



Universidad de Deusto  
Deustuko Unibertsitatea  
University of Deusto

Deusto Business School

PhD Programme “Business and Territorial Competitiveness, Innovation and Sustainability”

**PhD dissertation**

**“REVISITING INTEGRATED MARKETING COMMUNICATION (IMC):  
ASSESSMENT OF IMC AND PERFORMANCE IN HIGHER EDUCATION  
(HE)”**

Janire Gordon-Isasi  
Bilbao, September 2020





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Bilbao, September 2020

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A handwritten signature in blue ink, with the name "Janire Gordon-Isasi" written in a cursive script.



*'We must have perseverance and, above all, confidence in ourselves.  
We must believe that we are gifted for something,  
and that this thing, at whatever cost, must be attained'*

**– Marie Curie**



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## **Introduction**

Integrated marketing communication (IMC) is a construct that embraces all the different types of communication and marketing of an organization as a whole and in a consistent way. It is currently considered a holistic concept by many authors and in many studies (Finne & Grönroos, 2009; Mihart (Kailani), 2012; Šerić, Gil-Saura, & Ozretić-Došen, 2015; Daszkiewicz & Pukas, 2016; Porcu, del Barrio-García, & Kitchen, 2017).

There are different benefits that the application of IMC can offer organizations, such as the adaptation of every means of communication, the coherent use of multiple channels, or positive effects on their business performance. These advantages are very relevant for higher education marketing (HEM). Furthermore, several recent developments like the digital revolution and the globalization of education, have also been taking place in this context, and higher education institutions (HEIs) have accordingly adapted their ways of interaction to their stakeholders. More than ever, these organizations are paying particular attention to the potential of diverse and innovative techniques of communication, and also to their integration. Since their audiences use different types of media in an integrated way, it is interesting to take advantage of the benefits provided by that integration (Pickton & Broderick, 2005). However, while it has been recognized that consistency across all communication channels towards stakeholders is important (Peruta & Shields, 2017), relatively little research has been carried out into HEM to determine which particular type of tool is the most suitable.

With the aim of acquiring a better understanding of the current situation of HEM, further research on the higher education (HE) sector's challenges and marketization has been suggested (Chapleo & O'Sullivan, 2017). Other authors have also highlighted the need for holistic marketing models that meet the current needs (differentiation,

competitiveness, etc.) of HEIs related marketing practices (Hemsley-Brown & Oplatka, 2010; Elken, 2019).

As far as we know, hardly any research has been carried out to measure the level of IMC in HE and neither whether IMC has a positive influence on business performance in the HE sector, in the European context or in non-English speaking countries (Ots & Nyilasy, 2015b; Porcu, del Barrio-García, Alcántara-Pilar & Crespo-Almendros, 2019). Literature has also shown that the measurement tools available to assess the level of IMC in HEIs and its related business performance only take into account the perception of one type of employee (i.e., practitioners) inside organizations, but not the perceptions of other types of employees, for example, both academics and managers at the same investigation.

With these premises, the current dissertation aims to contribute to the IMC's theoretical body of knowledge by discussing issues raised with regards to the HE sector's marketization. Moreover, as suggested by Šerić et al. (2015) and Porcu et al. (2019), it would be highly interesting to apply IMC to other contexts (HE is a scarcely studied sector). Tafesse & Kitchen have also recently stated that measurement is still the most important research priority and that reliable and valid measurement scales for IMC related outcomes would be highly welcome (Tafesse & Kitchen, 2017). Besides, literature affirms that a possible correlation exists between IMC and business performance (Duncan, Thomas & Mulhern, 2004; Porcu, del Barrio-García & Kitchen, 2017). However, very few empirical research evidence exists (Završnik & Jerman, 2013; Porcu et al., 2019) and that is why the outcomes related to the IMC construct (which one of them is considered to be the business performance) require profoundly additional exploration (Duncan, Thomas & Mulhern, 2004; Porcu et al., 2019).

More specifically, the contribution of this dissertation is threefold. Firstly, the value of this research adds to the body of IMC knowledge exploring the concept of

integrated marketing communication (IMC) in the context of higher education (HE). To achieve the first objective of the current dissertation, an extensive literature review is carried out, where IMC definitions, measurement tools and performance related issues are exposed. Besides, the application of IMC in the HE sector is analysed which is a quite discovered one and literature suggests that IMC should be examined in different contexts (Séric, Gil-Saura, & Ozretić-Došen, 2015). Secondly, the present research responds to the call for more empirical and solid research in this field. In fact, the second of our objectives is to provide reliable and valid tools to measure IMC and performance in the HE sector. To accomplish that, four different adapted tools are going to be proposed. These are going to be adjusted to a different context, the HE sector (a relatively unknown one). They will be further adapted to a non-English speaking country (Spain), which involves a language other than English (Spanish), and we will consider different perceptions, those of academics and practitioners, in the same organization. The tool which measures the level of IMC is based on the previously proposed ‘the firm-wide IMC scale’ (Porcu, del Barrio-García & Kicthen, 2017) which assesses the IMC level in companies belonging to the service sector. Besides, the proposed scales that measure business performance at university level, faculty level and at a master’s degree level, are based on Reid’s (2005) proposal. These tools contribute in a contextual way to the effective measurement of marketing and communication within HEIs. It must be noticed that the review of HEM literature suggests that there has been an empirical attempt carried out by Edmiston-Strasser (2009) (possibly the sole so far). This is based on a tool published in a book by Schultz and Schultz (Schultz & Schultz, 2004) but does not provide a numeric value (level) of IMC nor a business performance insight. Therefore, the assessment tools for the level of integration of marketing and communication and the business performance achieved in HEIs remain scarce. In an attempt to contribute to the aforesaid gap, the four

tools proposed to achieve the second objective, will measure marketing and communication efforts carried out in HEI and also the business performance associated to the context. We will provide one scale that will measure the level of IMC achieved by a group of seven private universities that are members of the Spanish Association of Jesuit Universities (UNIJES). Besides, three instruments that will assess performance are also being proposed. This performance is going to be measured at three levels, first the performance of the institution as a whole, then the performance of the faculty and then the performance of the master's degrees.

The third objective of this dissertation is to analyse whether IMC is associated with those institutions' performances. Once the measurement of both constructs is obtained (IMC and business performances), the purpose of the aforesaid association's examination is to show if these are positively associated in order to deduce which strategies or areas work and which ones need to be improved. Subsequently, the third objective of this dissertation will be to analyse the impact of IMC on business performance and will help HEI researchers and marketers to assess these efforts. Indeed, if IMC and business performance are positively associated additional strategies should be accomplished with the aim of increasing IMC level and the consequent business performance.

The current dissertation starts with a review of the IMC construct and goes on to explore the HEM landscape (Chapter I). After that, the objectives, research questions, hypotheses, and methodology are explained (Chapter II). Then, the creation of scales is exposed in Chapter III. Next, the application of the proposed scales is shown and the association of IMC and performance is analysed in Chapter IV. To finish, the conclusions of this dissertation are presented as well as some of its limitations and recommendations

for future research related to this investigation, IMC and the HE sector (Chapter V). Besides, references and appendices can be read in the last part of the document.









## **Chapter I. Literature review**

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- 1.1. Integrated marketing communication (IMC) construct
- 1.2. Higher education (HE) sector
- 1.3. IMC applied to HE sector
- 1.4. Summary of Chapter I



## ***1.1. Integrated marketing communication (IMC) construct***

### ***1.1.1. Definitions of IMC***

Integrated marketing communication (IMC) is understood as the total coordination of the marketing communications in organizations (Kliatchko & Schultz, 2014; Luxton, Reid, & Mavondo, 2017; Porcu, del Barrio-García, Alcántara-Pilar & Crespo-Almendros, 2019). Most researchers agree that IMC was first defined in the late 1980's, but since then, several proposals regarding IMC have been suggested (Eagle, Lynne & Brennan, 2007). An evidence that shows the relevance of the topic is that one of the Marketing Science Institute's priorities for 2016-2018 was that integrative approaches are needed in marketing actions (Marketing Science Institute, 2016).

Even though the concept of IMC was first claimed more than three decades ago, several perspectives coexist due to the different approaches that academics and practitioners have suggested (Phelps & Johnson, 1996; Eagle, Kitchen, & Bulmer, 2007; Eagle et al., 2007; Porcu, del Barrio-García, & Kitchen, 2017). In order to reach a more solid theoretical foundation and clarification of the concept, additional research on its principles and conceptualization is required (Kitchen & Burgmann, 2010; Porcu, del Barrio-García, Alcántara-Pilar & Crespo-Almendros, 2019). Actually, there is still no agreement regarding its definition nor on its scope (Kitchen, 2005; Kliatchko, 2005; Madhavaram, Badrinarayanan, & McDonald, 2005; Schultz & Schultz, 1998; Kliatchko, 2008; Kliatchko & Schultz, 2014; Caywood, Schultz, & Wang, 1991; Swain, 2004). Therefore, it can be concluded that as there is not a consensual definition of IMC, further discussion of the most relevant proposals of IMC is welcome (Porcu et. al, 2019).

In the attempt to answer the aforementioned calls for clarification, in Appendix 1 a new classification of definitions of IMC is proposed chronologically from 1989 to 2017 (that last definition as far as we know was proposed in 2017).

When IMC was first claimed by the American Association of Advertising Agencies (4As), it was considered a concept that combined a variety of marketing communications disciplines and added value to organizations. The next proposed definitions reflected IMC as a concept that principally included marketing communication planning but also promotion mix related issues, such as advertising, direct response, sales promotion or public relations (i.e. Caywood, Schultz, & Wang, 1991; Schultz, 1996; Kotler, Armstrong, Saunders & Wong, 1999). In the meantime, some definitions were suggested which considered that IMC likewise embraced consumer's behavioural responses (i.e. Keegan, 1992; Nowak & Phelps, 1994; Keegan, Moriarty & Duncan, 1995; Duncan & Caywood, 1996; Duncan & Moriarty, 1998; Schultz & Schultz, 1998; Duncan, 2002).

The evolution of IMC is well exposed in the definitions proposed by Schultz. The author suggested various proposals over the years, which gradually embraced relevant issues concerning marketing communications. In 1991 IMC was principally centred in marketing planning (Caywood, Schultz, & Wang, 1991) but also referred to maintaining customer loyalty (Schultz, 1991). In 1996 the author considered that besides the marketing planning, IMC also evaluated that plan with the purpose of providing a higher impact on communications of each organization (Schultz, 1996). In 1998, IMC was established as a strategic business construct (Schultz & Schultz, 1998) where external and internal stakeholders and its importance related to the strategic business process were considered. Since Schultz's proposition in 1998, almost every researcher has considered that IMC embraced more than just marketing planning and promotion related issues (Fill,

2001; Percy, 2008; Kliatchko, 2008; Percy, 2008; Šerić & Gil, 2012; Šerić, Gil-Saura, & Ozretić-Došen, 2015; Porcu, del Barrio-García, Alcántara-Pilar, & Crespo-Almendros, 2017). However, some authors still are of the opinion that it was principally centred in the promotion mix elements and their successful integration (i.e. Kliatchko, 2005; Kliatchko & Schultz, 2014).

Besides, in 2003, the previously mentioned authors defined IMC as a measurable construct, introducing for the first time the measurement issue into the topic (Schultz & Schultz, 2003). This definition persisted until 2014 when after carrying out a study in their attempt to explain IMC, it was proposed as an overall business construct. It was far from being just related to marketing communications' planning (Kliatchko & Schultz, 2014), indeed, a 'broad' organizational approach was suggested.

An evolution is observed in IMC from being a marketing planning centred concept to consider it a measurable construct with a strategic vision. This may have occurred because due to the prevalence of media and communications, the academic and practitioner landscape has moved from a narrow-focus perspective to a broader organizational one. Thus, from being centred in marketing communications mix and planning to a strategic perception that involves all the organization that can be measured.

In addition, several elements (extracted from their definitions) have been introduced by the authors over the years (See Table 1). In 2009 IMC was suggested as an engagement embedded in the organization's culture, actually, it was regarded as a system (Luck & Moffatt, 2009). It is remarkable that Luck and Moffatt's input in 2009, introduced the digital perspective for the first time, although the World Wide Web had been launched in 1989 (two decades before). This should have been disadvantageous in the understanding and application of IMC, as by that time audiences already used multiple channels and social media (such as Facebook, twitter, etc.). Organizations were not very

familiar with that media and therefore, those channels were not totally introduced nor integrated in marketing strategies. Besides, not until Kliatchko in 2005 presented the importance about communication channels, was the multi-channel approach considered (See Table 1). This issue still needs further exploration, indeed, since Kliatchko's proposal in 2005, the efficient management of multiple channels in a coherent and homogeneous way (Omni-channel approach) is still a research priority for 2018-20 according to the Marketing Science Institute (2020).

It can be appreciated that since IMC was first incepted in 1989, a continuous redefinition and evolution has occurred which raises several concerns among both academics and practitioners. Consequently, according to the literature, IMC is a very vivid construct, constantly evolving and with the aim of adapting itself to the current era. It embraces all the marketing and communication related issues in an organization. It is not just a concept that successfully accomplishes a marketing plan and the promotion mix elements (in an integrative way), it is a lot more than that. IMC is a measurable construct that has gradually progressed and over the years, several theories have been introduced to its conceptualization. Those are crucial to understand IMC. Measurement, digital technology, the appearance of multiple channels or long-lasting profitable relationships are key concepts that have been gradually introduced over the years (see Table 1) and explain IMC in the current marketing environment.

Table 1. Summary of the elements introduced over the years.

| Authors                                                                                                    | Elements of IMC                                    |
|------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| ALL                                                                                                        | Strategic approach to planning                     |
|                                                                                                            | Coordination/consistency of messages and channels  |
| (Duncan, 1994; Nowak & Phelps, 1994; Schultz & Schultz, 1998; Schultz, 1991)                               | Behavioural responses                              |
| (Nowak & Phelps, 1994; Schultz & Schultz, 1998; Schultz, 1991)                                             | Nurture customer relationships and loyalty         |
| (Nowak & Phelps, 1994; Schultz & Schultz, 1998; Schultz, 1991)                                             | Inclusion of customers, prospects and stakeholders |
| (4AS, 1989, Nowak & Phelps, 1994; Porcu, Barrio-García, & Kitchen, 2017; Schultz, 1991)                    | Use of a variety of communication disciplines      |
| (Schultz & Schultz, 1996, Schultz & Schultz, 1998)                                                         | Expanded notion of brand communication             |
| (Schultz & Schultz, 2003)                                                                                  | Measurability                                      |
| (Kliatchko & Schultz, 2014; Percy, 2008; Schultz & Schultz, 1998; Šerić, Gil-Saura, & Ozretić-Došen, 2015) | IMC as business process                            |
| (Duncan, Tom, 2002; Porcu et al., 2017)                                                                    | Cross-functional                                   |
| (Kliatchko, 2008; Schultz & Schultz, 2003; Šerić et al., 2015)                                             | External and internal stakeholders                 |
| (Kliatchko, 2005)                                                                                          | Audience-focused and results-driven                |
| (Kliatchko, 2005; Percy, 2008)                                                                             | Channel-centred: multiple channels                 |
| (Kliatchko, 2008)                                                                                          | Content, channel and results                       |
| (Percy, 2008)                                                                                              | Single positioning                                 |
| (Kliatchko & Schultz, 2014; Šerić et al., 2015)                                                            | Consumer-centricity                                |
| (Kliatchko & Schultz, 2014; Porcu et al., 2017; Šerić et al., 2015)                                        | 360 coordination                                   |
| (Luck & Moffatt, 2009; Šerić et al., 2015)                                                                 | Driven by technology                               |
| (Porcu et al., 2017; Šerić et al., 2015)                                                                   | Long-lasting profitable relationships              |
| (Šerić et al., 2015)                                                                                       | Strategic and tactical business process            |
| (Porcu et al., 2017)                                                                                       | Stakeholder-centricity and interactivity           |

Source: Adapted and updated from (Kliatchko, 2008).

### 1.1.2. Origins of IMC

The origins of IMC started linked to the promotion element of the marketing mix (Robinson, 1942; McCarthy, 1960). Yet, its evolution from promotion management to an

integrated marketing communication approach was triggered nearly three decades later when the American Association of Advertising Agencies (4As) proposed a definition for IMC. The aforesaid definition included not only the promotion elements but also the integration of a variety of strategic disciplines. Schultz, Tannenbaum, Stanley & Lauterborn (1993) then published some strategies that helped in developing an integrated program in practice, with guidance on managing the entire communication process (advertising, promotion, direct response, public relations, and other marketing communications options). After this insight in 1993, it was concluded that because of developments in communication technology and the growth of channel options, in order to achieve marketing communication objectives in most organizations, more than one communication tool was needed (Kitchen et al., 2004; Kitchen & Schultz, 2009; Kliatchko, 2009; Séric, Gil-Saura & Ozretić-Došen, 2015; Turner, 2017). Therefore, when multiple and different channels and communication messages are managed in the same company, an integrated approach emerges with the aim of managing relations with groups of interest or stakeholders effectively. The management of multiple channels can be challenging and an effort is required to unify them. The integrated perspective arises with the aim of helping in that issue.

Nonetheless, the existing lack of consensus and theoretical basis has made many academics to question if IMC is a new concept (Schultz et al., 1993; Duncan & Caywood 1996; Schultz 1996; Hartley & Pickton 1999; Gould, 2000; Duncan, 2002; Zahay et al., 2004) or a natural evolution of the communication and marketing landscape (Keller 1996; Cornelissen & Lock, 2000; Kliatchko, 2005). Some other academics agree that ‘this debate is irrelevant because the integration happens automatically when customers receive the messages from different communication channels’ (Schultz, 1996, p. 139). This suggestion is quite related to the previously mentioned ‘natural evolution’ because



customers nowadays use different channels indistinctively and unconsciously. Maybe those channels are not integrated in an effective way and the audience may not always receive the information they are looking for from the channel they would like. However, in the same way customers use different channels ‘automatically’, they also receive messages from different sources and the integration happens accordingly.

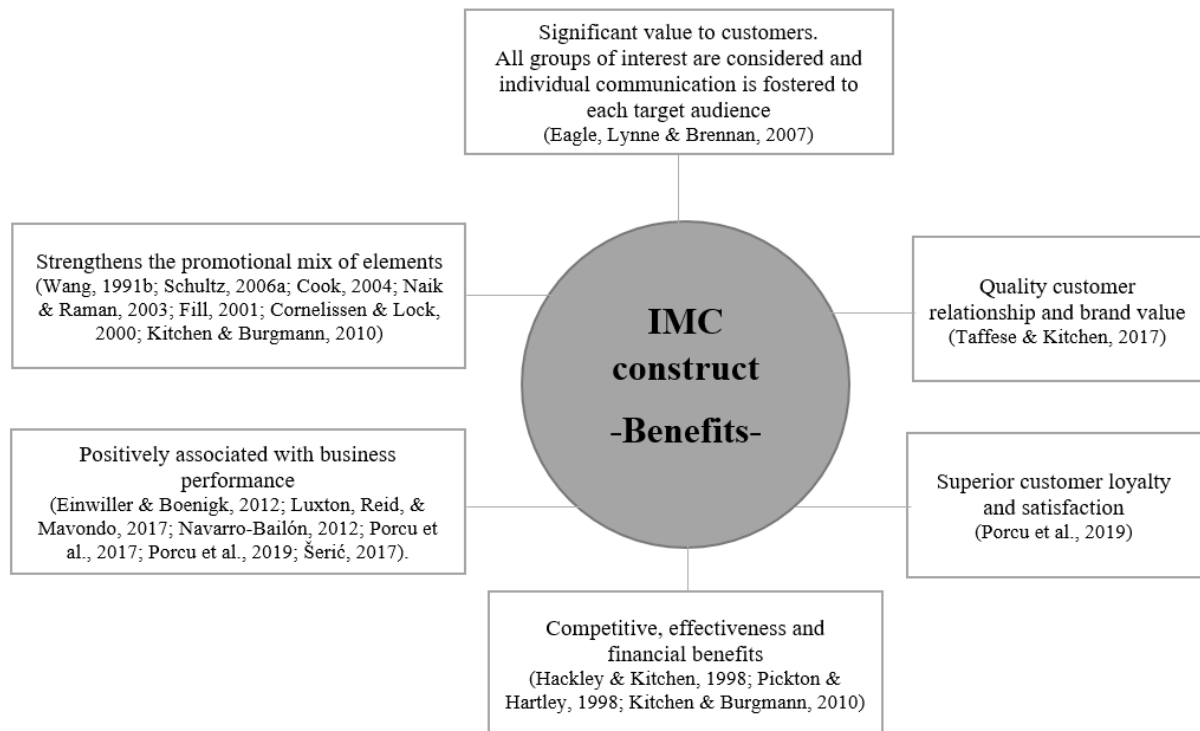
Consequently, IMC was first incepted as a tactical tool for coordinating the multiple elements of marketing communications. However currently it is considered a strategic construct, which helps in building and maintaining customer relationships by different media (Foroudi, Dinnie, Kitchen, Melewar, & Foroudi, 2017). As Kliatchko (2008) claimed, IMC is an “audience-driven business” where groups of interest are constantly receiving messages from the provider with the aim of gaining their trust and fostering long profitable relationships.

#### *1.1.3. Benefits and barriers of IMC*

Research conducted in UK and New Zealand affirms that IMC offered significant value to clients (Eagle, Lynne & Brennan, 2007). Besides, according to the extant works reviewed by Taffese and Kitchen (2017), some of the benefits arisen in organizations after following an IMC approach are related to consumers’ behavioural and image-related responses, and others, are related to customer relationship and brand value. These advantages are obtained after strategically integrating messages, stakeholders and interactivity processes, and it is also helpful the use of information technology which helps in the understanding of customers. IMC strengthens the promotional mix of elements such as advertising, public relations or sales promotions, if these are unified (Cook, 2004; Naik & Raman, 2003; Fill, 2001; Cornelissen & Lock, 2000; Kitchen & Burgmann, 2010).

According to some studies, a higher level of integration is usually positively with a higher level of performance (Einwiller & Boenigk, 2012; Luxton, Reid, & Mavondo, 2017; Navarro-Bailón, 2012; Porcu et al., 2017; Šerić, 2017; Porcu et al., 2019). Therefore, if the IMC level is measured accurately and then, that level is increased, organizations may also achieve that advantage related to performance. Besides, Porcu et al. (2019) sustain that the implementation of IMC is positively associated to a superior customer loyalty and satisfaction as it allows to effectively and efficiently arrange communication actions produced at all positions and in diverse departments.

Figure 1. Summary of the benefits provided by the application of the IMC construct.



Source: own elaboration

Additionally, the benefits that IMC carries have increased its importance, as well as the relevance of related issues and decisions (Kliatchko & Schultz, 2014). Among the main advantages of using IMC (summarized in Figure 1), we also see that all groups of interest are considered; that individual communication is fostered to each target audience,

and that competitive, effectiveness and financial benefits may be achieved with integration processes (Hackley & Kitchen, 1998; Pickton & Hartley, 1998; Kitchen & Burgmann, 2010).

Notwithstanding, little research has focused on measurement and performance metrics (Taylor, 2010) of IMC, and in order to make the most of the integration's benefits, its measurement needs to be accurate. That is why it is still considered one of the most relevant research priorities at the IMC landscape (Tafesse & Kitchen, 2017; Porcu et al., 2019). Besides, measurement is also considered a barrier which hinders the implementation of IMC. However, this is not the only barrier that makes more difficult to apply IMC in organizations. According to several studies, the lack of knowledge about the IMC approach (not well-trained staff with the necessary skills to carry out an integration and without skills to manage several channels) is a relevant obstacle for marketers to carry out successful IMC strategies in their organizations (Dmitrijeva & Batraga, 2012; Kliatchko & Schultz, 2014). Together with that, there are likewise difficulties to apply IMC because of the rigid structures of organizations and the lack of a teamwork approach (Ots & Nyilasy, 2015). Indeed, hierarchical organizations do not provide optimal ways to implement integrated and fluid communication approaches because messages have to go through many layers of management to make final decisions. In flat organizations, regulations and reporting structures are simpler which enables to react rapidly to changes and subsequently fosters effective communication. In addition to that, abundant time has to be spent with the audiences to build relationships based in trust (Šerić & Gil, 2012), as time is a very valuable resource, this becomes a relevant obstacle too. Still, difficulties related to IMC measurement remains the main barrier in IMC applications.

#### *1.1.4. Dimensions of IMC*

Literature concludes that IMC is a multidimensional construct. Besides, multiple interpretations of IMC have been suggested to explain the construct with dimensions. In Appendix 2, dimensions identified in prior literature (from 1996 to 2017) are exposed. Those proposals are suggested by relevant authors in the IMC landscape where services related business contexts are usually studied.

Frequently, when authors propose a definition for IMC, they suggest some dimensions too (i.e. Duncan & Moriarty, 1998; Kliatchko, 2005; Kliatchko, 2008; Schultz & Schultz, 1998; Porcu, del Barrio-García & Kitchen, 2012). Notwithstanding, other academics have not suggested a definition of IMC but propose a set of dimensions based on the literature (i.e. Gronstedt, 1996; Pickton & Hartley, 1998; Kitchen & Schultz, 2001; Moriarty & Schultz, 2012; Pickton, 2004; Syahputra, 2012) or grounded on previous definitions proposed by other authors. Reid (2005) claimed three dimensions -1. Interactivity, 2. Mission Marketing and 3. Strategic cross-functional planning- based on the Duncan and Moriarty's (1998) work. Duncan and Moriarty also proposed a definition of IMC and then established five dimensions.

IMC's dimensions have evolved over the years together with the concept. This evolution might have happened because as mentioned before, marketing and communications are in constant transformation. The clearest example in this issue are Porcu, del Barrio-García and Kitchen (2012; 2017) who updated their suggestions in 2012 and later in 2017 (See the full literature review regarding dimensions in Appendix 2). Pickton and Hartley (1998) also formulated an instrument to measure the different facets of IMC and subsequently improve the dimensions in 2004. Likewise, Kliatchko in 2005 proposed three dimensions -1. Audience-focused: multiple markets, 2. Channel-centred: multiple channels and 3. Results-driven: financial measurement- (Kliatchko, 2005).

Firstly, the *audience-focused* term highlights the importance of the relevant public of the organization, internal but also external audience. Secondly, the *channel-centred* dimension includes the coordinated management of the different channels. Thirdly, the *results-driven* dimensions means that IMC should be measurable in order to evaluate it and provide conclusions related to business results. After proposing the three dimensions, a revised definition of the author was proposed in 2008 and four were proposed to explain IMC -1. Stakeholder, 2. Content, 3. Channel and 4. Results-. These are introduced with the aim of improving the previous proposal to contribute to the theory building of IMC (Kliatchko, 2008) and as a result of the author's further research, particularly on the developments of marketing communications and the impact of digital technology. The first dimension, *stakeholders*, centres in the efficient management of the relevant audiences. Second, *content*, refers to messages (related to branding ideas) and incentives (offers or rewards) provided by the organization under an IMC strategy. The third dimension, *channel*, states to the management of the various channels, traditional and out-to-date ones. Lastly, the fourth dimension, *results*, highlights the importance of measuring IMC with the aim of achieving the advantages provided by the approach. The four latter mentioned dimensions and also its definition have been used in research conducted to build models that measure the effectiveness of IMC (Reinold & Tropp, 2012). Likewise, different proposals are suggested by several researchers although a definite tool is yet to be developed.

Dimensions help to understand, and also, measure the IMC construct. In fact, in some cases, dimensions are the basis of its measurement scale, such as the studies of Lee & Park (2007) or Porcu, del Barrio-García and Kitchen (2017). In this dissertation, where IMC is understood as a total coordination of the marketing communications in organizations, the dimensions play a significant role and are going to be associated with

that coordination in the organization as a whole. Consistency in all messages will be key to foster long-term and quality relationships, besides, interactivity with all type of audiences will also be crucial.

Interactivity is suggested in several proposals as a dimension (See Appendix 2) and it is likewise a key indicator of an IMC approach in terms of bidirectional communication with audiences. A stakeholder-centred attention is also essential, every organization should first identify their stakeholders and then focus on the relationships with them. The messages sent to each stakeholder will also be specific; language should be different for each group if the organization's aim is to communicate in a successful way with them. Finally, and once a broad IMC approach that embraces all the organization's activities is fostered, the whole organization should be aligned with that strategy. Every team and department should be aware of which approach the organization is pursuing in order to create similar messages and to use the established channels interactively. After reviewing the literature, the dimensions that are suitable for the current dissertation are explained in more detail in the next paragraphs.

#### *1) Message consistency*

When an IMC strategy is carried out, consistency in messages that are communicated through multiple communication channels is key. IMC involves the integration of those channels and that synergy is fostered by a consistency in the transmitted information or messages. All information should transmit a similar brand message with the purpose of contributing to a coherent positioning and reinforce the meaning of that brand in consumers' minds (Keller, 2001). This does not mean that every channel should communicate the exact same message, but the information sent should transmit the same idea, characteristic or association to that brand. This is relevant because if the messages sent by the diverse tools are

not well connected, the transmitted brand image could be confusing for the consumer and could damage the trust that stakeholders have. According to some authors, when people receive different messages from several channels but these messages are coherent, brand image strengthens and the persuasion of that communication in the consumer is also higher (Keller, 2003; Dewhirst & Davis, 2005; Madhavaram, Badrinarayanan, & McDonald, 2005; Loda & Carrick, 2005; Navarro, 2008).

## 2) *Interactivity*

Interactivity is considered one of the distinctive features for successful IMC campaigns (Šerić, 2016). Usually it is mixed up with personalization, which is another key feature for successful IMC campaigns. Personalization offers adapted messages, according to consumers' interests, needs or preferences. However, interactivity provides a bidirectional communication and feedback between an organization and the consumer (or between the organization/ brand and between different consumers).

Interactivity is based on the 'co-creating' of meaning between brands' channel managers and stakeholders through the exchange of messages (Finne & Grönroos, 2008; Kliatchko, 2008). It is considered an integration method that makes possible an interactive dialogue usually by the use of interactive channels that allow to exchange messages (i.e. social media or events) (Tafesse & Kitchen, 2017). Interactivity is considered essential for starting, maintaining and fostering relationships with different stakeholders because it provides a continuous dialogue with its positive effects for each part (the organization and the audience) (Porcu et al., 2012).

### *3) Stakeholder-centred strategic focus*

The stakeholder-centred strategic focus dimension emphasises the importance of the contact with stakeholders. Literature suggests that at first, IMC was mainly based on customer-centred focus, but nowadays most of the proposals embrace stakeholders' orientation (Porcu, et. al., 2017). It means to capture several elements related to stakeholders, such as, the added value provided to them and the creation and maintenance of long-term relationships. Besides, to achieve the aforementioned, it is essential to know the stakeholders in depth, also to manage the contact points created with them and address suitable messages to all stakeholders. Likewise, to accomplish this dimension's related issues in the most successful way, it is crucial that the whole organization (staff at all levels) knows that all the stakeholders of an organization are its actors (Pickton, 2004) and ambassadors.

### *4) Organizational alignment*

The organizational alignment dimension relates to the coordination and alignment among all functional departments and groups of an organization. With the advent of the internet, social media and the multiple channel options, an integrated approach was necessary to establish an integrated approach in organizations (IMC) and sometimes the staff felt quite overwhelmed (Kliatchko & Schultz, 2014). The communication activities changed because a wide range of channels and media needed to be considered in the organization as a whole. 'Hence aligning organizational processes, spanning departmental boundaries and eliminating functional silos are of paramount importance to achieving the highest level of integration' (Porcu et. al., 2017, p. 698). Besides, according to the literature, all



the organization functions, even the outsourced ones, must be involved in the integration processes (Moriarty & Schultz, 2012; Ots & Nyilasy, 2015).

With these premises, measurement of every dimension that defines IMC is key in order to achieve higher levels of integration of marketing and communication (and its consequent benefits) in organizations.

#### *1.1.5. IMC measurement*

Since IMC emerged, not only its definition but also its measurement has been a subject of discussion. Consequently, further research on methodologies should be developed (Cornelissen, 2003; Kliatchko, 2008; Reinold & Tropp, 2012; Šerić & Gil, 2012). Indeed, the lack of clearness regarding the concept, reduces the facility to develop valid and reliable measures of IMC (Lee & Park, 2007; Kerr, Schultz, Patti, & Kim, 2008). Consequently, some difficulties have been generated to gain the most of the advantages provided by the IMC approach.

In the past years, with the purpose to measure IMC, several models and scales have been formulated based on different focus of analysis, variables and methodologies which are exposed in Appendix 3 in chronological order from 1984 to 2017 (i.e. Strenski, 1984; Nowak & Phelps, 1994; Phelps y Johnson, 1996; Sjöberg & Hamrefors, 1996; Duncan & Moriarty, 1997; Duncan & Moriarty, 1998; Kitchen & Schultz, 1999; Ewing De Bussy, & Caruana, 2000; Low, 2000; Fill, 2001; Kirchner, 2001; Kitchen & Schultz, 2001; Vos & Schoemaker, 2004; Hering, Schuppener & Sommerhalder, 2004; Zerfaß, 2003; Rolke, 2004; Pickton & Broderick, 2005; Stumpf, 2005; Reid, 2005; Pfannenberger, 2005; Lee & Park, 2007; GPRA, 2006; Accelerom, 2008; Brandcontrol, 2008; Wang, Wu, & Yuan, 2009; Reinold & Tropp, 2012; Tafesse & Kitchen, 2017). Nonetheless,

according to the literature, there is neither a consensus nor a standard model that measures IMC (Ewing, 2009). In addition, more robust empirical efforts are required (Porcu, del Barrio-García, Alcántara-Pilar, et al., 2017; Porcu, del Barrio-García & Kitchen, 2017; Tafesse & Kitchen, 2017; Porcu, et al., 2019) in order to understand the IMC's behaviour and to be able to take the most advantage of the integrated approach.

The concern in the academia continues, as measurement among other issues, is the main subject of interest (Kitchen & Schultz, 2009; Kliatchko, 2008; Schultz & Patti, 2009). Moreover, special issues have also been devoted to the topic along the years (Kitchen, 2017; Laczniaak & Patti, 2005; Schultz & Patti, 2009; William, 2004; Woodard, 2005). After summarizing the results of the published research, the editor of the last special issue on IMC, 'Integrated marketing communications – current status, future developments', suggested that 'measurement remains the Achilles heel' for IMC. He also encouraged new researchers to keep assessing its applicability and to extend 'the concept and practice to new 'unthought-of domains'' (Kitchen, 2017, p. 404). In that particular issue, only one paper concerning IMC measurement was available, 'the firm-wide scale' proposed by Porcu et al. (2017).

Measurement of the IMC level provides information of the current integration of communication and marketing efforts in the organization. It can be considered an appreciated indicator (numeric value) when auditing and making marketing related decisions. If the level of IMC is higher, the overall coordination will be better. Considering that IMC is a multidimensional construct, each dimension is measured separately. Consequently, the total IMC level achieved by an organization (the numeric value) will be the sum of the values of each dimension.

Appendix 3 shows a review of the tools that have been developed over the years to measure IMC and embraces previous publications (i.e. Cornelissen, 2003; Šerić & Gil,

2012; Porcu, del Barrio-García & Kitchen, 2017). However, in this research, four tools that assess the level of IMC in different contexts are going to be studied profoundly (See Table 2).

Apart from the tools shown in Appendix 3, and after selecting the newest ones, Table 2 shows that there is one tool applied to the HE context but aside from Porcu et al.'s (2017) proposal, the rest do not provide an IMC level (numeric value) and are not based on an updated academic IMC definition nor dimensions. Besides, in all the studies the respondents are managers and in no case are they academics. Still, to the best of our knowledge, there is not a consensual tool for assessing IMC in non-English speaking countries. After reviewing the prior empirical studies (See Appendix 3), a tool based on an updated definition and dimensions regarding IMC, to be applied in a different context such as, Higher Education, would be developed.

Table 2. IMC measurement tools studied profoundly in this research.

| Authors                                              | Objective                                                                                                                                                     | Sample                                                                                                                                          | Basis                                                                                                                                                                                       | Results                                                                                                                                                                                  | Based on a definition and dimensions of IMC | Method                               | Positive aspects                                                                                                                               | Negative aspects                                                                                         |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Lee &amp; Park (2007)</b>                         | To measure the four central IMC dimensions, but also capture key aspects of each dimension with multiple items.                                               | 155 surveys and small-scale interviews to marketing managers from 160 Korean companies (different sectors, randomly selected).                  | After Churchill's (1979) approach. Adapted considering the dimensions proposed by the authors.                                                                                              | An 18-item scale, measuring important activities of each of the four dimensions of IMC.                                                                                                  | Yes                                         | Mixed (Qualitative and Quantitative) | Based on the dimensions proposed<br><br>Multistage approach                                                                                    | Developed within the practitioners' arena<br>Based on an antiquate approach<br>Not adapted to HE sector. |
| <b>Edmiston-Strasser (2009)</b>                      | To measure how marketing and communication processes are structured in HEIs and whether institutions have advanced to effective integration of IMC processes. | 42 surveys and interviews to the senior marketing and communication officers at the leading public HEIs in the United States                    | The Four Stages of IMC framework (Schultz & Schultz, 2004)                                                                                                                                  | Leadership and formal communication mechanism are important and IMC strengthens branding                                                                                                 | No                                          | Mixed (Qualitative and Quantitative) | Multistage approach<br><br>Adapted to HE sector                                                                                                | Developed within the practitioners' arena (based on a book)                                              |
| <b>Luxton, Reid, &amp; Mavondo (2015)</b>            | To explore the relationship between IMC as a process capability and a brand's market and financial performance with four variables.                           | 187 surveys to Australian managers with brand communication responsibilities from different sectors, sizes, brand sales and type of businesses. | Four variables assessed by pre-existing measures:<br>1- IMC capability<br>2- Campaign effectiveness<br>3- Brand market performance<br>4- Brand's financial performance                      | The more the firm is able to build its distinctive IMC capability, the greater its campaign effectiveness, which in turn leads to superior brand market-based and financial performance. | No                                          | Quantitative                         | Large sample<br><br>More than one construct                                                                                                    | Just quantitative design<br><br>Not based on a definition nor dimensions<br><br>Not adapted to HE sector |
| <b>Porcu, del Barrio-García &amp; Kitchen (2017)</b> | To measure the IMC level in the service sector.                                                                                                               | Delphi study and 180 surveys to CEOs and other senior managers.                                                                                 | The dimensions and definition proposed by the authors after carrying out an extensive literature review are the conceptual basis for the development of a scale for the measurement of IMC. | 'The firm-wide IMC scale', a 25-item Likert-format measure exhibiting adequate dimensionality, reliability and construct (convergent, discriminant and nomological) validity.            | Yes                                         | Mixed (Qualitative and Quantitative) | Based on the definition and dimensions proposed<br><br>Multistage approach<br><br>Actual proposal<br><br>Relevant authors in the IMC landscape | Not adapted to HE sector                                                                                 |

Source: own elaboration.

#### *1.1.6. Business performance as an outcome of IMC*

Literature suggests that the application of the IMC construct provides different types of outcomes. According to Tafesse and Kitchen (2017), IMC outcomes capture the organizational benefits arising from planning and implementing IMC. At the same time, there are different types of benefits resultant of IMC. These are shown in the right side of Table 3 and can be related to stakeholders' responses, increased market share or business performance, among others.

IMC's objectives and outcomes are usually associated to building relationships with customers and other stakeholders through a continuous dialogue and the consequent effects on sales and profits (Reid, 2003). Moreover, IMC suggests an integrated management of multiple media with the aim of achieving greater outcomes and it also offers a chance for generating improved brand and communication performance (Duncan & Moriarty, 1998; Nowak & Phelps, 1994; Hartley & Pickton, 1999; Low, 2000; Naik & Raman, 2003; Schultz & Schultz, 2004; Reid, 2005).

Table 3. IMC outcomes.

| Authors                                         | Core outcomes of IMC                                                                                                                                                                |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nowak and Phelps (1994)                         | Consumers' behavioural and image-related responses                                                                                                                                  |
| Duncan & Moriarty (1998)                        | Customer relationship and brand value (result from the strategic integration of messages, stakeholders and interactivity processes)                                                 |
| Kitchen & Schultz (1999)                        | Customer information, customer knowledge and improved profitability (result from the application of information technology that enables to understand, segment and serve customers) |
| Zahay, Peltier, Schultz, & Griffin (2004)       | Return on customer investments (ROCI)                                                                                                                                               |
| Kliatchko (2005)                                |                                                                                                                                                                                     |
| Dewhirst & Davis (2005)                         | Increased market share                                                                                                                                                              |
| Reid, Luxton, & Mavondo (2015)                  | Enhanced marketing communication and brand performance                                                                                                                              |
| Porcu, del Barrio-Gracia, & Kitchen (2012)      |                                                                                                                                                                                     |
| Reid, Luxton, & Mavondo (2005)                  |                                                                                                                                                                                     |
| Eagle, Kitchen, Hyde, Fourie, & Padiseti (1999) | More sales revenue                                                                                                                                                                  |
| Phelps & Johnson (1996)                         |                                                                                                                                                                                     |
| Reid (2005)                                     |                                                                                                                                                                                     |
| Zahay et al. (2004)                             |                                                                                                                                                                                     |
| Keller (2009)                                   | Enhanced brand equity                                                                                                                                                               |
| Madhavaram, Badrinarayanan & McDonald (2005)    | Consumer responses involving positive cognitive and affective processing                                                                                                            |
| Keller (2001)                                   |                                                                                                                                                                                     |
| Keller (2009)                                   |                                                                                                                                                                                     |
| Reid (2005)                                     | Increased customer satisfaction                                                                                                                                                     |
| Zahay et al. (2004)                             | Higher customer share of wallet and customer life time value                                                                                                                        |
| Einwiller & Boenigk (2012)                      | Total corporate value                                                                                                                                                               |

Source: own elaboration. Updated from (Tafesse & Kitchen, 2017).

IMC is consequently a process that combines and transforms tangible resources (e.g., billboards, point of sale) and intangible ones (e.g., brand identity, slogans) into direct and indirect performance outcomes (e.g., brand equity, sales, return on investment [ROI])' (Duncan & Mulhern, 2004; Zahay, Peltier, Schultz, & Griffin, 2004; Navarro-Bailón, Sicilia, & Delgado-Ballester, 2009; Baidya & Maity, 2010; Reinold & Tropp, 2012; Navarro-Bailón, 2012; Syahputra, 2012; Završnik & Jerman, 2013; Šerić et al., 2013; Šerić et al., 2014; Luxton et al., 2015; Šerić et al., 2017; Luxton et al., 2017).

Subsequently, literature suggests that a possible association exists between the IMC construct and business performance (Duncan, Thomas & Mulhern, 2004; Einwiller & Boenigk, 2012; Porcu et al., 2012; Porcu et al., 2019). Several authors also suggest that the positive association between IMC and business performance has a positive effect in financial results (Rust, Ambler, Carpenter, Kumar, & Srivastava, 2004; Madhavaram et al., 2005; Reid, 2005; Chen, Shen, & Chiu, 2007; Lekhanya, 2015; Zabkar, Mumel & Vanita, 2015; Porcu et al, 2019).

With the aim of analysing the aforementioned, several studies have tried to demonstrate the association between IMC and business performance. In order to assess the relation between IMC level and the overall performance of an organization, first, IMC level needs to be measured. Second, the performance level should be measured and third, the association between those two measures (IMC and performance levels) needs to be analysed. For this purpose, researchers have applied different approaches and scales. Appendix 4 summarizes the most significant studies that relate IMC with a variety of business performance variables in numerous sectors.

As a multidimensional approach, when the association between IMC and performance is analysed, each dimension is studied separately. For example, Syahputra (2012) proposes five dimensions to explain IMC (interactivity, mission marketing, organizational infrastructure, strategic consistency and planning and evaluation). Results of this research showed that there is a relationship between three (out of five) of the proposed dimensions of IMC (interactivity, mission marketing, and organizational infrastructure) with business performances.

Considering that service companies are likely to be more integrated than product-oriented ones (Reid, 2005), outcomes related to IMC in service companies are worthy to be studied. In previous research, concerning performance's measurement, three basic

dimensions are proposed. Firstly, the sales-related performance, which evaluates the market share growth, sales progress, overall profitability and sales income. Secondly, the brand strength-related performance that estimates the brand awareness, ability to predict prices, and the level of positive channel support. And thirdly, the customer satisfaction related performance, which provides a comparative customer satisfaction and level of customer brand loyalty (Syahputra, 2012) (See the full review of tools related to performance measurements in Appendix 4).

Nonetheless, and even though IMC has now reached a point of widespread acceptance between marketing academics and practitioners, as very few published articles provide empirical research evidence of its implementation (Porcu et al., 2019; Završnik & Jerman, 2013), outcomes related to the IMC approach require meaningfully further exploration and a refinement (Duncan, Thomas & Mulhern, 2004; Porcu et al., 2019). Contributions in this subject will help evaluating the IMC approach in organizations and will also analyse if effective implementation of IMC might result in more favourable business performance related outcomes, specifically related to brand, sales and satisfaction.

### ***1.2. Higher education (HE) sector***

Higher education (HE) is usually stated as the educational knowledge after graduation or secondary education, which is provided by both colleges and universities (Saunders, 2015). There are many characteristics that make HE management related issues challenging, such as the variety and nature of its stakeholders, debates about who is the customer (students or families, enterprises, etc.), the application of business oriented practices, marketization, the location of the institutions, the facilities of each campus or the degrees offered (Rutter, Lettice, & Nadeau, 2017). Moreover, some changes have



taken place in the HE area (Molesworth, Nixon, & Scullion, 2009; Todd, Barnoff, Moffatt, Panitch, Parada, & Strumm, 2017), such as the constantly growing global competition (Maringe, 2010), the importance on employability of former students (McGregor, Thanki, & McKee, 2002) or the variation in funding regimes (Foskett, 2011).

The HE sector is an industry that grows very fast (Naidoo, Shankar, & Veer, 2011). According to Christensen, a Harvard Business School's professor, '50% of the 4,000 colleges and universities in the US will be bankrupt in 10-15 years' (Christensen, 2017). Nevertheless, as a preventive action, the European Commission (<https://ec.europa.eu>) has increased general public expense and scholarships in education in Europe. However, according to the report 'The Spanish University in figures', the rectors of Spanish universities posit that the offered places at universities are not filled up and 27% of degrees have less than 40 students (Hernández & Pérez, 2017). Indeed, the advent of online education and the diverse offer of degrees among different universities and institutions have also created a competitive situation that generates difficulties to fill up the places and in which the suppliers (higher education institutions, HEIs) need to differentiate themselves in order to attract potential students to their university.

Besides, global issues have also challenged HE and brought more difficulties to the sector, such as the Coronavirus Disease (a viral pneumonia outbreak), COVID-19, which since December 2019 spread all over the world and declared a pandemic in March 2020. Consequently, HEIs were closed 'in 185 countries, affecting 1.542.412.000 learners, which constitute 89.4% of total enrolled learners' (Marinoni, Van't Land, & Jensen, 2020, p. 8). Due to the coronavirus outbreak, several challenges have emerged, firstly, clear and effective communication streams with staff and students needed to be ensured. Not only that, communication with all the stakeholders has been very relevant under the pandemic situation to inform them about the measures and *modus operandi* of

the HEIs. This would help in maintaining the long-term relationships that have been settled over the years. Secondly, in this situation, HEIs needed to act fast, apart from communicating with their stakeholders about the situation that was key, classroom teaching needed to be replaced with remote learning. The fast adaptation of HEIs to changes is a very relevant aspect. In the case of the aforementioned pandemic, Cambridge University was, as far as we know, the first university communicating that next course's lectures were all going to be online (BBC News, 2020, May 19). When a prospect student is making his or her career decision this fast responses, adaptation and communications are key. It provides the chance to create an opportunity out of a difficulty, for international prospective students for example online teaching could be nice as they will not have to travel but maybe it is not the desired modality to study for everyone. It is remarkable that in this undefined situations, fast decision and its communication, can be considered a good practice were uncertainty (an uncomfortable situation usually) of prospective and current students has been reduced. If actions are not rapidly carried out, the audience is not available to make a decision and in this case, can affect prospective students' decision-making about their college career, which also had a negative impact in enrolment numbers of national but more in international students. Some HEIs, especially private ones, could have negative financial consequences, which could be reduced with fast decision-making, response and communication to all their stakeholders.

#### *1.2.1. The marketing landscape in higher education institutions (HEIs)*

Given that universities need to distinguish themselves due to the increasing competition among universities, nationally as well as internationally, scholars carry on conducting research on the most suitable higher education marketing (HEM) related topics (Elken, 2019; Hemsley-Brown, 2016). HEM entered the US HE sector in the early 1980s when

HEIs started competing for students (Litten, 1980). However, in the European context HEM emerged significantly later. Although European private HEIs have specially been increasing marketing activities since 1990 (Lafuente Ruiz de Sabando, Forcada, & Zorrilla, 2018), not until the year 2002 (Foskett & Hemsley-Brown, 2002) was the first article published related to HEM with a European perspective. Currently, HEIs apply marketing oriented approaches. Nonetheless still much research needs to be done in order to explore business theories in HEM (Elken, 2019), as it has some specific characteristics associated to the context where it takes place. HE sector has more than one decision maker, usually is not just the student who decides where to enrol, families, friends, etc. also influence that decision. Likewise, HEIs have more than one stakeholder or group of interest and these are closely related to each other, so marketing strategies should reflect this.

To be more competitive, one of the solutions could be to fully apply business-oriented practices, thus, to give a step towards the marketization of HE that is currently taking place. In this sense, one of the most successful marketing strategies are alliances among HEIs or between HEI and commercial partners (Hemsley-Brown, 2016). These are increasing due to the benefits they bring along in this constantly changing environment.

Based on these premises, an adaptation in HEM to business oriented practices has gained more importance than ever, but considering the challenging nature of HEIs (stakeholders, organization and structure within faculties, mainly), in these organizations that ‘sell’ or provide education, a marketization needs to be carried out carefully, and without jeopardizing the essence of the sector (Gibbs, 2011). Considering IMC a well-accepted business oriented approach which fosters long-term relationships with all the targeted audiences, it should be interesting to apply it to other contexts such as HE.

### *1.2.2. Marketization of HE: towards business theories*

The rise of HEM is commonly related to an increasingly globalized, managed, and competitive marketization of HE (Elken, 2019), and although it has grown rapidly, it is a field that is still undergoing changes and consolidating itself. Until very recently, private HEIs were more concerned with enrolment and marketing activities than public ones. Nowadays, students have many options to choose from, and since competition has increased among HEIs, both public and private institutions have adopted more business-oriented approaches and use marketing practices to attract students in order to differentiate themselves from others (Hemsley-Brown, 2016; Veloutsou, Paton, & Lewis, 2005). Nevertheless, the application of different existing media and channels related to business marketing and the integration of all these could be further researched (Elken, 2019). HEM has been oriented towards the marketization of HE, and in this scenario, the benefits of integration should be considered.

Academic research on HEM has increased over the last 20 years, where collections of the strategies used by different HEIs have been documented (Milian & Rizk, 2018). It can be concluded that HEM strategies have not always been well designed, which has generated many discussions on this topic over the years. Possibly because institutions themselves have an internal resistance to marketization and have difficulty in defining their core business and customers (Binsardi & Ekwulugo, 2003). Currently, although this is not the case in Spain, in the United States and the UK marketing in HE is well established (Guilbault, 2018).

While bearing in mind that further research is needed to explore the success of business marketing strategies in HE, it is important to remember that according to the literature, discrepancies exist whether the HE sector's behaviour is similar to that of commercial businesses or not (Elken, 2019; Hemsley-Brown & Oplatka, 2006). Some

authors believe that the marketing theories applied to the commercial sector may also be applied to the HE sector (Nicolescu, 2009; Parahoo, Santally, Rajabalee, & Harvey, 2016; Rutter et al., 2017; Temple & Shattock, 2007). Other authors have claimed that they are only partially applicable to HEIs, whereas other scholars have suggested that they may not be relevant (Hemsley-Brown & Goonawardana, 2007; Ramachandran, 2010). Whether theories applicable to the marketing of services in the commercial sector are appropriate or not for HEIs remains a controversial issue. Consequently, in this context, and considering HE as a service, the debate continues. Indeed, if we apply the current approaches from business marketing, simply considering HE as a service does not automatically solve all the problems. The career choice it is not like a service that is bought and affects just to one period of your life, it is a very relevant decision which determines the future of a person usually. This is why Elken (2019) suggested that 'decisions about education remain a 'unique choice' which makes higher education marketing a different effort' (p. 2).

### *1.2.3. Stakeholders of HE sector*

The identification of stakeholders is a very relevant issue in every business and the whole organization (staff at all hierarchical levels) should perfectly know who are the main stakeholders in order to provide the best service as possible to them. In HE sector, the difficulty in identifying stakeholders arises because there are several types, at national but also at an international level. The different types of stakeholders or groups of interest in HEIs are closely related to each other, so marketing strategies should reflect this. The relationship between HEIs and their stakeholders is also quite a special one, for example, with students, who are the customers and, who, sometimes, are also considered the

product (Elken, 2019), after receiving the education, the student would be a result of the service provided, a graduated person.

Hemsley–Brown and Goonawardana (2007) stated that the idea of considering students as consumers pulls towards criticism; indeed, some authors consider the student a consumer and others do not. Narayanan T. Ramachandran (2010) claimed that students are not consumers because they are different from who buys commercial products since HE is not the same as commercial sector and the marketing applied is neither the equivalent. Nicolescu (2009) suggested that these discrepancies worth being studied since ‘students are the direct and immediate customers of the higher education services’ (p. 37). Stensaker and D’Andrea (2007), Wambsganss and Kennett (1995), Coates (2016), Bailey & Dangerfield (2000), Eagle and Brennan (2007), Parajoo et. al., (2016), Robinson and Celuch (2016), Guilbault (2016), Rutter et al. (2017), Mainardes, Alves and Raposo (2012) and Maringe (2005) also claim that students are the main consumers.

Despite the fact that there are still some doubts in the academia, apprentices should be viewed as the main customers in HE according to the recent literature, and as Guilbault (2018) claims, this ‘debate needs to end’ (p. 1). In this dissertation, the primary consumer of HE is considered to be the student because several authors indicate that they are one of the HEIs most significant audiences. However, other stakeholders are also being considered, they are called groups of interest and include families, companies and alumni.

Huempfner and Kopf (2017) stated that ‘if any organization is to be viewed through the lens of multiple-stakeholders marketing, certainly it should be HEIs’ (p. 254) and together with this statement they also add that all stakeholders of universities, not just students, need to be understood.

Besides, multiple stakeholders are recommended consider so that universities remain sustainable in the long term (Clark, Fine, & Scheuer, 2017). That is why HEIs have been taking into consideration the demands of their stakeholders (students, families, companies, alumni or former students, etc.). The primary stakeholders of HEIs are not society, parents, the government and other regulatory authorities, funding bodies, quality assurance agencies, and the university's staff (Chapleo, 2005; Kantanen, 2007; Voss, Gruber, & Szmigin, 2007). However, even though the aforementioned audiences are not the primary stakeholders, they are also important to consider in HEIs.

Another relevant audience is the staff of Universities, indeed, practitioners and academics that belong to these institutions. Considered the internal stakeholders of universities, this group is key in HE. They have acknowledged evidence of the context over their years (during their work experience) which is very valuable and unique for the subsistence of the universities. Due to their constant interaction with the rest of stakeholders, such as, students when they enrol and graduate from the university or with companies and institutions to establish different type of collaborations, academics and practitioners are one of the most accurate source of information when decisions about HE need to be made.

### ***1.3. IMC applied to HE sector***

HEIs have to provide a quick response by using all means of communication (sometimes from a distance), and under the impact of global issues (such as the coronavirus pandemic in 2020), to all the groups of interest, in order to attract and maintain not only national but also international students and stakeholders. According to Hayes (2007), IMC would be the next great strategy in HEM, combining and updating all the media available to foster this contact, not only through traditional means but also via social or online media.

Social media communications are a key investment for HEIs and are designed to create high-quality relationships with stakeholders (Clark, Fine, & Scheuer, 2017). In fact, HEIs receive numerous demands from diverse stakeholders (Alcaide-Pulido, Alves, & Gutiérrez-Villar, 2017) through many marketing channels, such as open days, face-to-face communications, printed information, or social media (Rutter et al., 2017), all of which should be considered relevant and integrated. To do so, it is pertinent to design a consistent marketing strategy, and IMC is considered by most academics and marketers as a reliable approach that makes possible to manage different media effectively (Ismail, Heng, Mohamed, & Anwar, 2017).

Certainly, a process which strengthens all the media and marketing related strategies could be advantageous for HEM. According to the definition proposed by Porcu et al. (2017), the continuous dialogue that this approach emphasizes is beneficial for the HE sector's audiences. However, as a constantly evolving construct, which can also be measured (Kliatchko, 2005), there is still a gap in the literature concerning the assessment of IMC and its effect on business performance. Besides, not many empirical studies have been carried out on this topic (Porcu et al., 2019). As far as we know, little empirical evidence has developed to measure the outcomes related to IMC in HE in general, and in terms of performance, in particular. However, several authors suggest (see '1.1.6. Business performance as an outcome of IMC' heading) that one of the outcomes related to IMC is its positive association with business performance. In the attempt to explore IMC in HE, Estaswara (2016) explored the different ways in which educators have gained awareness of IMC over time. Kerr and Kelly (2017), in contrast, provided a listing of practice and teaching indicators considering IMC educators. Šerić (2016) published a content analysis of the empirical research carried out on IMC from 2000 to 2015 and found a dozen articles related to education, but again, almost all research related to HE



and IMC has been about teaching and curricular practices. Conference papers that examine the embracing of IMC by HEIs and how they manage integration have also been found (i.e. Porcu, Barrio-García, Rodríguez-Priego, & Crespo-Almendros, 2012). Alternatively, Chu Abdullah & Bin Mohamad (2015) measured the level of IMC implementation in a set of selected Malaysian institutions. Although research in this context is in its infancy, publications conclude that IMC has a positive effect on business performance of organizations, especially regarding brand communication goals (Molesworth et al., 2009) and nurturing relationships with their groups of interest and stakeholders, which are very relevant in HEIs' marketing procedures (Porcu et al, 2019). This discussion leads to the following hypothesis where increased IMC level in a HEI will lead to a higher performance in that institution:

*H1. The adoption of an IMC strategy by the selected HEIs significantly and positively affects the institution related performance (PI). IMC level (I) and PI are positively associated.*

Likewise, HEIs are composed by different faculties and each faculty interacts with different kind of stakeholders, profiles of former and prospective students or type of companies. For example, a faculty of engineering would have to interact usually with more technical-based companies. However, faculties of education would have to cooperate with schools or organizations related to education with the aim of providing internships to students, future job opportunities or attract potential professors and researchers to their teams. To carry out these and other marketing and communication related issues, each faculty usually has its own marketing team in HEIs. Based on this discussion we hypothesize that a higher IMC level in a HEI, will lead to a higher performance in faculties belonging to that institution:

*H2.* The adoption of an IMC strategy by the selected HEIs significantly and positively affects the faculty related performance (PF). IMC level (I) and PF are positively associated.

HE related research has usually focused on students' perceptions (i.e. Adetunji, Nordin, & Noor, 2014; Delgado-Ballester & Sicilia, 2010; Mcgrath, 2005; Navarro-Bailón et al., 2009) and those of educators (i.e. Chu, Hsu, & Li, 2009) but not so much on the views of the staff (i.e. Edmiston-Strasser, 2009; Hawkins, Bulmer, & Eagle, 2011). As it is mentioned in '1.2.3. Stakeholders of HE sector' header, the staff is a very relevant internal stakeholder of the context who provides relevant and unique information due to the knowledge achieved over the years. To the best of our knowledge, only one publication has examined IMC applied to universities, such as the proposal of Edmiston-Strasser (2009) (See Table 2). HE practitioners' perspective was just considered and even though the instrument provided is based on a framework published in a book by Schultz and Schultz (Schultz & Schultz, 2004), who are prominent authors of the IMC landscape, the IMC level achieved by the organization was not provided. Moreover, the analysis did not take into account the perspective of HEIs academics, whose perception is essential given that they manage marketing related issues. Bearing in mind that the role of academics is essential, the following hypothesis that considered their perception (as master's degree directors) is derived:

*H3.* The adoption of an IMC strategy by the selected HEIs significantly and positively affects the master's degree related performance (PM). IMC level (I) and PM are positively associated.

To test the hypotheses stated and fulfil the goal of measurement of IMC and its outcome related to business performance, a set of definitions, dimensions and a tool were

selected after reviewing the previous literature (see Appendices 1, 2, 3 and 4). We shall consider the assessment tool proposed by Porcu, del Barrio-García and Kitchen (2017) to measure the achieved IMC level and Reid's (2005) proposal of a measurement scale with the aim of assessing performance. Both tools were proposed for service businesses so an adaptation to HE sector is developed in this dissertation. The full version of both tools, with every item detailed, is shown in Appendix 5. The definition and the four dimensions proposed by Porcu, del Barrio-García, and Kitchen (2017) (see Table 4) are also considered. The proposed definition and dimensions are appropriate for several reasons. First, the consistent use of all types of media is proposed in order to foster durable and profitable relationships with the organizations' stakeholders or groups of interest. Due to high competition and the globalization of educational institutions and students, it is convenient to offer added value and to keep in touch through the different media that each type of student and stakeholder uses (Doña-Toledo & Luque-Martínez, 2017).

The dimensions selected, which are exposed in Table 4, are explained in more detail in a previous section (See '1.1.4. Dimensions of IMC'). These were selected not only because they were connected to the definition, and therefore picked out for this study, but also because interactivity and one voice dimensions are closely related to personalized communication. HEIs need to provide their stakeholders with this type of communication because it generally has a positive impact on profitable long-term relationships which lead to trust.

Table 4. Definition and dimensions of IMC applied to this research.

|                   |                                                                                                                                                                                                                                                                                                                                                | Authors                                      |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>Definition</b> | IMC is the stakeholder-centred interactive process of cross-functional planning and alignment of organizational, analytical, and communication processes that allows for the possibility of continuous dialogue by conveying consistent and transparent messages via all media to foster long-term profitable relationships that create value. | Porcu, Del Barrio-García, and Kitchen (2017) |
| <b>Dimensions</b> | 1. Message consistency; 2. Interactivity; 3. Stakeholder-centred strategic focus; 4. Organizational alignment.                                                                                                                                                                                                                                 |                                              |

Source: own elaboration.

Besides, each stakeholder might need different information delivered through various types of media or channels. For example, students use social media, whereas parents or companies may prefer face-to-face or by phone interactions. It is crucial to establish a continuous dialogue, which is also one of the priorities proposed by the authors above. HEIs should carry out an integrated marketing and communications management with their different stakeholders (groups of interest) so that all the activities developed at the organization can be properly communicated and audience can be well informed.

Some of the main benefits provided by IMC are higher performance, taking care of stakeholders, and coordination among different departments in organizations. Thus, we believe that an IMC approach should be welcome in HE sector and HEM. However, to acquire the advantages that it provides, IMC needs to be accurately measured, and more rigorous empirical research is essential to be able to assess this measurement (Luxton et al., 2017; Porcu et al., 2012; Tafesse & Kitchen, 2017; Taylor, 2010). Besides, HE sector is an unexplored context regarding IMC.

### ***1.4. Summary of Chapter I***

Chapter I describes the key construct and context in which this dissertation is positioned, which applies IMC (construct) to HE (context). On the one hand, and despite of the conceptual debate regarding the construct, integration of marketing communications has been gaining relevance year by year, mainly due to the continuous developments and changes in markets, media (the advent and use of multiple channels), communications, and consumer behaviour (Muñoz-Leiva, Porcu, & Barrio-García, 2015; Reinold & Tropp, 2012). Nowadays, IMC is recognized by most academics and practitioners as the most effective method to adopt in the current complex multi-channel atmosphere (Laurie & Mortimer, 2019) and its application to other contexts is recommended (Porcu et al., 2019). On the other hand, literature shows that a marketization is currently happening in HE due to globalization, competition and extensive offer of HEIs around the world. Besides, more than ever, HEIs try to promote themselves in order to attract or maintain their groups of interest and a way of doing that is by interacting with the audience and sharing with them their academic offer and relevant information. This interaction is part of HEIs' marketing strategies and according to the literature, interactivity is part of the IMC. IMC is also considered the communication discipline that enables a fast response (Šerić et al., 2014) and fosters durable relationships with stakeholders (Porcu, del Barrio-García, & Kitchen, 2017) among other benefits that fit in the HE sector. Indeed, IMC's main objectives and outcomes are usually associated to building relationships with customers and other stakeholders through a continuous dialogue with the consequent positive effects on sales, profits and overall business performance (Reid, 2003). Considering that relationships with every stakeholder to gain their trust is crucial in HE, IMC fits well. Besides, IMC is also grounded in an integrated management of multiple media with the aim of achieving greater business performance (related to finance, brand

and satisfaction) which is key for HEIs subsistence.

With the aim of gaining the benefits related to business performance, once IMC is established in organizations, these should measure if integration of marketing and communication efforts are effective or not. In order to do that, literature suggests that assessment methods of IMC and performance related outcomes are scarce. Besides, researchers also encourage studying IMC related assessments in ‘new unthought-of domains’ (Kitchen, 2017). This dissertation responds to the call for further efforts in the IMC field in different contexts by selecting the HE sector, where a marketization is happening currently. Moreover, the association between IMC and performance is also analysed. To do that, the hypotheses are presented in this chapter, which posit that IMC and business performance are positively associated at different levels.

Next chapter presents the research objectives, hypotheses and methodology of this dissertation.







## **2. Chapter II. Objectives, hypotheses and methodology**

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2.1. Research objectives

2.2. Statement of hypotheses

2.3. Methodology

2.4. Summary of Chapter II



### **2.1. Research objectives**

As mentioned in the previous chapter, where an extensive literature review has been developed, little research has been carried out to measure the IMC level in HE. Likewise, few proposals have also been developed to assess if IMC is positively associated with business performance or not (Porcu et al., 2019). Besides, after reviewing the few empirical attempts carried out (See Appendix 3), the tools available to assess the level of IMC consider just practitioners' perceptions but not other stakeholders' perceptions such as staff. In addition, as far as we know, there are no tools to assess business performance in HE (See Appendix 4). Moreover, according to Ots & Nyilasy (2015), few studies have been carried out in the European context, nor in non-English speaking countries.

Taken the above into account, this dissertation contributes to fill the aforementioned gaps by analysing the influence of IMC in HE sector. We would like to analyse if IMC is positively associated with business performance in HE sector and to do that, our research objectives are the following:

- 1) To contribute to the IMC's theoretical body of knowledge by exploring the concept of integrated marketing communication (IMC) in higher education (HE) and marketization of HE. Certainly, as suggested by Porcu et al. (2019) and Šerić et al. (2015), it would be highly interesting to apply IMC to other contexts and HE sector is a quite undiscovered one in the IMC landscape (the current objective is accomplished in the previous chapter).
- 2) To provide adapted measurement tools to assess the IMC level (based on the proposal by Porcu, del Barrio-García & Kitchen (2017)) and performances (based on the suggestion by Reid (2005)) in the context of HE, in a non-English speaking country, in another language other than English (Spanish)

and considering different perceptions, academics' and practitioners' in the same organization.

- 3) To show if IMC is positively associated with business performance. IMC will be measured at the university level and business performance will be measured at three levels, at the university as a whole, at the faculty level and at master's degree level.

The first objective regarding the literature review is achieved in the previous chapter, Chapter I. The second and third objectives are going to be fulfilled in the following chapters, Chapter III and IV, respectively.

## **2.2. Statement of hypotheses**

The previously mentioned objectives represent the main issues of investigation of this dissertation. In order to address them, the hypotheses were formulated in Chapter I (See '1.3. IMC applied to HE' header) and linked to the gaps found in the literature review. In the current header, the hypotheses are listed and reminded.

Literature suggests that in order to obtain the benefits provided by IMC, this construct should be accurately measured. After that, this value (IMC level) can be analysed with performance (after this construct is also measured precisely) and find if these are positively associated or not. However, very few empirical attempts have been carried out over the years (Kitchen, 2017) and the academic landscape suggests that contributions in this topic are missing (Porcu et al., 2019). Based on the previous discussion, the hypotheses that are going to be empirically tested in this dissertation are summarized:

*H1.* The adoption of an IMC strategy by the selected HEIs significantly and positively affects the institution related performance (PI). IMC level (I) and PI are positively associated.

*H2.* The adoption of an IMC strategy by the selected HEIs significantly and positively affects the faculty related performance (PF). I and PF are positively associated.

*H3.* The adoption of an IMC strategy by the selected HEIs significantly and positively affects the master's degree related performance (PM). I and PM are positively associated.

Considering that IMC is multidimensional, if we analyse the relationship between IMC and business performance (see Appendix 4), although literature suggests that some of the benefits of a high IMC level lead to better business performances, not all the dimensions of IMC must be positively associated. Therefore, dimensions should be studied separately and provide conclusions accordingly.

To test previously mentioned hypotheses, a qualitative (panel of experts) and a quantitative methodology is carried out (well-structured questionnaires that were administered).

### **2.3. Methodology**

With the aim of fulfilling the empirical part of the current investigation, constituted by the second and third objectives, and test the stated hypotheses shown in previous sections (see '2.1.' and '2.2.' headers), first, the development of scales was carried out (see the following '2.3.1. Development of scales' header). After the scales are developed, the aforementioned two constructs, IMC and performance, are assessed. Afterwards, in order to test the hypotheses that state that these two constructs are positively associated at three levels, the results obtained in the scales were analysed developing linear regressions and CART trees (see '2.3.2. Application of scales' header), both run in proper statistical tools,

such as SPSS (IBM SPSS, 2011), R (R Core Team, 2019) and Rpart (Therneau and Atkinson, 2019).

### *2.3.1. Development of scales (objective 2)*

As mentioned in Chapter I, '1.1.5. IMC measurement' header, after reviewing the literature concerning the measurement of IMC over the years (see Appendix 3), four tools have been studied profoundly (See Table 2). Just one of the tools exposed in Table 2 is applied to the HE context, Edmiston-Strasser's (2009) proposal. However, Porcu, del Barrio-García and Kitchen's (2017) suggestion is applied to the service sector and is the one that provides the IMC level as a numeric value. Besides, it is based on an updated academic IMC definition and dimensions (proposed in 2017), whereas the other proposals are based on IMC definitions which have been proposed earlier than 2017 and are not considering up to date communication and marketing issues (multiple channels, digitalization, etc.). Consequently, 'the firm-wide IMC scale' proposed by Porcu, del Barrio-García & Kitchen (2017) was selected to be adapted and to achieve the second objective of the current dissertation. Apart from being applied to the services sector and HE is a service business, the definition and dimensions proposed by these authors are also the basis of the scale's proposal and are in accordance with the premises of this study where consistency is key (see Table 4 in Chapter I, '1.3. IMC applied to HE' header). Moreover, the output was the level of IMC achieved by the company.

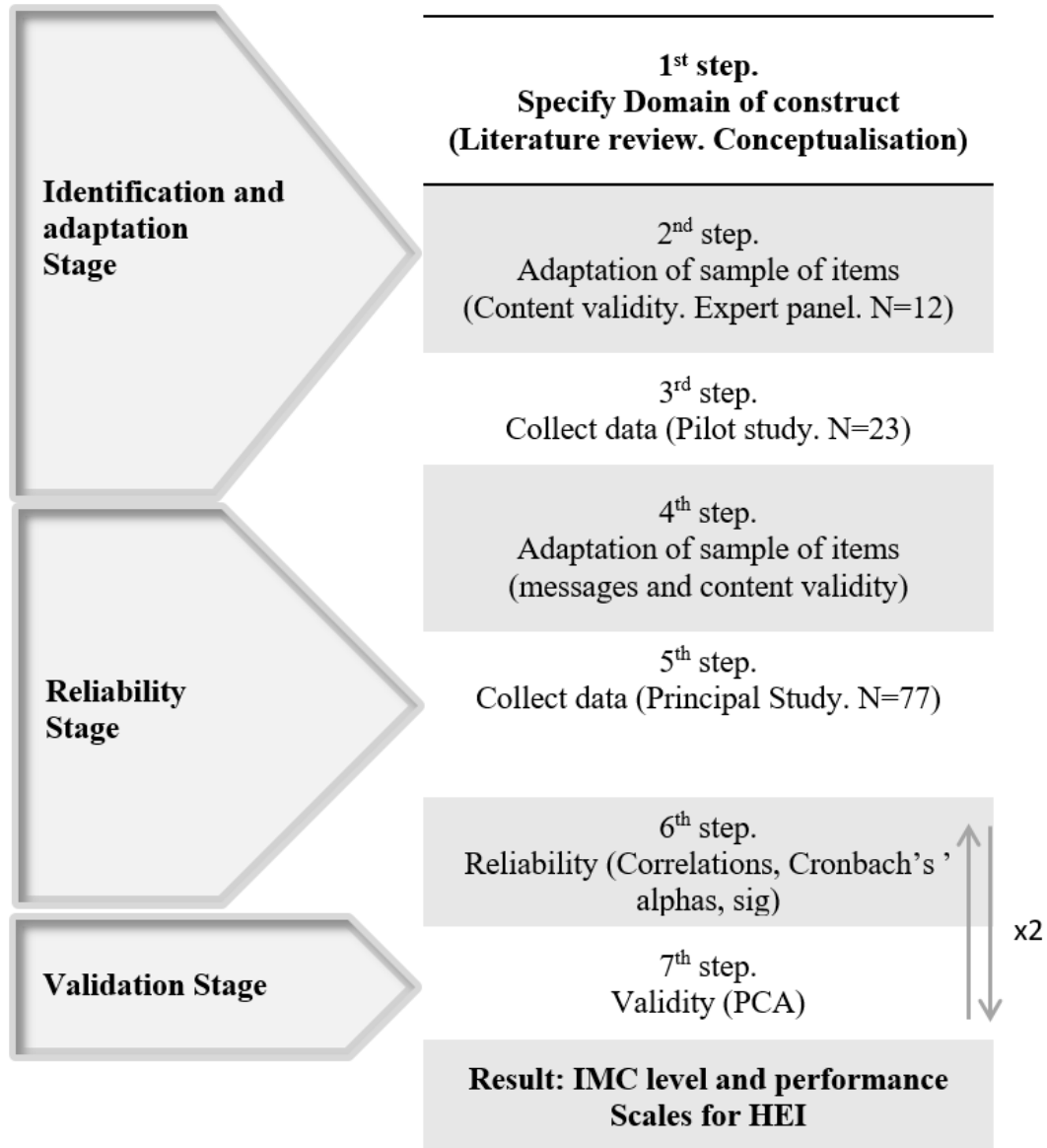
For the performance measurements, after reviewing the different proposals shown in Appendix 4, Reid's (2005) broadly accepted tool was selected (see Chapter I, '1.1.6. Business performance as an outcome of IMC' header for justification of this decision).

Both selected scales just considered managers' perceptions, in the present adaptation process, the scales were adjusted to the HE sector and also to the respondents'

nature (both academics and practitioners). Additionally, as this research is dealing with a different and an unknown context, Higher education (HE), it is advisable to use a qualitative approach together with a quantitative assessment to empirically test the IMC construct (Kliatchko, 2008; Šerić, 2016) and HE sector related performances. It is for this reason that, after selecting the key contributions from the literature, the scales were first tested qualitatively with experts, then, through a quantitative procedure, the qualitative conclusions were confirmed, and the scales were validated.

Consequently, considering the focus of this dissertation, we carried out a multi-stage research design and measure two constructs: first, the level of IMC achieved by the selected group of HEIs and second, the performance at three levels (institution, faculty and master's degree). We used an adapted qualitative (semi-structured interviews) and quantitative (surveys) approach following a broadly accepted methodology claimed by Churchill (1979). Churchill's (1979) goal was to develop improved measures of the variables marketers usually work with and it is a seminal work that has been used since it was suggested in 1988 to develop scales. The scale development methodology proposed by Gerbing and Anderson's (1988) was also followed. Besides, it incorporates a principal components analysis (PCA) which is a linear combination of variables and considered a data reduction technique that allows to capture the variance in variables in a smaller set (Santos, Gorgulho, Castro, Fisberg, Marchioni, & Baltar, 2019) (see Figure 2, seventh step).

Figure 2. Summary of the methodology's implementation.



Source: own elaboration adapted from Churchill (1979) and Gerbing and Anderson (1988).



The methodological process was carried out in seven stages (Figure 2), which were necessary in order to obtain the scales that measure the IMC level and business performances reached by HEIs. In the next chapter, each phase will be described in more detail for each of the four scales (see Chapter III, ‘3.2. Creation of the scales’ header). Besides, a brief explanation is exposed below:

*1) Specify Domain of construct (Identification and adaptation stage)*

The first step in the development of the scales is to specify the domain of construct by carrying an insightful literature review. This step is fulfilled in Chapter I, where IMC and performance constructs are deeply analysed. Besides, a profound revision is carried out regarding measurement, with the aim of deciding the most suitable scales to be adapted.

*2) Adaptation of respondents of items (Identification and adaptation stage)*

After the construct is defined, a panel of experts is carried out with the aim of adapting the items to the context of Higher Education (HE). This step, where 12 experts participated, constitutes the qualitative stage of the methodology. The experts belonged to different higher education institutions and were both academic and practitioners (as those two types of profiles are the selected respondents for this dissertation). This step is part of the identification and adaption stage of the scale development procedure. It is explained in more detail in the next chapter (see ‘3.2.2. Identification and adaptation stage’ header).

*3) Pilot Study (Identification and adaptation stage)*

The pilot study constitutes the first empirical step of the scale creation procedure. A group of 23 individuals is selected. This group belonged to the context to which the scale is adapted for, Higher education (HE), with the aim of providing feedback regarding the delivered survey and the items and messages in it.

*4) Adaptation of respondents of items (Identification and adaptation stage)*

The results obtained in the pilot study lead to an adaptation of the items or messages, which is crucial before carrying out the principal study.

*5) Principal study (Reliability stage)*

To carry on with the empirical part of the investigation, the principal study was fulfilled with the previously adapted items and survey. The respondents selected are academics and practitioners that belong to the population of this dissertation (seven higher education institutions that are detailed in the next Chapter III '3.1. Population and respondents' header).

*6) Reliability (Reliability stage)*

After delivering the survey, the data was obtained and the reliability procedure was fulfilled (see Chapter III '3.2.3. Reliability and validity' header).

*7) Validity (Validation stage)*

After the reliability stage was accomplished, the validity of the results was analysed. After the principal components analysis (PCA) was developed, a different combination and number of factors/ dimensions that explained the constructs arise. Consequently, the reliability step (previous step, number 6) was developed again to test if that new combination was reliable. That is why the right side of Figure 2 shows a second 'round' between step six and seven.

*2.3.2. Application of scales (objective 3)*

Once the data was obtained, with the aim of testing the hypotheses stated, the association between the IMC level achieved by an organization and performances related to institutions were analysed. To do that and test our hypotheses, we carried out two types of linear regression models (with just one independent variable and with three

independent variables) and three CART regression trees. The linear regressions were run in 'R base module' (R Core Team, 2019) and CART regression trees simulations were carried out in 'Rpart' package, which is a part of 'R' software (Therneau & Atkinson, 2019) (See Appendix 9 to see the full code in 'R base module' and 'Rpart'). Regression helps us understand the relationships between variables. It is usually helpful with socioeconomic variables of our societies. When we speak about regression, we have one dependent variable and one or more predictor or independent variables.

Based on these premises, linear regression is the most widely used method in statistics to predict values of continuous variables due to its easy interpretation. Nevertheless, in many situations, the suppositions to apply the linear regression models are not met and some users tend to force these, leading to erroneous conclusions. However, alternative methods exist that do not require suppositions on the data to be analysed, such as, classification and regression trees (CART), where the results can easily be interpreted. That is why in this dissertation, we compare the results obtained in the linear regressions with the obtained CART regression trees. After that, the association between IMC and performance in HE at three different levels is analysed and the stated hypotheses are tested.

First, we created three simple linear regression models with just one independent variable, the IMC level (I). Then we measured its relation with the performance grades achieved at three levels: Performance achieved at the Institution level (PI), Performance perceived at a Faculty level (PF) and Performance perceived at Master's degree level (PM).

Secondly, we fitted three multiple linear regression models with three independent variables, IMC level (I), Profile of the respondent (P) and the University (U) where those respondents belong. These three variables were studied with two dependent variables

separately; two types of performances, at the institution level (PI) and the faculty level (PF). Performance related to master's degree (PM) was just analysed considering I and U variables because all respondents were academics and the profile of the respondents (P) was coded as a '0', consequently there was not variability in 'P' as it was not providing information to explain PM at all.

Lastly, we fitted three CART models with three different dependent variables, the performance at the institution level (PI), at a faculty level (PF) and at master's degree level (PM). Besides, again three explicative (independent) variables were considered for the first two CART trees where PI and PF were predicted, IMC level (I), profile of the respondent (P) and university (U) where those subjects belong. However, the last CART tree that predicted PM just considered two independent variables, IMC level (I) and university (U), because as mentioned before, P does not provide variability in the current analysis.

Results of the 9 models regarding linear regression and CART regression trees are exposed in Chapter IV, '4.2. Association between IMC and performance' header.

## 2.4. Summary of Chapter II

The aim of this second chapter is first to present the three objectives of the current dissertation. The first objective consists of exploring the IMC construct in HE. The second purpose is related to preparing the appropriate measurement tools to measure IMC and performance at three levels (institution, faculty, master). Lastly, the third objective pursues to analyse the positive association between IMC and the performance.

After the objectives were exposed, the three hypotheses to be tested are presented which are showed in Table 5.

*Table 5. Summary of the hypotheses tested in this dissertation.*

| <b>Hypotheses</b>                                                                                                                                                           |                                                                                                                                                                      |                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| H1. The adoption of IMC by the selected HEIs significantly and positively affects the institution related performance (PI). IMC level (I) and PI are positively associated. | H2. The adoption IMC by the selected HEIs significantly and positively affects the faculty related performance (PF). IMC level (I) and PF are positively associated. | H3. The adoption IMC by the selected HEIs significantly and positively affects the master's degree related performance (PM). IMC level (I) and PM are positively associated. |

*Source: own elaboration.*

Finally, the methodology to be followed, which is extensively explained in the next chapter, is presented succinctly. In this part, special emphasis is placed on the procedure for developing scales. Then, the techniques to be used to test the association between IMC and performance are explained: the technique of linear regression and CART regression trees.



### **3. Chapter III. Development of scales**

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3.1. Population and respondents

3.2. Creation of the scales

3.3. Summary of Chapter III





### **3. Chapter III. Development of scales**

The objective of this chapter is to adapt and develop four reliable as well as valid tools. As mentioned in previous sections, the first tool will measure the IMC level achieved by the selected higher education institutions (HEIs) and the remaining three will measure performance related to HE sector at three levels, at the HEI as a whole, at faculty level and the performance achieved at master's degree level. To develop the scales, a multi-stage research methodology was carried out (see Figure 2). During the procedure, which consisted of the steps explained in '2.3.1. Development of scales' header, four scales were administered to academics and practitioners (see '3.1.2. Respondents' header) belonging to the selected HEIs (see '3.1.1. Population' header). The adaptation procedure for each tool is explained in more detail in the next sections of this chapter. Besides, the resultant proposal of the four scales is exposed in Appendix 8.

#### ***3.1. Population and respondents***

##### ***3.1.1. Population***

The population of this study are seven universities from the Spanish UNIJES Jesuit association. The supervisors and the author of this dissertation belong to one of the UNIJES higher education institutions (HEIs) and had the possibility to access this data, taking into account that certain sensitive information was requested which people sometimes refuse to answer (see the questions asked in Appendix 7). This network consists of 10 universities and centres, but only seven were selected for this dissertation, the ones that offered academic master's degrees. The reason to select just the ones that offer master's degrees is twofold: first, one of the empirical goals of the investigation was to provide the perception of marketers but also academics (with some marketing duties).

To do that, master's degrees directors were surveyed as in the UNIJES association, masters' degrees' directors are researchers that carry out some marketing related practices with the aim of increasing enrolments in their programs. The second reason to select just the HEIs that offered master's degrees is that one of the stated hypotheses sustains that the performance of master's degrees and IMC are positively associated (to test that, the performance of masters' degrees' was measured and then its association with IMC was analysed).

This group of HEIs was selected also because it is a set of private homogeneous institutions with more or less a common offer. These institutions are not competitors because they are located in different geographic zones. Indeed, despite sharing the same mission and values (see Figure 3), they centre its efforts in different markets since they are focused in regional or local students. Certainly, in Spain is more common to attend to universities near students' or families' hometowns. UNIJES is constituted of more than 4,000 professors, 1,500 staff, 41,028 students and participants. More than 250,000 alumni, more than 1,000 researchers, 139 research units and 298 funded research projects. More than 1,800 public events are organized every year and 163,406 mentions and impacts in communications and media have been achieved (Lopez-Viguria, 2018).

UNIJES is a relevant association of private Spanish HEIs, associated to the Society of Jesus in Spain, besides there is also an International Association of Jesuit Universities, IAJU. These HEIs have always had additional communication and marketing needs in comparison with public ones because enrolment rate is an important issue and several recruiting actions have been developed over the years. As mentioned in previous sections (See Chapter I, '1.3. IMC applied to HE' header), these institutions have a marketing department for the university as a whole and also a marketing department in each faculty. The group of seven HEIs analysed are seen as an alliance

between Jesuit universities, which increases competitive advantages regarding universities' reputation and positive influence in all stakeholders, not only prospective students' (Kalafatis, Ledden, Riley, & Singh, 2016). In this context, alliances among HEIs or between HEI and commercial partners are considered one of the most successful marketing strategies (Hemsley-Brown, 2016). These are increasing due to the benefits they bring along in this constantly changing environment. Subsequently, UNIJES, with its alliance approach could have been acknowledged as the most suitable to obtain the necessary levels of coordination and cooperation for accurate IMC to be achieved across all the customer touch points (Laurie & Mortimer, 2019). When marketing strategies are developed in HE contexts, multiple functions of HE needed to be considered; even in the privatized organizations, HEIs have very relevant roles as a public good (Elken, 2019).

*Figure 3. UNIJES institutions' description.*

UNIJES is a relevant network associated with Jesus' company in Spain (there is also a worldwide network of Jesuit Universities). UNIJES is a group of Spanish private higher education institutions linked to the Society of Jesus in Spain that, while maintaining their autonomy and own development, unites in order to promote alliances and common projects that reinforce:

- Academic and humanistic quality of their training programs.
- Investigation of solutions in the face of social challenges.
- The contribution to dialogues and debates to our times.



**IDENTITY AND MISSION**

To train men and women as competent professionals and responsible citizens that put their knowledge and skills to the service of society. To investigate and provide useful knowledge to the areas where the major challenges are presented to the human being and society in general.

In order to conduct this mission the UNIJES institutions consider a pedagogical model with four key dimensions for the comprehensive training of the people

**UTILITAS** - Skilled people, in order to face the technical, social and human problems that every professional has to face.

**HUMANITAS** - Human beings, in the fullest sense of the word; with total awareness of themselves and of the world they live in; sensitive to the aspirations and concerns of our contemporaneous.

**IUSTITIA** - Committed people with the construction of a fairer world, and compassionate towards feeling the joy and pain of others as their own.

**FIDES** - People capable of an explicit opening to the question about the meaning of life and the question of God; sensitive to the Gospel and to Christianity, to their values and proposals.



*Source: own elaboration adapted from the official website of UNIJES ([www.unijes.net](http://www.unijes.net)).*

### **3.1.2. Respondents**

Academics and practitioners that belong to the selected seven higher education institutions (HEIs) constitute the respondents of the current dissertation. On the one hand, 23 individuals were selected for the pilot study, where 13 were academics and 10 practitioners. This group belonged to the biggest institution of the population. On the other hand, in the main study a set of 150 (census) academics and practitioners from the seven HEIs belonging to UNIJES were identified and then contacted via email and by phone. From that group, 92 were academics (who were also directors of master's degrees) and 58 were practitioners.

## **3.2. Creation of the scales**

### **3.2.1. Survey (scale) and methodology's structure**

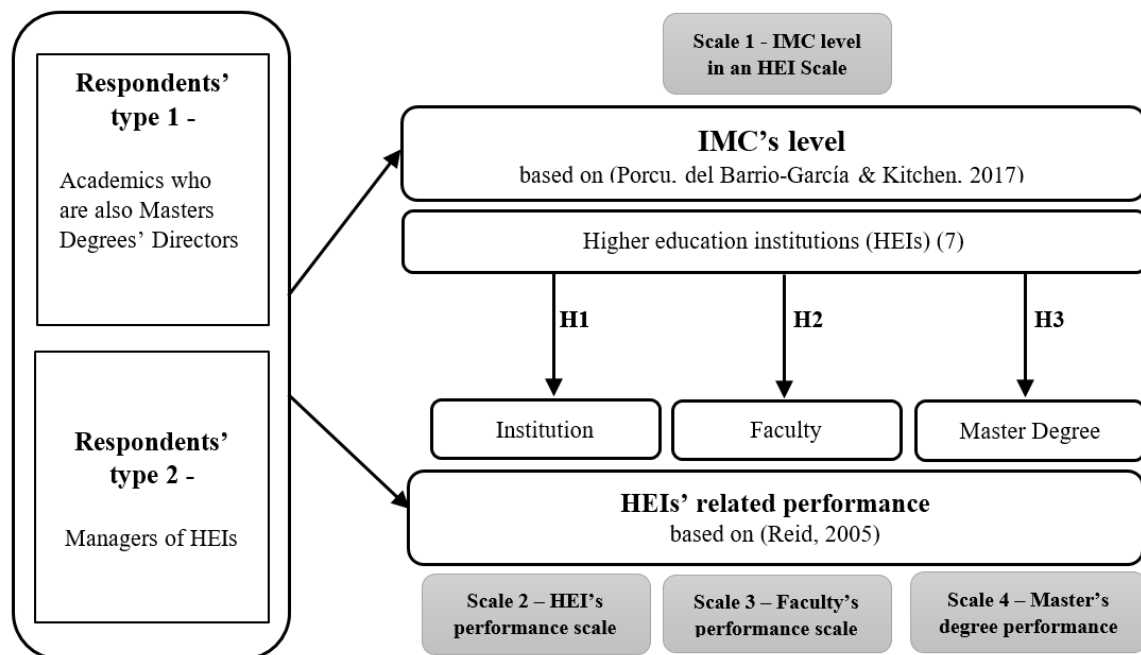
As we mentioned in previous sections, the scales to be validated are four. The first one is going to measure the level of IMC of HEIs. From now on, this scale would be named 'Scale 1 - IMC level in an HEI' and is based on 'the firm-wide IMC scale' (Porcu, del Barrio-García & Kitchen, 2017). In addition, the other three tools that will evaluate performance are based on Reid's proposal (Reid, 2005) that will be adapted for three levels or units in relation to higher education institutions (HEIs), from now on called 'Scale 2 – Institution's performance', 'Scale 3 – Faculty's performance', 'Scale 4 – Master's degree performance'. As we mentioned before, these scales were adapted to the HE sector but also to the respondents' nature.

The original scale proposed by Porcu, del Barrio-García & Kitchen (2017) consisted of four dimensions and 25 items scored on a 7-point Likert scale, from '1, strongly disagree' to '7, strongly agree'. Four items were used to measure 'message consistency' dimension, seven items for 'interactivity' dimension, seven items for

‘stakeholder-centred strategic focus’ dimension and seven items for ‘organizational alignment’ dimension (Porcu, del Barrio-García & Kitchen, 2017). Moreover, the tool chosen to measure performance and proposed by Reid (2005) consisted of three dimensions and nine items, including questions using a 7-point Likert scale, from ‘1, very low’ to ‘7, very high’: four items related to ‘sales performance’ dimension, three questions related to ‘brand advantage’ dimension, and two items for ‘satisfaction’ dimension. The full version of the scales before the adaptation procedure is exposed in Appendix 5.

The IMC’s level was going to be measured in the HEI as a whole and the performances related to the institutions were going to be measured at three levels. Figure 4 summarizes the types of respondents (academics and managers), and how the IMC level achieved by universities (HEIs) is analysed in this dissertation with the performance at three levels, institution, faculty and master’s degree.

Figure 4. Respondents, scales and levels of measurement of the study.



Source: own elaboration.

### *3.2.2. Identification and adaptations stage*

#### *Panel of experts*

After having carried out an extensive literature review, the results of the adopted theoretical framework are explained in previous sections. Once the constructs were indicated (IMC and performance), a panel of experts was consulted (see second step of Figure 2 in '2.3.1.' header) in order to validate the content and adapt the scales that measured IMC level ('the firm-wide IMC scale' (Porcu, del Barrio-García & Kitchen, 2017)) and performances (Reid, 2005) of services businesses to HEIs in particular. According to Tersine and Riggs (1976), 10 to 15 participants should be sufficient on a panel of experts for a homogeneous group. Numerous studies have embraced this recommendation (e.g. Richards & Curran, 2002; Kerr, 2009; Porcu, del Barrio-García & Kitchen, 2017). Consequently, in the present dissertation 12 experts (practitioners and academics) belonging to different Spanish public and private HEIs participated in in-depth semi-structured interviews (see Table 6) of the panel of experts that was the pillar of the empirical part of this research (Campbell, Quincy, Osserman, & Pedersen, 2013). In the panel of experts two of the authors of the definition, dimensions and the original 'firm-wide IMC scale' selected for this study, participated. Other experts belonged to different Spanish HEIs, not just to the UNIJES association, because it was believed that every suggestion was useful at this very first stage of the research. It is relevant to note that four experts have a significant managerial experience in HEM, four have a mixed position (academics with managerial related implications) and the rest of the experts, four, were scholars in the field of Marketing, HEM and IMC. Accordingly, both managerial and academic interpretations were covered.

Table 6. Panel of experts: profiles of the 12 experts participating in the qualitative stage.

| <b>Position</b>                                   | <b>Job experience<br/>(in years)</b> | <b>Type of Spanish HEI</b> | <b>Profile</b>          |
|---------------------------------------------------|--------------------------------------|----------------------------|-------------------------|
| <b>Marketing and Communication's manager</b>      | 20                                   | Private (UNIJES)           | Managerial              |
| <b>Postgraduate's communication manager</b>       | 20                                   | Private (UNIJES)           | Managerial              |
| <b>Digital Identity's Director</b>                | 30                                   | Private (UNIJES)           | Managerial              |
| <b>Marketing Director at the University</b>       | 20                                   | Private (UNIJES)           | Managerial              |
| <b>Associate Marketing Professor</b>              | 20                                   | Private (UNIJES)           | Academic/<br>Managerial |
| <b>Associate Statistics Professor</b>             | 20                                   | Private (UNIJES)           | Academic/<br>Managerial |
| <b>Associate Professor of Marketing</b>           | 30                                   | Public (Not UNIJES)        | Academic/<br>Managerial |
| <b>Researcher and Professor in Communication</b>  | 15                                   | Private (UNIJES)           | Academic/<br>Managerial |
| <b>Associate Professor of Marketing</b>           | 30                                   | Public (Not UNIJES)        | Academic                |
| <b>Marketing professor assistant</b>              | 15                                   | Public (Not UNIJES)        | Academic                |
| <b>Professor of Marketing and market research</b> | 30                                   | Public (Not UNIJES)        | Academic                |
| <b>Professor of Marketing and market research</b> | 30                                   | Public (Not UNIJES)        | Academic                |

Source: own elaboration.

Before the semi-structured interviews, the experts received an in depth description of the IMC construct, the scales' explanation and the main purposes of this research, with the aim of contributing to HEM and validating the scales that measured IMC level and performances in HEIs (See Appendix 5). They were also asked to evaluate the clarity of the statements, whether they missed any topics, or if the respondents' types (academics and managers) provided value to the research. In this face-to-face and online semi-structured interviews, there were some explicit questions but also there were chances to discuss general (Leech, 2002) HEM related topics.

This panel provided the author the chance to receive suggestions related to HEM research purposes overall and to the scales' content in particular. The results of the panel of experts led to rewrite modify and simplify some sentences (items) of the scale. They

also discussed measurement objectives and commented on the ‘double’ stakeholder focus. The description that the experts received before the interviews, explained how the present research proposed two main groups of stakeholders, the primary group, the students, who were considered the customers. On a second set, the groups of interest (alumni, enterprises and families) are going to be reflected, as some of the data gathered in the study is related to these different audiences’ outcomes. The originality of this research also lies in the type of respondent in that university staff was selected, both academics and practitioners, and the panel also supported this ‘double’ perception embraced in the research.

Additionally, experts recommended dividing some items in two because they were measuring two different ideas. Consequently, four items were added to the ‘Scale 1- IMC level in an HEI’ and after this step, the tool consisted of 29 items (while before there were 25).

Regarding the instruments to measure performance, ‘Scale 2 - Institution’s performance’, ‘Scale 3 - Faculty’s performance’ and ‘Scale 4 – Master’s degree performance’, it was suggested to duplicate the constructs related to satisfaction in order to gain the perception of the two main groups of stakeholders, students’ satisfaction but also other stakeholders’ (See Appendix 7). The scales to measure performances consisted of nine items but after the experts’ inputs, they evolved to 11 items. Besides, the formulation of the items was changed, instead of questions, statements were suggested by the experts. It must be noted that those academics that were also masters’ degrees directors had to answer the performance related scales at three levels. Whereas the practitioners replied to performance related instruments at just two levels, at a faculty and HEI level (see Appendix 7).



*Pilot study*

Successively, the pilot study was undertaken which is one of the stages of methodology's implementation (see third step of Figure 2 in 2.3.1. header). The principal reason to carry out a pilot study was that we wanted to analyse if the items were well understood and the answers of each respondent were properly received using the online medium enabled to fill the survey. A brief explanation of the research purposes and the scales were included in the information that was sent online for the pilot study. Regarding the scales, first, the one which measured IMC level was incorporated. Then, depending on the respondent's profiles nature, two or three scales that measured performance were introduced. Managers would answer to two performances related scales, those for institution and faculty related performance, and academics would respond to three performance related scales (as they had to answer also to the scale related to the master's degree that they manage). The data of the pilot study was obtained during autumn 2018, and 23 academics and practitioners belonging to the biggest institution at UNIJES were surveyed.

Once the pilot study was fulfilled, some items and messages were adapted. On the one hand, some items were explained in a more 'understandable' way by using not so technical terms related to marketing and communications. Moreover, a glossary of terms was introduced, defining concepts such as, market share, strategic positioning or vertical/horizontal communication (see Appendix 7). Besides, the introductory messages where the objectives of the study were described for the respondents were also more extensively explained. The pilot study gave us the chance to test the procedure of sending the surveys via online to the respondents. It also suggested that some messages and items were not clear enough and they needed to be proofread.

*Principal study*

After the pilot study was accomplished, the main study was performed (see fifth step of Figure 2 in 2.3.1. header), conducting online and face-to-face surveys when respondents requested to. This quantitative part of the study, led to confirm the qualitative conclusions. In both the qualitative and quantitative stages of this dissertation, two ways of data collection were carried out because some respondents asked for face-to-face surveys since they preferred to provide more ‘verbal’ information. The ones that were accomplished face-to-face were answered by respondents with a more academic profile, namely master directors that carry out marketing related decisions but not very familiar with the IMC topic and had a preference in discussing the issues orally. It is necessary to acknowledge that the two different methods of data collection may have provided different types of information and may have affected the quality of the responses, but there was no other way to obtain the information. In face-to-face interviews, the same online questionnaire was filled out as the conversations took place.

In the main study, a set of 150 (census) academics and practitioners from seven HEIs belonging to UNIJES were identified and after contacting them via email and by phone, the data collection of the main study was accomplished in winter 2018-2019. Seventy seven responses were obtained (academics (N=36) and practitioners (N=41)), the response rate was a little bit more than 50%. Note that the 77 respondents in the main study were different from the ones in the pilot study. It should also be mentioned that 41 individuals responded to three scales and 36 responded to the four scales because the last scale, regarding master’s degree performance, was answered by those academics. Once the replies were obtained, the reliability assessment procedure and then the validity measurement process were accomplished, both run in the statistical analysis program SPSS (IBM SPSS, 2011).

### 3.2.3. Reliability and validity procedures

According to Zeller and Carmines (1980), measurement ‘concerns the process of linking abstract concepts to empirical indicants’ (p. 2) and with these premises it is significant to determine if the four scales proposed in this study and the set of their empirical indicators represent the theoretical concept associated or not. To do that the reliability and validity of the indicators needed to be examined. In order to the indicators of an instrument to be valid, they need to assess ‘what it purports to measure’ (Carmines & Zeller, 1979, p.2).

#### *Reliability*

An observational study will be reliable if the instrument produces regular measurements and same results on recurrent trials. In this dissertation, reliability (see sixth step of Figure 2 in ‘2.3.1.’ header) was assessed by calculating Pearson’s correlations, *p* values, the Spearman-Brown formula, and Cronbach’s Alphas coefficients of the total scales items and also of each dimensions’ (Eisinga, Grotenhuis, & Pelzer, 2013).

Results of each step for the four scales are shown in detail in next headers (See 3.3.4., 3.3.5., 3.3.6. and 3.3.7). Besides, Cronbach’s Alphas coefficient is explained profoundly below:

#### *1) Cronbach’s Alphas*

The Cronbach’s Alpha (Cronbach, 1951) is the most commonly employed method for multi-item measurement (Peter, 1979). The values of these Alphas are sufficient between 0.5 and 0.6 in the first steps of an investigation, but in this stage we are going to accept values over 0.7 (Nunnally, 1978). If these coefficients do not reach the value of 0.7 a depuration process of the scale in order to improve its reliability should be carried out, this means that the items with lower values of correlations between them are going to be deleted in order to see if the value of

the Cronbach's Alpha increases. The estimation of Cronbach's Alpha is calculated by the following formula:

$$\rho_T = \frac{k}{k-1} \left( 1 - \frac{\sum_{i=1}^k \sigma_i^2}{\sigma_X^2} \right)$$

*X is the sum of all items in a test that consists of k items*

$$(X = X_1 + X_2 + \dots + X_k)$$

*$\sigma_i^2$  is the variance of every item*

*k is the number items*

*$\sigma_X^2$  refers to the variance of X*

### Validity

After we assessed the reliability of the scales, its validity needed to be tested (see seventh step of Figure 2 in '2.3.1.' header). To be able to affirm that a measuring instrument is valid, it needs to measure the concept for whose measurement it has been created (Carmines & Zeller, 1979), in our case, the IMC level and performances at three different stages, performance of the institution (PI), performance of the faculty (PF) and performance of the master's degree (PM). Moreover, as we had obtained a high-dimensional dataset, we carried out a principal components analysis (PCA) to determine the dimensions (Tharwat, 2016). PCA technique is selected because in this study it is important to find the relationships between the variables, extract the most important information and reduce the dimensions of the data to keep just the relevant information. To achieve that, the following analysis was carried out: scales' correlation matrix, Kaiser-Meyer-Olkin (KMO) test, anti-image correlation matrix, total variance to explain the factors extracted, scree plot, orthogonal varimax rotation, rotated component matrix and communalities. Results of each step for the four scales are shown in detail in next headers

(See ‘3.3.4., 3.3.5., 3.3.6. and 3.3.7’ headers). Besides, each calculation is explained below:

*1) Correlation matrix*

The correlation matrix addresses the relationship between a group of variables and shows the correlations and relationships between the all the variables from that group. It is a symmetric and square table with a main diagonal that is always a number one. Each number of the table is the correlation value between variables and the numbers on one side of the diagonal are a mirror to those on the other side, that is why usually only the above or the below portion of the main diagonal is shown. Each correlation value is checked out with the aim of developing conclusions and decide if variables correlate well with each other.

*2) Kaiser-Meyer-Olkin (KMO) test*

The Kaiser–Meyer–Olkin (KMO) measure indicates the suitability of the data for principal components analysis (PCA) and the adequacy for each variable and for the complete model of variables. It is considered a measure of the proportion of variance between variables that might be common variance (Kaiser, 1974). If the proportion is higher, the data is more suited to PCA. Values of KMO are between 0 and 1 and small values mean that the variables have too little in common to ensure a well-designed PCA. KMO values are interpreted as it follows: values between 0.9 and 1 mean that the data is marvellous for PCA. Values between 0.8 and 0.89 mean that the data is meritorious. Values from 0.6 and 0.79 are middling. Values below 0.6 indicate that the data is not adequate for a PCA (Cerny & Kaiser, 1977).

### 3) *Anti-image correlation matrix*

The anti-image correlation matrix addresses the sampling adequacy for all factors. The diagonal of the anti-image correlation matrix is composed by the Kaiser–Meyer–Olkin (KMO) values. The anti-image is the part of the variable that cannot be predicted. Most of the ‘off-diagonal’ elements should be small (below 0.5) in anti-image matrices in a good PCA model (Kusmana & Sukwika, 2018).

### 4) *Total Variance Explained*

The Total Variance Explained shows the cumulative percent of variance extracted. The *eigenvalue* is the measure of the variance of a dimension. Therefore, the Total Variance Explained is the sum of all the *eigenvalues*. The Total Variance Explained reveals the presence of highlighted factors with *eigenvalues* exceeding 1. Retaining the *eigenvalue* with values over 1, is one of the indications to deduce how many factors should be retained. This measure shows as many factors as variables, and in a PCA, the sum of *eigenvalues* equals the number of components. As the Total Variance Explained shows the eigenvalues greater than 1, the principal factors are extracted with their total percentage of variance and cumulative variance. The common percentage of the cumulative variance for social science research is usually suggested to be between 50-60% (Mat Isa, Saman, Rashidah, & Jaapar, 2014).

### 5) *Scree plot*

The scree plot is a diagram that shows the *eigenvalues* corresponding to the different dimensions and helps to select the appropriate number of dimensions to be retained. The *eigenvalue* of each component in the initial solution is plotted. ‘Scree is the accumulation of loose stones or rocky debris lying on a slope or at the base of a hill or cliff; this plot is called a scree plot because it looks like a scree

slope. The goal is to determine the point where the mountain gives way to the fallen rock' (Pflueger & Wang, 2015, p.14).

#### 6) *Orthogonal varimax rotation*

There are three different types of orthogonal rotation, *varimax*, *quartimax* and *equimax*. Firstly, the *quartimax* rotation minimizes the number of factors needed to explain each variable and tends to generate a general factor on which most variables load to medium or high values. Secondly, the *equimax* type is a combination of *quartimax* and *varimax*. Thirdly, the *varimax* is the most common type, it minimizes the number of variables with extreme loadings on a factor and makes possible to identify a variable with a factor. The latter, is the main reason why we use the *varimax* type in the current dissertation, indeed, to identify which variables fit in each factor. Besides a rotation is also applied because it eases the interpretation as it ordinales the variables showing the higher loadings at each factor. Moreover, the orthogonal varimax rotation maximizes the sum of the variance of the squared loadings, where 'loadings' mean correlations between variables and factors. Usually results in high factor loadings for a smaller number of variables and low factor loadings for the rest. All remaining components have *eigenvalues* of more than one (Stephens, 1996). The result is a small number of relevant variables, which makes it easier to interpret the results in PCA.

#### 7) *Rotated component matrix*

The rotated component matrix shows the key output of a PCA and helps to determine what the factors represent. Sometimes they are called loadings and contain estimates of the correlations between each of the variables and the estimated components (the components in this dissertation are called factors or dimensions). When variables have a correlation of less than 0.3 or 0.4, they are

considered insignificant. The rotated component matrix provides the highest loadings of each variable in each factor in an ordinated way, from the highest values in the first lines to the lowest ones. Consequently, it can be deduced in which factor is each item suggested (in a very visual way).

#### 8) *Communalities*

A communality is the part of the variability of the original items that is conserved in the factorial subspace chosen after a PCA. It indicates the amount of variance in each variable that is accounted for. Higher communalities are better, it means that those items are more represented. For example, if an item has a communality of 0.10 this means that the 90% of that item's information has been missed and just the 10% is represented. However, if a communality value of an item is of 0.90, this means that this item's 90% of the variability is retained and just the 10% is not. If communalities for a particular variable are low (between 0.0-0.4), then that variable may load significantly on any factor (IBM, 2020).

In each of the four scales, a different number of dimensions was extracted after the principal components analysis (PCA), which is why once the procedure was carried out, the reliability process, the second iteration, began again (see sixth and seventh step of Figure 2 in '2.3.1.' header). In this second round, it was not necessary to calculate neither the Pearson's and Spearman's correlations nor the total scale's Cronbach's Alpha, since the scales had the same number of items. However, the Cronbach's Alphas for each dimension of the scales were different because they consisted of a different combination of variables. After calculating the Cronbach's Alphas, those were compared with the previous ones. Nevertheless, these procedures are not enough to validate the measurement tools as reliable ones. They also had to be reviewed theoretically in order to check the



consistency of the items and the suitability of each dimension proposed by SPSS after the PCA. Once that review was carried out, a decision has to be made whether we changed items from each dimension or not because, sometimes, although they had lower loadings in their factors, they could have had a better theoretical fit in other dimensions.

In the next sections, the adaptation of each of the four scales will be described in more detail. Besides, reliability and validity procedures in SPSS can be checked out in Appendix 6.

#### *3.2.4. Scale 1 - IMC level in an HEI Scale. Reliability and validity procedures.*

As mentioned in previous sections, after reviewing the tools shown in Appendix 3 and discussing profoundly the ones exposed in Table 2 (See Chapter I, ‘1.1.5. IMC Measurement’ header), Porcu, del Barrio-García and Kitchen’s (2017) ‘the firm-wide IMC scale’ proposal was selected. Likewise, it is based on an updated definition and dimensions of IMC. Before the adaptation stage, ‘the firm-wide IMC scale’, that consisted of 25 items scored on a 7-point Likert scale and classified in four dimensions (See Appendix 5), will measure the IMC level of the HEI as a whole. It is going to be adapted and as we mentioned before, based on the experts’ feedback, four items were added to the scale and after this step, the tool consisted of 29 items (see Appendix 7 and Table 7).

Table 7. 'Scale 1 - IMC level in an HEI'. After the panel of experts. Before reliability and validity.

| IMC level scale for HEI - before PCA                                  |        |        |        |        |        |        |        |       | Cronbach's Alpha |
|-----------------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|-------|------------------|
| Total scale (29 items)                                                |        |        |        |        |        |        |        |       | 0.96             |
| Dimension 1 – Message consistency (4 items)                           |        |        |        |        |        |        |        |       | 0.86             |
| Coher1                                                                | Coher2 |        |        | Coher3 |        | Coher4 |        |       |                  |
| Dimension 2 – Interactivity (8 items)                                 |        |        |        |        |        |        |        |       | 0.87             |
| Inter1                                                                | Inter2 | Inter3 | Inter4 | Inter5 | Inter6 | Inter7 | Inter8 |       |                  |
| Dimension 3 - Strategic focus centred in groups of interest (9 items) |        |        |        |        |        |        |        |       | 0.89             |
| Enfo1                                                                 | Enfo2  | Enfo3  | Enfo4  | Enfo5  | Enfo6  | Enfo7  | Enfo8  | Enfo9 |                  |
| Dimension 4 – Organizational alignment (8 items)                      |        |        |        |        |        |        |        |       | 0.91             |
| Alin1                                                                 | Alin2  | Alin3  | Alin4  | Alin5  | Alin6  | Alin7  | Alin8  |       |                  |

Source: own elaboration.

The detailed outputs obtained in SPSS (SPSS IBM, 2011) are exposed in Appendix 6.1., specifically, the reliability procedure is shown in Appendix 6.1.1. Besides, in the next paragraphs every step is summarized. The process started with the calculation of the correlations between variables, which were correct as Pearson's correlations were over 0.47 and  $p$  value was below 0.05. Besides, Spearman's correlation coefficients were good, between 0.59 and 0.79. To assess the reliability of the coefficients, we calculated the Cronbach's Alphas for each dimension and for the total scale (Cronbach's, 1951). The Cronbach's Alphas are good, values over 0.86 (see Table 7), according to Nunnally higher than 0.7 values are admissible (Nunnally, 1978). The value of the total scale's Cronbach's Alpha (0.96) is higher than the value of each dimension (from 0.86 to 0.91) because the items load on more than one dimension's at the same time. The 'Item-Total Statistics' table (see Appendix 6.1.1.) shows the means and variances of the sampling. The last two columns regarding the total correlation and the Cronbach's Alphas if the item is deleted, indicate that the values remain over 0.4 so it is not recommended to delete any item. In

the case of 'Inter2' variable, if deleted, the Cronbach's Alpha's value would be 0.96, the same as the value of the total scale's Cronbach's Alpha, this means that if we delete the item would not affect to the scale in any ways, so we keep every item there.

Next, the values of 'Corrected Item – Total Correlation' and 'Cronbach's Alphas' if the items are deleted are detailed. These correlation values are over 0.4 and Cronbach's Alphas values have a difference of less than 0.2 which mean that variables correlated well and every of them were kept. Once the reliability stage is positively accomplished, the validity test was fulfilled which is detailed in Appendix 6.1.2. The PCA is carried out in SPSS (IBM SPSS, 2011), with the aim of reducing the correlated observed variables to a smaller set of important independent composed variables. The 'Correlation Matrix' in Appendix 6.1.2. shows that overall, values are over 0.5, thus, it can be concluded that variables correlate well. However, some correlation values are below 0.3 explaining that the variable is not correlated with other variables. Items that have a value of 0.3 are analysed in detail because they are likely to be removed. For example, in some values of the item named 'Inter8', it can be appreciated that more than one is below 0.3. In every item with a correlation value below 0.3 an eye was kept on. The Kaiser-Meyer-Olkin (KMO) measure shows a meritorious value of 0.88, at the same time the diagonal of the 'Anti-Image Correlation' represents very high values and near KMO rate which means that PCA is a suitable analysis for this sampling. A very big correlation is demonstrated between the variables and this, together with the value of the significance below 0.05, indicates that PCA is a very adequate technique to undertake in this study.

The total variance is explained with five factors which are needed to be retained and have a total variance over 1. The 'scree plot' shows an inflexion point between five and six (elbow) which also suggests that five factors should be retained and that PCA is a well-designed analysis for this study. Then, the 'Rotated Component matrix' (with the

orthogonal varimax method applied) exposes how each item loads each of the five factors extracted. When the component matrix is rotated, the highest loadings in each factor are exposed in an ordinated way and also the new combination suggested by the PCA analysis in SPSS can be clearer seen (see Table 8).

Table 8. 'Scale 1 - IMC level in an HEI'. Rotated component matrix.

| VARIABLES (items) | COMPONENTS (dimensions) |      |      |      |      |
|-------------------|-------------------------|------|------|------|------|
|                   | 1                       | 2    | 3    | 4    | 5    |
| ALIN1             | 0.78                    |      |      |      |      |
| COHER2            | 0.69                    |      |      |      |      |
| ALIN2             | 0.67                    |      |      |      |      |
| ENFO3             | 0.66                    |      |      |      |      |
| ALIN8             | 0.64                    |      |      |      |      |
| ALIN7             | 0.63                    |      |      |      |      |
| COHER3            | 0.59                    |      |      |      |      |
| COHER1            | 0.59                    |      |      |      |      |
| INTER8            |                         | 0.81 |      |      |      |
| INTER6            |                         | 0.73 |      |      |      |
| ENFO5             |                         | 0.66 |      |      |      |
| ENFO7             |                         | 0.57 |      |      |      |
| INTER5            |                         | 0.53 |      |      |      |
| ENFO6             |                         | 0.52 |      |      |      |
| INTER4            |                         |      | 0.70 |      |      |
| INTER3            |                         |      | 0.69 |      |      |
| INTER1            |                         |      | 0.58 |      |      |
| INTER2            |                         |      | 0.55 |      |      |
| COHER4            |                         |      | 0.50 |      |      |
| INTER7            |                         |      | 0.49 |      |      |
| ENFO2             |                         |      |      | 0.73 |      |
| ENFO1             |                         |      |      | 0.72 |      |
| ENFO9             |                         |      |      | 0.56 |      |
| ALIN5             |                         |      |      | 0.54 |      |
| ENFO8             |                         |      |      | 0.44 |      |
| ALIN6             |                         |      |      |      | 0.75 |
| ALIN3             |                         |      |      |      | 0.73 |
| ALIN4             |                         |      |      |      | 0.70 |
| ENFO4             |                         |      |      |      | 0.59 |

Source: own elaboration.

Subsequently, the communalities needed to be checked out, which represent the percentage of the variance explained by the extracted 5 components. The communalities (Appendix 6.1.2.) are quite high, over 0.6, so it can be concluded that at least a 60% of the changes taken place in the items are considered in the extracted dimensions. After the validity procedure, a different number of dimensions were obtained, five, while before there were four, indeed, the ones proposed by Porcu, del Barrio-García & Kitchen (2017).

Once we performed the PCA, reliability was checked again, with a second round. To do that, Pearson's and Spearman's correlations are not needed to be calculated because the scale remains the same number of items, but the Cronbach's Alphas for each of the dimensions are going to be different. After calculating them, it can be seen that the values are high (see the right part of Table 9).

Table 9. 'Scale 1 - IMC level in an HEI'. Cronbach's Alphas before and after PCA.

| IMC level scale for HEI – 29 items divided in 4 dimensions <u>before</u> PCA |      | Cronbach's Alphas                                                                 | IMC level scale for HEI – 29 items divided in 5 dimensions <u>after</u> PCA |      | Cronbach's Alphas |
|------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------|-------------------|
| Total scale's Cronbach alpha                                                 | 0.96 |  | Total scale's Cronbach alpha                                                | 0.96 |                   |
| Dimension 1 – (4 items)                                                      | 0.86 |                                                                                   | Dimension 1 – (8 items)                                                     | 0.91 |                   |
| Dimension 2 – (8 items)                                                      | 0.87 |                                                                                   | Dimension 2 – (6 items)                                                     | 0.87 |                   |
| Dimension 3 – (9 items)                                                      | 0.89 |                                                                                   | Dimension 3 – (6 items)                                                     | 0.83 |                   |
| Dimension 4 – (8 items)                                                      | 0.91 |                                                                                   | Dimension 4 – (5 items)                                                     | 0.86 |                   |
|                                                                              |      |                                                                                   | Dimension 5 - (4 items)                                                     | 0.91 |                   |

Source: own elaboration.

However, it is not enough to conclude the reliability and validity of this measurement tool. A theoretical review needs to be carried out to check up on the consistency of the items and the fit in each dimension proposed by SPSS in the PCA analysis. The final version of the scale is shown in Table 10. Three items were moved, the first one from dimension four to dimension two, the second one from dimension five to dimension three and the third one from dimension two to dimension three. Although they had lower loadings in those factors, they had a better theoretical fit in those dimensions where they have been moved to. It can also be observed that not only the

dimensions have evolved in number, from 4 to 5, but also the names have been adapted (See Tables 7 and 10).

Table 10. 'Scale 1 - IMC level in an HEI'. Final structure of the scale (29 Items/ 5 dimensions).

| IMC level scale for HEI - after PCA (ordinated coherently)    |        |        |        |        |        |                          |       |        | Cronbach's Alpha |
|---------------------------------------------------------------|--------|--------|--------|--------|--------|--------------------------|-------|--------|------------------|
| Dimension 1 – Institution’s communication alignment (9 items) |        |        |        |        |        |                          |       |        | 0.91             |
| Coher1                                                        | Coher2 | Coher3 | Coher4 | Enfo3  | Alin1  | Alin2                    | Alin7 | Alin8  |                  |
| Dimension 2 – Active Listening (7 items)                      |        |        |        |        |        |                          |       |        | 0.88             |
| Inter5                                                        | Inter6 | Inter8 | Enfo5  | Enfo6  | Enfo8  | Enfo9 - Moved from Dim4. |       |        |                  |
| Dimension 3 – Interactivity (7 items)                         |        |        |        |        |        |                          |       |        | 0.86             |
| Enfo4-Moved from Dim5.                                        |        | Inter1 | Inter2 | Inter3 | Inter4 | Enfo7- Moved from Dim2.  |       | Inter7 |                  |
| Dimension 4 – Institution’s values and mission (3 items)      |        |        |        |        |        |                          |       |        | 0.80             |
| Alin5                                                         |        |        | Enfo1  |        |        |                          | Enfo2 |        |                  |
| Dimension 5 – Collaborative culture and climate (3 items)     |        |        |        |        |        |                          |       |        | 0.91             |
| Alin3                                                         |        |        | Alin4  |        |        |                          | Alin6 |        |                  |

Source: own elaboration.

In Table 10, we present the scale with its Alpha values. The full version with all the items may be consulted in Appendix 8. When the PCA was performed, the scale presented high values of Cronbach's Alphas, and after two rounds, a reliable and valid tool for measuring IMC in the selected HEIs was obtained. The values of Cronbach's Alphas were over 0.8, which is very satisfactory, and thus enables to use this tool for other measurement purposes. After the scale was validated, the results showed that there are five dimensions which support an IMC approach in the HE context.

This tool can help assess and monitor the global level of integration of marketing communications in HEIs and also each dimension's level separately. The level of IMC (the total score) achieved by an organization (perceived by the respondent) was obtained by asking the 29 questions regarding the scale (items scored from 1 to 7). Adding the values obtained in each response, the overall level of IMC was found.

The interest of this tool lies in its potential to establish ranges of IMC levels to compare them with other values achieved by different HEIs. Nevertheless, the total scale and each dimension have different ranges (see Table 11). This fact makes interpreting the results more challenging.

Table 11. 'Scale 1 - IMC level in an HEI'. Theoretical minimum and maximum score values (29 items/5 dimensions).

| Type of levels measured                                                 | Theoretical minimum score | Theoretical maximum score |
|-------------------------------------------------------------------------|---------------------------|---------------------------|
| Total score - IMC level for HEIs<br>(the sum of the 5 dimensions below) | 29                        | 203                       |
| Dimension 1 – Institution's communication alignment (9 items)           | 9                         | 63                        |
| Dimension 2 – Active Listening (7 items)                                | 7                         | 49                        |
| Dimension 3 – Interactivity (7 items)                                   | 7                         | 49                        |
| Dimension 4 – Institution's values and mission (3 items)                | 3                         | 21                        |
| Dimension 5 – Collaborative culture and climate (3 items)               | 3                         | 21                        |

Source: own elaboration.

Therefore, in order to facilitate the comparison and interpretation of results, we normalized the total score of the scale and each dimension, creating a linear punctuation, from 0 to 1. Consequently, the total score is ranged from 29 to 203 and is presented as a scale that goes from 0 to 1.

The above described results highlight and corroborate the multidimensionality of IMC, with five dimensions having been identified:

1) *'Institution's communication alignment' dimension*

Represents the integration of the internal and external communications at the HEI.

2) *'Active listening' dimension*

Highlights the awareness of messages generated and related to the institution.

3) *'Interactivity' dimension*

Represents the continuous dialogue with the different stakeholders by all means of communication.

4) *'Institution's values and mission' dimension*

Transmits the common objectives of the HEI concerning the society and its stakeholders.

5) *'Collaborative culture and climate' dimension*

Symbolizes the cooperation and collaboration between the HEIs' departments and its effect on the success of the organization.

3.2.5. *Scale 2 - HEI's performance scale. Reliability and validity procedures.*

Related to HEIs' performance assessment purposes, as we mentioned in previous sections, Reid's (2005) proposal was adapted. This proposal consisted of three dimensions and nine items scored on a 7-point Likert scale (See Appendix 5). After the panel of experts, another dimension related to students' satisfaction with two items was added. Consequently, the tool consisted of 11 items where before there were nine (See first column of Table 12) and after that, the reliability and validity procedures were carried out. The full analysis run in SPSS (SPSS IBM, 2011) can be seen in Appendix 6.2, specifically, the reliability procedure for this scale is exposed in Appendix 6.2.1. Moreover, in the next paragraphs, the steps and relevant outputs are summarized. First, Pearson's correlations were calculated which provided values over 0.47 in general. Although some values for example regarding 'VentU1' were 0.35, the variable had other correlations over 0.5 so the item was kept. The *p* value was 0.00 (below 0.05) and Spearman's correlations was good, between 0.4 and 0.79 (See Appendix 6.2.1.).



Table 12. 'Scale 2 - Institution's performance'. Cronbach's Alphas values before PCA.

| Scale 2 - Institution's performance                          | Cronbach's Alpha |
|--------------------------------------------------------------|------------------|
| <b>Total scale<br/>(11 items)</b>                            | <b>0.91</b>      |
| Dimension 1 –<br>Sales-related performance (4 items)         | 0.87             |
| Dimension 2 –<br>Brand advantage (3 items)                   | 0.66             |
| Dimension 3 – Students' satisfaction (2<br>items)            | 0.82             |
| Dimension 4 –<br>Groups of interests' satisfaction (2 items) | 0.89             |

Source: own elaboration.

The value of the total scale's Cronbach's Alpha is higher than the value of each dimension because the items load more than one factor at the same time. Except from the value of 'Dimension 2' (see Table 12), the Cronbach's Alphas are good, higher than 0.7 which according to Nunnally (1978) are admissible. As the value of 'Dimension 2' is lower than 0,7, indeed 0.66, a depuration process was carried out with the aim of improving that value. To do that, each of the three items which compose 'Dimension 2' were deleted with different combinations. In table 13 it can be seen the results when one of the items of dimension 2 when 'VentU2' is deleted. After testing those values when each of the three items were separately deleted, the total scale's Cronbach's Alpha increased (from 0.906 to 0.910 before round it it out). However, the value of the Alpha of 'Dimension 2' decreases. Consequently, it is decided to retain the item because it is more important to maintain the highest value of the dimension instead of the value of the total scale's Cronbach's Alpha.

Table 13. 'Scale 2 - Institution's performance'. Depuration process.

|                                                        | Nº of items at the beginning | Cronbach's Alphas before the depuration process | Items deleted | Final Nº of items (if deleted) | Final Cronbach's Alphas |
|--------------------------------------------------------|------------------------------|-------------------------------------------------|---------------|--------------------------------|-------------------------|
| <b>Scale 2 - Institution's performance</b>             | 11                           | 0.91                                            | VentU2        | 10                             | 0.91                    |
| <b>Dimension 1 – Sales-related performance</b>         | 4                            |                                                 |               | 4                              |                         |
| <b>Dimension 2 – Brand advantage</b>                   | 3                            | 0.66                                            | VentU2        | 2                              | 0.57                    |
| <b>Dimension 3 – Students' satisfaction</b>            | 2                            |                                                 |               | 2                              |                         |
| <b>Dimension 4 – Groups of interests' satisfaction</b> | 2                            |                                                 |               | 2                              |                         |

Source: own elaboration.

The 'Item-Total Statistics' table (see Appendix 6.2.1.) shows the means and variances of the sampling if each item is deleted. The column regarding the total correlation indicates that the values remain over 0.4 so it is not recommended to delete any item. Besides, the 'Cronbach's Alphas if the item is deleted' column, shows that if we delete any item, except 'VentU2', the total scale's Alpha value decreases (the values are below 0.91). However, as it is shown in Table 13, the value of 'Dimension 2' decreases so it is recommended to keep the item there. The Cronbach's Alphas values are calculated to each of the four dimensions. In this procedure they are also analysed the values of 'Corrected Item – Total Correlation' and 'Cronbach's Alphas' if the items are deleted, which are correlation values over 0.4 and Cronbach's Alphas values have a difference of less than 0.2 (see Appendix 3.2.1.).

Once the reliability stage is positively fulfilled, the validity procedure is carried out (which is exposed in detail in Appendix 6.2.2.) and the PCA is accomplished in SPSS (IBM SPSS, 2011). The 'Correlation Matrix' shows that some variables have values below 0.3 (i.e. 'RendU', 'VentU' and 'SatGPU') but at least one of their correlation value is over 0.3 so for the moment those variables were retained. The KMO measure shows a

meritorious value of 0.86. At the same time, the diagonal of the ‘Anti-Image Correlation’ represents very high values and near KMO rate. A very big correlation is demonstrated and this, together with the p value of 0.00, indicates that PCA is a very adequate technique to undertake in this reliability process.

In the ‘Total Variance Explained’ it can be seen that the 60% of the variance is explained by two factors that should be retained. The ‘scree plot’ shows an elbow with an inflexion point between three and two which reinforces that two factors are needed to be kept and also that PCA is a well-designed analysis for this study. Then, the ‘Rotated Component matrix’ (see Table 14) shows how each item loads the two factors extracted. The new combination suggested by the PCA analysis in SPSS can also be deduced. In table 14 just the highest values for each factor are shown with the proposed combination. Afterwards, the quite high communalities are observed which are over 0.54.

Table 14. ‘Scale 2- Institution’s performance’. Rotated component matrix.

| VARIABLES (items) | COMPONENTS (dimensions) |      |
|-------------------|-------------------------|------|
|                   | 1                       | 2    |
| SatGPU2           | 0.88                    |      |
| SatAIU2           | 0.88                    |      |
| SatGPU1           | 0.82                    |      |
| SatAIU1           | 0.66                    |      |
| VentU1            | 0.59                    |      |
| RendU4            |                         | 0.88 |
| RendU1            |                         | 0.76 |
| RendU2            |                         | 0.74 |
| RendU3            |                         | 0.65 |
| VentU3            |                         | 0.44 |
| VentU2            |                         | 0.38 |

Source: own elaboration.

In the second round of validation, Pearson’s and Spearman’s correlations are not needed to be calculated because the scale remains the same amount of items, but the Cronbach’s Alphas for each of the dimensions are going to be different. After calculating

them with the new combination proposed by the PCA analysis, it can be seen that the values are high (see the right side of Table 15).

Table 15. 'Scale 2 - Institution's performance'. Cronbach's Alphas before and after PCA.

| Scale 2 - Institution's performance – 11 items divided in 4 dimensions <u>before</u> PCA |                   | Scale 2 - Institution's performance – 11 items divided in 2 dimensions <u>after</u> PCA |                   |
|------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------|-------------------|
|                                                                                          | Cronbach's Alphas |                                                                                         | Cronbach's Alphas |
| <b>Total scale's Cronbach Alpha</b>                                                      | <b>0.91</b>       | <b>Total scale's Cronbach Alpha</b>                                                     | <b>0.91</b>       |
| Dimension 1 – (4 items)                                                                  | 0.87              | Dimension 1 – (5 items)                                                                 | 0.91              |
| Dimension 2 – (3 items)                                                                  | 0.66              | Dimension 2 – (6 items)                                                                 | 0.84              |
| Dimension 3 – (2 items)                                                                  | 0.82              |                                                                                         |                   |
| Dimension 4 – (2 items)                                                                  | 0.89              |                                                                                         |                   |

Source: own elaboration.

Still, it is not enough to conclude the reliability and validity of this measurement tool, as a theoretical review needs to be carried out to check up on the coherency of the items and the fit in each dimension proposed by SPSS (IMB SPSS, 2011) in the PCA analysis. Table 17 shows the structure of the 'Scale 2- HEI's performance Scale' after PCA, indeed, the final version of the scale where one item was decided to move from 'Ddimension 2' to 'Dimension 1' because although it had a lower loading in dimension two, it had a better theoretical fit in the first dimension. It can be observed also that not only dimensions have evolved in number, from four to two, but also the names have been adapted (see Tables 16 and 17).

Table 16. 'Scale 2 - Institution's performance' after expert's panel and before reliability and validity stages.

| Scale 2 – Institution's performance – before PCA                |        |        |        | Cronbach's Alpha |
|-----------------------------------------------------------------|--------|--------|--------|------------------|
| <b>Dimension 1- Sales-related performance (4 items)</b>         |        |        |        | 0.86             |
| RendU1                                                          | RendU2 | RendU3 | RendU4 |                  |
| <b>Dimension 2 – Brand advantage (3 items)</b>                  |        |        |        | 0.91             |
| VentU1                                                          | VentU2 | VentU3 |        |                  |
| <b>Dimension 3 – Student's satisfaction (2 items)</b>           |        |        |        | 0.90             |
| SatAl1                                                          | SatAl2 |        |        |                  |
| <b>Dimension 4 – Group of Interests' satisfaction (2 items)</b> |        |        |        | 0.91             |
| SatGP1                                                          | SatGP2 |        |        |                  |

Source: own elaboration.

Table 17. 'Scale 2 - Institution's performance'. After PCA (11 items/ 2 dimensions).

| Scale 2 – Institution's performance – after PCA and review                    |         |         |         |                               |        |        | Cronbach's Alpha |
|-------------------------------------------------------------------------------|---------|---------|---------|-------------------------------|--------|--------|------------------|
| <b>Dimension 1- Sales- and brand-related performance (7 items)</b>            |         |         |         |                               |        |        | 0.87             |
| RendU4                                                                        | RendU1  | RendU2  | RendU3  | VentU1-<br>moved from<br>Dim2 | VentU3 | VentU2 |                  |
| <b>Dimension 2 – Student's and Group of Interests' satisfaction (4 items)</b> |         |         |         |                               |        |        | 0.91             |
| SatGPU2                                                                       | SatAlU2 | SatGPU1 | SatAlU1 |                               |        |        |                  |

Source: own elaboration.

Table 17 presents the final version of the second scale which measures the performance achieved by a HEI as a whole, besides, the full version with all the items may be consulted in Appendix 8. When the PCA was performed, the dimensions provided high values of Cronbach's alphas, and after two rounds, a reliable and valid tool for measuring the performance achieved in HEIs was obtained. The values of Cronbach's Alphas were over 0.8, which is very satisfactory.

This tool can help assess and monitor the global level of performance in HEIs and also each dimension's level separately (see Appendix 8). The performance level of an

organization (perceived by the respondent) was obtained by asking the 11 questions regarding the scale (items scored from 1 to 7). Adding the values obtained in each response, the overall level of institution's performance in an HEI was found.

The interest of this tool lies in its potential to establish ranges and 'performance levels' to compare them with other performance values achieved in different HEIs. The total scale and each dimension have different ranges (see Table 18). This fact makes interpreting and comparison of the results more challenging.

*Table 18. 'Scale 2 - Institution's performance'. Theoretical minimum and maximum score values. Final version of the scale (11 items/ 2 dimensions).*

| Type of levels measured                                                                      | Theoretical minimum score | Theoretical maximum score |
|----------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| <b>Total score - Scale 2 - Institution's performance (the sum of the 2 dimensions below)</b> | 11                        | 77                        |
| Dimension 1- Sales- and brand-related performance (7 items)                                  | 7                         | 49                        |
| Dimension 2 – Student's and Group of Interests' satisfaction (4 items)                       | 4                         | 28                        |

*Source: own elaboration.*

Therefore, in order to facilitate that issue, we normalized the total score of the scale and each dimension's, creating a linear score, from 0 to 1. Hence, a scale that gave a total score from 11 to 77 was presented as a scale that went from 0 to 1. The above-described results highlight and corroborate the multidimensionality of performance in HE. After the scale was validated, the results showed that there are two dimensions that explain an institution's performance measurement in HE context:

1) *'Sales- and brand-related performance' dimension*

Represents the overall sales progress perceived by academics and practitioners who belong to the seven HEIs selected. This dimension also considers the brand awareness.

## 2) 'Student's and Group of Interests' satisfaction' dimension

Measures the perception of the respondents about stakeholders' satisfaction.

### 3.2.6. Scale 3 - Faculty's performance scale. Reliability and validity procedures.

Related to Faculties' performance assessment purposes, Reid's (2005) proposal was also adapted (the same tool as the one adapted to measure performance in HEIs). After the panel of experts, another dimension with two items was added. This dimension was related to students' satisfaction. Consequently the tool consisted of 11 items where before there were 9 (See first column of Table 19). The reliability procedure is shown in appendix 6.3.1. (the SPSS output values) and Pearson's and Spearman's correlations were calculated. These values, together with the significance were admissible. Although some of Pearson's correlations were quite low, below 0.5, they were compensated with other values of the row (See Appendix 6.3.1.).

Table 19. 'Scale 3 - Faculty's performance'. Cronbach's Alphas values.

| <b>Scale 3 – Faculty's performance</b>                       | <b><i>Cronbach's Alpha</i></b> |
|--------------------------------------------------------------|--------------------------------|
| <b>Total scale<br/>(11 items)</b>                            | <b>0.91</b>                    |
| Dimension 1 –<br>Sales-related performance (4 items)         | 0.92                           |
| Dimension 2 –<br>Brand advantage (3 items)                   | 0.69                           |
| Dimension 3 – Students' satisfaction (2<br>items)            | 0.94                           |
| Dimension 4 –<br>Groups of interests' satisfaction (2 items) | 0.95                           |

Source: own elaboration.

Table 19 shows that except from the value of 'Dimension 2', Cronbach's Alphas are good, and according Nunnally (1978) higher than 0.7 are admissible. The value of the total scale's Cronbach's Alpha is higher than the value of each dimension because the items load more than one factor at the same time. The value of 'Dimension 2' is near but

still lower than 0.7, indeed 0.69, so a depuration process was carried out with the aim of improving it. When ‘VentF3’ item from ‘Dimension 2’ was deleted (see Table 20), it can be observed that the value of the total scale’s Cronbach’s Alpha increases (from 0.91 to 0.92) but the value of the Alpha of ‘Dimension 2’ decreases. Consequently, it is decided to retain all the items because it is more important to maintain the highest value of the dimension instead of the total scale’s Cronbach’s Alpha value.

Table 20. Depuration process of ‘Scale 3 - Faculty’s performance’.

|                                                        | Nº of items at the beginning | Cronbach’s Alphas before the depuration process | Items deleted | Final Nº of items (if deleted) | Final Cronbach’s Alphas |
|--------------------------------------------------------|------------------------------|-------------------------------------------------|---------------|--------------------------------|-------------------------|
| <b>Scale 3 – Faculty’s performance</b>                 | 11                           | 0.91                                            | VentF3        | 10                             | 0.92                    |
| <b>Dimension 1 – Sales-related performance</b>         | 4                            |                                                 |               | 4                              |                         |
| <b>Dimension 2 – Brand advantage</b>                   | 3                            | 0.69                                            | VentF3        | 2                              | 0.66                    |
| <b>Dimension 3 – Students’ satisfaction</b>            | 2                            |                                                 |               | 2                              |                         |
| <b>Dimension 4 – Groups of interests’ satisfaction</b> | 2                            |                                                 |               | 2                              |                         |

Source: own elaboration.

The ‘Item-Total Statistics’ table (see Appendix 6.3.1.) shows the means and variance of each item if those are deleted. The column regarding the total correlation, indicates that the values remain over 0.4 so it is not recommended to delete any item. Concerning, the column of Cronbach’s Alphas if the item is deleted, in the case of ‘VentF2’ variable, the Cronbach’s Alpha’s value would be 0.91, the same as the value of the total scale’s Cronbach’s Alpha. This means that if we delete the item would not affect to the scale in any ways, this supports our conclusion obtained at the depuration process shown in Table 20, so every item is suffested to be maintained.

The Cronbach’s Alphas values are calculated to each of the four dimensions (see the left side of Table 22). In this procedure they are also exposed the values of ‘Corrected



Item – Total Correlation’ and ‘Cronbach’s Alphas’ if the items are deleted, which are correlation values over 0.4 and Cronbach’s Alphas values have a difference of less than 0.2 which mean that variables correlated well and every of them were kept. Once the reliability stage is positively fulfilled, the validity procedure is accomplished (see Appendix 6.3.2.) and the PCA analysis is carried out on SPSS. The ‘Correlation Matrix’ shows that some variables have values below 0.3 (i.e. ‘RendF1’, ‘RendF2’, ‘RendF3’, ‘VentF2’, ‘VentF3’, ‘SatAlf2’, ‘SatPPF3’ and ‘SantGPF3’) but at least one of them is over 0.3 so for the moment those variables were retained. Besides, the KMO measure shows a meritorious value of 0.83, and at the same time the diagonal of the ‘Anti-Image Correlation’ represents very high values and near KMO. A very big correlation is demonstrated and this, together with the  $p$  value of 0.00, indicates that PCA is a very adequate technique to undertake in this reliability process (See all the outputs and tables obtained in SPSS in Appendix 6.3.2.).

In the ‘Total Variance Explained’, it can be observed that the 83% of the variance is explained by three factors that are suggested to be retained. In the elbow of the ‘scree plot’, the inflexion point between three and four also shows that three factors should be retained and that PCA is a well-designed analysis for this study. Then, the ‘Rotated Component matrix’ displays how each item loads the three factors extracted, in Table 21 the highest loadings and the new combination suggested by the PCA analysis in SPSS (IBM SPSS, 2011) can be deduced. Next, the communalities are observed, which are high and over 0.74.

Table 21. 'Scale 3 - Faculty's performance'. Rotated component matrix.

| VARIABLES (items) | COMPONENTS (dimensions) |      |      |
|-------------------|-------------------------|------|------|
|                   | 1                       | 2    | 3    |
| SatAlF2           | 0.92                    |      |      |
| SatGPF3           | 0.92                    |      |      |
| SatAlF1           | 0.89                    |      |      |
| SatGPF2           | 0.88                    |      |      |
| VentF1            | 0.73                    |      |      |
| RendF4            |                         | 0.91 |      |
| RendF2            |                         | 0.87 |      |
| RendF1            |                         | 0.86 |      |
| RendF3            |                         | 0.77 |      |
| VentF2            |                         |      | 0.83 |
| VentF3            |                         |      | 0.83 |

Source: own elaboration.

After the new combination is suggested, a second round of validation needs to be accomplished (see sixth and seventh steps of Figure 2 in 2.3.1. header). To do that, Pearson's and Spearman's correlations are not calculated because the scale remains the same amount of items, 11. Nevertheless, the Cronbach's Alphas for each dimension are going to be different. It can be seen that the obtained values in this second round are high, actually over 0.71 (see the right side of Table 22).

Table 22. 'Scale 3 - Faculty's performance'. Cronbach's Alphas before and after PCA.

| Scale 3 – Faculty's performance – 11 items divided in 4 dimensions <u>before</u> PCA |                   |   | Scale 3 – Faculty's performance – 11 items divided in 3 dimensions <u>after</u> PCA |                   |
|--------------------------------------------------------------------------------------|-------------------|---|-------------------------------------------------------------------------------------|-------------------|
|                                                                                      | Cronbach's Alphas |   |                                                                                     | Cronbach's Alphas |
| <b>Total scale's Cronbach Alpha</b>                                                  | <b>0.91</b>       |   | <b>Total scale's Cronbach Alpha</b>                                                 | <b>0.91</b>       |
| Dimension 1 – (4 items)                                                              | 0.92              | ➔ | Dimension 1 – (5 items)                                                             | 0.95              |
| Dimension 2 – (3 items)                                                              | 0.69              |   | Dimension 2 – (4 items)                                                             | 0.92              |
| Dimension 3 – (2 items)                                                              | 0.94              |   | Dimension 3 – (2 items)                                                             | 0.72              |
| Dimension 4 – (2 items)                                                              | 0.96              |   |                                                                                     |                   |

Source: own elaboration.

However, it is not enough to conclude the reliability and validity of this measurement tool, a theoretical review needs to be carried out to check up on the coherency of the items and the fit in each dimension proposed by SPSS (IBM SPSS, 2011) in the PCA analysis. The number of items and dimensions of the ‘Scale 3- Faculty’s performance’ before the PCA was of 11 and four respectively. After the analysis, the resultant number of items remain the same but dimensions are reduced to three. Moreover, Table 24 shows the final version and structure after PCA with the resulting items of each dimension. It shows that one item was decided to move because although it had a lower loading in that factor (dimension 3), it had a better fit in the second dimension.

It can be observed also that not only the dimensions have been changed, from four to three, but also the names have been adapted (see Tables 23 and 24). The full version which provides all the items may be consulted in Appendix 8. When the PCA analysis was performed, and after two rounds, a reliable and valid tool for measuring the performance achieved in faculties was obtained. The values of Cronbach’s Alphas were almost over 0.7, which is very satisfactory, and thus enables to use this tool. After the scale was validated, the results showed that there are three dimensions which explain the measurement of performance of faculties in the context of HE.

Table 23. ‘Scale 3 - Faculty’s performance’. After expert’s panel and before reliability and validity stages.

| Scale 3 – Faculty’s performance – before PCA                     |        |         |        | Cronbach’s Alphas |
|------------------------------------------------------------------|--------|---------|--------|-------------------|
| <b>Dimension 1 – Sales-related performance (4 items)</b>         |        |         |        | 0.92              |
| RendF1                                                           | RendF2 | RendF3  | RendF4 |                   |
| <b>Dimension 2 – Brand advantage (3 items)</b>                   |        |         |        | 0.69              |
| VenF1                                                            | VenF2  | VenF3   |        |                   |
| <b>Dimension 3 – Students’ satisfaction (2 items)</b>            |        |         |        | 0.94              |
| SatAlF1                                                          |        | SatAlF2 |        |                   |
| <b>Dimension 4 – Groups of interests’ satisfaction (2 items)</b> |        |         |        | 0.95              |
| StGPF1                                                           |        | SatGPF2 |        |                   |

Source: own elaboration.

Table 24. 'Scale 3 - Faculty's performance'. Final version of the scale – IMC level scale for in HEI (11 items/ 3 dimensions).

| <b>Scale 3 – Faculty's performance – before PCA</b>                                | <b>Cronbach's Alpha</b> |
|------------------------------------------------------------------------------------|-------------------------|
| <b>Dimension 1 – Sales-related performance (4 items)</b>                           | 0.92                    |
| RendF1      RendF2      RendF3      RendF4                                         |                         |
| <b>Dimension 2 – Brand advantage (3 items)</b>                                     | 0.75                    |
| VenF1 <small>Moved from Dim3.<br/>Better theoretic fit.</small> VentF2      VentF3 |                         |
| <b>Dimension 3 – Students' and Groups of interests' satisfaction (2 items)</b>     | 0.96                    |
| SatAlF1      SatAlF2      SatGPF1      SatGPF2                                     |                         |

Source: own elaboration.

This tool can help assess and monitor the level of performance at faculties in the selected HEIs and also each dimension's level separately (see Appendix 8). The performance level of a faculty (perceived by the respondent) was obtained by asking the 11 questions regarding the scale (items scored from 1 to 7). Adding the values obtained in each response, the overall level of faculties' performance is found.

The interest of this tool lies in its potential to establish ranges and 'performance levels' to compare them with other values from other faculties. The total scale and each dimension have different ranges (see Table 25). This fact makes interpreting the results more challenging.

Table 25. 'Scale 3 - Faculty's performance'. Minimum and maximum score values. Final version of the scale (11 items/ 3 dimensions).

| <b>Type of levels measured</b>                                                           | <b>Theoretical minimum score</b> | <b>Theoretical maximum score</b> |
|------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|
| <b>Total score - Scale 3 – Faculty's performance (the sum of the 3 dimensions below)</b> | 11                               | 77                               |
| Dimension 1- Sales- and brand-related performance (4 items)                              | 4                                | 28                               |
| Dimension 2 – Brand advantage (3 items)                                                  | 3                                | 21                               |
| Dimension 3 – Student's and Group of Interests' satisfaction (4 items)                   | 4                                | 28                               |

Source: own elaboration.

Therefore, in order to facilitate the comparison and interpretation of results, we normalized the total score of the scale and each dimension's, creating a linear score, from 0 to 1. For instance, a scale that gave a total score ranging from 11 to 77 was presented as a scale that went from 0 to 1.

The above described results highlight and corroborate the multidimensionality of performance of faculties in HE, with three dimensions having been identified:

1) *'Sales-related performance' dimension*

Represents the overall sales progress perceived in a faculty by academics and practitioners who belong to the seven HEIs selected.

2) *'Brand advantage' dimension*

Measures the perceived brand awareness of that faculty where they belong.

4) *'Students' and Group of interests' satisfaction' dimension*

Highlights the satisfaction of all the stakeholders considered in the present research.

3.2.7. *Scale 4 - Master's degree performance scale. Reliability and validity procedures.*

Master's degrees' performance assessment was also carried out with Reid's (2005) proposal (like the previous two scales related to performances of HEIs and faculties). The aforementioned was adapted and after the panel of experts, another dimension with two items was added (related to students' satisfaction). Consequently, the tool consisted of 11 items where before there were 9 (See first column of Table 26). The stages of the reliability procedure are shown in Appendix 6.4.1. where the calculation of Pearson's and Spearman's correlations were calculated, which were admissible. Besides,  $p$  value was also below 0.05. Although some of Pearson's correlations were quite low, they were compensated with other values of the row (See Appendix 6.4.1.).

Table 26. 'Scale 4 - Master's degree performance'. Cronbach's Alphas values.

| <b>Scale 4 – Master's degree performance</b>                 | <b>Cronbach's Alpha</b> |
|--------------------------------------------------------------|-------------------------|
| <b>Total scale<br/>(11 items)</b>                            | <b>0.89</b>             |
| Dimension 1 –<br>Sales-related performance (4 items)         | 0.94                    |
| Dimension 2 –<br>Brand advantage (3 items)                   | 0.69                    |
| Dimension 3 – Students' satisfaction (2<br>items)            | 0.93                    |
| Dimension 4 –<br>Groups of interests' satisfaction (2 items) | 0.95                    |

Source: own elaboration.

Except from the value of 'Dimension 2' (see Table 26), the Cronbach's Alphas are good, indeed, higher than 0.7, which according to Nunnally (1978) are admissible. As the value of 'Dimension 2' is lower than 0.7 (Nunnally, 1978), actually 0.699, a depuration process was carried out with the aim of improving it. When each of the three items that composed 'Dimension 2' were deleted, the value of the total scale's Cronbach's Alpha increased (from 0.89 to 0.92). However, when 'VentM3' was deleted, the Cronbach's Alpha value of 'Dimension 2' decreased (see Table 27). Consequently, it is decided to retain the item because it is more important to maintain the highest value of the dimension and not the total scale Cronbach's Alpha.

Table 27. Depuration process of 'Scale 4 - Master's degree performance'.

|                                                        | N° of items at the beginning | Cronbach's Alphas before the depuration process | Items deleted | Final N° of items (if deleted) | Final Cronbach's Alphas |
|--------------------------------------------------------|------------------------------|-------------------------------------------------|---------------|--------------------------------|-------------------------|
| <b>Scale 4 – Master's degree performance</b>           | 11                           | 0.89                                            | VentM3        | 10                             | 0.92                    |
| <b>Dimension 1 – Sales-related performance</b>         | 4                            |                                                 |               | 4                              |                         |
| <b>Dimension 2 – Brand advantage</b>                   | 3                            | 0.69                                            | VentM3        | 2                              | 0.66                    |
| <b>Dimension 3 – Students' satisfaction</b>            | 2                            |                                                 |               | 2                              |                         |
| <b>Dimension 4 – Groups of interests' satisfaction</b> | 2                            |                                                 |               | 2                              |                         |

Source: own elaboration.

As mentioned before, the SPSS (SPSS IBM, 2011) output of the reliability procedure is shown in Appendix 6.4.1., however, the next paragraphs explain every step carried out. The 'Item-Total Statistics' table shows the means and variances of each item if these are deleted, the column regarding the total correlation indicates that the values remain over 0.4 so it is not recommended to delete any item. The Cronbach's Alphas values were calculated for each of the four dimensions (see Table 26) and in this procedure they are also exposed the values of 'Corrected Item – Total Correlation' and 'Cronbach's Alphas' if the items are deleted. Which provide correlation values over 0.4 and Cronbach's Alphas values' have a difference of less than 0.2 (see Appendix 6.4.1), which means that variables correlated well and every of them were kept.

Once the reliability stage is positively fulfilled, validity procedure began (see Appendix 6.4.2.) and the PCA was carried out in SPSS (IBM SPSS, 2011). The 'Correlation Matrix' shows that the correlation values are in general over 0.3 so for the moment variables were retained. The KMO measure shows a value of 0.77, at the same time the diagonal of the 'Anti-Image Correlation' represents very high values and near the KMO. A very big correlation is demonstrated and this, together with the value of  $p$  of

0.00, indicates that PCA is a very adequate technique to undertake in this reliability process.

In the ‘Total Variance Explained’ it can be observed that the 83% of the variance is explained by three factors that are suggested to be retained. The inflexion point at the ‘scree plot’ between three and four (the elbow) also shows that three factors should be retained and that PCA is a well-designed analysis for this study. Then, the ‘Rotated Component matrix’ (values extracted at Table 28) displays how each item loads each of the three factors extracted. The highest loadings and the new combination suggested by the PCA analysis in SPSS (IBM SPSS, 2011) is also exposed. Next, the communalities are observed, which are high and over 0.71.

Table 28. ‘Scale 4 - Master’s degree performance’. Rotated component matrix.

| VARIABLES (items) | COMPONENTS (dimensions) |      |      |
|-------------------|-------------------------|------|------|
|                   | 1                       | 2    | 3    |
| SatAlM2           | 0.94                    |      |      |
| SatAlM1           | 0.94                    |      |      |
| SatGPM1           | 0.88                    |      |      |
| SatGPM2           | 0.87                    |      |      |
| VentM1            | 0.74                    |      |      |
| RendM4            |                         | 0.96 |      |
| RendM2            |                         | 0.95 |      |
| RendM1            |                         | 0.88 |      |
| RendM3            |                         | 0.83 |      |
| VentM3            |                         |      | 0.87 |
| VentM2            |                         |      | 0.78 |

Source: own elaboration.

The second round of validation is carried out with the combination proposed, Pearson’s and Spearman’s correlations are not calculated because the scale remains the same amount of items, 11. However, the Cronbach’s Alphas for each dimension are going to be different. The obtained new values are shown in table 29 and are high (see the right side at Table 29).



Table 29. 'Scale 4 - Master's degree performance'. Cronbach's Alphas before and after PCA.

| Scale 4 – Master’s Degree’s performance – 11 items divided in 4 dimensions <u>before</u> PCA |      | Cronbach’s Alphas |   | Scale 4 – Master’s Degree’s performance – 11 items divided in 3 dimensions <u>after</u> PCA |      | Cronbach’s Alphas |
|----------------------------------------------------------------------------------------------|------|-------------------|---|---------------------------------------------------------------------------------------------|------|-------------------|
| Total scale’s Cronbach Alpha                                                                 | 0.83 |                   | ➔ | Total scale’s Cronbach Alpha                                                                | 0.83 |                   |
| Dimension 1 – (4 items)                                                                      | 0.94 |                   |   | Dimension 1 – (5 items)                                                                     | 0.95 |                   |
| Dimension 2 – (3 items)                                                                      | 0.69 |                   |   | Dimension 2 – (4 items)                                                                     | 0.94 |                   |
| Dimension 3 – (2 items)                                                                      | 0.93 |                   |   | Dimension 3 – (2 items)                                                                     | 0.69 |                   |
| Dimension 4 – (2 items)                                                                      | 0.95 |                   |   |                                                                                             |      |                   |

Source: own elaboration.

Still, it is not enough to conclude the reliability and validity of this measurement scale. A theoretical review needs to be carried out to check up on the coherency of the items and the fit in each dimension proposed by SPSS (IBM SPSS, 2011) after the PCA analysis. Table 31 shows the number of items and dimensions of the 'Scale 4- Master's degree performance' after PCA which is the final version of the scale (with its correlation values). It can be seen that one item was decided to move from 'Dimension 3' to 'Dimension 2' because although it had a lower loading in 'Dimension 2', it had a better fit in 'Dimension 3'. The full version with all the items may be consulted in Appendix 8. It can be observed also that not only the dimensions have changed in number, from four to three, but also its names have been modified (see Tables 30 and 31).

Table 30. 'Scale 4 - Master's degree performance' - after expert's panel and before reliability and validity stages.

| <b>Scale 4 – Master's degree performance before PCA</b>          |         |        |        | <b>Cronbach's Alpha</b> |
|------------------------------------------------------------------|---------|--------|--------|-------------------------|
| <b>Dimension 1 – Sales-related performance (4 items)</b>         |         |        |        | 0.94                    |
| RendM1                                                           | RendM2  | RendM3 | RendM4 |                         |
| <b>Dimension 2 – Brand advantage (3 items)</b>                   |         |        |        | 0.69                    |
| VenM1                                                            | VenM2   | VenM3  |        |                         |
| <b>Dimension 3 – Students' satisfaction (2 items)</b>            |         |        |        | 0.93                    |
| SatAlM1                                                          | SatAlM2 |        |        |                         |
| <b>Dimension 4 – Groups of interests' satisfaction (2 items)</b> |         |        |        | 0.95                    |
| StGPM1                                                           | SatGPM2 |        |        |                         |

Source: own elaboration.

Table 31. 'Scale 4 - Master's degree performance'. Final version of the scale – IMC level scale for in HEI (11 items/ 3 dimensions).

| <b>Scale 4 – Master's degree performance after PCA (ordinated coherently)</b>  |         |         |         | <b>Cronbach's Alpha</b> |
|--------------------------------------------------------------------------------|---------|---------|---------|-------------------------|
| <b>Dimension 1 – Sales-related performance (4 items)</b>                       |         |         |         | 0.94                    |
| RendM1                                                                         | RendM2  | RendM3  | RendM4  |                         |
| <b>Dimension 2 – Brand advantage (3 items)</b>                                 |         |         |         | 0.69                    |
| VenM1 Moved from Dim3.<br>Better theoretic fit in Dim2.                        | VenM2   | VenM3   |         |                         |
| <b>Dimension 4 – Students' and Groups of interests' satisfaction (2 items)</b> |         |         |         | 0.96                    |
| SatAlM1                                                                        | SatAlM2 | SatGPM1 | SatGPM2 |                         |

Source: own elaboration.

In Table 31, we present the final version of the fourth scale. When the PCA analysis was performed, and after two rounds, a reliable and valid tool for measuring the performance achieved in master's degrees was obtained. The values of Cronbach's Alphas were almost over 0.7, which is very satisfactory. After the scale was validated, the results showed that there are three dimensions which explain the master's degrees' performance measurement in HE context.

This tool can help assess and monitor the global level of master's degrees in HEIs and also each dimension's level separately (see Appendix 8). The performance level of a master's degree (perceived by the respondent, in this case the master's degrees' directors) was obtained by asking the 11 questions regarding the scale (items scored from 1 to 7). Summing up the values obtained in each response, the overall level of master's degrees performance is found.

The interest of this tool lies in its potential to establish ranges and 'performance levels' to compare them with other master's degrees. The total scale and each dimension have different ranges (see Table 32). This issue makes interpreting the results more challenging.

*Table 32. 'Scale 4 - Master's degree performance'. Theoretical minimum and maximum score values. Final version of the scale (11 items/ 3 dimensions).*

| Type of levels measured                                                                            | Theoretical minimum score | Theoretical maximum score |
|----------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| <b>Total score - Scale 4 – Master's degree performance<br/>(the sum of the 3 dimensions below)</b> | 11                        | 77                        |
| Dimension 1- Sales- and brand-related performance<br>(4 items)                                     | 4                         | 28                        |
| Dimension 2 – Brand Advantage<br>(3 items)                                                         | 3                         | 21                        |
| Dimension 3 – Student's and Group of Interests' satisfaction<br>(4 items)                          | 4                         | 28                        |

*Source: own elaboration.*

Therefore, in order to facilitate the comparison and interpretation of results, we normalized the total score of the scale and each dimension, creating a linear score, from 0 to 1. For instance, a scale or dimension that gave scores ranging from 11 to 77 was presented as a scale that went from 0 to 1.

The above described results highlight and corroborate the multidimensionality of performance of master's degrees in HE, with three dimensions having been identified:

1) *'Sales-related performance' dimension*

Represents the overall sales progress perceived by academics who are also master's degrees' directors of the master's degrees offered in the selected seven HEIs for this research.

2) *'Brand advantage' dimension*

Measures the perceived brand awareness of that master's degree.

3) *'Students' and Group of interests' satisfaction' dimension*

Highlights the satisfaction of all the stakeholders participating in the corresponding master's degree.

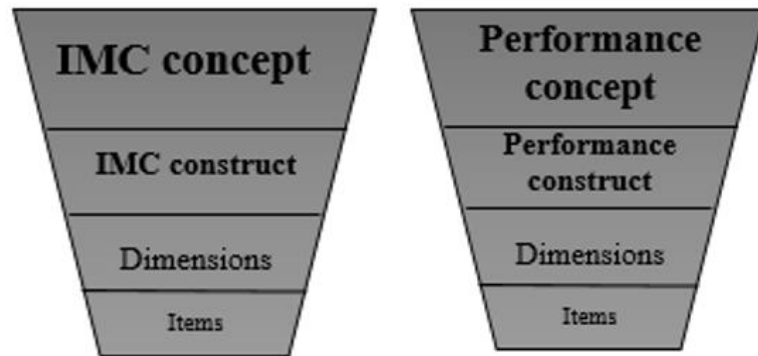
### **3.3. Summary of Chapter III**

In the present chapter, we achieved the second objective of the present dissertation, to suggest reliable and valid tools to measure the level of IMC and performance in the context of HE, in a non-English speaking country, in another language and considering different perceptions, academics' and practitioners' in the same organization.

IMC and performance are two multidimensional constructs and several proposals have been suggested over the years to measure them. As far as we know, there are not definite tools to measure those constructs and few empirical attempts have been carried out in the context of HE. In this chapter, besides proposing a set of tools to measure the aforementioned constructs, IMC and performance, a set of dimensions which explain those constructs in HE are also suggested and also the items to measure them are defined. Figure 5 shows how both constructs have been studied from being a concept to a

measurable construct. Indeed, as IMC and performance were needed to be measured, the construct was defined, and also its dimensions and its items.

*Figure 5. IMC and performance constructs.*



*Source: own elaboration.*

The definition of the constructs, its dimensions and items lead to four instruments to measure IMC and performances effectively at three levels (institution, faculty and master's degrees). To achieve those four measurement tools, we followed a multi-stage research design, indeed, an adapted process for creating an instrument and validating the scales based on Churchill's (1979) seminal work and Gerbing and Anderson's (1988) broadly accepted methodology. Porcu, del Barrio-García & Kitchen (2017) also adopted this procedure to carry out 'the firm-wide IMC scale', which is one of the tools that is being adapted and validated in this investigation together with the one proposed to assess performance by Reid (2005). Appendix 8 presents the final version of each of the four scales. The process of the adaptation and validation of the four tools is described in detail in the present Chapter III, first we contrasted the tool with the experts and then we confirmed the qualitative part with the quantitative procedure. The result of this adaptation is considered an improvement of scales that did not exist for HEIs and non-English speaking countries, nor considering two perspectives, those of academics and practitioners. In this process, a set of dimensions that explain IMC level and performance

in HE, performance in faculties and performance in master's degrees are proposed and summarized in Table 33.

*Table 33. IMC level and performance. Dimensions proposed after the empirical procedure.*

| <b>Scale 1 - IMC level in an HEI</b>                          | <b>Scale 2 - Institution's performance</b>                             | <b>Scale 3 – Faculty's performance</b>                                 | <b>Scale 4 – Master degree performance</b>                             |
|---------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|
| Dimension 1 – Institution's communication alignment (9 items) | Dimension 1- Sales- and brand-related performance (7 items)            | Dimension 1- Sales-related performance (4 items)                       | Dimension 1- Sales-related performance (4 items)                       |
| Dimension 2 – Active Listening (7 items)                      | Dimension 2 – Student's and Group of Interests' satisfaction (4 items) | Dimension 2 – Brand advantage (3 items)                                | Dimension 2 – Brand advantage (3 items)                                |
| Dimension 3 – Interactivity (7 items)                         |                                                                        | Dimension 3 – Students' and Group of Interests' satisfaction (4 items) | Dimension 3 – Students' and Group of Interests' satisfaction (4 items) |
| Dimension 4 – Institution's values and mission (3 items)      |                                                                        |                                                                        |                                                                        |
| Dimension 5 – Collaborative culture and climate (3 items)     |                                                                        |                                                                        |                                                                        |

*Source: own elaboration.*

Next chapter's (Chapter IV) purpose is to fulfil the third objective of the current dissertation, by analysing if IMC and performance are positively associated. The hypotheses of this dissertation are also tested with the data obtained after administering the surveys shown in appendix 7. To do that, simple linear regressions, multiple linear regressions and CART regression trees are going to be performed.







## **4. Chapter IV. Application of scales**

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4.1. Application of IMC measurement and performance scales

4.2. Results

4.3. Summary of Chapter IV



#### **4. Application of scales**

In Chapter IV, the association between IMC and performance is analysed. Actually, the hypotheses that have been proposed in previous chapters are tested (See Chapter I, ‘1.3. IMC applied to HE’ and Chapter II, ‘2.2. Statement of hypotheses’ headers) which are based on the gaps found in the literature. These hypotheses state that IMC and performance in higher education (HE) at three levels (institution, faculty and master’s degree) are positively associated.

##### ***4.1. Application of IMC measurement and performance scales***

Some studies show that there is a positive association between the IMC construct and the different dimensions that explain business performance. Such is the study proposed by Reid (2005) which measures the IMC construct through the ‘Duncan-Moriarty IMC mini-audit’ (Duncan & Moriarty, 1998). Also the study proposed by Porcu, del Barrio-García & Kitchen (2017), who proposed a measurement scale for IMC and then found that IMC level and business performance were positively associated.

This dissertation first assesses the IMC level in the selected seven HEIs and second, its business performance. These constructs were measured with four different scales. In order to measure them, the applied tools are designed in the previous chapter (Chapter III) and exposed in appendix 7. These tools help HEIs’ staff (both academics and practitioners) assess the integration of marketing and communication efforts and performances related to the HEI where they belong. Besides, the results obtained can be seen in the following tables 34, 35, 36 and 37 where the descriptive statistics are shown: Minimum, 1<sup>st</sup> quartile, Median, Mean, 3<sup>rd</sup> Quartile, Maximum and Standard Deviation values (See Appendix 11 to see the formulas and explanation for each descriptive statistic value).

#### 4.1.1. Scale 1 - IMC level in an HEI Scale. Descriptive statistics.

Table 34 shows that the obtained IMC values provide 77 data points with a minimum level of 0.21 and a maximum level of 0.91 (while the theoretical minimum and maximum levels were '0' and '1' respectively after normalizing the scale, see '3.2.4.' heading). The mean and the median are very similar ( $\bar{x}$  =0.65 and Me=0.66) so we can conclude that the distribution is symmetric. Besides, considering the mean as a reference point, 0.65, and the standard deviation as 0.16, it can be concluded that a variation of 0.16 exists over a mean of 0.65. Subsequently, respondents perceive overall a high level of IMC because its value is usually over 0.5 (as mentioned before, considering that the theoretical maximum value for IMC is '1').

Table 34. Descriptive statistics of the IMC level measured.

| Descriptive Statistics             | N  | Min. | 1 <sup>st</sup> quartile<br>(25% of the observations) | Median<br>Me | Mean<br>$\bar{x}$ | 3 <sup>rd</sup> quartile<br>(75% of the observations) | Max. | Std. deviation<br>$\sigma$ |
|------------------------------------|----|------|-------------------------------------------------------|--------------|-------------------|-------------------------------------------------------|------|----------------------------|
| Scale 1 - MC level in an HEI Scale | 77 | 0.21 | 0.52                                                  | 0.67         | 0.65              | 0.76                                                  | 0.91 | 0.16                       |

Source: own elaboration.

#### 4.1.2. Scale 2 - HEI's performance Scale. Descriptive statistics.

Table 35 shows that the obtained performance values about the institution provide 77 data points with a minimum level of 0.33 and a maximum level of 1 (while the theoretical minimum and maximum levels were '0' and '1' respectively after normalizing the scale, see '3.2.5.' heading). The mean and the median are very similar ( $\bar{x}$  =0.70 and Me=0.71) so we can conclude that the distribution is symmetric. Besides, considering the mean as a reference point, 0.70, and the standard deviation as 0.13, it can be concluded that a variation of 0.13 exists over a mean of 0.70.

Table 35. Descriptive statistics of the performance measured in the institution.

| Descriptive Statistics            | N  | Min. | 1 <sup>st</sup> quartile (25% of the observations) | Median Me | Mean $\bar{x}$ | 3 <sup>rd</sup> quartile (75% of the observations) | Max. | Std. deviation $\sigma$ |
|-----------------------------------|----|------|----------------------------------------------------|-----------|----------------|----------------------------------------------------|------|-------------------------|
| Scale 2 – HEI's performance scale | 77 | 0.33 | 0.64                                               | 0.71      | 0.70           | 0.79                                               | 1    | 0.13                    |

Source: own elaboration

#### 4.1.3. Scale 3 - Faculty's performance Scale. Descriptive statistics.

Table 36 shows that the obtained performance values regarding faculties provide 77 data points with a minimum level of 0.36 and a maximum level of 1 (while the theoretical minimum and maximum levels were '0' and '1' respectively after normalizing the scale, see '3.2.6.' heading). The mean and the median are the same ( $\bar{x}$  =0.71 and Me=0.71) so we can conclude that the distribution is symmetric. Besides, considering the mean as a reference point, 0.71, and the standard deviation as 0.14, it can be concluded that a variation of 0.14 exists over a mean of 0.71.

Table 36. Descriptive statistics of the performance measured in the faculty.

| Descriptive Statistics                | N  | Min. | 1 <sup>st</sup> quartile (25% of the observations) | Median Me | Mean $\bar{x}$ | 3 <sup>rd</sup> quartile (75% of the observations) | Max. | Std. deviation $\sigma$ |
|---------------------------------------|----|------|----------------------------------------------------|-----------|----------------|----------------------------------------------------|------|-------------------------|
| Scale 3 – Faculty's performance scale | 77 | 0.36 | 0.62                                               | 0.71      | 0.71           | 0.80                                               | 1    | 0.14                    |

Source: own elaboration.

#### 4.1.4. Scale 4 – Master’s degree performance Scale. Descriptive statistics.

Table 37 shows that the obtained performance values about the master’s degrees provide 36 data points with a minimum level of 0.28 and a maximum level of 0.91 (while the theoretical minimum and maximum levels were ‘0’ and ‘1’ respectively after normalizing the scale, see ‘3.2.7.’ heading). The mean and the median are very similar ( $\bar{x}$  =0.64 and Me=0.67) so we can conclude that the distribution is symmetric. Besides, considering the mean as a reference point, 0.64, and the standard deviation as 0.14, it can be concluded that a variation of 0.14 exists over a mean of 0.64. Subsequently, respondents perceive a variability of 0.14 over a mean of 0.64 regarding performance at master’s degrees.

Table 37. Descriptive statistics of the performance measured in the master’s degree.

| Descriptive Statistics                    | N  | Min. | 1 <sup>st</sup> Quartile<br>(25% of the observations) | Median<br>Me | Mean<br>$\bar{x}$ | 3 <sup>rd</sup> Quartile<br>(75% of the observations) | Max. | Std. Deviation<br>$\sigma$ |
|-------------------------------------------|----|------|-------------------------------------------------------|--------------|-------------------|-------------------------------------------------------|------|----------------------------|
| Scale 4 – Master degree performance scale | 36 | 0.28 | 0.56                                                  | 0.67         | 0.64              | 0.73                                                  | 0.91 | 0.14                       |

Source: own elaboration.

After the IMC level and business performance were measured with the four scales shown in tables 34, 35, 36 and 37, the association between those two constructs (IMC and performances) is studied in the next section.

## 4.2. Association between IMC and performance

With the aim of testing the stated hypotheses (see ‘2.2.’ heading ), indeed, to analyse the association between the IMC level achieved by an organization and performances related to institutions, faculties and master’s degrees, we carried out two types of linear regression models (with just one independent variable and with three independent variables) and three CART regression trees. The full data was analysed in R statistic

software (R Core Team, 2019). The linear regressions were run in 'R base module' and CART regression trees simulations were carried out in 'Rpart' package (Therneau & Atkinson, 2019) (in Appendix 9 the full code in 'R base module' and 'Rpart' is exposed).

In many situations, the suppositions to apply the linear regression models are not met and some users tend to force these, leading to erroneous conclusions. However, alternative methods exist that do not require suppositions on the data to be analysed, such as, classification and regression trees (CART), where the results can easily be interpreted and further information about the model is provided. That is why in this dissertation, we compare the results obtained in the linear regressions with the developed CART regression trees. Consequently, the association between IMC and performance in HE at three different levels is analysed and the stated hypotheses are tested.

As we mentioned before, first, we created three linear regression models with just one independent variable, the IMC level (I). To measure its relation with the performance grades achieved at three levels: Performance perceived at the Institution level (PI), Performance perceived at a Faculty level (PF) and Performance perceived at a Master's degree level (PM). Second, we fitted three multiple linear regression models with three independent variables, IMC level (I), Profile of the respondent (P) and the University (U) where those respondents belong. These three variables were studied with three dependent variables separately; the three types of performances, at the institution level (PI), the faculty level (PF) and the master's degree level (PM).

Lastly, we fitted three CART models with three different dependent variables, the performance at the institution level (PI), at a faculty level (PF) and at master's degree level (PM). Besides, again three explicative (independent) variables were considered for the first two CART trees were PI and PF were predicted, IMC level (I), profile of the respondent (P) and university (U) where those subjects belong. However, the last CART

tree that predicted PM just considered two independent variables, IMC level (I) and university (U), because all respondents were academics and the profile of the respondents (P) was coded as a '0', consequently there was not variability in 'P' as it was not providing information to explain PM at all.

#### *4.2.1. Linear regression*

Both simple and multiple linear regression are the most frequently used regression models. Their goal is to make the 'best' possible estimation of the general trend regarding the relationship between the predictor (independent variable(s)) and the dependent variable.

*Relation between IMC and Performances - simple linear regression model with one independent variable, IMC level (I).*

In the following three linear regression models with just one independent variable, the IMC level (I) (See Table 38), IMC level's association was analysed with the performance grades (dependent variable) achieved at three levels: at the institution level (PI), at a faculty level (PF) and at a master's degree level (PM). Results are shown in Table 39.



Table 38. Simple linear regression. Description and summary of variables.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $\mathbf{PI = f_1 (I) + \epsilon}$ $\mathbf{PF = f_2 (I) + \epsilon}$ $\mathbf{PM = f_3 (I) + \epsilon}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p><b>Legend:</b><br/> ‘f<sub>1</sub>’, ‘f<sub>2</sub>’ and ‘f<sub>3</sub>’ are considered linear functions which relate PI, PF and PM (dependent variables) with I (independent variable).</p> <p>‘<math>\epsilon</math>’ is the error term. The effect of the variables that have not been considered in the regression model.</p> <p><b>Dependent variables:</b><br/> ‘PI’ represents the performance perceived at the whole Institution level. Dependent variable 1.<br/> ‘PF’ represents the performance perceived at the Faculty level. Dependent variable 2.<br/> ‘PM’ represents the performance perceived at the master’s degree level. Dependent variable 3.</p> <p><b>Independent variable:</b><br/> ‘I’ represents the level of IMC. Quantitative variable.</p> |

Source: own elaboration.

Table 39. Simple linear regression. Descriptive statistics of the data series with one independent variable (I).

| Series                                  | N° of observations | Multiple R <sup>2</sup> | Adjusted R <sup>2</sup> | p-value | Coefficients | Estimate | Std. Error | t    |
|-----------------------------------------|--------------------|-------------------------|-------------------------|---------|--------------|----------|------------|------|
| <b>Model 1.1. PI dependent variable</b> | 77                 | 0.25                    | 0.24                    | 0.00    | Intercept    | 0.44     | 0.05       | 8.13 |
|                                         |                    |                         |                         |         | I            | 0.40     | 0.08       | 4.94 |
| <b>Model 1.2. PF dependent variable</b> | 77                 | 0.12                    | 0.11                    | 0.00    | Intercept    | 0.52     | 0.06       | 8.31 |
|                                         |                    |                         |                         |         | I            | 0.30     | 0.10       | 3.19 |
| <b>Model 1.3. PM dependent variable</b> | 36                 | 0.29                    | 0.27                    | 0.00    | Intercept    | 0.37     | 0.08       | 4.73 |
|                                         |                    |                         |                         |         | I            | 0.44     | 0.12       | 3.69 |

Note: The level of IMC (I) is the independent variable. Besides, the different performances, ‘PI’, ‘PF’, and ‘PM’, are the dependent variables.

Source: own elaboration.

*Interpretation of results of simple linear regression*

(See Table 39 and Appendix 10.1.)

*Model 1.1.*

The variable that we try to explain is PI (dependent variable) that corresponds to the performance perceived in the whole institution by both academics and practitioners in HEIs. In this simple model we try to explain PI with one independent variable, the IMC level (I).

‘*P* value’ is significant because it is below the significance level of 0.05, which is a generally accepted value (Fisher, 1992) in several publications (see ‘3.2.3. Reliability and validity’ header to see the explanation). Besides, the ‘*R*<sup>2</sup>’ value is 0.25 and this means that in this model, IMC explains the 25% of changes in the PI variable.

The ‘Estimate’ of IMC (I) value measures the effect that a change in a unit of IMC (I) has in the predicted performance of institutions (the effect that IMC has in PI). When IMC increases (in one unit), PI increases a 0.40 (‘Estimate’ of IMC) (see second row at the right side of Table 39). The ‘Estimate’ value states that this relation is positive and as ‘*p* value’ of I is below 0.05 ( $p=0.00$ ), the relation is also significant.

It can be concluded that the association between IMC (I) and PI is direct or positive and significant, consequently, when IMC increases PI increases too, and when IMC decreases PI decreases as well (IMC and PI are positively associated).

*Model 1.2.*

The variable that we try to describe is ‘PF’ (dependent variable) that corresponds to the performance perceived in the faculty of an institution by both academics

and practitioners in HEIs. In this model we try to explain PF with one independent variable, the IMC level (I).

' $P$  value' is significant as its value is below the significance level, according to Fisher (1992) 0.05 ( $p=0.00$ ). Besides, ' $R^2$ ' value is 0.12, which means that in Model 1.2. IMC explains the 12% of changes in PF variable.

Besides, ' $p$  value' is higher (0.0020 before rounding it out)) than the one of the previous Model 1.1. (See Table 39). Subsequently, Model 1.2. is less significant than the previous one (the previous model's ' $p$  value' is lower). This could be because while the institution was the same for the respondents (of the same institution), the faculties were not the same for every respondent at the same institution. For example, two respondents belonging to the institution number 1, would respond to the performance perceived at the institution (PI) number 1. Nevertheless, when we asked about the performance of the faculty that they belonged, one respondent could belong to the faculty of engineering and the other one to the faculty of social sciences. This means that although they belonged to the same institution, they did not necessarily had to belong to the same faculty. Accordingly, the responses received are the perceptions of performances of different faculties.

The 'Estimate' value for IMC is positive (0.30), consequently, and considering all the aforementioned values, when IMC (I) increases, the performance in faculties increase too (PF), thus, these variables are positively associated.

#### *Model 1.3.*

The variable that we try to explain in Model 1.3. is the performance perceived in the master's degrees (PM) (dependent variable) by the academics who are also the

directors of these. In the present model we try to explain PM with one independent variable, the IMC level (I).

‘*P* value’ is significant as its value is below the established significance level by Fisher (1992), it is below 0.05, indeed, 0.0008 before rounding it out. Besides, ‘*R*<sup>2</sup>’ value is 0.29, which means that in Model 1.3., IMC explains the 29% of changes in PF variable.

The ‘Estimate’ value is positive (0.44), consequently, when IMC (I) increases, the performance in master’s degrees increase too (PM), thus, these variables (I and PM), are positively associated.

*Relation between (IMC, profile, university) and performance – multiple linear regression model with three independent variables: IMC (I), Profile (P) and University (U)*

Three multiple linear regression models with three independent variables were also developed. The three independent variables are the following: the IMC level (I) which is a quantitative variable, the profile of the respondent (P), a dichotomous variable (coded with a value of ‘0’ for academics and a ‘1’ for practitioners) and the university (U) where those subjects belong, a qualitative variable (coded with values from 1 to 7). These three independent variables were studied with three different performances (dependent variables) measured separately, performance perceived at the institution level (PI), at a faculty level (PF) and at a master’s degree level (PM). Each variable is explained in Table 40.

Table 40. Multiple linear regression. Description and summary of variables.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $\mathbf{PI = f_1 (I, P, U) + \epsilon}$ $\mathbf{PF = f_2 (I, P, U) + \epsilon}$ $\mathbf{PM = f_3 (I, U) + \epsilon}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p><b>Legend:</b></p> <p><u>'f<sub>1</sub>'</u> and <u>'f<sub>2</sub>'</u> are considered linear functions that relate PI and PF (dependent variables) with I, P and U (independent variables).</p> <p><u>'f<sub>3</sub>'</u> is considered a linear function that relates PM (dependent variable) with I and U (independent variables). P, the dichotomous variable, is not considered in 'f<sub>3</sub>' because in this model this variable does not change as all respondents are academics, coded as '0'.</p> <p><u>'ε'</u> is the error term. The effect of the variables that have not been considered in the regression model.</p> <p><u>Dependent variables:</u></p> <p>'PI' represents the performance perceived at the whole Institution level. Dependent variable 1.</p> <p>'PF' represents the performance perceived at the Faculty level. Dependent variable 2.</p> <p>'PM' represents the performance perceived at the Master's degree level. Dependent variable 3.</p> <p><u>Independent variables:</u></p> <p>'I' represents the level of IMC. Quantitative variable.</p> <p>'P' represents the profile of the respondent. Dichotomous variable.</p> <p>'U' represents the University where the respondent belongs to and the third independent variable. Qualitative variable.</p> |

Source: own elaboration.

Table 41. Multiple linear regression. Descriptive statistics of the data series for multiple linear regression models with more than one independent variable (I, U, and P).

| Series                                              | N° of observations | Multiple R <sup>2</sup> | Adjusted R <sup>2</sup> | F-statistic | p value | Coefficient | Estimate                                                                                       | Std. Error | t     | p value |
|-----------------------------------------------------|--------------------|-------------------------|-------------------------|-------------|---------|-------------|------------------------------------------------------------------------------------------------|------------|-------|---------|
| <b>Model 2.1.<br/>PI<br/>dependent<br/>variable</b> | 77                 | 0.46                    | 0.40                    | 7.21        | 0.00    | Intercept   | 0.44                                                                                           | 0.05       | 8.80  | 0.00    |
|                                                     |                    |                         |                         |             |         | I           | 0.31                                                                                           | 0.08       | 3.97  | 0.00    |
|                                                     |                    |                         |                         |             |         | P           | 0.08                                                                                           | 0.02       | 3.15  | 0.00    |
|                                                     |                    |                         |                         |             |         | U2          | 0.11                                                                                           | 0.03       | 3.55  | 0.00    |
|                                                     |                    |                         |                         |             |         | U3          | -0.06                                                                                          | 0.05       | -1.21 | 0.23    |
|                                                     |                    |                         |                         |             |         | U4          | 0.04                                                                                           | 0.04       | 1.14  | 0.26    |
|                                                     |                    |                         |                         |             |         | U5          | 0.11                                                                                           | 0.07       | 1.53  | 0.13    |
|                                                     |                    |                         |                         |             |         | U6          | 0.02                                                                                           | 0.07       | 0.27  | 0.79    |
| <b>Model 2.2.<br/>PF<br/>dependent<br/>variable</b> | 77                 | 0.22                    | 0.13                    | 2.39        | 0.02    | Intercept   | 0.52                                                                                           | 0.06       | 8.27  | 0.00    |
|                                                     |                    |                         |                         |             |         | I           | 0.23                                                                                           | 0.09       | 2.35  | 0.02    |
|                                                     |                    |                         |                         |             |         | P           | 0.04                                                                                           | 0.03       | 1.14  | 0.26    |
|                                                     |                    |                         |                         |             |         | U2          | 0.08                                                                                           | 0.04       | 1.97  | 0.05    |
|                                                     |                    |                         |                         |             |         | U3          | -0.07                                                                                          | 0.07       | -0.98 | 0.33    |
|                                                     |                    |                         |                         |             |         | U4          | 0.03                                                                                           | 0.05       | 0.71  | 0.48    |
|                                                     |                    |                         |                         |             |         | U5          | 0.11                                                                                           | 0.09       | 1.13  | 0.26    |
|                                                     |                    |                         |                         |             |         | U6          | 0.00                                                                                           | 0.09       | 0.00  | 0.99    |
| <b>Model 2.3.<br/>PM<br/>dependent<br/>variable</b> | 36                 | 0.37                    | 0.21                    | 2.32        | 0.05    | Intercept   | 0.38                                                                                           | 0.09       | 4.27  | 0.00    |
|                                                     |                    |                         |                         |             |         | I           | 0.42                                                                                           | 0.14       | 2.80  | 0.00    |
|                                                     |                    |                         |                         |             |         | P           | All the respondents are academics. Coded as '0' (variable not considered in the present model) |            |       |         |
|                                                     |                    |                         |                         |             |         | U2          | -0.01                                                                                          | 0.06       | -0.26 | 0.80    |
|                                                     |                    |                         |                         |             |         | U3          | 0.08                                                                                           | 0.08       | 0.99  | 0.33    |
|                                                     |                    |                         |                         |             |         | U4          | -0.01                                                                                          | 0.07       | -0.20 | 0.84    |
|                                                     |                    |                         |                         |             |         | U5          | 0.03                                                                                           | 0.13       | 0.23  | 0.82    |
|                                                     |                    |                         |                         |             |         | U6          | 0.02                                                                                           | 0.13       | 0.16  | 0.88    |
| <b>Model 2.3.<br/>PM<br/>dependent<br/>variable</b> | 36                 | 0.37                    | 0.21                    | 2.32        | 0.05    | U7          | -0.18                                                                                          | 0.13       | -1.38 | 0.18    |

Source: own elaboration.

### Interpretation of results of multiple linear regression

(See Table 41 and Appendix 10.2.)

#### Model 2.1.

The variable that we try to explain is 'PI' (dependent variable) that corresponds to the performance perceived in the whole institution by both academics and practitioners from the selected HEIs. In this model, 'PI' is explained with three

independent variables: the IMC level (I), Profile (P) of respondents, academic or practitioner, and the University (U) where they belong.

This is a representative model overall, because ' $p$  value' is significant and below 0.05 ( $p=0.00$ ) but we have to analyse the role of each variable one by one. The ' $R^2$ ' value is 0.46 which reaffirms that the model overall is explicative because IMC (I), Profile and University, explain the 46% of the performance in the HEI.

The 'Estimate' value for the quantitative variable, IMC (I), measures the effect that a unit of IMC (I) has in the performance (PI). In model 2.1. IMC is significant because its value is 0.31 and ' $p$  value' is of 0.00. For Profile (P) and University (U) variables, the 'Estimate' is differently interpreted. As we mentioned before, regarding P, '0' corresponds to academics and '1' to managers. With these premises, the 'Estimate' value of P being 0.08 means that the profiles with the higher value computed, managers, provide a higher perception of performance. Indeed, the performance increases in 0.08 if a '1', manager, responds. About the variable related to the University where they belong (U), as we mentioned before, U1 is established as a base and the rest of the universities are codified as U2, U3, U4, U5, U6 and U7. Regarding the university (U) variable, there are not significant variations between U1 and the rest of the universities, except between U1 and U2.  $P$  value for U2 is significant (0.00), this means that respondents who belong to U2 perceive a 0.11 ('Estimate' value for U2) higher value of PI compared to the ones who belong to U1 (control variable).

First rows of Table 41 and Appendix 10.2. summarize the relevant values of the current multiple regression (model 2.1.) and overall suggest that I and PI

are positively associated. However, P and U are not very significant variables in this model.

#### *Model 2.2.*

The variable that we try to explain is PF (dependent variable) that corresponds to the performance perceived in the faculty of an institution by both academics and practitioners in HEIs. PF is explained with three independent variables: achieved IMC level (I), Profile (P) of respondents, academic or practitioner, and the University (U) where they belong.

This is a less explicative model compared to the previous one because ‘*p* value’ is significant as it is below 0.05 but has higher value (0.02 compared to 0.00, see Table 41). Still, we have to analyse each variable one by one. The ‘*R*<sup>2</sup>’ value is 0.22 (lower than the value of Model 2.1. also) which means that IMC (I), profile (P) and university (U), explain the 22% of the performance in the faculty of a HEI (PF).

The ‘Estimate’ value of IMC measures the effect that a unit of IMC (quantitative variable) has in the performance (PF). In model 2.2. IMC is significant because its ‘*p* value’ is of 0.02 ( $p < 0.05$ ) and its ‘Estimate’ value is of 0.23. P variable is not significant because its *p* value is higher than 0.05, indeed 0.26. About the university (U), there are not significant variations between U1 and the rest of the universities. ‘*P* value’ for U2 is almost significant ( $p = 0.05$ ), but it is over 0.05 so it is discarded. Second row of Table 41 and Appendix 10.2 summarize the relevant values of the current multiple regression (model 2.2.) and overall suggests that IMC (I) and PI are positively associated. However, P (profile) is not significant and U2 is almost but neither significant because both show ‘*p* values’ over 0.05.



*Model 2.3.*

The variable that we try to explain in model 2.3. is the performance perceived in the master's degree by the academics who are also directors of it (PM) (dependent variable). PM is described with two independent variables: the IMC level (I) and the university (U) where they belong. The profile (P) is not considered because there is no variation in this variable since every respondent is the same type; academics and coded with a '0'.

This model is not representative because its ' $p$  value' is 0.05, it is not lower than the significance level of 0.05 according to Fisher (1992) and several publications. However, when PM was explained with the linear regression model (see model 1.3.) and with just one independent variable, IMC (I), the positive association took place between I and PM.

*4.2.2. CART regression trees*

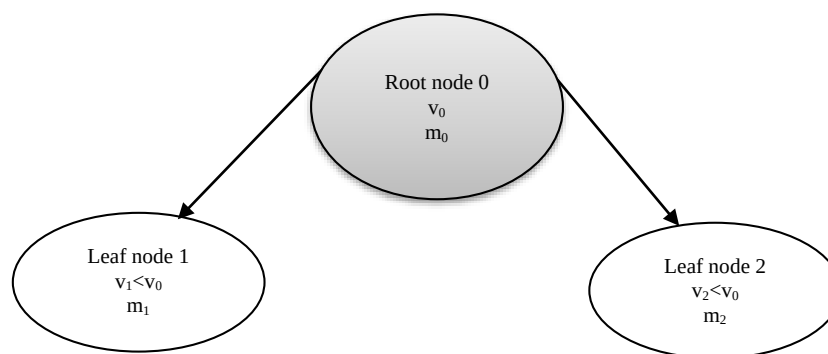
With the aim of explaining three types of performances (institution, faculty and master's degree), six linear regression models were accomplished (two for each of the performances) in the previous section. After that, three CART regression trees were carried out to explain these performances with the aim of providing additional information.

CART, the acronym for Classification and Regression Trees, is derived from the book titled Classification and Regression Trees, published in 1984 by Leo Breiman, Jerome H. Friedman, Richard A. Olshen, and Charles J. Stone (Breiman, Friedman, Olshen, & Stone, 1984).

Tree-based methods appeared with Morgan and Sonquist (1963). However, they gained their popularity through the major theoretical and practical contribution of

Breiman et al. (1984). It was initially introduced as an alternative to parametric methods in discriminant and regression analysis and has been extended more recently to censored survival analysis (LeBlanc & Crowley, 1992; Bou-Hamad, Larocque, & Ben-Ameur, 2009, Bou-Hamad, Larocque, & Ben-Ameur, 2011). As an alternative to standard statistical methods (such as linear discriminant analysis and linear regression), CART is applicable to nonstandard data sets (e.g., those with incomplete observations and those in which the relationships among the variables differ from group to group). Consequently, a regression tree can be understood as a non-parametric alternative technique for the linear regression algorithms. It is considered a more flexible and non-linear method and it does not necessarily provide a linear relationship between the predictor and the predicted variables. It provides a composition of linear pieces and establishes the linear cuts. CART uses a set of independent variables to split a sample into progressively smaller subgroups.

Figure 6. CART regression trees' features.



Legend: '  $v_x$  = Deviance' and '  $m_x$  = Average or Arithmetic mean'.

Source: own elaboration adapted from Bou-Hamad et al. (2011).

CART trees provide an interesting and often revealing way of looking at data in classification or regression models. They should not exclude other methods, but they do add a flexible nonparametric tool to the data analyst's resource.

CART uses a recursive algorithm to split the data into classes (or nodes) based on logical ‘if-then’ conditions on the explanatory variables. The purpose of classification trees is to find the best splitter explanatory variable partitioning the parent node into two more homogenous children nodes. The algorithm starts with the root node (initial data set), where all the respondents are considered. The root node is divided always in two children nodes, one child node on the left and another child node on the right. Thus, the internal variability of those children nodes is minimum (and the variability between those nodes is maximum) and so on until growing a large tree (see Figure 6). For CART regression trees, the goodness of the split is measured by the reduction’s impurity, which is measured by the deviance of the node, named ‘ $v_x$ ’ (see Figure 6). The deviance is the sum of squared deviations from the average and it is smaller after every split. Besides, the growth of the tree can be continued until it is decided to stop. The reasons to stop the splits of the tree may be because at a certain point, we have few individuals or the deviance is very small. Besides, when we run the tree until the end, ‘fully grown’ trees tend to over-fit the data. To avoid to over-fit the data, two criterions have been considered. On the one hand, we stopped in a node where there were few observations and on the other hand, we also ended the procedure in nodes where there was not variability (small deviance) as it meant that there were very homogeneous nodes.

The main advantage of classification trees is the simplicity of interpreting their results. Another benefit is that classification and regression trees do not require implicit assumptions as in the case of parametric models. Despite their benefits, CART trees suffer from unsteadiness (Breiman et al., 1984), where a small change in the training data may have a major impact on the predictive ability of the tree.

### *Application of CART regression trees*

The following three CART regression trees consider IMC level (I), profile (P) of respondents and the university (U) as independent variables. The dependent variables that are going to be explained will be the performances related to institution, faculty and master's degree (PI, PF and PM). In the previously mentioned dependent variables, every respondent is represented. When PI and PF are explained, 77, and when PM is explained, 36 will be the individuals. The nodes will be split in smaller nodes with smaller deviances which means that they are more homogeneous (See full code in 'Rpart' in Appendix 9.3.).

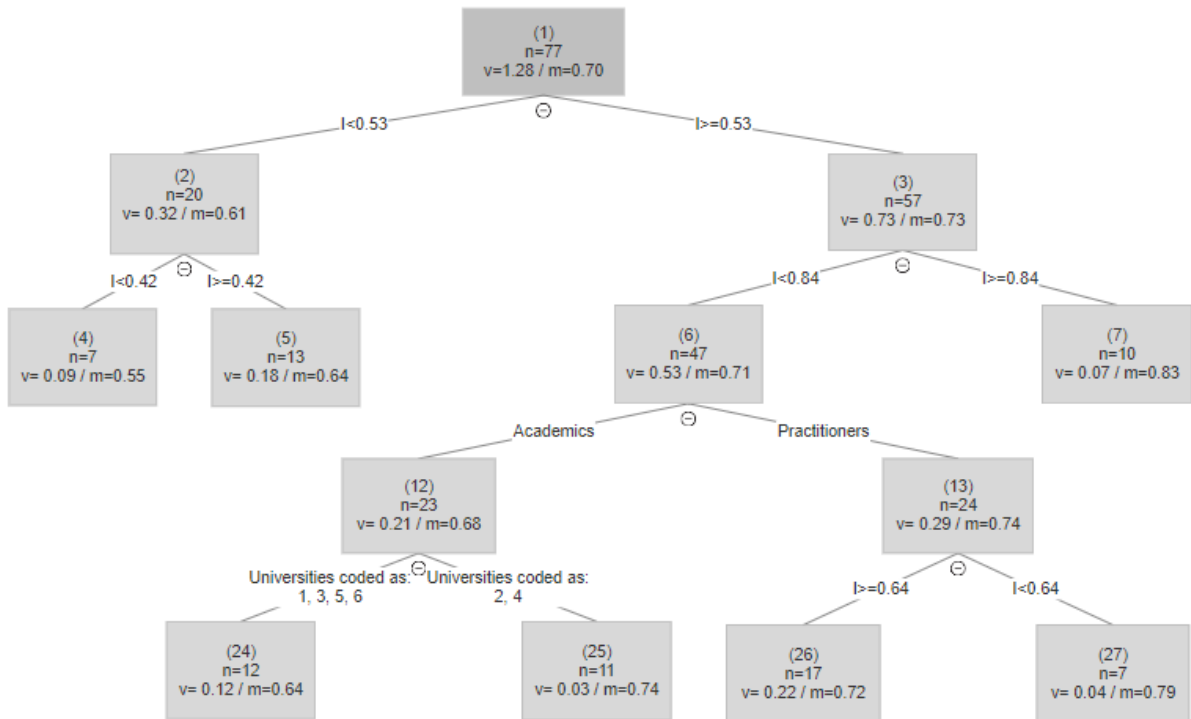
### *Interpretation of results – CART models*

#### *Model 3.1.*

The variable that we try to explain is PI (dependent variable) that corresponds to the performance perceived in the whole institution by both academic and practitioners in the selected seven HEIs. We explain PI with three independent variables, the IMC level (I), profile (P) of respondents, academic or practitioner, and the university (U) where they belong. The result is shown in Figure 7.

At the first node every individual is represented, 77 respondents (academics and practitioners) of the seven HEIs analysed. This root node is split in smaller nodes with smaller deviances (v) which means that are more homogeneous. In the same row/ level, when 'v' is higher, the individuals that belong to that node are more different. The 'm' value of its node at the same level is compared with the value of each split or cut (see Figure 7).

Figure 7. Decision tree 1. Performance of the institution (PI).



Legend:

*I*: IMC level

*v*= deviance

*m*= average or arithmetic mean (PI's average)

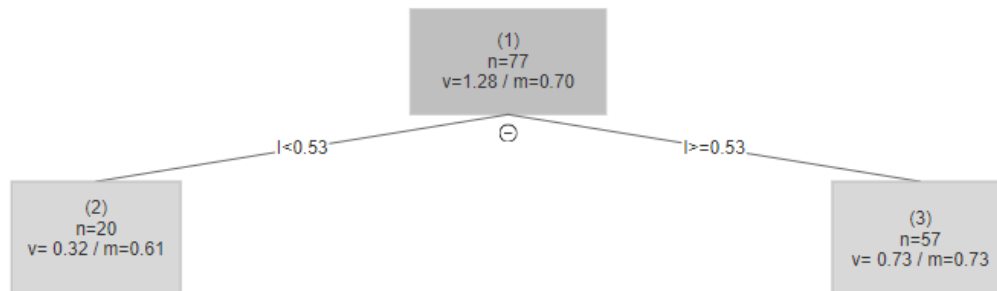
*n*=number of subjects

( ) = in brackets the number of node of the CART tree is indicated

Source: own elaboration after the 'Rpart' code exposed in Appendix 9.3.

Overall, there is a general tendency that when *I* is higher *PI* is higher too and vice versa; when *I* is lower *PI* is lower as well. This statement is appreciated (also) in the first splits where all the individuals are considered. The first splits are exposed in Figure 8 where from the 77 respondents those with IMC values (see the split on the left side of the figure) below 0.53 perceive lower IMC ('*m*' value is lower). Besides, those individuals with values of IMC over 0.53, perceive a higher value of *PI* ('*m*' value is higher in the right side of the figure).

Figure 8. Decision tree 1. First split. General tendency of the individuals (I and PI positively associated).



Source: own elaboration after the 'Rpart' code exposed in Appendix 9.3.

The first split of the tree shows (see Figure 8) the tendency that IMC and PI are positively associated, which is corroborated in the following splits (third row). Figure 9 exposes the third row of the tree, where all the respondents are represented, 77 individuals, and shows how the four nodes (4, 5, 6 and 7) are ordinated by the IMC value, when IMC is higher, PI is higher too (see IMC values of the splits and 'm' values ).

Figure 9. Decision tree 1. Third row. General tendency of the individuals (IMC and PI positively associated).

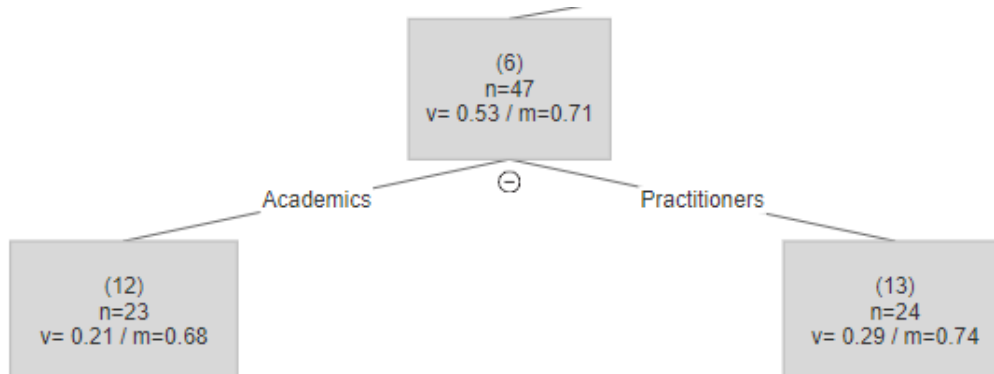


Source: own elaboration after the 'Rpart' code exposed in Appendix 9.3.

Particularly, the CART technique details the following about the small group of 47 people (see the splits below the sixth node in Figure 10): Node 6 is divided in two profiles, 23 academics that belong to the 12<sup>th</sup> node and 24 practitioners that belong to node 13. It is observed how practitioners with IMC values (of the splits) below 0.84, perceive a higher value of PI than academics ('m' is higher). The lower perception of IMC perceived by the academics may be because these are not so familiarized with the topic as the practitioners, but it is

not possible to make conclusions or find an explanation because the respondents are few. Subsequently, a hypothesis arises which states that academics perceive a lower PI than practitioners. The aforementioned could be tested in future research.

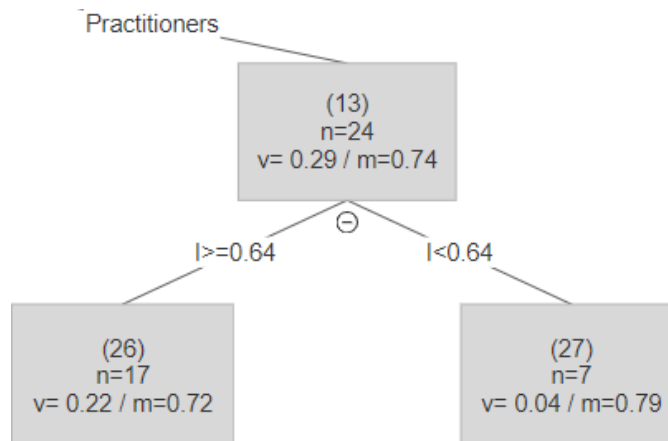
Figure 10. Decision tree 1. Practitioners and academics' perceptions with IMC values (of the splits) below 0.84.



Source: own elaboration after the 'Rpart' code exposed in Appendix 9.3.

However, those practitioners from node 13 with IMC values below 0.84 that perceive a higher IMC level than academics, perceive a negative association between IMC and PI (when 'm' values of nodes 26 and 27 are compared, see Figure 11). Namely, they believe that when IMC is higher, performance is lower and vice versa; when I is lower PI is higher.

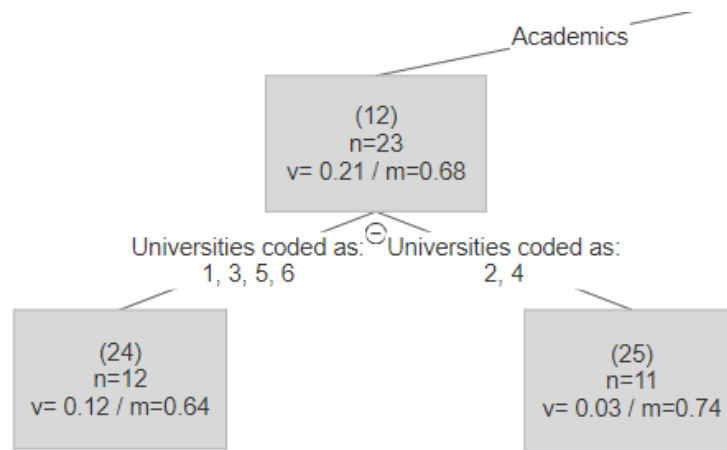
Figure 11. Decision tree 1. Negative association between PI and I. Perceived by practitioners with IMC values (of the splits) below 0.84.



Source: own elaboration after the 'Rpart' code exposed in Appendix 9.3.

Moreover, if we analyse the group of 23 academics with IMC values (of the splits) below 0.84, who perceive a lower value of PI than practitioners, the ones that belong to universities coded as 2 and 4 perceive a higher PI. Nevertheless, academics who belong to this group of 23 (node number 12) and belong to universities coded as 1, 3, 5 and 6, perceive a lower level of PI (see Figure 12).

Figure 12. Decision tree 1. Results of the variable university related associations. Perceived by academics with IMC values (of the splits) below 0.84.



Source: own elaboration after the 'Rpart' code exposed in Appendix 9.3.

Overall, it can be seen that the IMC level (I) is the leading variable in this regression tree (Model 3.1.) as it performs in almost all splits. Besides, generally, I and PI are positively associated and this conclusion can be seen in row three of the tree (Figure 9).

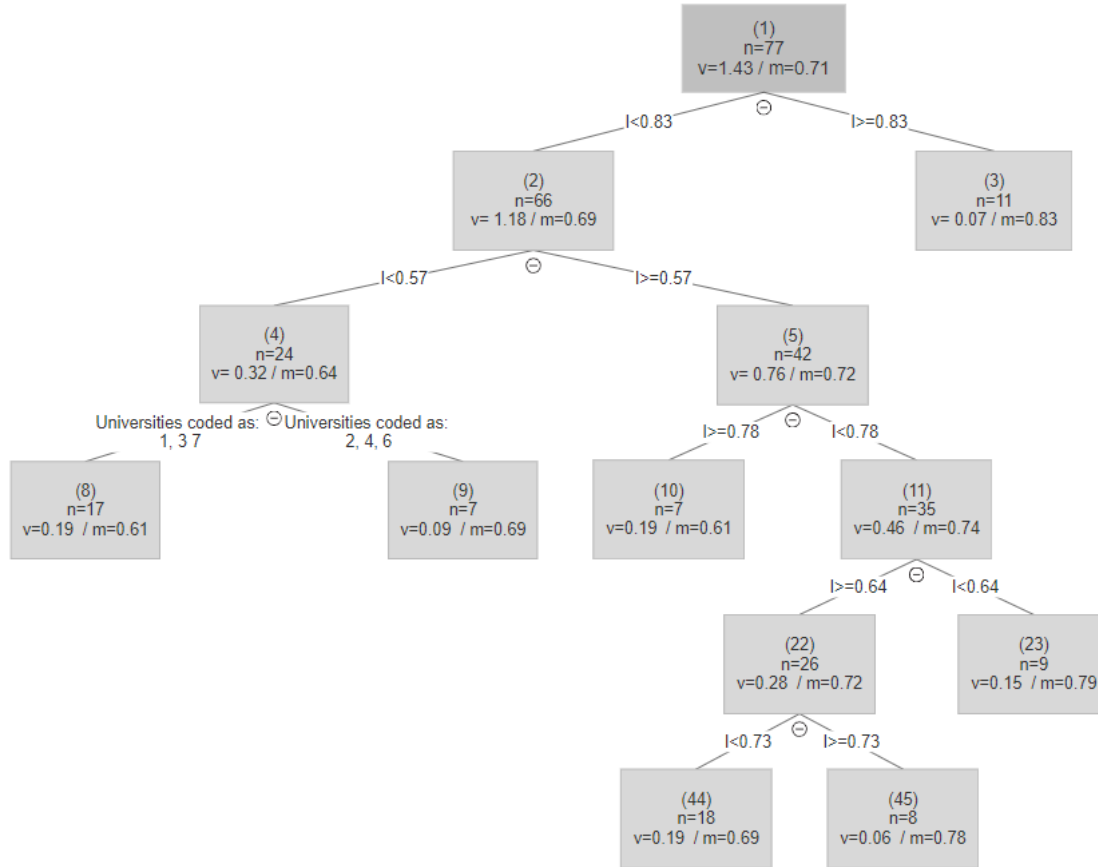
#### Model 3.2.

The variable that we try to explain is the performance at the faculties (PF) (dependent variable) that corresponds to the performance perceived in the faculty of an institution by both academics and practitioners in HEIs. In this model, we try to describe PF with three independent variables, achieved IMC level (I), profile



(P) of respondents, academic or practitioner, and the university (U) where they belong. The result is shown in Figure 13.

Figure 13. Decision tree 2. Performance of the faculty (PF).



Legend:

I: IMC level

v= deviance

m= average or arithmetic mean of the dependent variable (PF's average)

n= number of subjects

()= in brackets the number of the node of the CART tree is indicated

Source: own elaboration after the 'Rpart' code exposed in Appendix 9.3.

At the first node every individual is represented, 77 respondents (academics and practitioners). This root node is split in smaller nodes with smaller deviances (v) which are also more homogeneous. When 'v' is higher, the individuals that belong to that node are more different. In the next sections, the 'm' value of its node at the same level is compared with the value of each split with the aim of explaining how the variables are associated.

In general, IMC (I) is the leading variable in the splits of this tree (see Figure 13). Overall, there is a tendency that when I and PF are positively associated, but the details exposed by the CART technique shows some negative associations between I and PF (which can be observed in nodes 10, 11, 22 and 23).

Figure 14. Decision tree 2. First split. Positive association between I and PF.

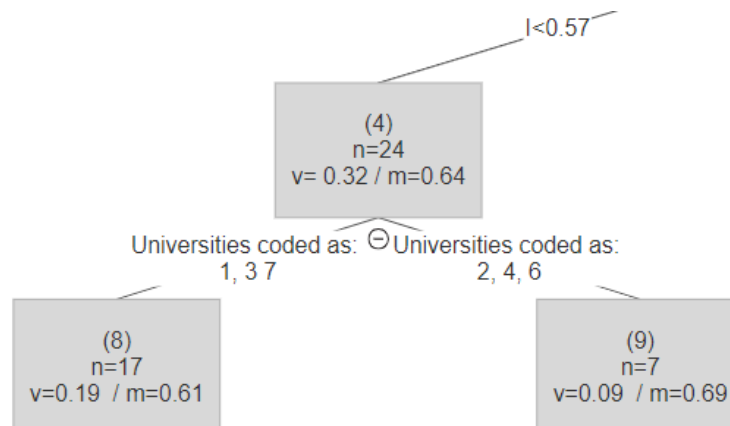


Source: own elaboration after the 'Rpart' code exposed in Appendix 9.3.

In figure 14, where the 77 individuals are represented, it can be observed that the tendency shows that when IMC is higher PF is higher too and vice versa, when IMC is lower PF is lower too (see m values of the row).

Moreover, the group of 24 respondents with IMC value (of the split) below 0.57 who belong to universities coded as 1, 3 and 7 perceive a lower PF than the ones who belong to universities coded as 2, 4 and 6 (see Figure 15).

Figure 15 Decision tree 2. Results of the variable university related associations. Perceived by respondents with IMC values (of the splits) below 0.57.



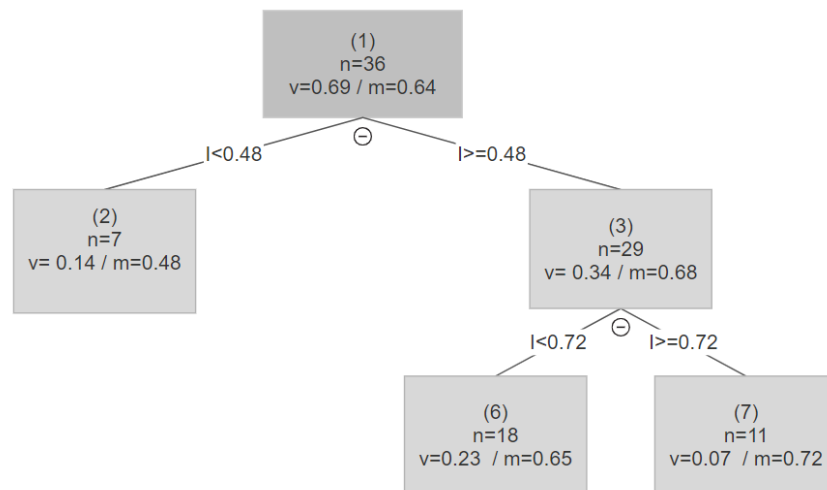
Source: own elaboration after the 'Rpart' code exposed in Appendix 9.3.

Overall, it can be seen that the IMC level (I) is the leading variable in this regression tree (Model 3.2.) as it performs in almost all splits. Besides, generally I and PF are positively associated and this conclusion can be seen in the first split where every respondent is represented (Figure 14).

### Model 3.3.

The variable that we try to explain is 'PM' (dependent variable) that corresponds to the performance perceived in the master's degree by the academics who are also the directors of these programs. Model 3.3. tries to explain PM with two independent variables, the IMC level (I) and the University (U) where those academics belong. We did not consider the profile variable as an independent variable in this model because all the respondents were academics so there was not a variability associated and the profile did not explain PM. The result is shown in Figure 16.

Figure 16. Decision tree 3. Performance of the master's degree (PM).



#### Legend:

I= IMC level

v= deviance

m= average or arithmetic mean of the dependent variable (PM's average)

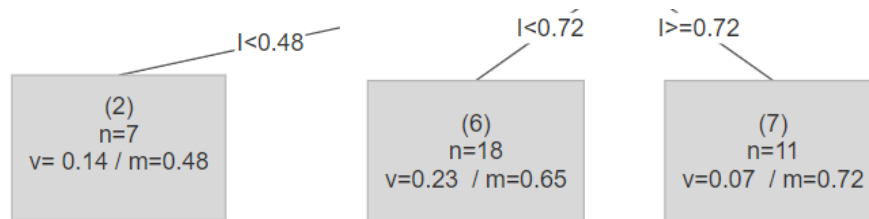
n= number of subjects

() = in brackets the number of the node of the CART tree is indicated

Source: own elaboration after the 'Rpart' code exposed in Appendix 9.3.

At the first node every individual is represented, 36 academics who are master's degree directors. This root node is split in smaller nodes with smaller deviances ( $v$ ) which are also more homogeneous. When ' $v$ ' is higher, the individuals that belong to that node are more different. In the next paragraphs, the ' $m$ ' value of its node at the same level is compared with the value of each cut (Figure 17) with the aim of showing how the variables are associated.

Figure 17. Decision tree 3. Positive association between  $I$  and  $PM$ ..



Source: own elaboration after the 'Rpart' code exposed in Appendix 9.3.

The IMC variable ( $I$ ) is explained with nodes 2, 6 and 7 (see Figure 17) where 36 individuals are represented, their positive association is observed when  $I$  values (of the splits) and ' $m$ ' values are observed.

It can be seen how IMC level ( $I$ ) is the leading variable in this regression as it performs all the splits. Besides, results show that all nodes are positively associated. When  $I$  is higher, the performance ( $PM$ ) is higher too and vice versa.

#### 4.2.3. Summary of results and testing of hypotheses

After running the previous simple, multiple and CART models, nine regression models overall, the hypotheses were tested. We can conclude that when IMC is considered the only independent variable, the relation with performance is positive and more significant than when we add other two independent variables such as profile of the respondents ( $P$ ) or universities where they belong ( $U$ ). In the previously exposed procedures, performance is predicted using two techniques, a more traditional one, the linear and multiple

regressions and a non-parametric new-fangled one, CART regression trees. We can conclude that CART trees confirm the results of the linear regression. These two methods provide similar results, but CART provides some extra details, deducing that overall performance and IMC are associated positively, but in some smaller groups, they are not.

In linear regression procedures, the whole process is linear while a CART tree perceives and provides more flexibility. Overall, linear regression and CART regression trees confirm that IMC level (I) is a significant variable that generally is positively associated with performance of institution (PI), faculties (PF) and master's degrees (PM). Besides, profile and university related variables do not explain very much and are generally not relevant in these models where performance is estimated. Moreover, in the models where PM is predicted with more than one independent variable, the profile (P) is not considered, as there is no variability because all the respondents are academics. Thus, PM is explained with U and I.

Consequently, each of the three hypotheses stated in this dissertation were tested with three different models and results for each hypothesis are summarized in more detail in the next tables (see table 42, 43 and 44).

*Table 42. Models to test hypothesis 1.*

|                   |                                                                                                                                                                                |                                            |                                      |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------|
| <b>Hypothesis</b> | H1. The adoption of IMC by the selected HEIs significantly and positively affects the institution related performance (PI).<br>IMC level (I) and PI are positively associated. |                                            |                                      |
| <b>Models</b>     | Model 1.1.<br>(simple linear regression)                                                                                                                                       | Model 2.1.<br>(multiple linear regression) | Model 3.1.<br>(CART regression tree) |
| <b>Result</b>     | Accepted                                                                                                                                                                       | Accepted                                   | Accepted                             |

*Source: own elaboration.*

To test Hypothesis H1, models 1.1., 2.1 and 3.1 were developed (See Table 42) and every model supports the hypothesis (see headers ‘4.2.1. and 4.2.2.’ of the present Chapter IV), consequently it can be concluded that the IMC level of an organization (I) and the performance of its organization (PI) are positively associated.

Table 43. Models to test hypothesis 2.

|                   |                                                                                                                                                                         |                                            |                                      |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------|
| <b>Hypothesis</b> | H2. The adoption IMC by the selected HEIs significantly and positively affects the faculty related performance (PF).<br>IMC level (I) and PF are positively associated. |                                            |                                      |
| <b>Models</b>     | Model 1.2.<br>(simple linear regression)                                                                                                                                | Model 2.2.<br>(multiple linear regression) | Model 3.2.<br>(CART regression tree) |
| <b>Result</b>     | Accepted                                                                                                                                                                | Accepted                                   | Accepted                             |

Source: own elaboration.

To test Hypothesis H2, models 1.2., 2.2 and 3.2 were developed (See Table 43) and every model supports the hypothesis (see headers ‘4.2.1. and 4.2.2.’ of the present Chapter IV), consequently, it can be concluded that the IMC level of an organization (I) and the performance of its faculties (PF) are positively associated.

Table 44. Models to test hypothesis 3.

|                   |                                                                                                                                                                              |                                            |                                      |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------|
| <b>Hypothesis</b> | H3. The adoption IMC by the selected HEIs significantly and positively affects the master’s degree related performance (PM). IMC level (I) and PM are positively associated. |                                            |                                      |
| <b>Models</b>     | Model 1.3.<br>(simple linear regression)                                                                                                                                     | Model 2.3.<br>(multiple linear regression) | Model 3.3.<br>(CART regression tree) |
| <b>Result</b>     | Accepted                                                                                                                                                                     | Partially accepted                         | Accepted                             |

Source: own elaboration.

To test Hypothesis H3, models 1.3., 2.3 and 3.3 were developed (See Table 44). Models 1.3. and 3.3. support the hypothesis (see headers '4.2.1. and 4.2.2.' of the current Chapter IV). Consequently, it can be concluded that the IMC level of an organization (I) and the performance of its master's degrees (PM) are positively associated in a simple linear regression model and the CART regression tree. However, when the multiple linear regression is developed (I and U independent variables), the significance level,  $p$  value, is 0.053 instead of 0.05 or below, and according to Fisher (1992) over 0.05  $p$  values are not significant. Nevertheless,  $p$  value almost reaches the significance level so we can state that model 2.3. partially supports hypotheses 3. Actually, there is sufficient evidence that supports that PM, I and U are positively associated in the multiple linear regression model (model 2.3.).

We can affirm that overall, the adoption of an integrated marketing communication (IMC) strategy by the selected HEIs significantly and positively affects their business performance in terms of institution, faculty and master's degree level. Therefore, we conclude that the IMC level and performances at three levels in the HE context are positively associated (when I is the one and only independent variable). Indeed, IMC has a positive impact in business performance. Thus, our hypotheses gain statistical support.

### 4.3. Summary of Chapter IV

With the aim of accomplishing the third objective of the present dissertation, to analyse the association between IMC and performance, nine regression models were accomplished in this chapter. The obtained results are summarized in Table 45.

Table 45. Summary of models developed to test the hypotheses.

| Hypotheses                        | <b>H1. The adoption of IMC by the selected HEIs significantly and positively affects the institution related performance (PI). IMC level (I) and PI are positively associated.</b>                                 | <b>H2. The adoption IMC by the selected HEIs significantly and positively affects the faculty related performance (PF). IMC level (I) and PF are positively associated.</b>                                        | <b>H3. The adoption IMC by the selected HEIs significantly and positively affects the master's degree related performance (PM). IMC level (I) and PM are positively associated.</b>                                 |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Simple Linear regression</b>   | <i>Model 1.1.</i><br>How is PI explained with I? Are PI and I positively associated?<br>PI: dependent variable<br>I: independent variable.<br><b>Hypothesis accepted</b>                                           | <i>Model 1.2.</i><br>How is PF explained with I? Are PF and I positively associated?<br>PI: dependent variable<br>I: independent variable.<br><b>Hypothesis accepted</b>                                           | <i>Model 1.3.</i><br>How is PM explained with I? Are PM and I positively associated?<br>PI: dependent variable<br>I: independent variable.<br><b>Hypothesis accepted</b>                                            |
| <b>Multiple Linear regression</b> | <i>Model 2.1.</i><br>How is PI explained with I? Are PI and I positively associated? Are P and U significant variables?<br>PI: dependent variable<br>P, I, U: independent variables.<br><b>Hypothesis accepted</b> | <i>Model 2.2.</i><br>How is PF explained with I? Are PF and I positively associated? Are P and U significant variables?<br>PI: dependent variable<br>P, I, U: independent variables.<br><b>Hypothesis accepted</b> | <i>Model 2.3.</i><br>How is PM explained with I? Are PM and I positively associated? Is U a significant variable?<br>PI: dependent variable<br>I, U: independent variables.<br><b>Hypothesis partially accepted</b> |
| <b>CART regression trees</b>      | <i>Model 3.1.</i><br>How is PI explained with I? Are PI and I positively associated? Are P and U significant variables?<br>PI: dependent variable<br>P, I, U: independent variables.<br><b>Hypothesis accepted</b> | <i>Model 3.2.</i><br>How is PF explained with I? Are PF and I positively associated? Are P and U significant variables?<br>PI: dependent variable<br>P, I, U: independent variables.<br><b>Hypothesis accepted</b> | <i>Model 3.3.</i><br>How is PM explained with I? Are PM and I positively associated? Is U a significant variable?<br>PI: dependent variable<br>I, U: independent variables.<br><b>Hypothesis accepted</b>           |

Source: own elaboration.



After running the previous nine regression models, we can conclude that when IMC is considered as the one and only independent variable (see second row of Table 45 about simple linear regressions), the relation with performance is positive and more significant than when we add other two independent variables (P or U), in fact, in model 2.3. when U variable is added to perceive PM in the multiple linear regression, the hypothesis is rejected. However, overall, in the rest eight models, IMC level and business performances are positively associated.

We can conclude that IMC explains performance at three levels in HEIs and that IMC and the different performances are positively associated but also other variables that explain IMC exist and are not considered (the IMC level for example explains the 25% of PI in Model 1.1. but a 75% is explained with other variables not considered in this study). The aforementioned is concluded because ' $R^2$ ', ' $p$  value' and 'Estimate' values are positive and significant. Besides, CART regression trees support the conclusions obtained in linear regression models and provide further details, indeed, in general IMC and business performance are positively associated but in some smaller groups of the individuals, they perceive a negative relation.

Next chapter, Chapter V, summarizes the conclusions obtained in this dissertation, besides, it exposes some of the limitations as well as some orientations for further research.



## **5. Chapter V. Conclusions, limitations and future research**

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5.1. Conclusions

5.2. Limitations

5.3. Future research



### **5.1. Introduction**

The present dissertation pursues to contribute to the IMC landscape in general and HE context in particular. The current challenges that HE sector is facing due to global evolution, such as remote learning or internationalization, have generated an environment where institutions need to differentiate themselves and attract students as well as stakeholders more than ever. To achieve the previously mentioned challenging goals, HE sector has been immersed in a marketization process with the main purpose of communicating their offer effectively to the audience. Literature suggests that IMC is a construct that facilitates the aforementioned as it fosters the continuous dialogue with all the stakeholders and via all media.

With these premises, the present investigation has explored the concept of integrated marketing communication (IMC) in higher education (HE). It has been deduced that IMC is a well-accepted construct as it provides several benefits, such as a higher business performance, to organizations but it has been mainly studied in the service business environment. Nonetheless, several authors suggested that this advantageous approach should be studied in other contexts and little research is developed in the context of HE. Considering the current challenges that HE context is facing, marketing strategies that provide performance related benefits are very welcome, that is why the IMC construct and its association with performance was empirically analysed in the current dissertation. After the aforementioned analysis, it can be suggested that IMC is a worthy construct for higher education marketing (HEM) related strategies.

The contribution of this investigation is especially relevant because as far as we know there is no empirical evidence of the positive and solid relationship between IMC and performance in the context of HE. Besides, this work provides a contribution to the

IMC body of knowledge by adapting and validating a scale that measures the IMC level in the selected seven higher education institutions (HEIs) and three scales that measure the performance of those HEIs, their faculties and their master's degrees. With the aforementioned scales, the constructs were measured (IMC and performances) and after the data was analysed (with three different regression methods exposed in Chapter IV), it is demonstrated that the effective integration of all communication efforts achieved by the selected HEIs provide a positive and robust association with their business performance.

## **5.2. *Main findings***

This dissertation contributes to answering one of the most relevant and unresolved research questions in the IMC landscape, certainly, the measurement of the IMC construct and its association with business performance (Tafesse & Kitchen, 2017; Porcu et al., 2019). Furthermore, it responds to several calls for further empirical studies to examine the benefits of IMC in different geographical (Ots, 2015; Kitchen, 2005) and sectorial contexts (Šerić, 2015). As mentioned in our literature review in Chapter I and stated among the objectives of this investigation, our main contribution in the previously mentioned topic is the development of reliable and valid scales that effectively assess the IMC level and performances at three levels (institution, faculty and master's degree) of HEIs. In our empirical procedure, we applied these tools to seven Spanish HEIs, which were previously selected. The proposed scales are applied in a non-English speaking country, thus taking a European perspective, and in a language other than English. In addition, two different perspectives of these organizations were considered: perceptions of both managers and academics. These academics, apart from being master's degree directors, also undertook marketing-related management tasks.

Additionally, after the scales were created, five dimensions that explain IMC in the HE context are proposed: 'institution's communication alignment', 'active listening', 'interactivity', 'institution's values and mission' and the 'collaborative culture and climate'. Besides, two dimensions that describe institution's performance have been suggested, 'sales and brand performance' and 'students' and groups of interests' satisfaction'. In addition, faculty's and Master's degree performances are described by three dimensions, firstly the 'sales-related performance', secondly, 'brand advantage' and thirdly, 'students' and groups of interests satisfaction'. Besides, it can be observed that regarding the measurement of performance, at institutions it is explained with two dimensions, the one related to sales and brand performance explained with seven items and the one related to students' and groups of interests' satisfaction defined by four items (see 3.3.5. header). However, performance at faculties and master's degrees are explained with three dimensions, firstly the sales-related performance measured with four items. Secondly, the one related to brand advantage which is assessed by three items and thirdly, the one related to students' and groups of interests' satisfaction defined by four items (see 3.3.6. and 3.3.7 headers). It can be observed that the performance at the institution is more 'compact' because it is explained with two dimensions while faculties' and master's degrees' performances are defined by three dimensions. Performance at faculties and master's degrees split sales and brand related issues in two different dimensions, this could be because as smaller units of analysis, brand and sales related issues are more interesting to be analysed separately in order to design management and communication actions according to them. Indeed, if sales are lower, communication actions directed to that purpose should be developed, such as, digital marketing related activities. On the other side, if branding issues are needed to be improved, maybe advertising strategies should be established.

Each of the dimensions proposed can be measured separately and once the measurement process is carried out, if one of the dimensions has a low value (each HEI should set its minimum ranges from 0 to 1), an improvement strategy can be developed and then, the whole process can be repeated to see if the value is improving or not. Moreover, the level achieved by each of the dimensions can be compared with that of the dimensions of other HEIs, or with that of the same HEI. For example, the level achieved in the ‘active listening’ dimension could be compared to that of the ‘interactivity’ dimension of the same HEI. Moreover, the level achieved in the ‘active listening’ dimension could be compared to that of the same dimension (‘active listening’) of a different HEI. Likewise, these assessments and comparisons could be carried out with dimensions related to performances. Consequently, these dimensions assess, evaluate and monitor the global level of integration in a HEI and performances at three levels in the HE context and provide relevant indicators which help the staff of HEIs in marketing related decisions-taking processes.

These dimensions are measured by specific items, and constitute the tools to measure IMC and performances at three levels in the context of HE. After measuring these dimensions, the association of the IMC level and business performance has been analysed (see Chapter IV). Overall, the IMC level and business performances at institution, faculty and master’s degree level are positively associated, consequently, the hypotheses (see Chapter II) stated were accepted. In order to test the three stated hypotheses, nine regression models were developed, and from those nine models eight were significant and accepted the formulated hypotheses (see Chapter IV, ‘4.3. Summary’ header). Specifically, when IMC level was the one and only independent variable, the relation with performance was positive and more significant than when we added the other two independent variables (such as profile or university). In fact, the unique model



that was partially accepted was the one that added the university variable with the aim of perceiving performance at master's degrees in the multiple linear regression (model 2.3.). However, in the rest eight models, IMC level and business performances are positively associated.

In practice, the aforementioned analysis and measurement tools can be used to survey academics with marketing responsibilities or HEI marketers. When measuring the IMC level, it is possible to trace efforts related to marketing and communications. Besides, after measuring also performance, these two approaches can be analysed to see if they are positively associated or not. This information can form the basis of an improvement strategy for each HEI, making use of IMC as part of an HEM-oriented (business-oriented) strategy. By effectively measuring IMC and performances, thanks to the tools provided in this dissertation, and then analysing the association between both IMC and performance, it would be easier to obtain benefits through IMC and this would be a step towards the marketization of HEIs.

Certainly, IMC is a relatively new landscape, which has increasingly been drawing attention from marketers and researchers alike. In fact, HEIs are already implementing IMC strategies. Nevertheless, the number of studies about IMC and its measurement related to business performance, which could help obtain benefits, is still insignificant, and very little is known about the suitability of IMC for HEIs. Despite the efforts of HEIs to combine all marketing and communication tools, as one of the panel experts said, 'it is not yet common to talk about comprehensive IMC strategies in the context of higher education'. To date, little research has been published on the application of IMC in HEM and its benefits in business performance. Hence, this dissertation may help academics as well as marketers to understand and measure these approaches, which until now, have been mostly applied in other sectors (mainly in service related

businesses). Research concerning the application of IMC in general, and of IMC for HEM purposes in particular, is still in its infancy. Considering also that IMC is a concept with multiple definitions, dimensions and measurement tools since it was first proposed, it could be advantageous for the university community staff to keep updated with IMC-related contributions and good practices in order to take advantage of what it can provide.

In addition, changes in the marketplace, media, communications and consumers, have brought an evolution to IMC and its developments reflect a more complex and interactive marketing phenomenon in this digital co-creative age (Pantea Foroudi, Keith Dinnie, Philip J. Kitchen, Melewar & Mohammad M. Foroudi, 2017). Subsequently, IMC has been evolving and adapting constantly to the current environment since it was proposed in 1989 and HE sector is also continuously adjusting to the society's needs too, while nurtures long-term relationships with every stakeholder. For these reasons, we believe that IMC is a worthy construct to be further studied in HE sector, as it is a necessary approach in the actual marketing communication environment because it is considered the communication discipline that enables a faster response (Séric et al., 2014). Besides, it is recognized by most academics and practitioners as the most effective method to adopt in the current complex multi-channel atmosphere (Laurie & Mortimer, 2019).

### **5.3. Limitations**

As with every dissertation, there are some limitations to be acknowledged. It should be noted that the current research only considers the context of one country, Spain, with one of its official languages, Spanish. Furthermore, it merely provides the perceptions of the respondents who belong to seven of the private universities that belong to the UNIJES network and the level of integration and performance as perceived by the senders

(university staff). The perceptions of stakeholders (students, families, companies, etc.) or the different media (radio, press, suppliers, agencies, etc.), who receive the messages generated and take part in the communication and marketing activities, have not been studied.

Besides, regarding the outcomes of this study, although its results cannot be extrapolated to a broader population, the population analysed in this investigation (seven HEIs) is a very relevant one in the Spanish private HE sector. As mentioned in the literature review, UNIJES is considered an alliance of Spanish private universities, which are also part of the International Association of Jesuit Universities (IAJU), and this provides numerous benefits and worldwide competitiveness.

#### **5.4. Future research**

Available marketing communication options are constantly growing, such as the internet, which is why IMC was seen by many researchers as the way of improving the management of the existing different marketing communications choices (Duncan, 2002). However, since it was first claimed 20 years ago, there has been a debate about the IMC's definition, conceptual underpinning, measurement and even the nomenclature established to name the concept (Tafesse & Kitchen, 2017) between both the academic and practitioners' landscape. This shows that although is a well-accepted concept in the academia and practitioner arena, further research is welcomed in several topics related to IMC. An interesting subject for further exploration is the role of IMC, in general, and the benefits of applying IMC to the HE sector in particular. Considering the relevance of the IMC practice and its importance in the business environment, it is reasonable to assume that HEIs can also gain advantages if they adopt the IMC in their marketing and communication strategies. It is also acknowledged that the different stakeholders of HEIs

are active and use different ways of communication, and thus HEM should consider the broad range of media available, as well as integrating them more efficiently and keeping them up-to-date. Considering that the results of this dissertation affirm that overall IMC level and performance are positively associated, indeed, that one of the major benefits of IMC is that a higher level of it is usually associated with a higher level of performance of the organization, the following question arises: how could university communities, particularly university marketers, increase the IMC level? The challenge could be to investigate what different stakeholders of the HE context (families, students, companies, etc.) consider effective IMC-related strategies. Once the most effective tactics are identified, these could be applied to the context of HE with the aim of achieving the consequent highest levels of performance as possible. Subsequently, additional studies could also propose effective IMC-related guidelines and tools for the university staff in order to help them develop, measure and successfully perform IMC-related marketing strategies.

In the current dissertation, two respondents' perceptions were considered, those of academics and practitioners. However, results in CART regression tree number one (Model number '3.1.' in '4.2.2. CART regression trees' header) show that in a concrete group of 47 respondents, a lower perception of IMC is perceived by the academics. Additional research regarding these result could be welcome, why do academics perceive a lower perception of IMC than practitioners?

Moreover, further research in this area covering both national and international universities could be welcome, for example, an analysis of universities from IAJU. The scales proposed in the present dissertation could be applied to other universities with the aim of measuring their IMC level and performances (two constructs) and after that, analysing the association between them. Besides, if these constructs' association is

positive, strategies to increase IMC level should be developed in order to gain the resultant higher business performance of those institutions.

Additionally, this dissertation concluded that IMC explains performance at three levels in HEIs and that IMC and the different performances are positively associated but also other variables that explain IMC exist and are not considered. Future research could investigate which are those other variables that are not considered in the current dissertation and affect performance in HEIs.









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## Appendices

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## Appendix 1. Definitions of IMC concept since its assumption

| Author                                                                                                                             | Date | Definition                                                                                                                                                                                                                                                                                                                                                                              | Main elements introduced*                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| American Association of Advertising Agencies (4As) – extracted from Duncan & Caywood, 1996, p. xiv<br>(Duncan, T. & Caywood, 1996) | 1989 | A concept of marketing communications planning that recognizes the benefit in a program that integrates a variety of strategic disciplines – e.g. general advertising, direct response, sales promotion and public relations – and combines these disciplines to provide clarity, consistency and maximum communication impact.                                                         | -Coordination and consistency of messages and communication channels ('one sight, one sound')<br>-Use of a variety of communication disciplines to work in synergy based on a comprehensive plan<br>-IMC as a concept |
| Schultz (1991)                                                                                                                     | 1991 | The process of managing all sources of information about a product/service to which a customer or prospect is exposed, which behaviourally moves the customer towards a sale and maintains customer loyalty.                                                                                                                                                                            | -Inclusion of consumers, prospects<br>-Behavioural responses<br>-Nurture relationship and customer loyalty<br>-IMC as a process                                                                                       |
| Caywood, Schultz & Wang (1991)                                                                                                     | 1991 | [IMC is a] concept of marketing communications planning that recognizes the added value of a comprehensive plan that evaluates the strategic roles of a variety of communication disciplines – general advertising, direct response, sales promotion, and public relations – and combines these disciplines to provide clarity, consistency, and maximum communication impact           | -Coordination and consistency of messages and communication channels (one sight, one sound)<br>-Use of a variety of communication disciplines to work in synergy based on a comprehensive plan<br>-IMC as a concept   |
| Nowak & Phelps (1994)                                                                                                              | 1994 | Considered one voiced marketing communications is the expanded capabilities for targeting, reaching, persuading and cultivating consumers.                                                                                                                                                                                                                                              | -Reinforced notions of consistency, coordination and behavioural response                                                                                                                                             |
| Keegan, Moriarty & Duncan (1995)                                                                                                   | 1995 | The strategic coordination of all messages and media used by an organization to collectively influence its perceived brand value.                                                                                                                                                                                                                                                       | -Profitable relationships<br>-Expanded audience scope from customers to other stakeholders<br>-IMC as a process<br>-Influence of the IMC in the perceived brand value                                                 |
| Schultz (1996)                                                                                                                     | 1996 | IMC is a concept of marketing communications planning that recognizes the added value of a comprehensive plan that evaluates the strategic roles of a variety of communication disciplines (for example, general advertising, direct response, sales promotion, and public relations) and combines these disciplines to provide clarity, consistency and maximum communications impact. | -Reinforced IMC as a concept<br>-Comprehensive plan consisting of different communication disciplines to provide clarity and maximum impact                                                                           |
| Duncan & Caywood (1996)                                                                                                            | 1996 | IMC is the process of strategically controlling or influencing all messages and encouraging purposeful dialogue to create and nourish profitable relationships with customers and other stakeholders.                                                                                                                                                                                   | -IMC as a process<br>-Profitable relationships with stakeholders by promoting dialogue                                                                                                                                |
| Duncan & Moriarty (1998)                                                                                                           | 1998 | A systemic process that requires certain organizational support elements. Whereby integration involves the corporate, marketing and communication levels - and highlighted the importance of stakeholder-orientation and not just that of customer-orientation                                                                                                                          | -IMC as a process<br>-Organizational support in IMC, integration in every level                                                                                                                                       |
| Schultz & Schultz (1998)                                                                                                           | 1998 | IMC is a strategic business process used to plan, develop, execute and evaluate coordinated, measurable, persuasive brand                                                                                                                                                                                                                                                               | -Strategic business process<br>-Expanded notion of brand communication                                                                                                                                                |

|                                           |      |                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                           |
|-------------------------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                           |      | communication programs over time with consumers, customers, prospects and other targeted, relevant external and internal audiences.                                                                                                                                                                                                                      | -Measurability<br>-Specified more explicitly the multiple markets – inclusive of external and internal audiences                                                          |
| Kotler, Armstrong, Saunders & Wong (1999) | 1999 | IMC is the concept under which a company carefully integrates and coordinates its many communication channels to deliver a clear, consistent and compelling message about the organization and its products.                                                                                                                                             | -IMC as a concept<br>-Integration of channels to deliver understanding messages                                                                                           |
| Fill (2001)                               | 2001 | IMC can be identified as the strategic development, delivery and dialogue of consistent, co-ordinated messages, between stakeholders who have a willingness to share information for mutual long-term benefit.                                                                                                                                           | -Coordination of messages<br>-Long-term benefit                                                                                                                           |
| Duncan (2002)                             | 2002 | A cross-functional process for creating and nourishing profitable relationships with customers and other stakeholders by strategically controlling or influencing all messages sent to these groups and encouraging data-driven purposeful dialogue or between them.                                                                                     | -IMC as a cross functional process<br>-Dialogue and profitable relationships with stakeholders                                                                            |
| Schultz & Schultz (2003)                  | 2003 | IMC is a strategic business process used to plan, develop, execute and evaluate coordinated, measurable, persuasive brand communication programs over time with consumers, customers, prospects, and other targeted, relevant external and internal audiences.                                                                                           | -Strategic business process<br>-Extensive brand communication<br>-Evaluation and measurement<br>-External and internal stakeholder groups<br>-Long-term brand value focus |
| Kliatchko (2005)                          | 2005 | IMC is the concept and process of strategically managing audience-focused, channel-centred and results-driven brand communication programs over time.<br>IMC – in its practical guise – attempts to combine, integrate, and synergise different elements of the communications mix, as the strengths of one are used to offset the weaknesses of others. | -Process and concept<br>-Strategic Management of Communication program<br>-The three dimensions of IMC (audience-focused, channel-centred and results-driven)             |
| Kliatchko (2008)                          | 2008 | IMC is an audience-driven business process of strategically managing stakeholders, content, channels, and results of brand communication programs. (The four dimensions of IMC)                                                                                                                                                                          | -IMC as an audience-driven business process<br>-The four dimensions of IMC (stakeholders, content, channels and results)                                                  |
| Percy (2008)                              | 2008 | Has defined IMC as ‘the planning and execution of all advertising-like and promotion-like messages selected for a brand, service, or company, in order to meet a common set of communications objectives, or more importantly, to support a “single positioning”’.                                                                                       | -IMC as a process<br>-Using every channel to support a ‘single positioning’                                                                                               |
| Luck & Moffatt. (2009)                    | 2009 | It is more than a process or activity within an organization: it is a system of belief and engagement, embedded in an organization’s culture, underpinned by communication and driven by technology and senior management.                                                                                                                               | -IMC as a system<br>-The nature of an organization                                                                                                                        |



|                                                                       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Šerić & Gil (2012)                                                    | 2012 | IMC is a tactic and strategic process that fosters synergies between different communication channels. The messages provided are clear and coherent and the communication is centred in information and communication technologies (ICTs), database and customers. The IMC is key for brand value and relationships.                                                                                                                                                                                                                                                                                                                                                     | -IMC as a tactic and strategic process<br>-ICT based                                                                                                                                                                                                                                                       |
| Porcu, del Barrio-García & Kitchen (2012)                             | 2012 | The interactive and systemic process of cross-functional planning and optimization of messages to stakeholders with the aim of communicating with coherence and transparency to achieve synergies and encourage profitable relationships in the short, medium and long-term.                                                                                                                                                                                                                                                                                                                                                                                             | -Distinguishes four principal dimensions: (1) "one voice", (2) interactivity, (3) cross-functional planning; (4) profitable long-term relationships                                                                                                                                                        |
| Kliatchko & Schultz (2014) p381                                       | 2014 | In the study carried out by these authors this is the result of their attempt to explain IMC concept in four notions for client and agency interviewed members (from their point of view):<br><br>Use of multiple channels, touchpoints or contact points to deliver a message to a target audience.<br>Consumer centricity – that is, the need for deep consumer understanding, consumer engagements and ongoing connections and conversations as a basis for marketing communications planning and execution.<br>Coordination and consistency of 360 or total communications solutions.<br>Involvement of overall business process, not just marketing communications. | -IMC as a concept<br>-Consumer centricity<br>-Total coordination and consistency<br>- Involvement of all the business process                                                                                                                                                                              |
| Šerić, Gil-Saura, & Ozretić-Došen (2015)                              | 2015 | The Integrated Marketing Communication (IMC) is a tactical and strategic consumer-centric business process boosted by advances in Information and Communication Technology (ICT).<br><br>It delivers a clear and consistent message through the coordination and synergies of different communications tools and channels, in order to nourish long-lasting profitable relationships with customers and other stakeholders and create and maintain brand equity.                                                                                                                                                                                                         | -Consumer centric<br>-Strategic and tactical business process<br>-ICT technologies<br>-Delivers clear and consistent message<br>-Coordination of different communication tools and channels<br>-Long-lasting profitable relationships with customers and stakeholders<br>-Create and maintain brand equity |
| (Luxton, S., Reid, M & Mavondo, F., 2017)                             | 2017 | A firm-wide market relating deployment mechanism that enables the optimization of communication approaches to achieve superior communication effectiveness.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -firm-wide approach<br>-involves the whole organization<br>-IMC as a strategic approach                                                                                                                                                                                                                    |
| (Porcu, del Barrio-García, Alcántara-Pilar, & Crespo-Almendros, 2017) | 2017 | IMC is the stakeholder-centred interactive process of cross-functional planning and alignment of organizational, analytical, and communication processes that allows for the possibility of continuous dialogue by conveying consistent and transparent messages via all media to foster long-term profitable relationships that create value.                                                                                                                                                                                                                                                                                                                           | -Dialogue<br>-Create value<br>-Interactive process<br>-Transparent messages via all media                                                                                                                                                                                                                  |

Source: own elaboration after several authors.



## Appendix 2. Dimensions of IMC and intersection points

| Authors                             | Dimensions of IMC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Dimensions' intersection |              |                     |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------|---------------------|
|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Interactivity            | Stakeholders | Message Consistency |
| <b>Gronstedt (1996)</b>             | 1.Stakeholders<br>2.Interactive tools<br>3.Sending tools<br>4. Receiving tools                                                                                                                                                                                                                                                                                                                                                                                                                                                    | √                        | √            | √                   |
| <b>Duncan &amp; Moriarty (1998)</b> | 1.Organizational infrastructure<br>2.Interactivity<br>3.Mission marketing<br>4.Strategic consistency<br>5.Planning and evaluation                                                                                                                                                                                                                                                                                                                                                                                                 | √                        | √            |                     |
| <b>Pickton &amp; Hartley (1998)</b> | 1.Consistency between communication objectives<br>2.Consistency and synergy of communication planning<br>3.Coverage of all relevant stakeholders and publics<br>4.Effective management of all forms of contact<br>5.Effective management and integration of all communication activities<br>6.Identification and product/brand communication on corporate communication efforts<br>7.Exploitation of a range of promotional tools<br>8. Consistent strategy<br>9. Use of media able to transmit corporate communication messages. |                          |              |                     |
| <b>Schultz &amp; Schultz (1998)</b> | 1.Tactical coordination of marketing communications<br>2. Redefinition of the scope of marketing communications<br>3. Application of information technology<br>4. Financial and strategic integration.                                                                                                                                                                                                                                                                                                                            |                          |              |                     |
| <b>Kitchen &amp; Schultz (2001)</b> | Integration of communication with...<br>1. ... corporate mission/values; 2. ... different internal divisions/operations; 3. ... different target audiences;<br>4. ... different media; 5. ... overall financial goals.                                                                                                                                                                                                                                                                                                            |                          | √            |                     |
| <b>Pickton (2004)</b>               | 1.Communication mix integration<br>2. Communication mix with marketing mix integration<br>3. Creative integration; 4. Intra-organization integration<br>5. Inter-organizational integration; 6. Information and database systems; 7. Target-audience integration<br>8.Corporate and 'unitized' integration<br>9. Geographical integration.                                                                                                                                                                                        |                          |              |                     |
| <b>Kliatchko (2005)</b>             | 1.Audience-focused: multiple markets<br>2.Channel-centred: multiple channels<br>3. Results-driven: financial measurement                                                                                                                                                                                                                                                                                                                                                                                                          |                          |              |                     |
| <b>Reid (2005)</b>                  | 1. Interactivity; 2. Mission marketing; 3. Planning and evaluation.                                                                                                                                                                                                                                                                                                                                                                                                                                                               | √                        |              |                     |

| <b>Kliatchko (2008)</b>                              | 1. Stakeholders (orientation)<br>2. Content<br>3. Channel; 4. (Measurable) results                                                                                                                                                                                                     |   | √ |   |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|
| <b>Moriarty &amp; Schultz (2012)</b>                 | 1. Interactive communication 2. Message consistency;<br>3. Brand focus; 4. Synergy; 5. Customer focus;<br>6. Perceptual integration; 7. Stakeholders; 8. Relationships; 9. Reciprocity; 10. Contact points;<br>11. Cross-functional management; 12. Continuous planning and monitoring | √ | √ | √ |
| <b>Porcu, Del Barrio-García &amp; Kitchen (2012)</b> | 1. One voice<br>2. Interactivity<br>3. Cross-functional planning<br>4. Profitable long-term relationships                                                                                                                                                                              | √ |   |   |
| <b>Syahputra (2012)</b>                              | 1. Interactivity 2. Mission marketing 3. Organizational infrastructure<br>4. Strategic consistency 5. Planning and evaluation                                                                                                                                                          | √ |   | √ |
| <b>Šerić &amp; Gil (2012)</b>                        | 1. Synergies between communication tools 2. ICT centred communication 3. Message consistency 4. Consumer centred communication 5. IMC as brand's value proposition component                                                                                                           |   | √ | √ |
| <b>Porcu, Del Barrio-García &amp; Kitchen (2017)</b> | 1. Message consistency;<br>2. Interactivity;<br>3. Stakeholder-centred strategic focus;<br>4. Organizational alignment                                                                                                                                                                 | √ |   | √ |

Source: Adapted and updated from (Porcu, et al., 2017).

### **Appendix 3. Review of tools to measure IMC.**

The following table shows a literature review of tools and frameworks that asses IMC according to several authors and proposed over the years.

| Publication                | Type                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                       | Objective                                                                                                                                                                                                                                                                                                                                                     | The definition in which is based                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strenski (1984)            | Tool: The Communications Audit                | Phone interviews to 200 (prospective) clients, contrasting the results of these phone interviews concerning strengths and weaknesses of a company's image with internal perception                                                                                                                                                                                                                                                | To survey external corporate image, evaluation and development of recommendations to improve corporate communications                                                                                                                                                                                                                                         | Extracted from Reinold & Tropp (2012)                                                                                                                                                                                                                                                                                                                                                          |
| Nowak & Phelps (1994)      | Framework: The Nowak and Phelps framework     | IMC outcome: Consumer response<br>Integration scope: Campaign level<br>Audience type: Consumers/customers<br>Relationship episode: Short-term/transactional<br>Message sources: The marketing function<br>Media channels: Marketing media disciplines<br>Integration modes: Communication consistency Communication customization<br>Organizational support processes: Customer database<br>Feedback: Captured customer responses | This article identifies the underlying tenets of integrated marketing or advertising communication philosophies; offers a conceptual framework for understanding and addressing integrated marketing and advertising communication issues; and delineates the advertising-related research opportunities that exist as a result of the integrated phenomenon. | Considered one voiced marketing communications is the expanded capabilities for targeting, reaching, persuading and cultivating consumers.<br><br>This examination indicates the integrated phenomenon has impacted marketing communications at an advertisement as well as campaign level, and created a need for empirical research and theoretical development in four advertising domains. |
| Phelps & Johnson (1996)    | Tool: Measurement Scale                       | Exploratory study. A factorial analysis was carried out with the scale that consisted of 16 items.                                                                                                                                                                                                                                                                                                                                | To measure IMC level in 101 companies of the commercial sector                                                                                                                                                                                                                                                                                                | Based on the following five dimensions:<br>1. Direct Marketing<br>2. One-voice<br>3. Coordinated marketing communication campaigns<br>4. Higher responsibilities<br>5. Response objectives                                                                                                                                                                                                     |
| Sjöberg & Hamrefors (1996) | Tool: Return on Communications                | Personal interviews using existing surveys, internal company reports, company managers (e.g., at Ericsson, Enator Group or Swedish Railroads). The purpose was to identify specific goals of communications as performance indicators using a checklist, linking these KPIs to value creation                                                                                                                                     | To identify and evaluate value drivers of internal communication, investor- and customer-communications, and public relations.                                                                                                                                                                                                                                | Extracted from Reinold & Tropp (2012)                                                                                                                                                                                                                                                                                                                                                          |
| Duncan & Moriarty (1997)   | Tool: Integrated Marketing Audit (Mini Audit) | A questionnaire was carried out (the Internal Communication Network Survey) to managers of all departments concerning brand relationship. The tool consisted in 20 items.                                                                                                                                                                                                                                                         | To find the degree of communications and content integration within company.                                                                                                                                                                                                                                                                                  | Based on the following 5 dimensions:<br>1. Interactivity<br>2. Marketing mission<br>3. Organizational infrastructure<br>4- Strategic consistency<br>5. Planning and evaluation<br>The next year, in 1998, the authors propose a definition.                                                                                                                                                    |

|                                  |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Duncan & Moriarty (1998)         | Framework: The Duncan and Moriarty framework        | <p>IMC outcome: Customer relationships, Brand equity</p> <p>Integration scope: Organization level</p> <p>Audience type: Consumers/customers. Other stakeholders</p> <p>Relationship episode: Ongoing/relational</p> <p>Message sources: Corporate level, Marketing level, Marketing communication level</p> <p>Media channels: Marketing media disciplines</p> <p>Integration modes: Communication consistency, Communication Interactivity</p> <p>Organizational support processes: Corporate focus, SWOT analysis, Core management competence, Cross-functional coordination</p> <p>Feedback: Not clearly defined</p>                                                | To propose a communication-based model of relationship marketing and discuss how communications rather than persuasion is the foundation of the new customer-focus marketing efforts.                                                                                                                                                                                                                                                                                                                                        | <p>A systemic process that requires certain organizational support elements. Whereby integration involves the corporate, marketing and communication levels - and highlighted the importance of stakeholder-orientation and not just that of customer-orientation.</p> <p>An appreciation of the complexities of Brand communication makes easier to understand structural changes related to IMC.</p> |
| Kitchen & Schultz (1999)         | Framework: The Kitchen and Schultz framework        | <p>IMC outcome: Customer information, Customer knowledge, Profitability</p> <p>Integration scope: Organization level</p> <p>Audience type: Consumers/customers</p> <p>Relationship episode: Short-term/ transactional, Ongoing/ relational</p> <p>Message sources: The marketing function, Advertising agencies</p> <p>Media channels: Marketing media disciplines, All customer touch points</p> <p>Integration modes: Communication consistency, Communication customization</p> <p>Organizational support processes: Information technology, Outside in planning, Cross-functional planning, Coordination with ad agencies</p> <p>Feedback: Not clearly defined</p> | To broaden the parameters of IMC by considering its development in an international five-nation scenario (all English speaking). This paper, therefore, analyzes data on how senior advertising agency executives perceive IMC in the United States, United Kingdom, New Zealand, Australia, and India. Thus, the paper is concerned with developing a wider, more overarching, perspective on IMC and levels of understanding, implementation, and usage in an important segment of the marketing communications landscape. | Extracted from Reinold & Tropp (2012)                                                                                                                                                                                                                                                                                                                                                                  |
| Ewing De Bussy, & Caruana (2000) | Tool: Measurement scale                             | The scale consisted of 14 items. Bivariate correlation analysis was carried out, step by step regression in 80 public Australian companies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | To measure IMC with an adaptation of Phelps & Johnson, 1996.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Based on the following 4 dimensions of IMC: <ol style="list-style-type: none"> <li>1. Direct Marketing</li> <li>2. One-voice</li> <li>3. Higher responsibilities</li> <li>4. Response objectives</li> </ol>                                                                                                                                                                                            |
| Low (2000)                       | Tool: Measurement scale                             | The scale consisted of 3 items. Bivariate correlation analysis was carried out, step by step regression in 421 American companies that have implemented IMC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | To measure IMC in companies that have implemented IMC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Based on the following 3 dimensions: <ol style="list-style-type: none"> <li>1. Integration</li> <li>2. Strategic consistency</li> <li>3. Message Consistency</li> </ol>                                                                                                                                                                                                                                |
| Fill (2001)                      | Framework: The establishment of IMC – Fill's model. | <p>Steps to take to implement and measure the IMC approach:</p> <p>1: Coordinate IMC at the tactical level. Focus on promotional activities</p> <p>2: Look after functional coordination (human resources, finance, corporate communications, etc.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                | To guide to implement the IMC approach in companies. A model was established from critical review about IMC, not from empirical research.                                                                                                                                                                                                                                                                                                                                                                                    | Messages need to be consistent, a customer focus needs to be maintained by all people within an organization and there should be a                                                                                                                                                                                                                                                                     |

|                                          |                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                          |                                                    | 3: Cultural shift of values and beliefs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                      | consistent willingness to share information with a range of internal and external audiences.                                                                                                                                                                                                                                                                                                                                                                                    |
| Kirchner (2001)                          | Tool: Integration Index                            | A written questionnaire was carried out to communications and marketing experts of 123 top US companies. Gathered data was analysed via factor analysis.                                                                                                                                                                                                                                                                                                                                                                                                                             | To find the degree of communications integration within a company via checklists                                                                     | Extracted from (Reinold & Tropp, 2012)                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Kitchen & Schultz (2001)                 | Framework: IMC – a four stage model                | Steps to take to implement and then measure an IMC approach:<br>1- to coordinate IMC at the tactical level in order to generate harmony among various communication tools and the product.<br>2- to redefine communications considering all communications contact points of customer or prospect customers<br>3- to use information about consumers behaviours and attitudes.<br>4- to deploy IMC at the strategic level. Involves marketing and finance working together for the business to become fully customer-centric as a means of generating measurable and behavioral ROI. | To understand the development process of an IMC approach within client organizations.                                                                | The five attributes of IMC definition to (Kitchen et al., 2004a; Low, 2000):<br>1. The communication effort should be directed at consumers in order to affect behaviour.<br>2. An outside-in approach, start with the customer first when developing a communication strategy.<br>3. A well-established relationship between the company and the customer is necessary.<br>4. Correct message delivery to all communication activities.<br>5. Creation of a competitive brand. |
| Vos & Schoemaker (2004)                  | Tool: Balanced Scorecard for Communication Quality | 5-point Likert-scale was administered to internal auditors who evaluate four different areas: concern-, marketing- and internal communications as well as organization of communications in five different quality dimensions                                                                                                                                                                                                                                                                                                                                                        | To measure the quality of an organization's different areas of communication.                                                                        | Extracted from (Reinold & Tropp, 2012)                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Hering, Schuppener & Sommerhalder (2004) | Tool: Communication Scorecard                      | In a seven-step process applied to external and internal experts, value drivers are being deducted by internal expert teams and evaluated by how they influence integrated communications, scoring those factors by standardized KPIs.                                                                                                                                                                                                                                                                                                                                               | To add communications measures to the existing Balanced Scorecard approach.                                                                          | Extracted from (Reinold & Tropp, 2012)                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Zerfaß (2003)                            | Tool: Corporate Communications Scorecard           | Strategic communication goals from overall corporate strategy and value drivers were identified within communications. Then, KPIs were created that help to measure the construct.                                                                                                                                                                                                                                                                                                                                                                                                   | To extend the classic BSC concept by a communications dimension.                                                                                     | Extracted from (Reinold & Tropp, 2012)                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Rolke (2004)                             | Tool: Communication Control Cockpit                | Sample out of 1,200 German top B2C companies established a ranking regarding the importance of different stakeholder groups to image rating, internally identifying value drivers and creating KPIs.                                                                                                                                                                                                                                                                                                                                                                                 | To define and control the metrics of communications.                                                                                                 | Extracted from (Reinold & Tropp, 2012)                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Pickton, & Broderick (2005)              | Framework: IMC rabostic model                      | Steps to take to implement an IMC approach:<br>1-Research & Analysis: Asses the company's current position in the market place.<br>2-Audiences: Determine companies' target audiences by the evaluation of marketing communication campaigns and activities.                                                                                                                                                                                                                                                                                                                         | To implement IMC with a model established from critical review and empirical research about IMC (the fill's model (2001) just from critical review). | Is not based in a definition. Very practitioner. It is a book.                                                                                                                                                                                                                                                                                                                                                                                                                  |



|                         |                                                         |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                 |                                                                                                                            |
|-------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|                         |                                                         | 3-Budget: Budget allocation and review of available resources.<br>4- Objectives: Setting of objectives<br>5- Strategy: Setting of the strategic plan<br>6- Tactics: Decisions-making at the operational level.<br>7- Implementation: choice of promotional tools as tactical instruments<br>8- Control: evaluation in order to change and improve. |                                                                                                                 |                                                                                                                            |
| Stumpf (2005)           | Tool: EFQM-Audit of Integrated Marketing Communications | Repertory-grid analysis and bottom up-laddering interviews to internal or external communication experts to find relevant factors for IMC within the dimensions 'actions' 'results' and 'strategic aims' quantitative analysis of these factors.                                                                                                   | To find and measure factors of a company's Integrated Marketing Communication                                   | Extracted from (Reinold & Tropp, 2012)                                                                                     |
| Reid (2005)             | Tool: Measurement scale                                 | The scale consisted of 15 items. After receiving the data, confirmatory factor analysis and multiple regression in 169 industrial companies from Australia.                                                                                                                                                                                        | To propose a scale that measured IMC based on the proposal of Duncan & Moriarty's (1997) proposal.              | Based on the following 3 dimensions:<br>1. Interactivity<br>2. Marketing mission<br>3. Cross-functional strategic planning |
| Pfannenbergl (2005)     | Tool: Value-Based Communication Management              | Identifying value links that add to communication value and summarizing them to KPIs, estimating value of each KPI and integrating those to overall management                                                                                                                                                                                     | To apply integrating communications into the existing Value-Based Management system of a corporation.           | Extracted from (Reinold & Tropp, 2012)                                                                                     |
| Lee & Park (2007)       | Tool: Measurement scale                                 | A comprehensive yet parsimonious 18-item scale, measuring important activities of each of the four dimensions, was empirically developed.                                                                                                                                                                                                          | To empirically measure the four-dimensional conceptualization of integrated marketing communications (IMC)      | Extracted from (Reinold & Tropp, 2012)                                                                                     |
| GPRA (2006)             | Tool: Communications Value System                       | Relevant communication metrics were developed according to corporate goals.                                                                                                                                                                                                                                                                        | To link communications and management strategy.                                                                 | Not based in a definition. Very practitioner. It is a report.<br>Extracted from (Reinold & Tropp, 2012)                    |
| Accelerom (2008)        | Tool: 360°-Touchpoint Analysis                          | Identification of relevant touch points; rating and evaluation on three levels: market, competition and customers                                                                                                                                                                                                                                  | To measure the relevance of different communication channels to a company in order to optimize touch-point mix. | Not based in a definition. Very practitioner. It is a report.<br>Extracted from (Reinold & Tropp, 2012)                    |
| Brandcontrol (2008)     | Tool: Communication Information System                  | A media response analysis was carried out, analysis of impact on the target audience through different channels by calculating indicators                                                                                                                                                                                                          | To integrate communication channels and measure their impact.                                                   | Not based in a definition. Very practitioner. It is a report.<br>Extracted from (Reinold & Tropp, 2012)                    |
| Wang, Wu, & Yuan (2009) | Tool: Measurement tool                                  | The scale consisted of 20 items. Analysed via descriptive statistics and varimax rotation in 197 visitors in Taiwan.                                                                                                                                                                                                                               | To measure IMC level.                                                                                           | Based on the following 3 dimensions:<br>1. Direct sales and promotion<br>2. Public relations<br>3. Advertisement           |

|                                                           |                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                              |
|-----------------------------------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reinold & Tropp (2012)                                    | Framework: Model for measuring IMC effectiveness | Steps to implement the model:<br>1- Survey: to measure content and media dimensions of the examined brand<br>2-Calculation of metrics: the results from the survey are processed to calculate the effectiveness of both the channel and content dimensions<br>3-Analysis and managerial implications: the resulting metrics are used to answer in detail the three key IMC questions (degree of IMC effectiveness, influencing effectiveness factors, means to increase IMC effectiveness). | To measure the effectiveness of IMC answering the following questions.<br>(1) What is the degree of the effectiveness of the company's IMC? (2) What factors define it to what extent? (3) How and by what means can the IMC effectiveness be increased?                                                              | Based on Kliatchko's (2008) definition. IMC is an audience-driven business process of strategically managing stakeholders, content, channels, and results of brand communication programs. (Kliatchko 2008). |
| Tafesse & Kitchen (2017)                                  | Framework: The Integrative Framework of IMC      | The proposal of three multilevel conceptualization which aligns IMC processes and elements:<br>- Integration scope<br>- Integration strategy<br>- Integration models                                                                                                                                                                                                                                                                                                                        | To propose a framework to help implement IMC, first helpings defining the scope of IMC program by linking it to specific organizational objectives and priorities. when the scope is established. When the scope is established, the framework directs manager's attention to integration strategy and then the mode. | Not based in any definition of IMC. The integrative framework explicates IMC in terms of three multilevel processes consisting of integration scope, integration strategy and integration modes.             |
| TNS Global (TNS global. market contact audit. TNS group.) | Tool: Market Contact Audit                       | A weighing factor was created for each touch point, weighing the recall of touch points and adding the results to create the contact value. The pre test was carried out with 35 representatives of target group, full run with minimum 500 members of target group recommended                                                                                                                                                                                                             | To define quality and perception of communication channels                                                                                                                                                                                                                                                            | Not based in a definition. Very practitioner. It is a report. Extracted from (Reinold & Tropp, 2012)                                                                                                         |

Source: own elaboration.

#### Appendix 4. Review of tools on the relationship between IMC and business performance

| Study                               | Research Context/Sample/Estimation Method                                                                                                                                                                                                                  | Approach [Scales]                                                                                                       | Key outcomes of IMC                                                                                                                                                                                  |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Duncan &amp; Moriarty (1998)</b> | N/A (Conceptual paper)                                                                                                                                                                                                                                     | IMC: Firm-wide approach                                                                                                 | <ul style="list-style-type: none"> <li>- Brand equity</li> <li>- Shareholder value</li> <li>- Customer value</li> <li>- Premium prices</li> </ul>                                                    |
| <b>Low (2000)</b>                   | Multi-sectorial United States of America<br>Sampling frame: a commercial listing of 1400 companies.<br>Key informant: CEOs or CMOs.<br>421 cases (36 % response rate)<br>Multiple regressions and bivariate correlation analysis                           | IMC: Narrow-focused approach centred on marketing communications<br>[3 items measuring message consistency (Low, 2000)] | <ul style="list-style-type: none"> <li>- Overall profitability</li> <li>- Sales volume</li> <li>- Sales growth</li> <li>- Market share</li> <li>- Customer value</li> </ul>                          |
| <b>Naik &amp; Raman (2003)</b>      | Study of specific brand advertising campaign.<br>Kalman filtering methodology.                                                                                                                                                                             | IMC: Narrow approach, measured in terms of cross-media synergy.                                                         | <ul style="list-style-type: none"> <li>- Maximization of the communication budgets (Efficiency)</li> </ul>                                                                                           |
| <b>Duncan &amp; Mulhern (2004)</b>  | N/A (Conceptual paper)                                                                                                                                                                                                                                     | IMC: Firm-wide approach                                                                                                 | <ul style="list-style-type: none"> <li>- ROI</li> <li>- Purchase intention</li> <li>- Return on customer</li> <li>- Brand preference</li> <li>- Brand awareness</li> <li>- Brand attitude</li> </ul> |
| <b>Zahay et al. (2004)</b>          | Multi-sectorial/United States of America.<br>Sampling frame: 433 companies.<br>Key-informant: Business-to-Business marketing executives.<br>209 cases (48% response rate).<br>EFA. Principal Components Analysis, Varimax Rotation.<br>Regression Analysis | IMC: Firm-wide approach<br>[adapted version of the scale by Reid (2005)]                                                | <ul style="list-style-type: none"> <li>- Financial outcomes</li> <li>- Customer relationship</li> <li>- Overall brand performance</li> </ul>                                                         |
| <b>Rust et al. (2004)</b>           | N/A (Conceptual paper)                                                                                                                                                                                                                                     | IMC: narrow approach                                                                                                    | <ul style="list-style-type: none"> <li>- Financial market position</li> <li>- Shareholder value</li> <li>- Customer loyalty</li> </ul>                                                               |

|                                      |                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                          | <ul style="list-style-type: none"> <li>- Customer satisfaction</li> <li>- Cash flow</li> <li>- Brand value</li> </ul>                                                                                                                                                                                                                                                                                     |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Authors                              | Method/ analysis                                                                                                                                                                                                                                                                                                   | Sample/ unit of analysis                                                                                                                                                 | Research findings                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Madhavaram et al. (2005)</b>      | N/A (Conceptual paper)                                                                                                                                                                                                                                                                                             | IMC: Firm-wide approach                                                                                                                                                  | <ul style="list-style-type: none"> <li>- Overall profitability</li> <li>- Financial results</li> <li>- Brand awareness</li> <li>- Brand image</li> <li>- Stakeholder relationships</li> </ul>                                                                                                                                                                                                             |
| <b>Reid (2005)</b>                   | Multi-sectorial/Australia<br>Sampling frame: a commercial listing of 1000 companies.<br>Key-informant: CEOs or CMOs.<br>169 cases (18.7 % response rate).<br>AFC to validate the scales and SEM-Path Analysis to estimate the structural model (IMC and Market Performance as second-order reflective constructs). | IMC: Firm-wide approach<br>[Duncan and Moriarty (1997)]<br>Market performance: subjective multidimensional scale and assessed in comparison with the closest competitor. | <ul style="list-style-type: none"> <li>- Market performance, in terms of:               <ol style="list-style-type: none"> <li>1. Sales-related performance (Overall profitability; market share; sales volume; sales growth);</li> <li>2. Brand advantage (Brand awareness; premium prices; channel cooperation)</li> <li>3. Customer-related outcomes (loyalty and satisfaction)</li> </ol> </li> </ul> |
| <b>Navarro-Bailón et al. (2009)</b>  | Fast Moving Consumer Goods (FMCGs) /Spain<br>Experimental design                                                                                                                                                                                                                                                   | IMC: narrow approach (consistency between sponsorship and advertising)                                                                                                   | <ul style="list-style-type: none"> <li>- Brand image</li> <li>- Brand associations</li> <li>- Brand attitude</li> </ul>                                                                                                                                                                                                                                                                                   |
| <b>Chen, Shen, &amp; Chiu (2007)</b> | Self-administered questionnaire.<br>Descriptive statistics. T tests.<br>Pearson correlations.<br>Moderated regression analyses<br>Focus: how IMC influences business performance in terms of sales.<br>Focused on IMC's effectiveness<br>Research method: Quantitative                                             | 101 high-tech firms in Taiwan                                                                                                                                            | Informational messages have greater communication and sales effects than transformational ones.<br>Message clarity and integration of communication show positive moderating                                                                                                                                                                                                                              |

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                               |                                                                                                                                                                                                                    |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | Techniques: correlation analysis, regression analysis<br>Area: asia, Taiwan<br>Sector: technology sector,<br>Main research objective: IMC measurement and Business performance                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                               | effects on message–performance. Message uniformity impacts only messages–sales effect relationships.                                                                                                               |
| <b>Authors</b>                    | Method/ analysis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sample/ unit of analysis                                                      | Research findings                                                                                                                                                                                                  |
| <b>Baidya &amp; Maity (2010)</b>  | Time-series data analysis.<br>Descriptive statistics.<br>Regression analysis<br>Focus: how IMC influences business performance in terms of sales.<br>Focused on IMC’s effectiveness<br>Research method: Quantitative<br>Techniques: regression analysis<br>Area: Asia, India<br>Sector: retailing, Hair care<br>Main research objective: Business performance                                                                                                                                                                                                                                                                                            | Two brands of two firms in the hair-care product sector in West Bengal, India | IMC components (i.e. advertising, sales force, promotion and distribution) have significant positive impact on physical sales. The influence of total IMC on physical sales varies between brands                  |
| <b>Reinold &amp; Tropp (2012)</b> | Online questionnaire.<br>Descriptive statistics.<br>Correspondence analysis. Dual scaling<br>Focus: how IMC influences business performance in terms of market share.<br>Focused on IMC’s effectiveness<br>Research method: Quantitative<br>Techniques: correlation analysis, regression analysis<br>Area: Europe, Germany<br>Sector: Education, students’ evaluation of IMC effectiveness<br>Main research objective: IMC measurement and Business performance<br>Comments: On the basis of Kliatchko’s (2008) four dimensions of IMC, Reinold and Tropp (2012) proposed a model of IMC effectiveness and tested it in full-service direct German banks | 368 students evaluating six direct banks in Germany                           | The model of IMC effectiveness can be employed as a direct metric for the marketing capability of a company from a consumer perspective. Higher brand’s effectiveness of IMC leads to higher brand’s market shares |
| <b>Navarro-Bailón (2012)</b>      | FMCGs /Spain<br>Experimental design                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | IMC: narrow approach                                                          | - Brand image<br>- Brand attitude                                                                                                                                                                                  |

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                               | (consistency between sponsorship and advertising)                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                   |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Einwiller &amp; Boenigk (2012)</b> | Financial sector/Switzerland<br>Sampling frame: a list of 4056 companies with 50-500 employees.<br>Key-informant: managers in communication, marketing/sales, CEOs, general managers or owner.<br>642 cases (159% response rate).<br>Correlation Analyses.                                                                                                                                                                                    | IMC: Firm-wide approach.<br>Measured in terms of the alignment of the communication with the corporate strategy and mission. Market performance: subjective multidimensional scale and assessed in comparison with the closest competitor. | <ul style="list-style-type: none"> <li>- ROI</li> <li>- Market share</li> <li>- Communication effectiveness</li> <li>- Brand awareness</li> <li>- Brand image</li> <li>- Brand attitude</li> <li>- Employee satisfaction</li> <li>- Customer satisfaction</li> </ul>              |
| <b>Authors</b>                        | Method/ analysis                                                                                                                                                                                                                                                                                                                                                                                                                              | Sample/ unit of analysis                                                                                                                                                                                                                   | Research findings                                                                                                                                                                                                                                                                 |
| <b>Porcu et al. (2012)</b>            | N/A (Conceptual paper)                                                                                                                                                                                                                                                                                                                                                                                                                        | IMC: Firm-wide approach                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>- ROI</li> <li>- Overall profitability</li> <li>- Sales growth</li> <li>- Brand awareness</li> <li>- Brand image</li> <li>- Brand equity</li> <li>- Brand attitude</li> <li>- Customer loyalty</li> <li>- Customer satisfaction</li> </ul> |
| <b>Syahputra, (2012)</b>              | Correlations, Cronbach's Alphas<br>Small Medium Enterprises Malaysia<br>Food and beverage industry<br>497 SMEs<br>20 items represent the independent variables and 9 items represent the dependent variables.<br>Objective: to identify the specific aspects of each component of the integrated marketing communications management which are the most monitored, respectively those considered as having the most important contribution to | Integrated marketing communications management items are adapted from the previous researches (Reid, 2005; Duncan and Moriarty, 1997). For marketing performances, items are adapted from Gray et al. (1998) and Reid, (2005).             | There is a positive relationship/ correlation between three dimensions of integrated marketing communications (interactivity, mission marketing, and organizational infrastructure) toward marketing performances.                                                                |

|                                      | the overall performances of the firm's marketing communications activities                                                                                                                                                                    |                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                          |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Završnik &amp; Jerman, (2013)</b> | LISREL<br>Slovenian pharmacy stores 2009<br>Objective: to investigate the impact of implementation of integrated marketing communication among OTC brands and food supplements sold in Slovenian pharmacy stores on their market performance. | Mike Reid (2005) which is Based on Duncan and Moriarty (1997). The used model is based on the basic model of IMC, developed by Duncan and Moriarty (1997) but we also consider some changes made later by Reid (2005). | The results of the empirical research reveal a relatively strong and statistically significant relationship between the two variables. greater implementation of integrated marketing communications could be associated with a higher brand performance |
| <b>Šerić et al. (2013)</b>           | Dalmatian region (Croatia). Key-informants: Managers of 17 high-class hotels. Survey among 120 guests of the 17 targeted hotels. Mann-Whitney U test. Variance-based SEM with Smart PLS.                                                      | IMC: Narrow-focused approach centred on marketing communications, based on the scale of Lee & Park (1997)]. Customer and supply-side perspective.                                                                      | - Brand loyalty (visit frequency; intention to return; first choice; satisfaction; intention to recommend; non-intention to change).                                                                                                                     |
| <b>Šerić et al. (2014)</b>           | Rome (Italy). High-quality hotels. Survey among 400 guests of such hotels (20 per hotel). Face-to-face and self-administered questionnaires. 335 valid responses (83.75 % response rate). CFA and multi-group SEM with EQS.                   | IMC: Narrow-focused approach centred on marketing communications, based on the scale of Lee & Park (1997)]. Customer and supply-side perspective.                                                                      | - Brand equity, in terms of brand image, perceived quality, brand loyalty                                                                                                                                                                                |
| <b>Šerić et al. (2015)</b>           | Croatia and Italy. High-quality hotels. Rome (Italy): 335 valid responses (83.75 % response rate). Croatia: 475 valid responses (98.95 % response rate). Variance-based SEM with Smart PLS.                                                   | IMC: Narrow-focused approach centred on marketing communications (Lee & Park (1997). Customer perspective.                                                                                                             | - Customer satisfaction                                                                                                                                                                                                                                  |

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lekhanya (2015)</b>                   | <p>Questionnaire with closed-ended questions. Descriptive statistics.</p> <p>Z test</p> <p>Focus: how IMC influences business performance in terms of sales.</p> <p>Focused on</p> <p>Research method: Quantitative</p> <p>Techniques:</p> <p>Area: Africa, south Africa</p> <p>Main research objective: Business performance</p>                                                                                                                                                                                                                                                                   | 374 SMEs owners/managers in South Africa                                                                                                                                                                                                                | <p>Managers agree that IMC is important in their business growth, but show a lack of knowledge and experience of IMC. Economy and competition are the most influential factors for IMC adoption in support of SME growth</p>                                                                                    |
| <b>Zabkar, Mumel &amp; Vanita (2015)</b> | <p>Qualitative approach. In-depth interviews. Quantitative approach.</p> <p>Self-administered questionnaire.</p> <p>Confirmatory factor analysis</p> <p>Focus: how IMC influences business performance in terms of market and financial performance.</p> <p>Focused on IMC's concept</p> <p>Research method: Quantitative and qualitative</p> <p>Techniques: factor analysis</p> <p>Area: Europe, Slovenia</p> <p>Sector: several different industries in the same study</p> <p>Main research objective: Business performance, IMC implementation, Degree of IMC implementation, IMC perception</p> | 175 marketing managers of middle size and large companies in a Central-European country                                                                                                                                                                 | <p>IMC involvement is higher in manufacturing than in services companies. IMC management involvement positively influences the level of marketing communication integration, although the impact is not very strong. The level of IMC implementation positively influences market and financial performance</p> |
| <b>Luxton et al. (2015, 2017)</b>        | <p>Multi-sectorial/Australia</p> <p>Key informant: senior managers.</p> <p>187 cases (17.7 % response rate). Variance-based SEM with Smart PLS.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>IMC: Firm-wide approach, measured using the scale by Luxton et al. (2015), extending the research of Reid (2005).</p> <p>Brand market performance and brand financial performance measured via subjective scales and assessed in comparison with</p> | <p>- Campaign effectiveness</p> <p>- Brand market performance (perceived quality; premium prices; channel cooperation; brand loyalty; market penetration)</p> <p>- Brand financial performance (sales value; market share; gross margin, ROI; ROA)</p>                                                          |



|                            |                                                                                                                                                            |                                                                                                            |                                                                               |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
|                            |                                                                                                                                                            | the closest competitor.                                                                                    |                                                                               |
| <b>Šerić (2017)</b>        | Croatia. 24 high-class hotels. 475 valid responses (98.95 % response rate). SEM with Lisrel and multigroup (by country of origin) analysis with Smart PLS. | IMC: Narrow-focused approach centred on marketing communications (Lee & Park (1997). Customer perspective. | - Overall brand equity                                                        |
| <b>Porcu et al. (2019)</b> |                                                                                                                                                            | IMC: Firm-wide approach                                                                                    | - Brand equity<br>- Shareholder value<br>- Customer value<br>- Premium prices |
| <b>Authors</b>             | Method/ analysis                                                                                                                                           | Sample/ unit of analysis                                                                                   | Research findings                                                             |

Source: own elaboration. Extended version of (Porcu et al., 2019).



## **Appendix 5. Panel of experts guide**

This appendix shows the guide, information and scales that were provided to the experts that took part in the qualitative stage of this dissertation.

**- PARTICIPACIÓN EN INVESTIGACIÓN -**

ADAPTACIÓN DE LAS ESCALAS PARA MEDIR LA COMUNICACIÓN  
INTEGRADA DEL MARKETING EN EL SECTOR DE LA EDUCACIÓN SUPERIOR  
- PANEL DE EXPERTOS -

**Nombre y apellidos:**

**Fecha:**

## Contextualización e introducción

¿Qué es la Comunicación Integrada del Marketing (CIM)?

*'Consiste en la coordinación estratégica de todos los mensajes y medios utilizados por una organización para influir en el valor de marca percibido'* (Duncan y Everett, 1993, p.31)

Es un concepto de planificación de las comunicaciones de marketing que reconoce el valor añadido de un plan integral. Evalúa el papel estratégico y combina una variedad de disciplinas de herramientas de comunicación para brindar claridad, coherencia y comunicaciones de máximo impacto en las organizaciones. En palabras de Shimp (2003) se conoce como herramientas de la CIM –publicidad, promoción de ventas, relaciones públicas, marketing directo, y todos los demás canales a través de los cuáles las organizaciones se comunican con sus audiencias–.

Es considerado el proceso de manejar todos los recursos de información de un producto o servicio a los que una persona consumidora está expuesta, teniendo como objetivo el dirigir a las personas hacia la compra o a mantener su fidelidad (Duncan y Caywood, 1996). Este proceso es capaz de controlar o influir estratégicamente en todos los mensajes, además de fomentar el diálogo con el propósito de crear y alimentar las relaciones rentables y estables con clientes (alumnado para esta investigación) y *stakeholders* o partes interesadas (empresas y entidades público-privadas relacionadas con la institución de educación superior).

Desde el planteamiento de Moriarty (1994) la diferencia general entre la efectividad de la postura tradicional y la integrada es la siguiente: un programa de comunicación integrada tiene en consideración todos los tipos de mensajes emitidos por una organización en cada punto donde un grupo de interés entra en contacto con la empresa. De aquí, según Jiménez y otros (2006) basados en Cornwell y Maignan, (1998), se puede interpretar que la efectividad de una herramienta de comunicación particular ha de valorarse de manera simultánea con los efectos del resto de herramientas, ya que todas afectan en menor o mayor grado la integridad de la comunicación de la empresa, y así es percibido por los grupos de interés. Según Kitchen y otros (2004), la integración de las comunicaciones debe reconocer no solo el valor de las funciones de comunicación por separado, sino el valor de la yuxtaposición de dichas funciones.

En la presente investigación y debido a las ventajas que este enfoque conlleva, se pretende estudiar la Comunicación Integrada del Marketing (CIM) en el sector de la educación superior. Para ello, primero se pretende medir el nivel de la CIM con la escala propuesta a continuación (ver ‘Escala 1’) y después de medir el nivel, se intentará medir el rendimiento de dicha CIM (ver ‘Escala 2’) para así poder entender en qué medida es ventajoso utilizar este enfoque en el sector. Se aplicarán dichas escalas a 8 instituciones pertenecientes a la red de universidades jesuitas, UNIJES. De las 11 instituciones que la componen sólo se obtendrá la muestra de 8, ya que los másteres universitarios son una de las unidades de medición propuestas y 8 de las instituciones pertenecientes a la red UNIJES ofertan este tipo de másteres.

La CIM se medirá con la ‘Escala 1’ a nivel institución en las 8 instituciones de la red UNIJES que ofertan másteres universitarios.

El rendimiento sin embargo, se medirá con la ‘Escala 2’ teniendo en cuenta 3 niveles:

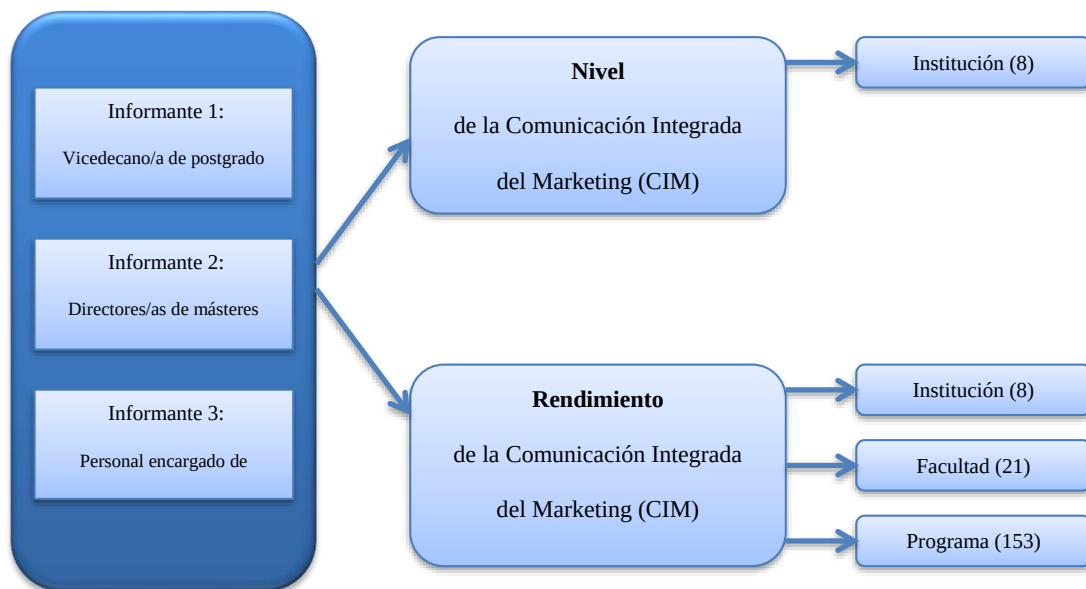
Nivel 1: rendimiento de la institución en su totalidad (8 instituciones de la red UNIJES).

Nivel 2: rendimiento de las facultades de la institución (21 facultades pertenecientes a las 8 instituciones de la red UNIJES y que ofertan másteres universitarios)

Nota: UD:6, Comillas: 5, IQS: 2, ESADE: 1, LOYOLA ANDALUCÍA: 4, INEA: 1, FACULTAD DE TEOLOGÍA DE GRANADA:1, HTSI:1.

Nivel 3: rendimiento de los programas de másteres universitarios de la institución (153 másteres universitarios ofertados por la red UNIJES).

Se propone un sistema multinivel ya que hay unidades que se encuentran a distintos niveles (ver esquema inferior). El rendimiento se medirá a 3 niveles (institución, facultad y programa). Los programas están agrupados en facultades que a su vez están agrupadas en instituciones. Por otro lado, el nivel de la CIM se refiere al conjunto de la institución y se mide al mismo nivel; a nivel institución.



Las escalas propuestas fueron formuladas para ser aplicadas en empresas del sector de los servicios en general. En la presente investigación nos gustaría aplicar dichas herramientas de medición a un sector específico, el de la educación superior. Por eso, nos gustaría saber si algún cambio sería conveniente en dichas escalas para adecuarlas al sector.

## **Resumen**

**Objetivo de la escala 1:** la medición del nivel de la CIM logrado por las organizaciones (the assessment of the level of IMC achieved by organizations).

**Objetivo de la escala 2:** la medición del rendimiento de la CIM logrado por las organizaciones, facultades y másteres universitarios.

## **¿Qué queremos medir con las escalas?**

- 1 Escala 1: El nivel de la CIM. El constructo de la CIM con la escala de Porcu, Del Barrio-García, & Kitchen (2017) de las instituciones de educación superior
- 2 Escala 2: El rendimiento de la CIM. El constructo rendimiento (performance) con el instrumento de Reid (2005) a tres niveles: en la institución en su totalidad, facultades y másteres universitarios.
  1. Rendimiento relacionado con las ventas
  2. Ventaja de la marca

3. Satisfacción del cliente (Adaptación de Reid (2005)) (dada la naturaleza del sector de la educación superior, se considerará cliente por un lado, el alumnado y por otro lado, los *stakeholders* o partes interesadas)

**¿A quién van dirigidas las escalas? ¿Quién va a responder las preguntas de las escalas?**

Informantes:

1. Vicedecano/a de postgrado de las instituciones pertenecientes a la red UNIJES
2. Directores/as de másteres universitarios de las instituciones pertenecientes a la red UNIJES
3. Managers: encargados/as de la comunicación en la facultad, directores/as de comunicación y marketing de las instituciones, personal encargado de comunicación y marketing de postgrados de las instituciones pertenecientes a la red UNIJES.

**¿Cómo nos gustaría que nos ayudara?**

**Objetivo que queremos conseguir con usted como persona experta:** adaptar dichas escalas ya que las mismas han sido aplicadas en otros sectores de servicios pero no en el sector de la educación superior en concreto.

Nos gustaría recibir recomendaciones y mejoras para adecuar dichas escalas al sector de la educación superior, y medir el nivel de la CIM y su correspondiente rendimiento en este sector. Muchas gracias de antemano.

**ESCALA 1: Medición del nivel de la Comunicación Integrada del Marketing (CIM) en instituciones de educación superior** (tener presente que es una escala que fue formulada para el sector de servicios y el objetivo con este panel de expertos es adaptarla al sector de la educación superior)

Por favor, a continuación, indique su nivel de acuerdo con las siguientes afirmaciones (1 = totalmente en desacuerdo, 7 = totalmente de acuerdo):

| <b>Coherencia del mensaje</b>                                                                                                                                                                                                                                                                                | Totalmente en desacuerdo |   |   |   | Totalmente de acuerdo |   |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|-----------------------|---|---|
| 1. Mi institución coordina cuidadosamente todos los mensajes generados por todos los departamentos con el objetivo de mantener la consistencia de su posicionamiento estratégico.                                                                                                                            | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| 2. Mi institución mantiene la coherencia en todos los componentes visuales de la comunicación.                                                                                                                                                                                                               | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| 3. Mi institución revisa periódicamente todos sus mensajes planificados para determinar su nivel de consistencia de cara al posicionamiento estratégico.                                                                                                                                                     | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| 4. En mi institución, es primordial mantener la coherencia entre los mensajes del producto, que se infieren y comprenden todo lo que está integrado en los mensajes del producto y servicio de la organización, derivados de la experiencia de tratar con la organización, su personal, agentes y productos. | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| <b>Interactividad</b>                                                                                                                                                                                                                                                                                        | Totalmente en desacuerdo |   |   |   | Totalmente de acuerdo |   |   |
| 5. Mi institución promueve la creación de programas especiales para facilitar las consultas y quejas de los <i>stakeholders</i> <sup>1</sup> sobre nuestras marcas, productos y la propia institución.                                                                                                       | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| 6. Mi compañía reúne la información de los <i>stakeholders</i> que se recopila o se genera a través de diferentes fuentes de todas las divisiones o departamentos en una base de datos unificada que está configurada para ser útil y de fácil acceso para todos los niveles de la organización.             | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| 7. En mi institución es crucial para el conjunto de la organización y para todos sus recursos humanos, tener una actitud receptiva hacia los mensajes recibidos de sus partes interesadas.                                                                                                                   | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |

*Nota 1: se considera stakeholder a todas las partes interesada, familiares, empresas y entidades publico privadas relacionadas con la institución de educación superior*



| <b>Interactividad (continuación)</b>                                                                                                                                                                              | Totalmente en desacuerdo |   |   |   |   | Totalmente de acuerdo |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|---|-----------------------|---|
|                                                                                                                                                                                                                   | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 8.En mi institución, el uso estratégico de las TIC mejora la velocidad de respuesta de la organización en su conjunto.                                                                                            | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 9.En mi institución, escuchar activamente los mensajes generados por las partes interesadas, por ejemplo, mediante el boca a boca, es de vital importancia para establecer estrategias de comunicación efectivas. | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 10.Mi institución considera que la relación entre la misma y sus <i>stakeholders</i> debe ser recíproca a fin de establecer un diálogo basado en la confianza.                                                    | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 11.Mi institución implementa de manera proactiva las redes sociales escuchando la información existente.                                                                                                          | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |

| <b>Enfoque estratégico centralizado en los <i>stakeholders</i></b>                                                                                                                                                               | Totalmente en desacuerdo |   |   |   |   | Totalmente de acuerdo |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|---|-----------------------|---|
|                                                                                                                                                                                                                                  | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 12. La misión de la institución es una consideración clave en la planificación de sus comunicaciones y se promueve entre los <i>stakeholders</i> .                                                                               | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 13. Mi institución desarrolla e implementa estudios sistemáticos para evaluar la eficacia y consistencia de sus comunicaciones corporativas a fin de construir y mantener relaciones sólidas con todos sus <i>stakeholders</i> . | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 14. En mi institución, el reconocimiento de los principales puntos de contacto entre la institución y sus <i>stakeholders</i> es fundamental para fortalecer la comunicación más efectiva.                                       | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 15. En mi institución, las redes sociales son una forma alternativa para que los <i>stakeholders</i> se comuniquen con la institución.                                                                                           | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |

*Nota: se considera stakeholder a todas las partes interesadas, familiares, empresas y entidades publico privadas relacionadas con la institución de educación superior*

| <b>Enfoque estratégico centralizado en los <i>stakeholders</i> (continuación)</b>                                                                                                                                           | Totalmente en desacuerdo |   |   |   |   | Totalmente de acuerdo |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|---|-----------------------|---|
|                                                                                                                                                                                                                             | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 16.Al trabajar para lograr el objetivo de establecer y mantener relaciones con los <i>stakeholders</i> , en mi institución los recursos humanos en todas las áreas de la organización deben colaborar cuando sea necesario. | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |

|                                                                                                                                                                      |   |   |   |   |   |   |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|
| 17. En mi institución, los recursos humanos en todas las áreas organizativas persiguen el objetivo de proporcionar soluciones centradas en los <i>stakeholders</i> . | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 18. Mi institución establece y nutre las relaciones con agentes / socios externos con el fin de lograr soluciones de alto valor para los <i>stakeholders</i> .       | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

*Nota: se considera stakeholder a todas las partes interesadas, familiares, empresas y entidades publico privadas relacionadas con la institución de educación superior*

| <b>Alineación organizacional</b>                                                                                                                                                                      | Totalmente en desacuerdo |   |   |   | Totalmente de acuerdo |   |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|-----------------------|---|---|
| 19. Mi institución maneja cuidadosamente la comunicación interna horizontal al asegurar que todas las áreas de la organización reconozcan los objetivos perseguidos por la organización.              | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| 20. Mi institución gestiona cuidadosamente la comunicación interna vertical garantizando que la información fluye a través de todos los niveles jerárquicos de la organización.                       | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| 21. Mi institución se asegura de que sus agentes externos y socios tengan al menos varios contactos por mes entre ellos.                                                                              | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| 22. En mi institución, la cooperación horizontal y vertical es crucial porque todos los departamentos afectan a la reputación corporativa.                                                            | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| 23. En mi institución, los empleados y gerentes comparten los valores corporativos y los principales objetivos de la institución que los guían en el desempeño de sus tareas y funciones específicas. | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| <b>Alineación organizacional (continuación)</b>                                                                                                                                                       | Totalmente en desacuerdo |   |   |   | Totalmente de acuerdo |   |   |
| 24. En mi institución, alentar y promover una cultura y clima colaborativos es muy relevante para activar mecanismos de coordinación inter funcionales.                                               | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |
| 25. Mi institución capacita a todos sus recursos humanos para que puedan desarrollar habilidades de cooperación y coordinación.                                                                       | 1                        | 2 | 3 | 4 | 5                     | 6 | 7 |

**ESCALA 2**

**Medición del rendimiento de la comunicación integrada del marketing (CIM) en instituciones de educación superior.**

| <b>Constructos e ítems relacionados con la marca a nivel <u>Institución</u><br/>(rendimiento a nivel <u>Institución</u>)</b>                             |          |   |       |   |          |   |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---|-------|---|----------|---|---|
| <i>Rendimiento relacionado con las ventas</i>                                                                                                            | Muy bajo |   | Igual |   | Muy alto |   |   |
| 1. ¿Cuál es su cuota de ventas en comparación con su competidor más cercano?                                                                             | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 2. ¿Cuál es el crecimiento de sus ventas en comparación con su competidor más cercano?                                                                   | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 3. ¿Cuál es su rentabilidad en comparación con su competidor más cercano?                                                                                | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 4. ¿Cuáles es el total de los ingresos de venta en comparación con su competidor más cercano?                                                            | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| <i>Ventajas de la marca</i>                                                                                                                              | Muy bajo |   | Igual |   | Muy alto |   |   |
| 5. ¿Cuál es el nivel de conciencia de marca de sus clientes en comparación con su competidor más cercano?                                                | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 6. ¿Cuál es su capacidad para obtener mejores precios en comparación a la de las otras marcas en su mercado principal?                                   | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 7. ¿Qué nivel de competición de canales recibe en relación con marcas competidoras similares en su mercado principal?                                    | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| <i>Satisfacción del alumnado</i>                                                                                                                         | Muy bajo |   | Igual |   | Muy alto |   |   |
| 8. ¿Cómo de satisfechos cree que están los clientes con su marca en comparación con los clientes de su competidor más cercano?                           | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 9. ¿Cómo de leales cree que son sus clientes con su marca en comparación con los clientes de su competidor más cercano?                                  | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| <i>Satisfacción de stakeholders</i><br>(partes interesadas, empresas y entidades público privadas relacionadas con la institución de educación superior) | Muy bajo |   | Igual |   | Muy alto |   |   |
| 10. ¿Cómo de satisfechos cree que están los clientes con su marca en comparación con los clientes de su competidor más cercano?                          | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 11. ¿Cómo de leales cree que son sus clientes con su marca en comparación con los clientes de su competidor más cercano?                                 | 1        | 2 | 3     | 4 | 5        | 6 | 7 |

*Nota: Se les pidió a las personas encuestadas que se centraran en la **institución** en su totalidad.*

| <b>Constructos e ítems relacionados con la marca a nivel <u>Facultad</u><br/>(rendimiento a nivel <u>Facultad</u>)</b>                                   |          |   |       |   |   |          |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---|-------|---|---|----------|---|
| <i>Rendimiento relacionado con las ventas</i>                                                                                                            | Muy bajo |   | Igual |   |   | Muy alto |   |
| 1. ¿Cuál es su cuota de ventas en comparación con su competidor más cercano?                                                                             | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 2. ¿Cuál es el crecimiento de sus ventas en comparación con su competidor más cercano?                                                                   | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 3. ¿Cuál es su rentabilidad en comparación con su competidor más cercano?                                                                                | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 4. ¿Cuáles es el total de los ingresos de venta en comparación con su competidor más cercano?                                                            | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| <i>Ventajas de la marca</i>                                                                                                                              | Muy bajo |   | Igual |   |   | Muy alto |   |
| 5. ¿Cuál es el nivel de conciencia de marca de sus clientes en comparación con su competidor más cercano?                                                | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 6. ¿Cuál es su capacidad para obtener mejores precios en comparación a la de las otras marcas en su mercado principal?                                   | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 7. ¿Qué nivel de competición de canales recibe en relación con marcas competidoras similares en su mercado principal?                                    | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| <i>Satisfacción del alumnado</i>                                                                                                                         | Muy bajo |   | Igual |   |   | Muy alto |   |
| 8. ¿Cómo de satisfechos cree que están los clientes con su marca en comparación con los clientes de su competidor más cercano?                           | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 9. ¿Cómo de leales cree que son sus clientes con su marca en comparación con los clientes de su competidor más cercano?                                  | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| <i>Satisfacción de stakeholders</i><br>(partes interesadas, empresas y entidades publico privadas relacionadas con la institución de educación superior) | Muy bajo |   | Igual |   |   | Muy alto |   |
| 10. ¿Cómo de satisfechos cree que están los clientes con su marca en comparación con los clientes de su competidor más cercano?                          | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 11. ¿Cómo de leales cree que son sus clientes con su marca en comparación con los clientes de su competidor más cercano?                                 | 1        | 2 | 3     | 4 | 5 | 6        | 7 |

*Nota: Se les pidió a las personas encuestadas que se centraran en las **facultades** de la institución (todas las facultades en general o la suya en particular).*

| <b>Constructos e ítems relacionados con la marca a nivel <u>Programa (máster universitario)</u><br/>(rendimiento a nivel <u>máster universitario</u>)</b> |          |   |       |   |          |   |   |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---|-------|---|----------|---|---|--|
| <i>Rendimiento relacionado con las ventas</i>                                                                                                             | Muy bajo |   | Igual |   | Muy alto |   |   |  |
| 1. ¿Cuál es su cuota de ventas en comparación con su competidor más cercano?                                                                              | 1        | 2 | 3     | 4 | 5        | 6 | 7 |  |
| 2. ¿Cuál es el crecimiento de sus ventas en comparación con su competidor más cercano?                                                                    | 1        | 2 | 3     | 4 | 5        | 6 | 7 |  |
| 3. ¿Cuál es su rentabilidad en comparación con su competidor más cercano?                                                                                 | 1        | 2 | 3     | 4 | 5        | 6 | 7 |  |
| 4. ¿Cuáles es el total de los ingresos de venta en comparación con su competidor más cercano?                                                             | 1        | 2 | 3     | 4 | 5        | 6 | 7 |  |
| <i>Ventajas de la marca</i>                                                                                                                               | Muy bajo |   | Igual |   | Muy alto |   |   |  |
| 5. ¿Cuál es el nivel de conciencia de marca de sus clientes en comparación con su competidor más cercano?                                                 | 1        | 2 | 3     | 4 | 5        | 6 | 7 |  |
| 6. ¿Cuál es su capacidad para obtener mejores precios en comparación a la de las otras marcas en su mercado principal?                                    | 1        | 2 | 3     | 4 | 5        | 6 | 7 |  |
| 7. ¿Qué nivel de competición de canales recibe en relación con marcas competidoras similares en su mercado principal?                                     | 1        | 2 | 3     | 4 | 5        | 6 | 7 |  |
| <i>Satisfacción del alumnado</i>                                                                                                                          | Muy bajo |   | Igual |   | Muy alto |   |   |  |
| 8. ¿Cómo de satisfechos cree que están los clientes con su marca en comparación con los clientes de su competidor más cercano?                            | 1        | 2 | 3     | 4 | 5        | 6 | 7 |  |
| 9. ¿Cómo de leales cree que son sus clientes con su marca en comparación con los clientes de su competidor más cercano?                                   | 1        | 2 | 3     | 4 | 5        | 6 | 7 |  |
| <i>Satisfacción de stakeholders</i><br>(partes interesadas, empresas y entidades público privadas relacionadas con la institución de educación superior)  | Muy bajo |   | Igual |   | Muy alto |   |   |  |
| 10. ¿Cómo de satisfechos cree que están los clientes con su marca en comparación con los clientes de su competidor más cercano?                           | 1        | 2 | 3     | 4 | 5        | 6 | 7 |  |
| 11. ¿Cómo de leales cree que son sus clientes con su marca en comparación con los clientes de su competidor más cercano?                                  | 1        | 2 | 3     | 4 | 5        | 6 | 7 |  |

Nota: Se les pidió a los encuestados que se centraran en los **programas de másteres universitarios** la institución.

### **Preguntas sobre las escalas:**

El objetivo de la ‘Escala 1’ ha sido medir el nivel de la Comunicación Integrada del Marketing y el de la ‘Escala 2’ ha sido medir el rendimiento de dicho proceso.

A continuación, añadimos cuestiones relacionadas con las anteriores herramientas de medición:

1. ¿Las escalas han sido claras? ¿Definen claramente el objetivo de las mismas? (medir el nivel de la CIM logrado por las organizaciones y el rendimiento de la misma a diferentes niveles)
2. ¿Echas en falta algún tema que no se haya tenido en cuenta en la formulación de las preguntas? ¿Echas algo de más?
3. ¿Se te ocurre alguna forma mejor de tratar algún tema?
4. ¿Crees que falta algún tema por tratar?
5. ¿Crees que se debería profundizar más sobre algún tema en concreto?
6. ¿Crees que alguna cuestión planteada suscita dudas?
7. ¿Los diferentes niveles de informantes tiene sentido? ¿crees que se puede preguntar a todos acerca de todas las unidades de medición?

*Nota: -Los informantes son: directores/as de másteres universitarios, vicedecano/a y responsables de comunicación y marketing*

*- Unidades de medición: la institución en su totalidad, facultades y másteres universitarios*

8. Añadir las sugerencias oportunas, por favor:

### **Referencias**

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## Appendix 6. SPSS outputs

Based on an adaptation of the approach proposed by Churchill (1979) (shown in Figure 2, Chapter II, '2.3.1. Development of the scales (objective 1)') to develop improved measures of the variables marketers usually work with and the scale development methodology proposed by Gerbing and Anderson's (1988), the following four multi-item and multidimensional scales' adaptation carried out in SPSS (IBM SPSS, 2011) is exposed in the present appendix: 'Appendix 3.1. Scale 1 - IMC level in an HEI Scale', 'Appendix 3.2. Scale 2 - HEI's performance scale', 'Appendix 3.3. Scale 3 – Faculty's performance scale' and 'Appendix 3.4. Scale 4 – Master's degree performance scale'.

As Figure 2 of the dissertation's main document file shows, first reliability and then the validity procedures are going to be fulfilled for each of the four scales. To fulfil the first stage, the correlations and Cronbach's Alphas were studied. Secondly, the validation stage was carried out by running a PCA analysis.

Below a summary of the obtained results are explained and in the next sections, each procedure will be described in more detail.

*Summary of results obtained after the reliability and validity.*

| <b>Scale</b>                                  | <b>1</b>                                  | <b>2</b>                             | <b>3</b>                                 | <b>4</b>                                             |
|-----------------------------------------------|-------------------------------------------|--------------------------------------|------------------------------------------|------------------------------------------------------|
| <b>Name/<br/>Objective<br/>of the scale</b>   | Scale 1 - IMC<br>level in an HEI<br>Scale | Scale 2 - HEI's<br>performance scale | Scale 3 - Faculty's<br>performance scale | Scale 4 -<br>Master's degree<br>performance<br>scale |
| <b>Number of<br/>items</b>                    | 29                                        | 11                                   | 11                                       | 11                                                   |
| <b>Number of<br/>dimensions</b>               | 4                                         | 4                                    | 4                                        | 4                                                    |
| <b>Number of<br/>items after<br/>PCA</b>      | 29                                        | 11                                   | 11                                       | 11                                                   |
| <b>Number of<br/>dimensions<br/>after PCA</b> | 5                                         | 2                                    | 3                                        | 3                                                    |

## Appendix 6.1. Scale 1 - IMC level in an HEI Scale.

### 6.1.1. Reliability (correlations and Cronbach's Alphas)

#### 6.1.1.1. Pearson correlations

'Scale 1 - IMC level in an HEI Scale'. Pearson correlations. Significant relation. Values over  $r=0.476$  generally.

|        |                                   | Correlations |         |         |         |        |        |        |
|--------|-----------------------------------|--------------|---------|---------|---------|--------|--------|--------|
|        |                                   | Coher1       | Coher2  | Coher3  | Coher4  | Inter1 | Inter2 | Inter3 |
| Coher1 | Pearson Correlation               | 1            | ,619**  | ,659**  | ,656**  | ,510** | ,259*  | ,382** |
|        | Sig. (2-tailed)                   |              | ,000    | ,000    | ,000    | ,000   | ,026   | ,001   |
|        | Sum of Squares and Cross-products | 148,716      | 81,081  | 81,595  | 97,743  | 72,027 | 51,257 | 52,541 |
|        | Covariance                        | 2,037        | 1,111   | 1,118   | 1,339   | ,987   | ,702   | ,720   |
|        | N                                 | 74           | 74      | 74      | 74      | 74     | 74     | 74     |
| Coher2 | Pearson Correlation               | ,619**       | 1       | ,467**  | ,474**  | ,483** | ,188   | ,204   |
|        | Sig. (2-tailed)                   | ,000         |         | ,000    | ,000    | ,000   | ,108   | ,082   |
|        | Sum of Squares and Cross-products | 81,081       | 115,405 | 50,973  | 62,216  | 60,135 | 32,784 | 24,703 |
|        | Covariance                        | 1,111        | 1,581   | ,698    | ,852    | ,824   | ,449   | ,338   |
|        | N                                 | 74           | 74      | 74      | 74      | 74     | 74     | 74     |
| Coher3 | Pearson Correlation               | ,659**       | ,467**  | 1       | ,660**  | ,504** | ,292*  | ,441** |
|        | Sig. (2-tailed)                   | ,000         | ,000    |         | ,000    | ,000   | ,012   | ,000   |
|        | Sum of Squares and Cross-products | 81,595       | 50,973  | 103,135 | 81,919  | 59,324 | 48,081 | 50,486 |
|        | Covariance                        | 1,118        | ,698    | 1,413   | 1,122   | ,813   | ,659   | ,692   |
|        | N                                 | 74           | 74      | 74      | 74      | 74     | 74     | 74     |
| Coher4 | Pearson Correlation               | ,656**       | ,474**  | ,660**  | 1       | ,589** | ,252*  | ,480** |
|        | Sig. (2-tailed)                   | ,000         | ,000    | ,000    |         | ,000   | ,031   | ,000   |
|        | Sum of Squares and Cross-products | 97,743       | 62,216  | 81,919  | 149,149 | 83,405 | 49,851 | 66,108 |
|        | Covariance                        | 1,339        | ,852    | 1,122   | 2,043   | 1,143  | ,683   | ,906   |
|        | N                                 | 74           | 74      | 74      | 74      | 74     | 74     | 74     |



## 6.1.1.2. Spearman Correlation

‘Scale 1 - IMC level in an HEI Scale’. Spearman’s correlations. Significant relation.

Values over  $r=0.4$  generally.

|                |        |                         | Correlations |        |        |        |
|----------------|--------|-------------------------|--------------|--------|--------|--------|
|                |        |                         | Coher1       | Coher2 | Coher3 | Coher4 |
| Spearman's rho | Coher1 | Correlation Coefficient | 1,000        | ,597** | ,669** | ,645** |
|                |        | Sig. (2-tailed)         | .            | ,000   | ,000   | ,000   |
|                |        | N                       | 77           | 77     | 77     | 77     |
|                | Coher2 | Correlation Coefficient | ,597**       | 1,000  | ,440** | ,466** |
|                |        | Sig. (2-tailed)         | ,000         | .      | ,000   | ,000   |
|                |        | N                       | 77           | 77     | 77     | 77     |
|                | Coher3 | Correlation Coefficient | ,669**       | ,440** | 1,000  | ,640** |
|                |        | Sig. (2-tailed)         | ,000         | ,000   | .      | ,000   |
|                |        | N                       | 77           | 77     | 77     | 77     |
|                | Coher4 | Correlation Coefficient | ,645**       | ,466** | ,640** | 1,000  |
|                |        | Sig. (2-tailed)         | ,000         | ,000   | ,000   | .      |
|                |        | N                       | 77           | 77     | 77     | 77     |

### 6.1.1.3. Cronbach's Alphas

'Scale 1 - IMC level in an HEI Scale'. 77 responses obtained.

#### Case Processing Summary

|       |                       | N  | %     |
|-------|-----------------------|----|-------|
| Cases | Valid                 | 77 | 100,0 |
|       | Excluded <sup>a</sup> | 0  | ,0    |
|       | Total                 | 77 | 100,0 |

a. Listwise deletion based on all variables in the procedure.

'Scale 1 - IMC level in an HEI Scale'. Cronbach's Alpha for the total scale. Is very high, 0.958, according to Nunnally (1978) 0.7 would be the minimum value.

#### Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,958             | 29         |

'Scale 1 - IMC level in an HEI Scale'. Cronbach's Alpha for 'Dimension 1'. Is very high, 0.858, according to Nunnally (1978) 0.7 would be the minimum value.

#### Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,858             | 4          |

‘Scale 1 - IMC level in an HEI Scale’. Cronbach’s Alpha for ‘Dimension 2’. Is very high, 0.866, according to Nunnally (1978) 0.7 would be the minimum value.

#### Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,866             | 8          |

‘Scale 1 - IMC level in an HEI Scale’. Cronbach’s Alpha for ‘Dimension 3’. Is very high, 0.891, according to Nunnally (1978) 0.7 would be the minimum value.

#### Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,891             | 9          |

‘Scale 1 - IMC level in an HEI Scale’. Cronbach’s Alpha for ‘Dimension 4’. Is very high, 0.912, according to Nunnally (1978) 0.7 would be the minimum value.

#### Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,912             | 8          |

‘Scale 1 - IMC level in an HEI Scale’. Item Total statistics.

| Item-Total Statistics |                            |                                |                                  |                                  |
|-----------------------|----------------------------|--------------------------------|----------------------------------|----------------------------------|
|                       | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
| Coher1                | 137,21                     | 717,062                        | ,754                             | ,955                             |
| Coher2                | 136,47                     | 744,173                        | ,474                             | ,958                             |
| Coher3                | 137,16                     | 734,081                        | ,646                             | ,956                             |
| Coher4                | 136,70                     | 722,554                        | ,699                             | ,956                             |
| Inter1                | 136,55                     | 728,830                        | ,652                             | ,956                             |
| Inter2                | 138,39                     | 722,794                        | ,500                             | ,958                             |
| Inter3                | 136,29                     | 733,233                        | ,609                             | ,957                             |
| Inter4                | 136,19                     | 743,133                        | ,514                             | ,957                             |
| Inter5                | 137,71                     | 717,075                        | ,758                             | ,955                             |
| Inter6                | 137,60                     | 733,059                        | ,578                             | ,957                             |
| Inter7                | 136,88                     | 712,262                        | ,757                             | ,955                             |
| Inter8                | 137,34                     | 737,595                        | ,456                             | ,958                             |
| Enfo1                 | 136,60                     | 742,954                        | ,570                             | ,957                             |
| Enfo2                 | 136,75                     | 735,425                        | ,667                             | ,956                             |
| Enfo3                 | 137,99                     | 728,171                        | ,651                             | ,956                             |
| Enfo4                 | 137,04                     | 721,485                        | ,748                             | ,956                             |
| Enfo5                 | 137,10                     | 720,173                        | ,649                             | ,956                             |
| Enfo6                 | 137,43                     | 722,880                        | ,668                             | ,956                             |
| Enfo7                 | 137,25                     | 732,004                        | ,654                             | ,956                             |
| Enfo8                 | 137,34                     | 725,200                        | ,749                             | ,956                             |
| Enfo9                 | 137,26                     | 730,484                        | ,694                             | ,956                             |
| Alin1                 | 137,78                     | 718,332                        | ,675                             | ,956                             |
| Alin2                 | 137,65                     | 720,231                        | ,701                             | ,956                             |
| Alin3                 | 137,18                     | 715,467                        | ,759                             | ,955                             |
| Alin4                 | 137,06                     | 719,588                        | ,717                             | ,956                             |
| Alin5                 | 137,26                     | 724,458                        | ,676                             | ,956                             |
| Alin6                 | 137,09                     | 714,110                        | ,721                             | ,956                             |
| Alin7                 | 137,97                     | 727,578                        | ,617                             | ,957                             |
| Alin8                 | 138,04                     | 725,801                        | ,624                             | ,957                             |

The two columns in the right are analysed in order to decide if the items should be kept in the scale or not:

- 1- ‘Corrected Item-Total correlation’: values are correct as the column values are higher than 0.4.
- 2- ‘Cronbach’s Alpha if Item Deleted’: the values need to be compared with the total Cronbach’s Alpha value that is 0.958 (see Table above), if the items have a difference bigger than 0.2 an eye should be kept. In this simulation, there is no

problem so every item is kept. Besides, the value of 'Item2' is the same as the total Cronbach's Alpha value that is 0.958. This means that taking out 'Item2' does not affect to the scale at all.

### 6.1.2. Validity (PCA analysis)

#### 6.1.2.1. Correlation matrix

'Scale 1 - IMC level in an HEI Scale'. Correlation matrix.

When correlations are below 0.3, explain that the variable is not correlated with other variables, so an eye was kept on those. In the case of the item named 'Inter8', some values were below 0,3 and others over 0.5. It can be appreciated that the items at least have one correlation above 0.3 and it can be concluded that variables correlate well.

|             |        | Coher1 | Coher2 | Coher3 | Coher4 | Inter1 | Inter2 |
|-------------|--------|--------|--------|--------|--------|--------|--------|
| Correlation | Coher1 | 1,000  | ,614   | ,685   | ,668   | ,513   | ,309   |
|             | Coher2 | ,614   | 1,000  | ,482   | ,487   | ,469   | ,216   |
|             | Coher3 | ,685   | ,482   | 1,000  | ,675   | ,501   | ,343   |
|             | Coher4 | ,668   | ,487   | ,675   | 1,000  | ,585   | ,286   |
|             | Inter1 | ,513   | ,469   | ,501   | ,585   | 1,000  | ,349   |
|             | Inter2 | ,309   | ,216   | ,343   | ,286   | ,349   | 1,000  |
|             | Inter3 | ,383   | ,227   | ,448   | ,488   | ,560   | ,399   |
|             | Inter4 | ,356   | ,130   | ,412   | ,426   | ,449   | ,412   |
|             | Inter5 | ,507   | ,266   | ,455   | ,566   | ,464   | ,454   |
|             | Inter6 | ,310   | ,046   | ,317   | ,309   | ,367   | ,361   |
|             | Inter7 | ,548   | ,322   | ,465   | ,531   | ,512   | ,439   |
|             | Inter8 | ,253   | -,040  | ,121   | ,186   | ,339   | ,303   |
|             | Enfo1  | ,531   | ,335   | ,360   | ,483   | ,383   | ,218   |
|             | Enfo2  | ,601   | ,346   | ,453   | ,478   | ,510   | ,284   |
|             | Enfo3  | ,617   | ,525   | ,468   | ,457   | ,407   | ,428   |
|             | Enfo4  | ,564   | ,216   | ,603   | ,639   | ,532   | ,374   |
|             | Enfo5  | ,469   | ,134   | ,298   | ,339   | ,522   | ,302   |
|             | Enfo6  | ,613   | ,316   | ,343   | ,442   | ,478   | ,349   |
|             | Enfo7  | ,365   | ,121   | ,451   | ,521   | ,446   | ,457   |
|             | Enfo8  | ,590   | ,338   | ,444   | ,536   | ,456   | ,464   |
|             | Enfo9  | ,541   | ,359   | ,303   | ,378   | ,452   | ,477   |

|                 |        |      |      |      |      |      |      |
|-----------------|--------|------|------|------|------|------|------|
| Sig. (1-tailed) | Alin1  | ,581 | ,503 | ,504 | ,426 | ,375 | ,376 |
|                 | Alin2  | ,645 | ,521 | ,534 | ,535 | ,390 | ,368 |
|                 | Alin3  | ,620 | ,382 | ,520 | ,638 | ,489 | ,338 |
|                 | Alin4  | ,640 | ,482 | ,464 | ,586 | ,469 | ,261 |
|                 | Alin5  | ,551 | ,474 | ,445 | ,458 | ,468 | ,246 |
|                 | Alin6  | ,463 | ,313 | ,393 | ,567 | ,438 | ,289 |
|                 | Alin7  | ,463 | ,294 | ,455 | ,376 | ,325 | ,286 |
|                 | Alin8  | ,425 | ,289 | ,435 | ,374 | ,264 | ,278 |
|                 | Coher1 |      | ,000 | ,000 | ,000 | ,000 | ,003 |
|                 | Coher2 | ,000 |      | ,000 | ,000 | ,000 | ,029 |
|                 | Coher3 | ,000 | ,000 |      | ,000 | ,000 | ,001 |
|                 | Coher4 | ,000 | ,000 | ,000 |      | ,000 | ,006 |
|                 | Inter1 | ,000 | ,000 | ,000 | ,000 |      | ,001 |
|                 | Inter2 | ,003 | ,029 | ,001 | ,006 | ,001 |      |
|                 | Inter3 | ,000 | ,023 | ,000 | ,000 | ,000 | ,000 |
|                 | Inter4 | ,001 | ,130 | ,000 | ,000 | ,000 | ,000 |
|                 | Inter5 | ,000 | ,010 | ,000 | ,000 | ,000 | ,000 |

|             |        | Inter3 | Inter4 | Inter5 | Inter6 | Inter7 | Inter8 |
|-------------|--------|--------|--------|--------|--------|--------|--------|
| Correlation | Coher1 | ,383   | ,356   | ,507   | ,310   | ,548   | ,253   |
|             | Coher2 | ,227   | ,130   | ,266   | ,046   | ,322   | -,040  |
|             | Coher3 | ,448   | ,412   | ,455   | ,317   | ,465   | ,121   |
|             | Coher4 | ,488   | ,426   | ,566   | ,309   | ,531   | ,186   |
|             | Inter1 | ,560   | ,449   | ,464   | ,367   | ,512   | ,339   |
|             | Inter2 | ,399   | ,412   | ,454   | ,361   | ,439   | ,303   |
|             | Inter3 | 1,000  | ,635   | ,471   | ,361   | ,606   | ,248   |
|             | Inter4 | ,635   | 1,000  | ,433   | ,397   | ,540   | ,324   |
|             | Inter5 | ,471   | ,433   | 1,000  | ,700   | ,690   | ,497   |
|             | Inter6 | ,361   | ,397   | ,700   | 1,000  | ,537   | ,597   |
|             | Inter7 | ,606   | ,540   | ,690   | ,537   | 1,000  | ,466   |
|             | Inter8 | ,248   | ,324   | ,497   | ,597   | ,466   | 1,000  |
|             | Enfo1  | ,327   | ,311   | ,478   | ,323   | ,456   | ,263   |
|             | Enfo2  | ,470   | ,394   | ,448   | ,270   | ,471   | ,262   |
|             | Enfo3  | ,334   | ,230   | ,535   | ,422   | ,444   | ,300   |
|             | Enfo4  | ,581   | ,502   | ,601   | ,439   | ,648   | ,327   |
|             | Enfo5  | ,423   | ,379   | ,560   | ,558   | ,592   | ,616   |
|             | Enfo6  | ,359   | ,253   | ,469   | ,453   | ,467   | ,418   |
|             | Enfo7  | ,528   | ,376   | ,482   | ,508   | ,527   | ,506   |
|             | Enfo8  | ,403   | ,419   | ,653   | ,410   | ,611   | ,383   |
|             | Enfo9  | ,498   | ,428   | ,503   | ,284   | ,602   | ,260   |
|             | Alin1  | ,306   | ,118   | ,477   | ,393   | ,385   | ,283   |

|                 |        |      |      |      |      |      |      |
|-----------------|--------|------|------|------|------|------|------|
| Sig. (1-tailed) | Alin2  | ,366 | ,228 | ,449 | ,220 | ,500 | ,235 |
|                 | Alin3  | ,472 | ,336 | ,590 | ,419 | ,591 | ,211 |
|                 | Alin4  | ,428 | ,331 | ,514 | ,259 | ,605 | ,104 |
|                 | Alin5  | ,361 | ,271 | ,512 | ,286 | ,457 | ,243 |
|                 | Alin6  | ,567 | ,406 | ,619 | ,524 | ,637 | ,253 |
|                 | Alin7  | ,240 | ,187 | ,445 | ,400 | ,336 | ,353 |
|                 | Alin8  | ,215 | ,224 | ,507 | ,458 | ,396 | ,395 |
|                 | Coher1 | ,000 | ,001 | ,000 | ,003 | ,000 | ,013 |
|                 | Coher2 | ,023 | ,130 | ,010 | ,346 | ,002 | ,363 |
|                 | Coher3 | ,000 | ,000 | ,000 | ,003 | ,000 | ,147 |
|                 | Coher4 | ,000 | ,000 | ,000 | ,003 | ,000 | ,053 |
|                 | Inter1 | ,000 | ,000 | ,000 | ,001 | ,000 | ,001 |
|                 | Inter2 | ,000 | ,000 | ,000 | ,001 | ,000 | ,004 |
|                 | Inter3 |      | ,000 | ,000 | ,001 | ,000 | ,015 |
|                 | Inter4 | ,000 |      | ,000 | ,000 | ,000 | ,002 |
|                 | Inter5 | ,000 | ,000 |      | ,000 | ,000 | ,000 |

|             |        | Enfo1 | Enfo2 | Enfo3 | Enfo4 | Enfo5 | Enfo6 |
|-------------|--------|-------|-------|-------|-------|-------|-------|
| Correlation | Coher1 | ,531  | ,601  | ,617  | ,564  | ,469  | ,613  |
|             | Coher2 | ,335  | ,346  | ,525  | ,216  | ,134  | ,316  |
|             | Coher3 | ,360  | ,453  | ,468  | ,603  | ,298  | ,343  |
|             | Coher4 | ,483  | ,478  | ,457  | ,639  | ,339  | ,442  |
|             | Inter1 | ,383  | ,510  | ,407  | ,532  | ,522  | ,478  |
|             | Inter2 | ,218  | ,284  | ,428  | ,374  | ,302  | ,349  |
|             | Inter3 | ,327  | ,470  | ,334  | ,581  | ,423  | ,359  |
|             | Inter4 | ,311  | ,394  | ,230  | ,502  | ,379  | ,253  |
|             | Inter5 | ,478  | ,448  | ,535  | ,601  | ,560  | ,469  |
|             | Inter6 | ,323  | ,270  | ,422  | ,439  | ,558  | ,453  |
|             | Inter7 | ,456  | ,471  | ,444  | ,648  | ,592  | ,467  |
|             | Inter8 | ,263  | ,262  | ,300  | ,327  | ,616  | ,418  |
|             | Enfo1  | 1,000 | ,707  | ,349  | ,492  | ,320  | ,361  |
|             | Enfo2  | ,707  | 1,000 | ,330  | ,554  | ,444  | ,487  |
|             | Enfo3  | ,349  | ,330  | 1,000 | ,452  | ,361  | ,468  |
|             | Enfo4  | ,492  | ,554  | ,452  | 1,000 | ,556  | ,429  |
|             | Enfo5  | ,320  | ,444  | ,361  | ,556  | 1,000 | ,621  |
|             | Enfo6  | ,361  | ,487  | ,468  | ,429  | ,621  | 1,000 |
|             | Enfo7  | ,259  | ,370  | ,429  | ,542  | ,571  | ,500  |
|             | Enfo8  | ,508  | ,488  | ,514  | ,601  | ,527  | ,549  |
|             | Enfo9  | ,407  | ,559  | ,479  | ,547  | ,457  | ,538  |
|             | Alin1  | ,307  | ,453  | ,670  | ,413  | ,378  | ,471  |
|             | Alin2  | ,424  | ,533  | ,533  | ,443  | ,382  | ,415  |
|             | Alin3  | ,505  | ,592  | ,494  | ,708  | ,455  | ,462  |
|             | Alin4  | ,490  | ,567  | ,428  | ,635  | ,405  | ,425  |

|                 |        |       |       |       |       |       |       |
|-----------------|--------|-------|-------|-------|-------|-------|-------|
| Sig. (1-tailed) | Alin5  | ,496  | ,574  | ,429  | ,454  | ,379  | ,504  |
|                 | Alin6  | ,406  | ,505  | ,383  | ,675  | ,532  | ,404  |
|                 | Alin7  | ,283  | ,370  | ,412  | ,371  | ,396  | ,515  |
|                 | Alin8  | ,256  | ,321  | ,477  | ,371  | ,376  | ,588  |
|                 | Coher1 | ,000  | ,000  | ,000  | ,000  | ,000  | ,000  |
|                 | Coher2 | ,001  | ,001  | ,000  | ,030  | ,123  | ,003  |
|                 | Coher3 | ,001  | ,000  | ,000  | ,000  | ,004  | ,001  |
|                 | Coher4 | ,000  | ,000  | ,000  | ,000  | ,001  | ,000  |
|                 | Inter1 | ,000  | ,000  | ,000  | ,000  | ,000  | ,000  |
|                 | Inter2 | ,028  | ,006  | ,000  | ,000  | ,004  | ,001  |
|                 | Inter3 | ,002  | ,000  | ,001  | ,000  | ,000  | ,001  |
|                 | Inter4 | ,003  | ,000  | ,022  | ,000  | ,000  | ,013  |
|                 | Inter5 | ,000  | ,000  | ,000  | ,000  | ,000  | ,000  |
|                 |        | Enfo7 | Enfo8 | Enfo9 | Alin1 | Alin2 | Alin3 |
| Correlation     | Coher1 | ,365  | ,590  | ,541  | ,581  | ,645  | ,620  |
|                 | Coher2 | ,121  | ,338  | ,359  | ,503  | ,521  | ,382  |
|                 | Coher3 | ,451  | ,444  | ,303  | ,504  | ,534  | ,520  |
|                 | Coher4 | ,521  | ,536  | ,378  | ,426  | ,535  | ,638  |
|                 | Inter1 | ,446  | ,456  | ,452  | ,375  | ,390  | ,489  |
|                 | Inter2 | ,457  | ,464  | ,477  | ,376  | ,368  | ,338  |
|                 | Inter3 | ,528  | ,403  | ,498  | ,306  | ,366  | ,472  |
|                 | Inter4 | ,376  | ,419  | ,428  | ,118  | ,228  | ,336  |
|                 | Inter5 | ,482  | ,653  | ,503  | ,477  | ,449  | ,590  |
|                 | Inter6 | ,508  | ,410  | ,284  | ,393  | ,220  | ,419  |
|                 | Inter7 | ,527  | ,611  | ,602  | ,385  | ,500  | ,591  |
|                 | Inter8 | ,506  | ,383  | ,260  | ,283  | ,235  | ,211  |
|                 | Enfo1  | ,259  | ,508  | ,407  | ,307  | ,424  | ,505  |
|                 | Enfo2  | ,370  | ,488  | ,559  | ,453  | ,533  | ,592  |
|                 | Enfo3  | ,429  | ,514  | ,479  | ,670  | ,533  | ,494  |
|                 | Enfo4  | ,542  | ,601  | ,547  | ,413  | ,443  | ,708  |
|                 | Enfo5  | ,571  | ,527  | ,457  | ,378  | ,382  | ,455  |
|                 | Enfo6  | ,500  | ,549  | ,538  | ,471  | ,415  | ,462  |
|                 | Enfo7  | 1,000 | ,498  | ,420  | ,476  | ,434  | ,430  |
|                 | Enfo8  | ,498  | 1,000 | ,650  | ,448  | ,529  | ,540  |
|                 | Enfo9  | ,420  | ,650  | 1,000 | ,422  | ,491  | ,561  |
|                 | Alin1  | ,476  | ,448  | ,422  | 1,000 | ,771  | ,544  |
|                 | Alin2  | ,434  | ,529  | ,491  | ,771  | 1,000 | ,598  |
|                 | Alin3  | ,430  | ,540  | ,561  | ,544  | ,598  | 1,000 |
|                 | Alin4  | ,310  | ,520  | ,601  | ,501  | ,684  | ,880  |
|                 | Alin5  | ,416  | ,557  | ,597  | ,559  | ,600  | ,468  |
|                 | Alin6  | ,505  | ,533  | ,590  | ,474  | ,484  | ,753  |
|                 | Alin7  | ,469  | ,492  | ,385  | ,594  | ,517  | ,429  |



|                 |        |      |      |      |      |      |      |
|-----------------|--------|------|------|------|------|------|------|
|                 | Alin8  | ,453 | ,556 | ,399 | ,600 | ,500 | ,416 |
| Sig. (1-tailed) | Coher1 | ,001 | ,000 | ,000 | ,000 | ,000 | ,000 |
|                 | Coher2 | ,148 | ,001 | ,001 | ,000 | ,000 | ,000 |
|                 | Coher3 | ,000 | ,000 | ,004 | ,000 | ,000 | ,000 |
|                 | Coher4 | ,000 | ,000 | ,000 | ,000 | ,000 | ,000 |
|                 | Inter1 | ,000 | ,000 | ,000 | ,000 | ,000 | ,000 |
|                 | Inter2 | ,000 | ,000 | ,000 | ,000 | ,000 | ,001 |
|                 | Inter3 | ,000 | ,000 | ,000 | ,003 | ,001 | ,000 |
|                 | Inter4 | ,000 | ,000 | ,000 | ,154 | ,023 | ,001 |
|                 | Inter5 | ,000 | ,000 | ,000 | ,000 | ,000 | ,000 |

|                 |        |       |       |       |       |       |
|-----------------|--------|-------|-------|-------|-------|-------|
|                 |        | Alin4 | Alin5 | Alin6 | Alin7 | Alin8 |
| Correlation     | Coher1 | ,640  | ,551  | ,463  | ,463  | ,425  |
|                 | Coher2 | ,482  | ,474  | ,313  | ,294  | ,289  |
|                 | Coher3 | ,464  | ,445  | ,393  | ,455  | ,435  |
|                 | Coher4 | ,586  | ,458  | ,567  | ,376  | ,374  |
|                 | Inter1 | ,469  | ,468  | ,438  | ,325  | ,264  |
|                 | Inter2 | ,261  | ,246  | ,289  | ,286  | ,278  |
|                 | Inter3 | ,428  | ,361  | ,567  | ,240  | ,215  |
|                 | Inter4 | ,331  | ,271  | ,406  | ,187  | ,224  |
|                 | Inter5 | ,514  | ,512  | ,619  | ,445  | ,507  |
|                 | Inter6 | ,259  | ,286  | ,524  | ,400  | ,458  |
|                 | Inter7 | ,605  | ,457  | ,637  | ,336  | ,396  |
|                 | Inter8 | ,104  | ,243  | ,253  | ,353  | ,395  |
|                 | Enfo1  | ,490  | ,496  | ,406  | ,283  | ,256  |
|                 | Enfo2  | ,567  | ,574  | ,505  | ,370  | ,321  |
|                 | Enfo3  | ,428  | ,429  | ,383  | ,412  | ,477  |
|                 | Enfo4  | ,635  | ,454  | ,675  | ,371  | ,371  |
|                 | Enfo5  | ,405  | ,379  | ,532  | ,396  | ,376  |
|                 | Enfo6  | ,425  | ,504  | ,404  | ,515  | ,588  |
|                 | Enfo7  | ,310  | ,416  | ,505  | ,469  | ,453  |
|                 | Enfo8  | ,520  | ,557  | ,533  | ,492  | ,556  |
|                 | Enfo9  | ,601  | ,597  | ,590  | ,385  | ,399  |
|                 | Alin1  | ,501  | ,559  | ,474  | ,594  | ,600  |
|                 | Alin2  | ,684  | ,600  | ,484  | ,517  | ,500  |
|                 | Alin3  | ,880  | ,468  | ,753  | ,429  | ,416  |
|                 | Alin4  | 1,000 | ,559  | ,690  | ,427  | ,424  |
|                 | Alin5  | ,559  | 1,000 | ,489  | ,569  | ,563  |
|                 | Alin6  | ,690  | ,489  | 1,000 | ,451  | ,402  |
|                 | Alin7  | ,427  | ,569  | ,451  | 1,000 | ,877  |
|                 | Alin8  | ,424  | ,563  | ,402  | ,877  | 1,000 |
| Sig. (1-tailed) | Coher1 | ,000  | ,000  | ,000  | ,000  | ,000  |

|  |        |        |        |        |        |        |        |
|--|--------|--------|--------|--------|--------|--------|--------|
|  | Coher2 | ,000   | ,000   | ,003   | ,005   | ,005   |        |
|  | Coher3 | ,000   | ,000   | ,000   | ,000   | ,000   |        |
|  | Coher4 | ,000   | ,000   | ,000   | ,000   | ,000   |        |
|  | Inter1 | ,000   | ,000   | ,000   | ,002   | ,010   |        |
|  | Inter2 | ,011   | ,016   | ,005   | ,006   | ,007   |        |
|  | Inter3 | ,000   | ,001   | ,000   | ,018   | ,030   |        |
|  | Inter4 | ,002   | ,009   | ,000   | ,052   | ,025   |        |
|  | Inter5 | ,000   | ,000   | ,000   | ,000   | ,000   |        |
|  |        |        |        |        |        |        |        |
|  |        | Coher1 | Coher2 | Coher3 | Coher4 | Inter1 | Inter2 |
|  | Inter6 | ,003   | ,346   | ,003   | ,003   | ,001   | ,001   |
|  | Inter7 | ,000   | ,002   | ,000   | ,000   | ,000   | ,000   |
|  | Inter8 | ,013   | ,363   | ,147   | ,053   | ,001   | ,004   |
|  | Enfo1  | ,000   | ,001   | ,001   | ,000   | ,000   | ,028   |
|  | Enfo2  | ,000   | ,001   | ,000   | ,000   | ,000   | ,006   |
|  | Enfo3  | ,000   | ,000   | ,000   | ,000   | ,000   | ,000   |
|  | Enfo4  | ,000   | ,030   | ,000   | ,000   | ,000   | ,000   |
|  | Enfo5  | ,000   | ,123   | ,004   | ,001   | ,000   | ,004   |
|  | Enfo6  | ,000   | ,003   | ,001   | ,000   | ,000   | ,001   |
|  | Enfo7  | ,001   | ,148   | ,000   | ,000   | ,000   | ,000   |
|  | Enfo8  | ,000   | ,001   | ,000   | ,000   | ,000   | ,000   |
|  | Enfo9  | ,000   | ,001   | ,004   | ,000   | ,000   | ,000   |
|  | Alin1  | ,000   | ,000   | ,000   | ,000   | ,000   | ,000   |
|  | Alin2  | ,000   | ,000   | ,000   | ,000   | ,000   | ,000   |
|  | Alin3  | ,000   | ,000   | ,000   | ,000   | ,000   | ,001   |
|  | Alin4  | ,000   | ,000   | ,000   | ,000   | ,000   | ,011   |
|  | Alin5  | ,000   | ,000   | ,000   | ,000   | ,000   | ,016   |
|  | Alin6  | ,000   | ,003   | ,000   | ,000   | ,000   | ,005   |
|  | Alin7  | ,000   | ,005   | ,000   | ,000   | ,002   | ,006   |
|  | Alin8  | ,000   | ,005   | ,000   | ,000   | ,010   | ,007   |

#### 6.1.2.2. Kaiser-Meyer-Olkin (KMO)

‘Scale 1 - IMC level in an HEI Scale’. Kaiser-Meyer-Olkin (KMO) and significance.

Shows that KMO good because its value is near 1 and that the model is significant because value Sig value is below 0.05.

| KMO and Bartlett's Test                          |                    |          |
|--------------------------------------------------|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | ,878     |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 1752,383 |
|                                                  | df                 | 406      |
|                                                  | Sig.               | ,000     |

## 6.1.2.3. Anti-Image Correlation

‘Scale 1 - IMC level in an HEI Scale’. Anti –Image Correlation matrix.

The diagonal shows high punctuations (near Cronbach’s Alpha) so no variable is eliminated.

|                        |        | Coher1            | Coher2            | Coher3            | Coher4 | Inter1 |
|------------------------|--------|-------------------|-------------------|-------------------|--------|--------|
| Anti-image Covariance  | Coher1 | ,151              | -,040             | -,084             | -,048  | ,065   |
|                        | Coher2 | -,040             | ,313              | -,045             | -,030  | -,102  |
|                        | Coher3 | -,084             | -,045             | ,230              | -,017  | -,037  |
|                        | Coher4 | -,048             | -,030             | -,017             | ,208   | -,086  |
|                        | Inter1 | ,065              | -,102             | -,037             | -,086  | ,324   |
|                        | Inter2 | ,054              | -,051             | -,032             | ,044   | ,003   |
|                        | Inter3 | ,022              | ,015              | -,019             | ,027   | -,076  |
|                        | Inter4 | -,028             | ,028              | -,024             | -,049  | -,010  |
|                        | Inter5 | ,014              | ,028              | -,005             | -,078  | ,032   |
|                        | Inter6 | -,007             | ,050              | -,032             | ,060   | -,048  |
|                        | Inter7 | -,018             | -,030             | -,019             | ,017   | ,002   |
|                        | Inter8 | -,043             | ,017              | ,098              | ,022   | -,063  |
|                        | Enfo1  | ,003              | -,042             | ,036              | -,041  | ,050   |
|                        | Enfo2  | -,028             | ,023              | -,015             | ,040   | -,050  |
|                        | Enfo3  | -,061             | -,084             | ,040              | ,019   | -,015  |
|                        | Enfo4  | ,009              | ,096              | -,085             | -,035  | -,007  |
|                        | Enfo5  | -,016             | ,007              | ,005              | ,077   | -,065  |
|                        | Enfo6  | -,084             | ,010              | ,070              | -,036  | -,034  |
|                        | Enfo7  | ,057              | ,055              | -,043             | -,102  | ,042   |
|                        | Enfo8  | -,041             | ,005              | ,032              | ,006   | -,037  |
|                        | Enfo9  | -,027             | ,008              | ,046              | ,058   | -,018  |
|                        | Alin1  | -,023             | -,040             | ,017              | ,038   | -,020  |
|                        | Alin2  | ,004              | ,021              | -,035             | -,041  | ,044   |
|                        | Alin3  | ,011              | ,032              | -,033             | -,023  | ,005   |
|                        | Alin4  | -,026             | -,025             | ,043              | ,018   | -,028  |
|                        | Alin5  | ,009              | -,039             | -,018             | ,027   | -,043  |
|                        | Alin6  | ,029              | -,063             | ,044              | -,050  | ,066   |
|                        | Alin7  | -,050             | ,026              | ,002              | ,020   | -,052  |
|                        | Alin8  | ,058              | -,015             | -,036             | -,014  | ,059   |
| Anti-image Correlation | Coher1 | ,853 <sup>a</sup> | -,185             | -,449             | -,270  | ,293   |
|                        | Coher2 | -,185             | ,840 <sup>a</sup> | -,168             | -,119  | -,320  |
|                        | Coher3 | -,449             | -,168             | ,851 <sup>a</sup> | -,078  | -,134  |

|                        |        |        |        |        |                   |                   |
|------------------------|--------|--------|--------|--------|-------------------|-------------------|
|                        | Coher4 | -,270  | -,119  | -,078  | ,859 <sup>a</sup> | -,330             |
|                        | Inter1 | ,293   | -,320  | -,134  | -,330             | ,864 <sup>a</sup> |
|                        | Inter2 | ,204   | -,132  | -,096  | ,139              | ,007              |
|                        | Inter3 | ,098   | ,047   | -,068  | ,103              | -,228             |
|                        | Inter4 | -,115  | ,081   | -,080  | -,174             | -,027             |
|                        | Inter5 | ,078   | ,103   | -,022  | -,358             | ,118              |
|                        |        | Inter2 | Inter3 | Inter4 | Inter5            | Inter6            |
| Anti-image Covariance  | Coher1 | ,054   | ,022   | -,028  | ,014              | -,007             |
|                        | Coher2 | -,051  | ,015   | ,028   | ,028              | ,050              |
|                        | Coher3 | -,032  | -,019  | -,024  | -,005             | -,032             |
|                        | Coher4 | ,044   | ,027   | -,049  | -,078             | ,060              |
|                        | Inter1 | ,003   | -,076  | -,010  | ,032              | -,048             |
|                        | Inter2 | ,471   | ,019   | -,106  | -,068             | -,010             |
|                        | Inter3 | ,019   | ,341   | -,149  | -,031             | ,041              |
|                        | Inter4 | -,106  | -,149  | ,384   | ,045              | -,067             |
|                        | Inter5 | -,068  | -,031  | ,045   | ,227              | -,096             |
|                        | Inter6 | -,010  | ,041   | -,067  | -,096             | ,248              |
|                        | Inter7 | -,022  | -,062  | ,003   | -,045             | -,022             |
|                        | Inter8 | ,000   | ,038   | -,039  | -,031             | -,050             |
|                        | Enfo1  | ,017   | ,001   | ,020   | ,005              | -,070             |
|                        | Enfo2  | ,010   | -,016  | -,045  | -,014             | ,050              |
|                        | Enfo3  | -,023  | -,024  | ,015   | -,037             | -,026             |
|                        | Enfo4  | -,018  | -,021  | ,002   | ,016              | ,032              |
|                        | Enfo5  | ,066   | ,038   | -,028  | -,043             | ,002              |
|                        | Enfo6  | -,070  | -,049  | ,080   | ,040              | -,043             |
|                        | Enfo7  | -,064  | -,062  | ,038   | ,076              | -,032             |
|                        | Enfo8  | -,051  | ,041   | -,016  | -,058             | ,042              |
|                        | Enfo9  | -,082  | -,007  | -,037  | -,001             | ,050              |
|                        | Alin1  | -,020  | -,003  | ,047   | -,011             | -,030             |
|                        | Alin2  | -,042  | -,022  | ,016   | ,025              | ,032              |
|                        | Alin3  | -,022  | -,001  | ,035   | ,002              | -,016             |
|                        | Alin4  | ,017   | ,015   | -,022  | -,009             | ,017              |
|                        | Alin5  | ,082   | ,016   | ,000   | -,063             | ,017              |
|                        | Alin6  | ,058   | -,052  | ,000   | ,000              | -,080             |
|                        | Alin7  | -,058  | -,010  | ,039   | ,009              | ,015              |
|                        | Alin8  | ,057   | ,020   | -,039  | -,008             | -,016             |
| Anti-image Correlation | Coher1 | ,204   | ,098   | -,115  | ,078              | -,037             |
|                        | Coher2 | -,132  | ,047   | ,081   | ,103              | ,179              |
|                        | Coher3 | -,096  | -,068  | -,080  | -,022             | -,135             |
|                        | Coher4 | ,139   | ,103   | -,174  | -,358             | ,265              |

|                        |        |                   |                   |                   |                   |       |
|------------------------|--------|-------------------|-------------------|-------------------|-------------------|-------|
|                        | Inter1 | ,007              | -,228             | -,027             | ,118              | -,168 |
|                        | Inter2 | ,851 <sup>a</sup> | ,048              | -,250             | -,207             | -,029 |
|                        | Inter3 | ,048              | ,910 <sup>a</sup> | -,412             | -,111             | ,142  |
|                        | Inter4 | -,250             | -,412             | ,860 <sup>a</sup> | ,151              | -,218 |
|                        | Inter5 | -,207             | -,111             | ,151              | ,910 <sup>a</sup> | -,406 |
|                        |        | Inter7            | Inter8            | Enfo1             | Enfo2             | Enfo3 |
| Anti-image Covariance  | Coher1 | -,018             | -,043             | ,003              | -,028             | -,061 |
|                        | Coher2 | -,030             | ,017              | -,042             | ,023              | -,084 |
|                        | Coher3 | -,019             | ,098              | ,036              | -,015             | ,040  |
|                        | Coher4 | ,017              | ,022              | -,041             | ,040              | ,019  |
|                        | Inter1 | ,002              | -,063             | ,050              | -,050             | -,015 |
|                        | Inter2 | -,022             | ,000              | ,017              | ,010              | -,023 |
|                        | Inter3 | -,062             | ,038              | ,001              | -,016             | -,024 |
|                        | Inter4 | ,003              | -,039             | ,020              | -,045             | ,015  |
|                        | Inter5 | -,045             | -,031             | ,005              | -,014             | -,037 |
|                        | Inter6 | -,022             | -,050             | -,070             | ,050              | -,026 |
|                        | Inter7 | ,265              | -,057             | -,024             | ,027              | ,024  |
|                        | Inter8 | -,057             | ,339              | -,024             | ,000              | ,017  |
|                        | Enfo1  | -,024             | -,024             | ,346              | -,174             | -,035 |
|                        | Enfo2  | ,027              | ,000              | -,174             | ,276              | ,066  |
|                        | Enfo3  | ,024              | ,017              | -,035             | ,066              | ,323  |
|                        | Enfo4  | -,015             | -,028             | -,035             | -,004             | -,043 |
|                        | Enfo5  | -,020             | -,078             | ,034              | -,010             | ,008  |
|                        | Enfo6  | ,015              | ,040              | ,008              | -,027             | ,028  |
|                        | Enfo7  | -,030             | -,067             | ,032              | -,008             | -,044 |
|                        | Enfo8  | -,006             | ,037              | -,070             | ,039              | ,006  |
|                        | Enfo9  | -,037             | ,009              | ,038              | -,041             | -,051 |
|                        | Alin1  | ,031              | ,020              | ,040              | -,028             | -,063 |
|                        | Alin2  | -,019             | -,047             | -,011             | -,018             | ,000  |
|                        | Alin3  | ,024              | -,030             | -,004             | -,030             | -,028 |
|                        | Alin4  | -,032             | ,053              | -,005             | ,020              | ,026  |
|                        | Alin5  | ,028              | ,007              | -,054             | -,026             | ,031  |
|                        | Alin6  | -,026             | ,046              | ,039              | -,017             | ,039  |
|                        | Alin7  | ,042              | ,005              | -,028             | ,010              | ,034  |
|                        | Alin8  | -,022             | -,036             | ,030              | -,004             | -,033 |
| Anti-image Correlation | Coher1 | -,091             | -,190             | ,013              | -,137             | -,275 |
|                        | Coher2 | -,103             | ,052              | -,128             | ,079              | -,264 |
|                        | Coher3 | -,077             | ,352              | ,127              | -,058             | ,146  |
|                        | Coher4 | ,071              | ,083              | -,151             | ,165              | ,075  |
|                        | Inter1 | ,006              | -,191             | ,149              | -,166             | -,045 |

|                        |        |           |       |       |       |       |
|------------------------|--------|-----------|-------|-------|-------|-------|
|                        | Inter2 | -,062     | ,001  | ,041  | ,028  | -,059 |
|                        | Inter3 | -,208     | ,113  | ,002  | -,052 | -,074 |
|                        | Inter4 | ,008      | -,109 | ,055  | -,138 | ,043  |
|                        | Inter5 | -,184     | -,113 | ,018  | -,057 | -,139 |
|                        |        | Enfo4     | Enfo5 | Enfo6 | Enfo7 | Enfo8 |
| Anti-image Covariance  | Coher1 | ,009      | -,016 | -,084 | ,057  | -,041 |
|                        | Coher2 | ,096      | ,007  | ,010  | ,055  | ,005  |
|                        | Coher3 | -,085     | ,005  | ,070  | -,043 | ,032  |
|                        | Coher4 | -,035     | ,077  | -,036 | -,102 | ,006  |
|                        | Inter1 | -,007     | -,065 | -,034 | ,042  | -,037 |
|                        | Inter2 | -,018     | ,066  | -,070 | -,064 | -,051 |
|                        | Inter3 | -,021     | ,038  | -,049 | -,062 | ,041  |
|                        | Inter4 | ,002      | -,028 | ,080  | ,038  | -,016 |
|                        | Inter5 | ,016      | -,043 | ,040  | ,076  | -,058 |
|                        | Inter6 | ,032      | ,002  | -,043 | -,032 | ,042  |
|                        | Inter7 | -,015     | -,020 | ,015  | -,030 | -,006 |
|                        | Inter8 | -,028     | -,078 | ,040  | -,067 | ,037  |
|                        | Enfo1  | -,035     | ,034  | ,008  | ,032  | -,070 |
|                        | Enfo2  | -,004     | -,010 | -,027 | -,008 | ,039  |
|                        | Enfo3  | -,043     | ,008  | ,028  | -,044 | ,006  |
|                        | Enfo4  | ,233      | -,047 | ,018  | ,007  | -,037 |
|                        | Enfo5  | -,047     | ,271  | -,099 | -,062 | -,030 |
|                        | Enfo6  | ,018      | -,099 | ,254  | -,023 | ,016  |
|                        | Enfo7  | ,007      | -,062 | -,023 | ,301  | -,029 |
|                        | Enfo8  | -,037     | -,030 | ,016  | -,029 | ,294  |
|                        | Enfo9  | -,013     | ,033  | -,039 | -,017 | -,064 |
|                        | Alin1  | -,026     | ,009  | ,012  | -,028 | ,040  |
|                        | Alin2  | ,056      | -,026 | ,023  | ,000  | -,043 |
|                        | Alin3  | -,002     | ,014  | -,014 | ,001  | -,016 |
|                        | Alin4  | -,028     | -,008 | ,015  | ,011  | ,035  |
|                        | Alin5  | -,009     | ,034  | -,025 | -,051 | -,004 |
|                        | Alin6  | -,041     | -,044 | ,028  | -,006 | -,016 |
|                        | Alin7  | ,015      | -,023 | ,051  | -,027 | ,030  |
|                        | Alin8  | -4,719E-5 | ,032  | -,077 | ,020  | -,053 |
| Anti-image Correlation | Coher1 | ,048      | -,079 | -,429 | ,269  | -,196 |
|                        | Coher2 | ,354      | ,023  | ,036  | ,180  | ,018  |
|                        | Coher3 | -,365     | ,020  | ,288  | -,165 | ,123  |
|                        | Coher4 | -,160     | ,324  | -,157 | -,407 | ,025  |
|                        | Inter1 | -,025     | -,220 | -,120 | ,133  | -,119 |
|                        | Inter2 | -,055     | ,184  | -,202 | -,170 | -,138 |

|                        |        |       |       |       |       |       |
|------------------------|--------|-------|-------|-------|-------|-------|
|                        | Inter3 | -,073 | ,124  | -,167 | -,195 | ,128  |
|                        | Inter4 | ,007  | -,087 | ,257  | ,112  | -,049 |
|                        | Inter5 | ,070  | -,174 | ,167  | ,291  | -,226 |
|                        |        | Enfo9 | Alin1 | Alin2 | Alin3 | Alin4 |
| Anti-image Covariance  | Coher1 | -,027 | -,023 | ,004  | ,011  | -,026 |
|                        | Coher2 | ,008  | -,040 | ,021  | ,032  | -,025 |
|                        | Coher3 | ,046  | ,017  | -,035 | -,033 | ,043  |
|                        | Coher4 | ,058  | ,038  | -,041 | -,023 | ,018  |
|                        | Inter1 | -,018 | -,020 | ,044  | ,005  | -,028 |
|                        | Inter2 | -,082 | -,020 | -,042 | -,022 | ,017  |
|                        | Inter3 | -,007 | -,003 | -,022 | -,001 | ,015  |
|                        | Inter4 | -,037 | ,047  | ,016  | ,035  | -,022 |
|                        | Inter5 | -,001 | -,011 | ,025  | ,002  | -,009 |
|                        | Inter6 | ,050  | -,030 | ,032  | -,016 | ,017  |
|                        | Inter7 | -,037 | ,031  | -,019 | ,024  | -,032 |
|                        | Inter8 | ,009  | ,020  | -,047 | -,030 | ,053  |
|                        | Enfo1  | ,038  | ,040  | -,011 | -,004 | -,005 |
|                        | Enfo2  | -,041 | -,028 | -,018 | -,030 | ,020  |
|                        | Enfo3  | -,051 | -,063 | ,000  | -,028 | ,026  |
|                        | Enfo4  | -,013 | -,026 | ,056  | -,002 | -,028 |
|                        | Enfo5  | ,033  | ,009  | -,026 | ,014  | -,008 |
|                        | Enfo6  | -,039 | ,012  | ,023  | -,014 | ,015  |
|                        | Enfo7  | -,017 | -,028 | ,000  | ,001  | ,011  |
|                        | Enfo8  | -,064 | ,040  | -,043 | -,016 | ,035  |
|                        | Enfo9  | ,273  | ,016  | ,008  | ,002  | -,011 |
|                        | Alin1  | ,016  | ,192  | -,111 | -,028 | ,035  |
|                        | Alin2  | ,008  | -,111 | ,187  | ,032  | -,061 |
|                        | Alin3  | ,002  | -,028 | ,032  | ,112  | -,077 |
|                        | Alin4  | -,011 | ,035  | -,061 | -,077 | ,096  |
|                        | Alin5  | -,075 | -,021 | -,022 | ,043  | -,026 |
|                        | Alin6  | -,055 | -,021 | ,009  | -,037 | -,003 |
|                        | Alin7  | ,006  | ,008  | -,005 | ,000  | ,008  |
|                        | Alin8  | ,000  | -,029 | ,012  | ,011  | -,022 |
| Anti-image Correlation | Coher1 | -,132 | -,137 | ,023  | ,087  | -,215 |
|                        | Coher2 | ,029  | -,164 | ,087  | ,173  | -,144 |
|                        | Coher3 | ,183  | ,083  | -,168 | -,204 | ,293  |
|                        | Coher4 | ,243  | ,192  | -,206 | -,151 | ,130  |
|                        | Inter1 | -,060 | -,078 | ,179  | ,029  | -,157 |
|                        | Inter2 | -,230 | -,066 | -,140 | -,095 | ,078  |
|                        | Inter3 | -,024 | -,011 | -,086 | -,006 | ,081  |



|                        |        |        |       |       |       |           |       |
|------------------------|--------|--------|-------|-------|-------|-----------|-------|
|                        |        | Inter4 | -,115 | ,172  | ,062  | ,166      | -,114 |
|                        |        | Inter5 | -,003 | -,052 | ,121  | ,012      | -,062 |
|                        |        |        | Alin5 | Alin6 | Alin7 | Alin8     |       |
| Anti-image Covariance  | Coher1 |        | ,009  | ,029  | -,050 | ,058      |       |
|                        | Coher2 |        | -,039 | -,063 | ,026  | -,015     |       |
|                        | Coher3 |        | -,018 | ,044  | ,002  | -,036     |       |
|                        | Coher4 |        | ,027  | -,050 | ,020  | -,014     |       |
|                        | Inter1 |        | -,043 | ,066  | -,052 | ,059      |       |
|                        | Inter2 |        | ,082  | ,058  | -,058 | ,057      |       |
|                        | Inter3 |        | ,016  | -,052 | -,010 | ,020      |       |
|                        | Inter4 |        | ,000  | ,000  | ,039  | -,039     |       |
|                        | Inter5 |        | -,063 | ,000  | ,009  | -,008     |       |
|                        | Inter6 |        | ,017  | -,080 | ,015  | -,016     |       |
|                        | Inter7 |        | ,028  | -,026 | ,042  | -,022     |       |
|                        | Inter8 |        | ,007  | ,046  | ,005  | -,036     |       |
|                        | Enfo1  |        | -,054 | ,039  | -,028 | ,030      |       |
|                        | Enfo2  |        | -,026 | -,017 | ,010  | -,004     |       |
|                        | Enfo3  |        | ,031  | ,039  | ,034  | -,033     |       |
|                        | Enfo4  |        | -,009 | -,041 | ,015  | -4,719E-5 |       |
|                        | Enfo5  |        | ,034  | -,044 | -,023 | ,032      |       |
|                        | Enfo6  |        | -,025 | ,028  | ,051  | -,077     |       |
|                        | Enfo7  |        | -,051 | -,006 | -,027 | ,020      |       |
|                        | Enfo8  |        | -,004 | -,016 | ,030  | -,053     |       |
|                        | Enfo9  |        | -,075 | -,055 | ,006  | ,000      |       |
|                        | Alin1  |        | -,021 | -,021 | ,008  | -,029     |       |
|                        | Alin2  |        | -,022 | ,009  | -,005 | ,012      |       |
|                        | Alin3  |        | ,043  | -,037 | ,000  | ,011      |       |
|                        | Alin4  |        | -,026 | -,003 | ,008  | -,022     |       |
|                        | Alin5  |        | ,330  | -,011 | -,017 | -,009     |       |
|                        | Alin6  |        | -,011 | ,198  | -,048 | ,028      |       |
|                        | Alin7  |        | -,017 | -,048 | ,151  | -,101     |       |
|                        | Alin8  |        | -,009 | ,028  | -,101 | ,106      |       |
| Anti-image Correlation | Coher1 |        | ,038  | ,169  | -,334 | ,453      |       |
|                        | Coher2 |        | -,123 | -,252 | ,122  | -,082     |       |
|                        | Coher3 |        | -,066 | ,206  | ,011  | -,228     |       |
|                        | Coher4 |        | ,102  | -,248 | ,110  | -,092     |       |
|                        | Inter1 |        | -,131 | ,260  | -,237 | ,318      |       |
|                        | Inter2 |        | ,207  | ,189  | -,217 | ,254      |       |
|                        | Inter3 |        | ,047  | -,201 | -,043 | ,107      |       |
|                        | Inter4 |        | ,001  | -,001 | ,164  | -,192     |       |
|                        | Inter5 |        | -,230 | -,002 | ,049  | -,049     |       |

|  |        | Coher1 | Coher2 | Coher3 | Coher4 | Inter1 |
|--|--------|--------|--------|--------|--------|--------|
|  | Inter6 | -,037  | ,179   | -,135  | ,265   | -,168  |
|  | Inter7 | -,091  | -,103  | -,077  | ,071   | ,006   |
|  | Inter8 | -,190  | ,052   | ,352   | ,083   | -,191  |
|  | Enfo1  | ,013   | -,128  | ,127   | -,151  | ,149   |
|  | Enfo2  | -,137  | ,079   | -,058  | ,165   | -,166  |
|  | Enfo3  | -,275  | -,264  | ,146   | ,075   | -,045  |
|  | Enfo4  | ,048   | ,354   | -,365  | -,160  | -,025  |
|  | Enfo5  | -,079  | ,023   | ,020   | ,324   | -,220  |
|  | Enfo6  | -,429  | ,036   | ,288   | -,157  | -,120  |
|  | Enfo7  | ,269   | ,180   | -,165  | -,407  | ,133   |
|  | Enfo8  | -,196  | ,018   | ,123   | ,025   | -,119  |
|  | Enfo9  | -,132  | ,029   | ,183   | ,243   | -,060  |
|  | Alin1  | -,137  | -,164  | ,083   | ,192   | -,078  |
|  | Alin2  | ,023   | ,087   | -,168  | -,206  | ,179   |
|  | Alin3  | ,087   | ,173   | -,204  | -,151  | ,029   |
|  | Alin4  | -,215  | -,144  | ,293   | ,130   | -,157  |
|  | Alin5  | ,038   | -,123  | -,066  | ,102   | -,131  |
|  | Alin6  | ,169   | -,252  | ,206   | -,248  | ,260   |
|  | Alin7  | -,334  | ,122   | ,011   | ,110   | -,237  |
|  | Alin8  | ,453   | -,082  | -,228  | -,092  | ,318   |

|  |        | Inter2 | Inter3 | Inter4 | Inter5 | Inter6            |
|--|--------|--------|--------|--------|--------|-------------------|
|  | Inter6 | -,029  | ,142   | -,218  | -,406  | ,847 <sup>a</sup> |
|  | Inter7 | -,062  | -,208  | ,008   | -,184  | -,084             |
|  | Inter8 | ,001   | ,113   | -,109  | -,113  | -,174             |
|  | Enfo1  | ,041   | ,002   | ,055   | ,018   | -,239             |
|  | Enfo2  | ,028   | -,052  | -,138  | -,057  | ,193              |
|  | Enfo3  | -,059  | -,074  | ,043   | -,139  | -,093             |
|  | Enfo4  | -,055  | -,073  | ,007   | ,070   | ,134              |
|  | Enfo5  | ,184   | ,124   | -,087  | -,174  | ,009              |
|  | Enfo6  | -,202  | -,167  | ,257   | ,167   | -,173             |
|  | Enfo7  | -,170  | -,195  | ,112   | ,291   | -,117             |
|  | Enfo8  | -,138  | ,128   | -,049  | -,226  | ,154              |
|  | Enfo9  | -,230  | -,024  | -,115  | -,003  | ,191              |
|  | Alin1  | -,066  | -,011  | ,172   | -,052  | -,139             |
|  | Alin2  | -,140  | -,086  | ,062   | ,121   | ,148              |
|  | Alin3  | -,095  | -,006  | ,166   | ,012   | -,099             |
|  | Alin4  | ,078   | ,081   | -,114  | -,062  | ,110              |

|  |        |                   |                   |                   |                   |                   |
|--|--------|-------------------|-------------------|-------------------|-------------------|-------------------|
|  | Alin5  | ,207              | ,047              | ,001              | -,230             | ,058              |
|  | Alin6  | ,189              | -,201             | -,001             | -,002             | -,359             |
|  | Alin7  | -,217             | -,043             | ,164              | ,049              | ,080              |
|  | Alin8  | ,254              | ,107              | -,192             | -,049             | -,101             |
|  |        | Inter7            | Inter8            | Enfo1             | Enfo2             | Enfo3             |
|  | Inter6 | -,084             | -,174             | -,239             | ,193              | -,093             |
|  | Inter7 | ,951 <sup>a</sup> | -,189             | -,079             | ,098              | ,083              |
|  | Inter8 | -,189             | ,825 <sup>a</sup> | -,071             | ,001              | ,051              |
|  | Enfo1  | -,079             | -,071             | ,871 <sup>a</sup> | -,562             | -,103             |
|  | Enfo2  | ,098              | ,001              | -,562             | ,904 <sup>a</sup> | ,221              |
|  | Enfo3  | ,083              | ,051              | -,103             | ,221              | ,910 <sup>a</sup> |
|  | Enfo4  | -,061             | -,100             | -,124             | -,017             | -,155             |
|  | Enfo5  | -,075             | -,257             | ,110              | -,038             | ,026              |
|  | Enfo6  | ,059              | ,137              | ,026              | -,101             | ,099              |
|  | Enfo7  | -,106             | -,209             | ,099              | -,028             | -,141             |
|  | Enfo8  | -,021             | ,117              | -,218             | ,137              | ,021              |
|  | Enfo9  | -,138             | ,030              | ,124              | -,151             | -,171             |
|  | Alin1  | ,136              | ,078              | ,157              | -,123             | -,252             |
|  | Alin2  | -,088             | -,187             | -,041             | -,081             | -,001             |
|  | Alin3  | ,140              | -,152             | -,019             | -,173             | -,145             |
|  | Alin4  | -,200             | ,296              | -,029             | ,125              | ,146              |
|  | Alin5  | ,093              | ,020              | -,160             | -,085             | ,095              |
|  | Alin6  | -,114             | ,176              | ,149              | -,075             | ,155              |
|  | Alin7  | ,212              | ,022              | -,121             | ,047              | ,154              |
|  | Alin8  | -,133             | -,192             | ,157              | -,025             | -,176             |
|  |        | Enfo4             | Enfo5             | Enfo6             | Enfo7             | Enfo8             |
|  | Inter6 | ,134              | ,009              | -,173             | -,117             | ,154              |
|  | Inter7 | -,061             | -,075             | ,059              | -,106             | -,021             |
|  | Inter8 | -,100             | -,257             | ,137              | -,209             | ,117              |
|  | Enfo1  | -,124             | ,110              | ,026              | ,099              | -,218             |
|  | Enfo2  | -,017             | -,038             | -,101             | -,028             | ,137              |
|  | Enfo3  | -,155             | ,026              | ,099              | -,141             | ,021              |
|  | Enfo4  | ,927 <sup>a</sup> | -,188             | ,074              | ,025              | -,140             |
|  | Enfo5  | -,188             | ,891 <sup>a</sup> | -,378             | -,217             | -,107             |
|  | Enfo6  | ,074              | -,378             | ,848 <sup>a</sup> | -,084             | ,059              |
|  | Enfo7  | ,025              | -,217             | -,084             | ,888 <sup>a</sup> | -,098             |
|  | Enfo8  | -,140             | -,107             | ,059              | -,098             | ,926 <sup>a</sup> |
|  | Enfo9  | -,053             | ,121              | -,148             | -,059             | -,226             |

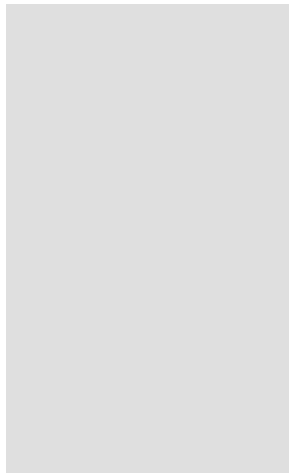
|  |       |       |       |       |       |       |
|--|-------|-------|-------|-------|-------|-------|
|  | Alin1 | -,124 | ,042  | ,054  | -,115 | ,169  |
|  | Alin2 | ,268  | -,116 | ,106  | -,001 | -,182 |
|  | Alin3 | -,015 | ,082  | -,085 | ,003  | -,088 |
|  | Alin4 | -,188 | -,049 | ,094  | ,063  | ,208  |
|  | Alin5 | -,032 | ,115  | -,086 | -,162 | -,013 |
|  | Alin6 | -,189 | -,190 | ,127  | -,023 | -,068 |
|  | Alin7 | ,079  | -,112 | ,261  | -,127 | ,145  |
|  | Alin8 | ,000  | ,190  | -,469 | ,110  | -,301 |

|  |        |                   |                   |                   |                   |                   |
|--|--------|-------------------|-------------------|-------------------|-------------------|-------------------|
|  |        | Enfo9             | Alin1             | Alin2             | Alin3             | Alin4             |
|  | Inter6 | ,191              | -,139             | ,148              | -,099             | ,110              |
|  | Inter7 | -,138             | ,136              | -,088             | ,140              | -,200             |
|  | Inter8 | ,030              | ,078              | -,187             | -,152             | ,296              |
|  | Enfo1  | ,124              | ,157              | -,041             | -,019             | -,029             |
|  | Enfo2  | -,151             | -,123             | -,081             | -,173             | ,125              |
|  | Enfo3  | -,171             | -,252             | -,001             | -,145             | ,146              |
|  | Enfo4  | -,053             | -,124             | ,268              | -,015             | -,188             |
|  | Enfo5  | ,121              | ,042              | -,116             | ,082              | -,049             |
|  | Enfo6  | -,148             | ,054              | ,106              | -,085             | ,094              |
|  | Enfo7  | -,059             | -,115             | -,001             | ,003              | ,063              |
|  | Enfo8  | -,226             | ,169              | -,182             | -,088             | ,208              |
|  | Enfo9  | ,925 <sup>a</sup> | ,069              | ,037              | ,012              | -,071             |
|  | Alin1  | ,069              | ,881 <sup>a</sup> | -,586             | -,189             | ,259              |
|  | Alin2  | ,037              | -,586             | ,874 <sup>a</sup> | ,223              | -,456             |
|  | Alin3  | ,012              | -,189             | ,223              | ,886 <sup>a</sup> | -,743             |
|  | Alin4  | -,071             | ,259              | -,456             | -,743             | ,840 <sup>a</sup> |
|  | Alin5  | -,252             | -,084             | -,089             | ,226              | -,147             |
|  | Alin6  | -,235             | -,107             | ,045              | -,247             | -,020             |
|  | Alin7  | ,029              | ,045              | -,032             | -,003             | ,065              |
|  | Alin8  | ,003              | -,200             | ,084              | ,102              | -,222             |

|  |        |       |       |       |       |
|--|--------|-------|-------|-------|-------|
|  |        | Alin5 | Alin6 | Alin7 | Alin8 |
|  | Inter6 | ,058  | -,359 | ,080  | -,101 |
|  | Inter7 | ,093  | -,114 | ,212  | -,133 |
|  | Inter8 | ,020  | ,176  | ,022  | -,192 |
|  | Enfo1  | -,160 | ,149  | -,121 | ,157  |
|  | Enfo2  | -,085 | -,075 | ,047  | -,025 |
|  | Enfo3  | ,095  | ,155  | ,154  | -,176 |
|  | Enfo4  | -,032 | -,189 | ,079  | ,000  |
|  | Enfo5  | ,115  | -,190 | -,112 | ,190  |

|  |       |                   |                   |                   |                   |
|--|-------|-------------------|-------------------|-------------------|-------------------|
|  | Enfo6 | -,086             | ,127              | ,261              | -,469             |
|  | Enfo7 | -,162             | -,023             | -,127             | ,110              |
|  | Enfo8 | -,013             | -,068             | ,145              | -,301             |
|  | Enfo9 | -,252             | -,235             | ,029              | ,003              |
|  | Alin1 | -,084             | -,107             | ,045              | -,200             |
|  | Alin2 | -,089             | ,045              | -,032             | ,084              |
|  | Alin3 | ,226              | -,247             | -,003             | ,102              |
|  | Alin4 | -,147             | -,020             | ,065              | -,222             |
|  | Alin5 | ,939 <sup>a</sup> | -,041             | -,078             | -,047             |
|  | Alin6 | -,041             | ,888 <sup>a</sup> | -,276             | ,189              |
|  | Alin7 | -,078             | -,276             | ,815 <sup>a</sup> | -,798             |
|  | Alin8 | -,047             | ,189              | -,798             | ,759 <sup>a</sup> |

a. Measures of Sampling Adequacy(MSA)



#### 6.1.2.4. Communalities

‘Scale 1 - IMC level in an HEI Scale’. Communalities.

Values are quite high, close to one. Except for the ones not in orange (0.499 and 0.597). Those variables are less represented in the model than the others (‘Inter2’ and ‘Enfo9’). However, they are not eliminated because in the ‘Anti Image matrix’ they have high values (0.851 and 0.925 respectively).

#### Communalities

|        | Initial | Extraction |
|--------|---------|------------|
| Coher1 | 1,000   | ,757       |
| Coher2 | 1,000   | ,728       |
| Coher3 | 1,000   | ,703       |
| Coher4 | 1,000   | ,686       |
| Inter1 | 1,000   | ,610       |
| Inter2 | 1,000   | ,499       |
| Inter3 | 1,000   | ,669       |
| Inter4 | 1,000   | ,632       |
| Inter5 | 1,000   | ,679       |
| Inter6 | 1,000   | ,688       |
| Inter7 | 1,000   | ,702       |
| Inter8 | 1,000   | ,723       |
| Enfo1  | 1,000   | ,634       |
| Enfo2  | 1,000   | ,728       |
| Enfo3  | 1,000   | ,623       |
| Enfo4  | 1,000   | ,746       |
| Enfo5  | 1,000   | ,672       |
| Enfo6  | 1,000   | ,648       |
| Enfo7  | 1,000   | ,634       |
| Enfo8  | 1,000   | ,626       |
| Enfo9  | 1,000   | ,597       |
| Alin1  | 1,000   | ,752       |
| Alin2  | 1,000   | ,693       |
| Alin3  | 1,000   | ,835       |
| Alin4  | 1,000   | ,848       |
| Alin5  | 1,000   | ,650       |
| Alin6  | 1,000   | ,804       |
| Alin7  | 1,000   | ,743       |
| Alin8  | 1,000   | ,796       |

Extraction Method: Principal Component Analysis.

## 6.1.2.5. Total variance

‘Scale 1 - IMC level in an HEI Scale’. Total variance.

Five factors extracted. Total variance has 5 values higher than one. See column named ‘Cumulative%’, five factors/ dimensions/ components are proposed which explain 69.332% of the variance.

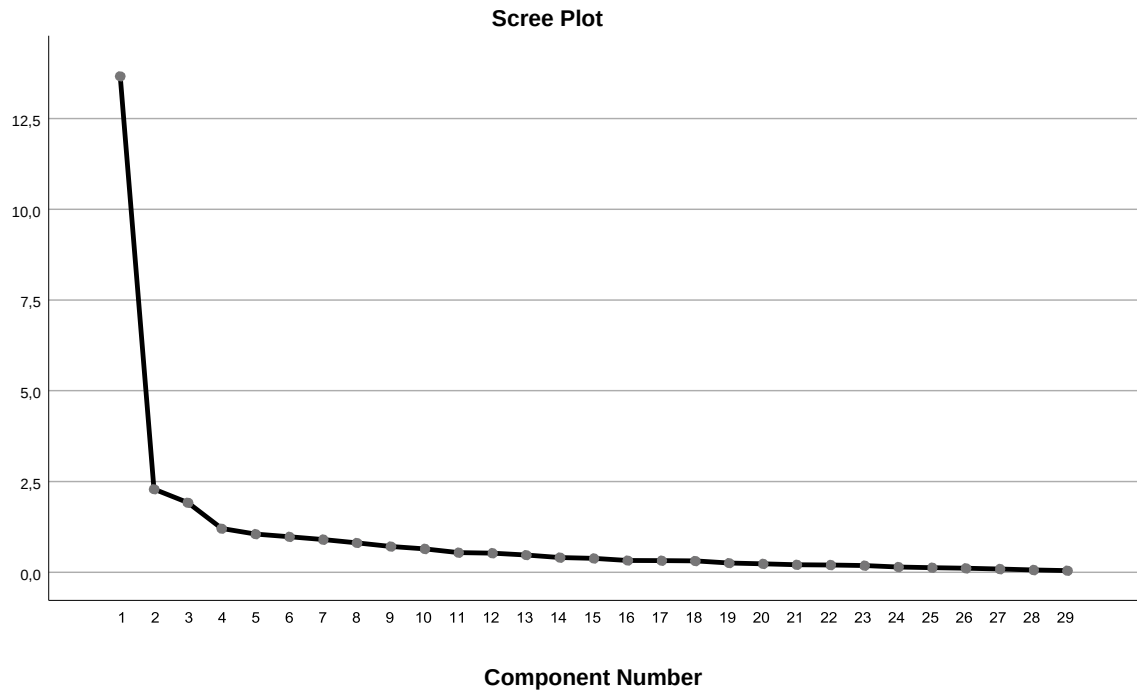
| Total Variance Explained |        |                     |              |                                     |               |              |
|--------------------------|--------|---------------------|--------------|-------------------------------------|---------------|--------------|
| Component                | Total  | Initial Eigenvalues |              | Extraction Sums of Squared Loadings |               |              |
|                          |        | % of Variance       | Cumulative % | Total                               | % of Variance | Cumulative % |
| 1                        | 13,661 | 47,107              | 47,107       | 13,661                              | 47,107        | 47,107       |
| 2                        | 2,285  | 7,879               | 54,986       | 2,285                               | 7,879         | 54,986       |
| 3                        | 1,914  | 6,600               | 61,586       | 1,914                               | 6,600         | 61,586       |
| 4                        | 1,200  | 4,139               | 65,724       | 1,200                               | 4,139         | 65,724       |
| 5                        | 1,046  | 3,607               | 69,332       | 1,046                               | 3,607         | 69,332       |
| 6                        | ,973   | 3,355               | 72,686       |                                     |               |              |
| 7                        | ,896   | 3,091               | 75,778       |                                     |               |              |
| 8                        | ,806   | 2,780               | 78,558       |                                     |               |              |
| 9                        | ,706   | 2,435               | 80,993       |                                     |               |              |
| 10                       | ,639   | 2,204               | 83,197       |                                     |               |              |
| 11                       | ,536   | 1,849               | 85,046       |                                     |               |              |
| 12                       | ,524   | 1,807               | 86,853       |                                     |               |              |
| 13                       | ,472   | 1,627               | 88,480       |                                     |               |              |
| 14                       | ,401   | 1,384               | 89,864       |                                     |               |              |
| 15                       | ,379   | 1,306               | 91,171       |                                     |               |              |
| 16                       | ,321   | 1,108               | 92,279       |                                     |               |              |
| 17                       | ,315   | 1,086               | 93,365       |                                     |               |              |
| 18                       | ,308   | 1,062               | 94,427       |                                     |               |              |
| 19                       | ,251   | ,867                | 95,293       |                                     |               |              |
| 20                       | ,228   | ,787                | 96,081       |                                     |               |              |
| 21                       | ,204   | ,702                | 96,782       |                                     |               |              |
| 22                       | ,197   | ,678                | 97,461       |                                     |               |              |
| 23                       | ,180   | ,620                | 98,081       |                                     |               |              |
| 24                       | ,141   | ,485                | 98,566       |                                     |               |              |
| 25                       | ,123   | ,423                | 98,989       |                                     |               |              |
| 26                       | ,107   | ,371                | 99,359       |                                     |               |              |
| 27                       | ,085   | ,294                | 99,653       |                                     |               |              |
| 28                       | ,059   | ,202                | 99,855       |                                     |               |              |
| 29                       | ,042   | ,145                | 100,000      |                                     |               |              |

Extraction Method: Principal Component Analysis.

#### 6.1.2.6. Scree Plot

‘Scale 1 - IMC level in an HEI Scale’. Scree plot.

Shows an inflexion point between factors 5 and 6, this means that 5 are the factors needed to be retained.





## 6.1.2.7. Component and Rotated component matrix

‘Scale 1 - IMC level in an HEI Scale’. Component Matrix.

The items proposed for each of the factors extracted are the ones with higher loadings.

**Component Matrix<sup>a</sup>**

|        | Component |       |       |       |        |
|--------|-----------|-------|-------|-------|--------|
|        | 1         | 2     | 3     | 4     | 5      |
| Alin3  | ,793      | -,163 | -,191 | -,213 | -,313  |
| Coher1 | ,785      | -,317 | -,020 | ,078  | ,181   |
| Enfo4  | ,780      | ,113  | -,286 | -,051 | -,2015 |
| Inter7 | ,779      | ,231  | -,199 | -,019 | -,033  |
| Inter5 | ,776      | ,251  | ,031  | -,040 | -,103  |
| Enfo8  | ,772      | ,063  | ,058  | -,077 | ,129   |
| Alin4  | ,757      | -,321 | -,204 | -,277 | -,231  |
| Alin6  | ,754      | ,067  | -,181 | -,241 | -,375  |
| Coher4 | ,737      | -,183 | -,229 | ,192  | -,142  |
| Alin2  | ,730      | -,368 | ,151  | ,019  | -,049  |
| Enfo9  | ,721      | -,013 | -,103 | -,171 | ,192   |
| Alin5  | ,710      | -,237 | ,157  | -,192 | ,168   |
| Enfo2  | ,703      | -,143 | -,212 | -,288 | ,292   |
| Alin1  | ,698      | -,273 | ,402  | ,128  | -,108  |
| Enfo6  | ,691      | ,090  | ,271  | -,093 | ,285   |
| Inter1 | ,680      | ,034  | -,220 | ,204  | ,237   |
| Coher3 | ,679      | -,235 | -,085 | ,399  | -,146  |
| Enfo3  | ,674      | -,148 | ,238  | ,296  | ,056   |
| Enfo5  | ,672      | ,415  | ,075  | -,160 | ,133   |
| Enfo7  | ,671      | ,340  | ,128  | ,201  | -,109  |
| Alin8  | ,645      | -,016 | ,594  | -,061 | -,151  |
| Inter3 | ,640      | ,218  | -,408 | ,205  | -,051  |
| Alin7  | ,640      | -,068 | ,546  | -,073 | -,161  |
| Enfo1  | ,610      | -,125 | -,212 | -,326 | ,309   |
| Inter6 | ,594      | ,525  | ,189  | ,001  | -,154  |
| Inter4 | ,543      | ,342  | -,409 | ,222  | ,065   |
| Inter2 | ,528      | ,213  | ,014  | ,401  | ,119   |
| Inter8 | ,475      | ,602  | ,294  | -,052 | ,215   |
| Coher2 | ,514      | -,595 | ,002  | ,261  | ,2015  |

Extraction Method: Principal Component Analysis.

‘Scale 1 - IMC level in an HEI Scale’. Rotated Component Matrix.

The items proposed for each of the factors extracted (in blue).

**Rotated Component Matrix<sup>a</sup>**

|        | Component |       |       |      |       |
|--------|-----------|-------|-------|------|-------|
|        | 1         | 2     | 3     | 4    | 5     |
| Alin1  | ,775      | ,276  | ,072  | ,137 | ,226  |
| Coher2 | ,687      | -,252 | ,250  | ,361 | ,017  |
| Alin2  | ,671      | ,111  | ,134  | ,325 | ,327  |
| Enfo3  | ,655      | ,255  | ,313  | ,163 | ,069  |
| Alin8  | ,635      | ,566  | -,117 | ,078 | ,228  |
| Alin7  | ,633      | ,503  | -,116 | ,098 | ,257  |
| Coher3 | ,588      | ,009  | ,519  | ,075 | ,288  |
| Coher1 | ,587      | ,083  | ,328  | ,504 | ,208  |
| Inter8 | ,015      | ,807  | ,185  | ,179 | -,075 |
| Inter6 | ,107      | ,729  | ,270  | ,002 | ,267  |
| Enfo5  | ,074      | ,655  | ,261  | ,360 | ,199  |
| Enfo7  | ,290      | ,567  | ,423  | ,020 | ,221  |
| Inter5 | ,256      | ,533  | ,340  | ,235 | ,398  |
| Enfo6  | ,389      | ,518  | ,132  | ,459 | ,033  |
| Inter4 | -,061     | ,244  | ,700  | ,197 | ,199  |
| Inter3 | ,061      | ,194  | ,685  | ,198 | ,344  |
| Inter1 | ,268      | ,179  | ,577  | ,403 | ,105  |
| Inter2 | ,290      | ,332  | ,547  | ,063 | -,043 |
| Coher4 | ,436      | ,030  | ,502  | ,231 | ,435  |
| Inter7 | ,152      | ,402  | ,486  | ,332 | ,413  |
| Enfo2  | ,205      | ,136  | ,217  | ,734 | ,285  |
| Enfo1  | ,132      | ,116  | ,159  | ,719 | ,246  |
| Enfo9  | ,244      | ,274  | ,266  | ,563 | ,274  |
| Alin5  | ,499      | ,238  | ,041  | ,538 | ,231  |
| Enfo8  | ,349      | ,418  | ,274  | ,441 | ,247  |
| Alin6  | ,183      | ,302  | ,242  | ,237 | ,752  |
| Alin3  | ,337      | ,142  | ,227  | ,333 | ,734  |
| Alin4  | ,375      | ,015  | ,142  | ,441 | ,701  |
| Enfo4  | ,173      | ,271  | ,465  | ,282 | ,589  |

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

## Appendix 6.2. Scale 2 - HEI's performance Scale.

### 6.2.1. Reliability (correlations and Cronbach's Alphas)

#### 6.2.1.1. Pearson correlation

'Scale 2 - HEI's performance scale'. Pearson correlations.

Significant relation. Values over  $r=0.476$  generally.

|        |                     | Correlations |        |        |        |        |        |        |     |
|--------|---------------------|--------------|--------|--------|--------|--------|--------|--------|-----|
|        |                     | RendU1       | RendU2 | RendU3 | RendU4 | VentU1 | VentU2 | VentU3 | Sat |
| RendU1 | Pearson Correlation | 1            | ,625** | ,489** | ,748** | ,533** | ,289*  | ,449** | ,4  |
|        | Sig. (2-tailed)     |              | ,000   | ,000   | ,000   | ,000   | ,011   | ,000   |     |
|        | N                   | 77           | 77     | 77     | 77     | 77     | 77     | 77     |     |
| RendU2 | Pearson Correlation | ,625**       | 1      | ,601** | ,688** | ,356** | ,315** | ,413** | ,4  |
|        | Sig. (2-tailed)     | ,000         |        | ,000   | ,000   | ,001   | ,005   | ,000   |     |
|        | N                   | 77           | 77     | 77     | 77     | 77     | 77     | 77     |     |
| RendU3 | Pearson Correlation | ,489**       | ,601** | 1      | ,656** | ,451** | ,447** | ,430** | ,4  |
|        | Sig. (2-tailed)     | ,000         | ,000   |        | ,000   | ,000   | ,000   | ,000   |     |
|        | N                   | 77           | 77     | 77     | 77     | 77     | 77     | 77     |     |
| RendU4 | Pearson Correlation | ,748**       | ,688** | ,656** | 1      | ,512** | ,336** | ,417** | ,4  |
|        | Sig. (2-tailed)     | ,000         | ,000   | ,000   |        | ,000   | ,003   | ,000   |     |
|        | N                   | 77           | 77     | 77     | 77     | 77     | 77     | 77     |     |
| VentU1 | Pearson Correlation | ,533**       | ,356** | ,451** | ,512** | 1      | ,436** | ,410** | ,4  |

#### 6.2.1.2. Spearman Correlation

'Scale 2 - HEI's performance scale'. Spearman's correlations. Significant

relation. Values over  $r=0.4$  generally.

|                |        | Correlations            |        |        |        |        |        |        |        |
|----------------|--------|-------------------------|--------|--------|--------|--------|--------|--------|--------|
|                |        |                         | RendU1 | RendU2 | RendU3 | RendU4 | VentU1 | VentU2 | VentU3 |
| Spearman's rho | RendU1 | Correlation Coefficient | 1,000  | ,655** | ,560** | ,780** | ,531** | ,345** | ,460** |
|                |        | Sig. (2-tailed)         |        | ,000   | ,000   | ,000   | ,000   | ,002   | ,000   |
|                |        | N                       | 77     | 77     | 77     | 77     | 77     | 77     | 77     |
|                | RendU2 | Correlation Coefficient | ,655** | 1,000  | ,622** | ,691** | ,371** | ,322** | ,430** |
|                |        | Sig. (2-tailed)         | ,000   |        | ,000   | ,000   | ,001   | ,004   | ,000   |
|                |        | N                       | 77     | 77     | 77     | 77     | 77     | 77     | 77     |
|                | RendU3 | Correlation Coefficient | ,560** | ,622** | 1,000  | ,670** | ,351** | ,373** | ,384** |
|                |        | Sig. (2-tailed)         | ,000   | ,000   |        | ,000   | ,002   | ,001   | ,001   |
|                |        | N                       | 77     | 77     | 77     | 77     | 77     | 77     | 77     |
|                | RendU4 | Correlation Coefficient | ,780** | ,691** | ,670** | 1,000  | ,496** | ,399** | ,356** |
|                |        | Sig. (2-tailed)         | ,000   | ,000   | ,000   |        | ,000   | ,000   | ,001   |
|                |        | N                       | 77     | 77     | 77     | 77     | 77     | 77     | 77     |
|                | VentU1 | Correlation Coefficient | ,531** | ,371** | ,351** | ,496** | 1,000  | ,439** | ,439** |
|                |        | Sig. (2-tailed)         | ,000   | ,001   | ,002   | ,000   |        | ,000   | ,000   |

## 6.2.1.3. Cronbach's Alphas

'Scale 2 - HEI's performance scale'. 77 responses obtained.

| Case Processing Summary |                       |    |       |
|-------------------------|-----------------------|----|-------|
|                         |                       | N  | %     |
| Cases                   | Valid                 | 77 | 100,0 |
|                         | Excluded <sup>a</sup> | 0  | ,0    |
|                         | Total                 | 77 | 100,0 |

a. Listwise deletion based on all variables in the procedure.

'Scale 2 - HEI's performance scale. Cronbach's Alpha for the total scale. It is very high, 0.906, according to Nunnally (1978) 0.7 would be the minimum value.

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,906             | 11         |

'Scale 2 - HEI's performance scale'. Cronbach's Alpha for 'Dimension 1'. It is very high, 0.873, according to Nunnally (1978) 0.7 would be the minimum value.

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,873             | 4          |

‘Scale 2 - HEI’s performance scale’. Cronbach’s Alpha for ‘Dimension 2’.

It is very high, 0.662, according to Nunnally (1978) 0.7 would be the minimum value.

| <b>Reliability Statistics</b> |            |
|-------------------------------|------------|
| Cronbach's Alpha              | N of Items |
| ,662                          | 3          |

‘Scale 2 - HEI’s performance scale’. Cronbach’s Alpha for ‘Dimension 3’.

It is very high, 0.817, according to Nunnally (1978) 0.7 would be the minimum value.

| <b>Reliability Statistics</b> |            |
|-------------------------------|------------|
| Cronbach's Alpha              | N of Items |
| ,817                          | 2          |

Table 60. ‘Scale 2 - HEI’s performance scale’. Cronbach’s Alpha for ‘Dimension 4’. It is very high, 0.893, according to Nunnally (1978) 0.7 would be the minimum value.

| <b>Reliability Statistics</b> |            |
|-------------------------------|------------|
| Cronbach's Alpha              | N of Items |
| ,893                          | 2          |

‘Scale 2 - HEI’s performance scale’. Item Total statistics.

| <b>Item-Total Statistics</b> |                            |                                |                                  |                                  |
|------------------------------|----------------------------|--------------------------------|----------------------------------|----------------------------------|
|                              | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
| RendU1                       | 52,58                      | 60,114                         | ,648                             | ,898                             |
| RendU2                       | 52,57                      | 61,669                         | ,646                             | ,898                             |
| RendU3                       | 52,44                      | 60,092                         | ,674                             | ,896                             |
| RendU4                       | 52,47                      | 59,779                         | ,696                             | ,895                             |
| VentU1                       | 51,69                      | 60,954                         | ,700                             | ,895                             |
| VentU2                       | 52,16                      | 62,817                         | ,456                             | ,910                             |
| VentU3                       | 52,58                      | 59,430                         | ,587                             | ,903                             |
| SatAIU1                      | 51,53                      | 62,147                         | ,710                             | ,895                             |
| SatAIU2                      | 51,69                      | 60,375                         | ,699                             | ,895                             |
| SatGPU1                      | 51,55                      | 61,093                         | ,759                             | ,893                             |
| SatGPU2                      | 51,60                      | 62,323                         | ,670                             | ,897                             |

The two columns in the right are analysed in order to decide if the items should be kept in the scale or not:

- 1- ‘Corrected Item-Total correlation’: values are correct as the column values are higher than 0.4.
- 2- ‘Cronbach’s Alpha if Item Deleted’: the values need to be compared with the total Cronbach’s Alpha value that is 0.906 (see Table above), if the items have a difference bigger than 0.2 an eye should be kept. In this simulation, there is no problem so every item is kept.

## 6.2.2. Validity (PCA analysis)

## 6.2.2.1. Correlation matrix.

‘Scale 2 - HEI’s performance scale’. When correlations are below 0.3 that variable is not correlated with other variables, an eye was kept on those variables.

|             |                 | RendU1 | RendU2  | RendU3  | RendU4  | VentU1  | VentU2 |
|-------------|-----------------|--------|---------|---------|---------|---------|--------|
| Correlation | RendU1          | 1,000  | ,625    | ,489    | ,748    | ,533    | ,289   |
|             | RendU2          | ,625   | 1,000   | ,601    | ,688    | ,356    | ,315   |
|             | RendU3          | ,489   | ,601    | 1,000   | ,656    | ,451    | ,447   |
|             | RendU4          | ,748   | ,688    | ,656    | 1,000   | ,512    | ,336   |
|             | VentU1          | ,533   | ,356    | ,451    | ,512    | 1,000   | ,436   |
|             | VentU2          | ,289   | ,315    | ,447    | ,336    | ,436    | 1,000  |
|             | VentU3          | ,449   | ,413    | ,430    | ,417    | ,410    | ,369   |
|             | SatAIU1         | ,430   | ,505    | ,440    | ,474    | ,563    | ,316   |
|             | SatAIU2         | ,359   | ,363    | ,484    | ,389    | ,637    | ,314   |
|             | SatGPU1         | ,472   | ,442    | ,460    | ,480    | ,607    | ,295   |
|             | SatGPU2         | ,313   | ,373    | ,416    | ,322    | ,613    | ,267   |
|             | Sig. (1-tailed) | RendU1 |         | ,000    | ,000    | ,000    | ,000   |
| RendU2      |                 | ,000   |         | ,000    | ,000    | ,001    | ,003   |
| RendU3      |                 | ,000   | ,000    |         | ,000    | ,000    | ,000   |
| RendU4      |                 | ,000   | ,000    | ,000    |         | ,000    | ,001   |
| VentU1      |                 | ,000   | ,001    | ,000    | ,000    |         | ,000   |
| VentU2      |                 | ,005   | ,003    | ,000    | ,001    | ,000    |        |
| VentU3      |                 | ,000   | ,000    | ,000    | ,000    | ,000    | ,000   |
| SatAIU1     |                 | ,000   | ,000    | ,000    | ,000    | ,000    | ,003   |
| SatAIU2     |                 | ,001   | ,001    | ,000    | ,000    | ,000    | ,003   |
| SatGPU1     |                 | ,000   | ,000    | ,000    | ,000    | ,000    | ,005   |
| SatGPU2     |                 | ,003   | ,000    | ,000    | ,002    | ,000    | ,009   |
|             |                 | VentU3 | SatAIU1 | SatAIU2 | SatGPU1 | SatGPU2 |        |
| Correlation | RendU1          | ,449   | ,430    | ,359    | ,472    | ,313    |        |
|             | RendU2          | ,413   | ,505    | ,363    | ,442    | ,373    |        |
|             | RendU3          | ,430   | ,440    | ,484    | ,460    | ,416    |        |
|             | RendU4          | ,417   | ,474    | ,389    | ,480    | ,322    |        |
|             | VentU1          | ,410   | ,563    | ,637    | ,607    | ,613    |        |
|             | VentU2          | ,369   | ,316    | ,314    | ,295    | ,267    |        |
|             | VentU3          | 1,000  | ,488    | ,381    | ,522    | ,457    |        |
|             | SatAIU1         | ,488   | 1,000   | ,699    | ,698    | ,591    |        |
|             | SatAIU2         | ,381   | ,699    | 1,000   | ,775    | ,822    |        |
|             | SatGPU1         | ,522   | ,698    | ,775    | 1,000   | ,807    |        |
|             | SatGPU2         | ,457   | ,591    | ,822    | ,807    | 1,000   |        |

|                 |         |      |      |      |      |      |
|-----------------|---------|------|------|------|------|------|
| Sig. (1-tailed) | RendU1  | ,000 | ,000 | ,001 | ,000 | ,003 |
|                 | RendU2  | ,000 | ,000 | ,001 | ,000 | ,000 |
|                 | RendU3  | ,000 | ,000 | ,000 | ,000 | ,000 |
|                 | RendU4  | ,000 | ,000 | ,000 | ,000 | ,002 |
|                 | VentU1  | ,000 | ,000 | ,000 | ,000 | ,000 |
|                 | VentU2  | ,000 | ,003 | ,003 | ,005 | ,009 |
|                 | VentU3  |      | ,000 | ,000 | ,000 | ,000 |
|                 | SatAIU1 | ,000 |      | ,000 | ,000 | ,000 |
|                 | SatAIU2 | ,000 | ,000 |      | ,000 | ,000 |
|                 | SatGPU1 | ,000 | ,000 | ,000 |      | ,000 |
|                 | SatGPU2 | ,000 | ,000 | ,000 | ,000 |      |

#### 6.2.2.2. Kaiser-Meyer-Olkin (KMO).

‘Scale 2 - HEI’s performance scale’. Kaiser-Meyer-Olkin (KMO) and significance.

The values shows that KMO is good because its value is near 1 and that the model is significant because Sig value is below 0.05.

#### KMO and Bartlett's Test

|                                                  |                    |         |
|--------------------------------------------------|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | ,858    |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 542,367 |
|                                                  | df                 | 55      |
|                                                  | Sig.               | ,000    |



## 6.2.2.3. Anti-Image Correlation matrix.

‘ Scale 2 - HEI’s performance scale’. Anti –Image Correlation matrix.

The diagonal shows high punctuations (near Cronbach’s Alpha) so no variable is eliminated.

|                        |         | RendU1            | RendU2            | RendU3            | RendU4            | VentU1            |
|------------------------|---------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Anti-image Covariance  | RendU1  | ,355              | -,105             | ,044              | -,136             | -,108             |
|                        | RendU2  | -,105             | ,391              | -,100             | -,094             | ,096              |
|                        | RendU3  | ,044              | -,100             | ,430              | -,127             | ,005              |
|                        | RendU4  | -,136             | -,094             | -,127             | ,288              | -,056             |
|                        | VentU1  | -,108             | ,096              | ,005              | -,056             | ,397              |
|                        | VentU2  | ,034              | -,038             | -,125             | ,020              | -,145             |
|                        | VentU3  | -,081             | ,014              | -,064             | ,012              | ,021              |
|                        | SatAIU1 | ,039              | -,107             | ,043              | -,010             | -,056             |
|                        | SatAIU2 | -,008             | ,046              | -,068             | ,005              | -,032             |
|                        | SatGPU1 | -,042             | ,026              | ,014              | -,035             | ,016              |
|                        | SatGPU2 | ,047              | -,067             | ,003              | ,041              | -,074             |
| Anti-image Correlation | RendU1  | ,840 <sup>a</sup> | -,283             | ,113              | -,425             | -,288             |
|                        | RendU2  | -,283             | ,839 <sup>a</sup> | -,243             | -,280             | ,244              |
|                        | RendU3  | ,113              | -,243             | ,879 <sup>a</sup> | -,360             | ,012              |
|                        | RendU4  | -,425             | -,280             | -,360             | ,853 <sup>a</sup> | -,165             |
|                        | VentU1  | -,288             | ,244              | ,012              | -,165             | ,885 <sup>a</sup> |
|                        | VentU2  | ,069              | -,072             | -,229             | ,045              | -,277             |
|                        | VentU3  | -,179             | ,029              | -,128             | ,029              | ,045              |
|                        | SatAIU1 | ,109              | -,281             | ,109              | -,030             | -,148             |
|                        | SatAIU2 | -,030             | ,159              | -,222             | ,022              | -,111             |
|                        | SatGPU1 | -,144             | ,085              | ,042              | -,136             | ,052              |
|                        | SatGPU2 | ,173              | -,232             | ,009              | ,167              | -,257             |
|                        |         | VentU2            | VentU3            | SatAIU1           | SatAIU2           |                   |
| Anti-image Covariance  | RendU1  | ,034              | -,081             | ,039              | -,008             |                   |
|                        | RendU2  | -,038             | ,014              | -,107             | ,046              |                   |
|                        | RendU3  | -,125             | -,064             | ,043              | -,068             |                   |
|                        | RendU4  | ,020              | ,012              | -,010             | ,005              |                   |
|                        | VentU1  | -,145             | ,021              | -,056             | -,032             |                   |
|                        | VentU2  | ,695              | -,119             | ,004              | -,015             |                   |
|                        | VentU3  | -,119             | ,582              | -,096             | ,081              |                   |
|                        | SatAIU1 | ,004              | -,096             | ,366              | -,109             |                   |
|                        | SatAIU2 | -,015             | ,081              | -,109             | ,216              |                   |
|                        | SatGPU1 | ,008              | -,050             | -,078             | -,036             |                   |

|                        |         |                   |                   |                   |                   |
|------------------------|---------|-------------------|-------------------|-------------------|-------------------|
|                        | SatGPU2 | ,038              | -,066             | ,060              | -,107             |
| Anti-image Correlation | RendU1  | ,069              | -,179             | ,109              | -,030             |
|                        | RendU2  | -,072             | ,029              | -,281             | ,159              |
|                        | RendU3  | -,229             | -,128             | ,109              | -,222             |
|                        | RendU4  | ,045              | ,029              | -,030             | ,022              |
|                        | VentU1  | -,277             | ,045              | -,148             | -,111             |
|                        | VentU2  | ,863 <sup>a</sup> | -,187             | ,009              | -,039             |
|                        | VentU3  | -,187             | ,889 <sup>a</sup> | -,208             | ,227              |
|                        | SatAIU1 | ,009              | -,208             | ,867 <sup>a</sup> | -,386             |
|                        | SatAIU2 | -,039             | ,227              | -,386             | ,844 <sup>a</sup> |
|                        | SatGPU1 | ,019              | -,136             | -,264             | -,160             |
|                        | SatGPU2 | ,099              | -,189             | ,215              | -,501             |

|                        |         |                   |
|------------------------|---------|-------------------|
|                        | SatGPU2 |                   |
| Anti-image Covariance  | RendU1  | ,047              |
|                        | RendU2  | -,067             |
|                        | RendU3  | ,003              |
|                        | RendU4  | ,041              |
|                        | VentU1  | -,074             |
|                        | VentU2  | ,038              |
|                        | VentU3  | -,066             |
|                        | SatAIU1 | ,060              |
|                        | SatAIU2 | -,107             |
|                        | SatGPU1 | -,104             |
|                        | SatGPU2 | ,211              |
| Anti-image Correlation | RendU1  | ,173              |
|                        | RendU2  | -,232             |
|                        | RendU3  | ,009              |
|                        | RendU4  | ,167              |
|                        | VentU1  | -,257             |
|                        | VentU2  | ,099              |
|                        | VentU3  | -,189             |
|                        | SatAIU1 | ,215              |
|                        | SatAIU2 | -,501             |
|                        | SatGPU1 | -,466             |
|                        | SatGPU2 | ,794 <sup>a</sup> |

a. Measures of Sampling Adequacy(MSA)

## 6.2.2.4. Communalities

‘Scale 2 - HEI’s performance scale’. Communalities.

Values are quite high, close to one. Except for ‘VentU2’ which is coloured in ‘orange’. This variable is less represented in the model than the others. However, it is not eliminated because in the ‘Anti Image matrix’ it has a high value of 0.863.

**Communalities**

|         | Initial | Extraction  |
|---------|---------|-------------|
| RendU1  | ,645    | <b>,627</b> |
| RendU2  | ,609    | <b>,596</b> |
| RendU3  | ,570    | <b>,535</b> |
| RendU4  | ,712    | <b>,812</b> |
| VentU1  | ,603    | <b>,543</b> |
| VentU2  | ,305    | <b>,221</b> |
| VentU3  | ,418    | <b>,365</b> |
| SatAIU1 | ,634    | <b>,592</b> |
| SatAIU2 | ,784    | <b>,819</b> |
| SatGPU1 | ,764    | <b>,785</b> |
| SatGPU2 | ,789    | <b>,811</b> |

Extraction Method: Principal Axis Factoring.

## 6.2.2.5. Total variance.

‘Scale 2 - HEI’s performance scale’. Total variance.

Two factors extracted. Total variance has two values that higher than one. See column named ‘Cumulative%’. Two factors/ dimensions/ components are proposed which explain 66.676% of the variance.

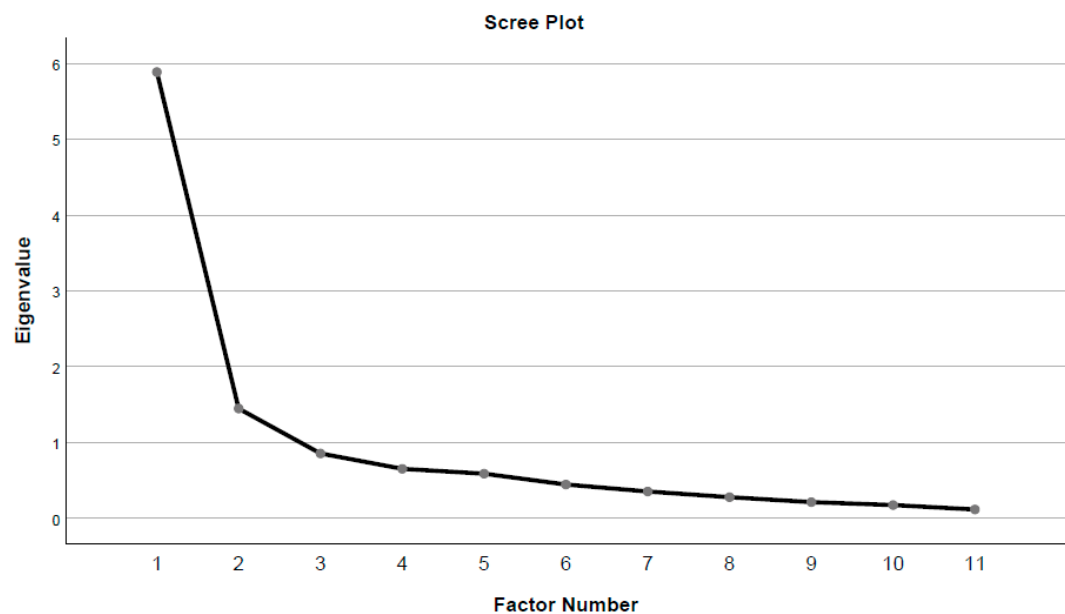
| Component | Total Variance Explained |               |              |                                     |               |              |                                   |               |              |
|-----------|--------------------------|---------------|--------------|-------------------------------------|---------------|--------------|-----------------------------------|---------------|--------------|
|           | Initial Eigenvalues      |               |              | Extraction Sums of Squared Loadings |               |              | Rotation Sums of Squared Loadings |               |              |
|           | Total                    | % of Variance | Cumulative % | Total                               | % of Variance | Cumulative % | Total                             | % of Variance | Cumulative % |
| 1         | 5,888                    | 53,526        | 53,526       | 5,888                               | 53,526        | 53,526       | 3,797                             | 34,519        | 34,519       |
| 2         | 1,447                    | 13,150        | 66,676       | 1,447                               | 13,150        | 66,676       | 3,537                             | 32,157        | 66,676       |
| 3         | ,854                     | 7,762         | 74,438       |                                     |               |              |                                   |               |              |
| 4         | ,651                     | 5,921         | 80,358       |                                     |               |              |                                   |               |              |
| 5         | ,587                     | 5,338         | 85,696       |                                     |               |              |                                   |               |              |
| 6         | ,444                     | 4,039         | 89,735       |                                     |               |              |                                   |               |              |
| 7         | ,352                     | 3,200         | 92,935       |                                     |               |              |                                   |               |              |
| 8         | ,277                     | 2,521         | 95,456       |                                     |               |              |                                   |               |              |
| 9         | ,212                     | 1,927         | 97,383       |                                     |               |              |                                   |               |              |
| 10        | ,173                     | 1,573         | 98,957       |                                     |               |              |                                   |               |              |
| 11        | ,115                     | 1,043         | 100,000      |                                     |               |              |                                   |               |              |

Extraction Method: Principal Component Analysis.

## 6.2.2.6. Scree plot

‘Scale 2 - HEI’s performance scale’. Scree plot.

Shows an inflexion point between factors 5 and 6.



## 6.2.2.7. Rotated component matrix.

‘Scale 2 - HEI’s performance scale’. Rotated Component Matrix.

The items proposed for each of the factors extracted (in blue).

**Rotated Factor Matrix<sup>a</sup>**

|         | Factor |      |
|---------|--------|------|
|         | 1      | 2    |
| SatGPU2 | ,884   | ,173 |
| SatAIU2 | ,875   | ,229 |
| SatGPU1 | ,816   | ,344 |
| SatAIU1 | ,655   | ,404 |
| VentU1  | ,599   | ,429 |
| RendU4  | ,198   | ,879 |
| RendU1  | ,225   | ,759 |
| RendU2  | ,235   | ,735 |
| RendU3  | ,333   | ,651 |
| VentU3  | ,412   | ,442 |
| VentU2  | ,272   | ,383 |

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

### Appendix 6.3. Scale 3 – Faculty’s performance Scale.

#### 6.3.1. Reliability (correlations and Cronbach’s Alphas)

##### 6.3.1.1. Pearson correlation.

‘Scale 3 – Faculty’s performance scale’. Pearson correlations.

Significant relation. Values over  $r=0.476$  generally.

|        |                     | Correlations |        |        |        |        |        |        |         |
|--------|---------------------|--------------|--------|--------|--------|--------|--------|--------|---------|
|        |                     | RendF1       | RendF2 | RendF3 | RendF4 | VentF1 | VentF2 | VentF3 | SatAIF1 |
| RendF1 | Pearson Correlation | 1            | ,762** | ,599** | ,777** | ,394** | ,391** | ,263*  | ,404**  |
|        | Sig. (2-tailed)     |              | ,000   | ,000   | ,000   | ,000   | ,000   | ,021   | ,000    |
|        | N                   | 77           | 77     | 77     | 77     | 77     | 77     | 77     | 77      |
| RendF2 | Pearson Correlation | ,762**       | 1      | ,655** | ,827** | ,409** | ,369** | ,298** | ,454**  |
|        | Sig. (2-tailed)     | ,000         |        | ,000   | ,000   | ,000   | ,001   | ,009   | ,000    |
|        | N                   | 77           | 77     | 77     | 77     | 77     | 77     | 77     | 77      |
| RendF3 | Pearson Correlation | ,599**       | ,655** | 1      | ,804** | ,407** | ,552** | ,286*  | ,414**  |
|        | Sig. (2-tailed)     | ,000         | ,000   |        | ,000   | ,000   | ,000   | ,012   | ,000    |
|        | N                   | 77           | 77     | 77     | 77     | 77     | 77     | 77     | 77      |
| RendF4 | Pearson Correlation | ,777**       | ,827** | ,804** | 1      | ,377** | ,413** | ,298** | ,436**  |
|        | Sig. (2-tailed)     | ,000         | ,000   | ,000   |        | ,001   | ,000   | ,009   | ,000    |
|        | N                   | 77           | 77     | 77     | 77     | 77     | 77     | 77     | 77      |
| VentF1 | Pearson Correlation | ,394**       | ,409** | ,407** | ,377** | 1      | ,492** | ,472** | ,742**  |
|        | Sig. (2-tailed)     | ,000         | ,000   | ,000   | ,001   |        | ,000   | ,000   | ,000    |

##### 6.3.1.2. Spearman Correlation.

‘Scale 3 – Faculty’s performance scale’. Spearman’s correlations.

Significant relation. Values over  $r=0.4$  generally.

|                |        |                         | Correlations |        |        |        |        |        |
|----------------|--------|-------------------------|--------------|--------|--------|--------|--------|--------|
|                |        |                         | RendF1       | RendF2 | RendF3 | RendF4 | VentF1 | VentF2 |
| Spearman's rho | RendF1 | Correlation Coefficient | 1,000        | ,774** | ,629** | ,798** | ,412** | ,418** |
|                |        | Sig. (2-tailed)         |              | ,000   | ,000   | ,000   | ,000   | ,000   |
|                |        | N                       | 77           | 77     | 77     | 77     | 77     | 77     |
|                | RendF2 | Correlation Coefficient | ,774**       | 1,000  | ,651** | ,823** | ,454** | ,376** |
|                |        | Sig. (2-tailed)         | ,000         |        | ,000   | ,000   | ,000   | ,001   |
|                |        | N                       | 77           | 77     | 77     | 77     | 77     | 77     |
|                | RendF3 | Correlation Coefficient | ,629**       | ,651** | 1,000  | ,819** | ,431** | ,586** |
|                |        | Sig. (2-tailed)         | ,000         | ,000   |        | ,000   | ,000   | ,000   |
|                |        | N                       | 77           | 77     | 77     | 77     | 77     | 77     |
|                | RendF4 | Correlation Coefficient | ,798**       | ,823** | ,819** | 1,000  | ,385** | ,438** |
|                |        | Sig. (2-tailed)         | ,000         | ,000   | ,000   |        | ,001   | ,000   |
|                |        | N                       | 77           | 77     | 77     | 77     | 77     | 77     |

## 6.3.1.3. Cronbach's Alphas.

'Scale 3 – Faculty's performance scale'. 77 responses obtained.

| <b>Case Processing Summary</b> |                       |    |       |
|--------------------------------|-----------------------|----|-------|
|                                |                       | N  | %     |
| Cases                          | Valid                 | 77 | 100,0 |
|                                | Excluded <sup>a</sup> | 0  | ,0    |
|                                | Total                 | 77 | 100,0 |

a. Listwise deletion based on all variables in the procedure.

'Scale 3 – Faculty's performance scale'. Cronbach's Alpha for the total scale.

It is very high, 0.913, according to Nunnally (1978) 0.7 would be the minimum value.

| <b>Reliability Statistics</b> |            |
|-------------------------------|------------|
| Cronbach's Alpha              | N of Items |
| ,913                          | 11         |

‘Scale 3 – Faculty’s performance scale’. Cronbach’s Alpha for ‘Dimension 1’.

It is very high, 0.918, according to Nunnally (1978) 0.7 would be the minimum value.

#### Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,918             | 4          |

‘Scale 3 – Faculty’s performance scale’. Cronbach’s Alpha for ‘Dimension 2’.

It is very high, 0.754, according to Nunnally (1978) 0.7 would be the minimum value.

#### Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,754             | 3          |

‘Scale 3 – Faculty’s performance scale’. Cronbach’s Alpha for ‘Dimension 3’.

It is very high, 0.954, according to Nunnally (1978) 0.7 would be the minimum value.

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,954             | 2          |



‘Scale 3 – Faculty’s performance scale’. Cronbach’s Alpha for ‘Dimension 4’.

It is very high, 0.954, according to Nunnally (1978) 0.7 would be the minimum value.

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,954             | 2          |

‘Scale 3 – Faculty’s performance scale’. Item Total statistics.

**Item-Total Statistics**

|         | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---------|----------------------------|--------------------------------|----------------------------------|----------------------------------|
| RendF1  | 53,01                      | 68,566                         | ,611                             | ,909                             |
| RendF2  | 53,01                      | 67,934                         | ,677                             | ,905                             |
| RendF3  | 52,73                      | 68,911                         | ,703                             | ,904                             |
| RendF4  | 52,87                      | 67,036                         | ,716                             | ,903                             |
| VentF1  | 52,16                      | 67,581                         | ,725                             | ,903                             |
| VentF2  | 52,61                      | 69,478                         | ,541                             | ,913                             |
| VentF3  | 52,99                      | 68,829                         | ,490                             | ,918                             |
| SatAIF1 | 52,03                      | 68,526                         | ,764                             | ,901                             |
| SatAIF2 | 52,06                      | 68,667                         | ,726                             | ,903                             |
| SatGPF2 | 52,03                      | 68,736                         | ,750                             | ,902                             |
| SatGPF3 | 52,04                      | 68,643                         | ,766                             | ,901                             |

The two columns in the right are analysed in order to decide if the items should be kept in the scale or not:

- 1- ‘Corrected Item-Total correlation’: values are correct as the column values are higher than 0.4.
- 2- ‘Cronbach’s Alpha if Item Deleted’: the values need to be compared with the total Cronbach’s Alpha value that is 0.913 (see Table above), if the items have a difference bigger than 0.2 an eye should be kept. In this simulation, there is no problem so every item is kept.

### 6.3.2. Validity (PCA analysis)

#### 6.3.2.1. Correlation matrix.

‘Scale 3 – Faculty’s performance scale’. Correlation matrix.

When correlations are below 0.3, variables are not correlated with other variables.

|                 |         | RendF1 | RendF2  | RendF3  | RendF4  | VentF1  | VentF2 |
|-----------------|---------|--------|---------|---------|---------|---------|--------|
| Correlation     | RendF1  | 1,000  | ,762    | ,599    | ,777    | ,394    | ,391   |
|                 | RendF2  | ,762   | 1,000   | ,655    | ,827    | ,409    | ,369   |
|                 | RendF3  | ,599   | ,655    | 1,000   | ,804    | ,407    | ,552   |
|                 | RendF4  | ,777   | ,827    | ,804    | 1,000   | ,377    | ,413   |
|                 | VentF1  | ,394   | ,409    | ,407    | ,377    | 1,000   | ,492   |
|                 | VentF2  | ,391   | ,369    | ,552    | ,413    | ,492    | 1,000  |
|                 | VentF3  | ,263   | ,298    | ,286    | ,298    | ,472    | ,563   |
|                 | SatAIF1 | ,404   | ,454    | ,414    | ,436    | ,742    | ,343   |
|                 | SatAIF2 | ,318   | ,397    | ,439    | ,407    | ,760    | ,295   |
|                 | SatGPF2 | ,326   | ,420    | ,504    | ,492    | ,670    | ,290   |
|                 | SatGPF3 | ,316   | ,421    | ,535    | ,462    | ,709    | ,294   |
| Sig. (1-tailed) | RendF1  |        | ,000    | ,000    | ,000    | ,000    | ,000   |
|                 | RendF2  | ,000   |         | ,000    | ,000    | ,000    | ,000   |
|                 | RendF3  | ,000   | ,000    |         | ,000    | ,000    | ,000   |
|                 | RendF4  | ,000   | ,000    | ,000    |         | ,000    | ,000   |
|                 | VentF1  | ,000   | ,000    | ,000    | ,000    |         | ,000   |
|                 | VentF2  | ,000   | ,000    | ,000    | ,000    | ,000    |        |
|                 | VentF3  | ,010   | ,004    | ,006    | ,004    | ,000    | ,000   |
|                 | SatAIF1 | ,000   | ,000    | ,000    | ,000    | ,000    | ,001   |
|                 | SatAIF2 | ,002   | ,000    | ,000    | ,000    | ,000    | ,005   |
|                 | SatGPF2 | ,002   | ,000    | ,000    | ,000    | ,000    | ,005   |
|                 | SatGPF3 | ,003   | ,000    | ,000    | ,000    | ,000    | ,005   |
|                 |         | VentF3 | SatAIF1 | SatAIF2 | SatGPF2 | SatGPF3 |        |
| Correlation     | RendF1  | ,263   | ,404    | ,318    | ,326    | ,316    |        |
|                 | RendF2  | ,298   | ,454    | ,397    | ,420    | ,421    |        |
|                 | RendF3  | ,286   | ,414    | ,439    | ,504    | ,535    |        |
|                 | RendF4  | ,298   | ,436    | ,407    | ,492    | ,462    |        |
|                 | VentF1  | ,472   | ,742    | ,760    | ,670    | ,709    |        |
|                 | VentF2  | ,563   | ,343    | ,295    | ,290    | ,294    |        |
|                 | VentF3  | 1,000  | ,380    | ,343    | ,418    | ,401    |        |
|                 | SatAIF1 | ,380   | 1,000   | ,892    | ,841    | ,859    |        |
|                 | SatAIF2 | ,343   | ,892    | 1,000   | ,802    | ,884    |        |
|                 | SatGPF2 | ,418   | ,841    | ,802    | 1,000   | ,913    |        |
|                 | SatGPF3 | ,401   | ,859    | ,884    | ,913    | 1,000   |        |

|                 |         |      |      |      |      |      |
|-----------------|---------|------|------|------|------|------|
| Sig. (1-tailed) | RendF1  | ,010 | ,000 | ,002 | ,002 | ,003 |
|                 | RendF2  | ,004 | ,000 | ,000 | ,000 | ,000 |
|                 | RendF3  | ,006 | ,000 | ,000 | ,000 | ,000 |
|                 | RendF4  | ,004 | ,000 | ,000 | ,000 | ,000 |
|                 | VentF1  | ,000 | ,000 | ,000 | ,000 | ,000 |
|                 | VentF2  | ,000 | ,001 | ,005 | ,005 | ,005 |
|                 | VentF3  |      | ,000 | ,001 | ,000 | ,000 |
|                 | SatAIF1 | ,000 |      | ,000 | ,000 | ,000 |
|                 | SatAIF2 | ,001 | ,000 |      | ,000 | ,000 |
|                 | SatGPF2 | ,000 | ,000 | ,000 |      | ,000 |
|                 | SatGPF3 | ,000 | ,000 | ,000 | ,000 |      |

a. Determinant = 1,264E-5

#### 6.3.2.2. Kaiser-Meyer-Olkin (KMO).

‘Scale 3 – Faculty’s performance scale’. Kaiser-Meyer-Olkin (KMO) and significance.

Shows that KMO is good because its value is near 1 and that the model is significant because Sig’s value is below 0.05.

### KMO and Bartlett's Test

|                                                  |                    |         |
|--------------------------------------------------|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | ,833    |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 806,448 |
|                                                  | df                 | 55      |
|                                                  | Sig.               | ,000    |

## 6.3.2.3. Anti-Image Correlation matrix.

‘Scale 3 – Faculty’s performance scale’. Anti –Image Correlation matrix.

|                        |         | RendF1            | RendF2            | RendF3            | RendF4            | VentF1            |
|------------------------|---------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Anti-image Covariance  | RendF1  | ,301              | -,072             | -,003             | -,085             | -,058             |
|                        | RendF2  | -,072             | ,265              | -,003             | -,093             | -,022             |
|                        | RendF3  | -,003             | -,003             | ,216              | -,091             | ,024              |
|                        | RendF4  | -,085             | -,093             | -,091             | ,150              | ,030              |
|                        | VentF1  | -,058             | -,022             | ,024              | ,030              | ,305              |
|                        | VentF2  | ,004              | ,025              | -,149             | ,021              | -,109             |
|                        | VentF3  | ,000              | -,028             | ,092              | -,020             | -,036             |
|                        | SatAIF1 | -,049             | -,026             | ,044              | ,013              | ,001              |
|                        | SatAIF2 | ,026              | ,010              | -,004             | -,013             | -,065             |
|                        | SatGPF2 | ,031              | ,026              | ,005              | -,038             | -,018             |
|                        | SatGPF3 | ,012              | -,007             | -,049             | ,018              | -,007             |
| Anti-image Correlation | RendF1  | ,865 <sup>a</sup> | -,253             | -,010             | -,402             | -,192             |
|                        | RendF2  | -,253             | ,891 <sup>a</sup> | -,013             | -,467             | -,078             |
|                        | RendF3  | -,010             | -,013             | ,783 <sup>a</sup> | -,505             | ,095              |
|                        | RendF4  | -,402             | -,467             | -,505             | ,801 <sup>a</sup> | ,139              |
|                        | VentF1  | -,192             | -,078             | ,095              | ,139              | ,914 <sup>a</sup> |
|                        | VentF2  | ,010              | ,077              | -,514             | ,086              | -,316             |
|                        | VentF3  | -,001             | -,072             | ,266              | -,069             | -,089             |
|                        | SatAIF1 | -,251             | -,141             | ,268              | ,091              | ,004              |
|                        | SatAIF2 | ,131              | ,056              | -,026             | -,096             | -,332             |
|                        | SatGPF2 | ,154              | ,138              | ,028              | -,273             | -,089             |
|                        | SatGPF3 | ,076              | -,043             | -,357             | ,157              | -,042             |
|                        |         | VentF2            | VentF3            | SatAIF1           | SatAIF2           | SatGPF2           |
| Anti-image Covariance  | RendF1  | ,004              | ,000              | -,049             | ,026              | ,031              |
|                        | RendF2  | ,025              | -,028             | -,026             | ,010              | ,026              |
|                        | RendF3  | -,149             | ,092              | ,044              | -,004             | ,005              |
|                        | RendF4  | ,021              | -,020             | ,013              | -,013             | -,038             |
|                        | VentF1  | -,109             | -,036             | ,001              | -,065             | -,018             |
|                        | VentF2  | ,391              | -,230             | -,052             | ,022              | ,024              |
|                        | VentF3  | -,230             | ,550              | ,030              | ,019              | -,034             |
|                        | SatAIF1 | -,052             | ,030              | ,127              | -,066             | -,046             |
|                        | SatAIF2 | ,022              | ,019              | -,066             | ,126              | ,030              |
|                        | SatGPF2 | ,024              | -,034             | -,046             | ,030              | ,131              |
|                        | SatGPF3 | ,037              | -,032             | -,011             | -,046             | -,064             |
| Anti-image Correlation | RendF1  | ,010              | -,001             | -,251             | ,131              | ,154              |
|                        | RendF2  | ,077              | -,072             | -,141             | ,056              | ,138              |

|                        |         |                   |                   |                   |                   |                   |
|------------------------|---------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                        | RendF3  | -,514             | ,266              | ,268              | -,026             | ,028              |
|                        | RendF4  | ,086              | -,069             | ,091              | -,096             | -,273             |
|                        | VentF1  | -,316             | -,089             | ,004              | -,332             | -,089             |
|                        | VentF2  | ,697 <sup>a</sup> | -,496             | -,234             | ,097              | ,105              |
|                        | VentF3  | -,496             | ,790 <sup>a</sup> | ,114              | ,072              | -,125             |
|                        | SatAlF1 | -,234             | ,114              | ,856 <sup>a</sup> | -,518             | -,357             |
|                        | SatAlF2 | ,097              | ,072              | -,518             | ,844 <sup>a</sup> | ,234              |
|                        | SatGPF2 | ,105              | -,125             | -,357             | ,234              | ,841 <sup>a</sup> |
|                        | SatGPF3 | ,202              | -,147             | -,100             | -,434             | -,598             |
|                        |         |                   |                   |                   |                   |                   |
|                        |         |                   | SatGPF3           |                   |                   |                   |
| Anti-image Covariance  | RendF1  | ,012              |                   |                   |                   |                   |
|                        | RendF2  | -,007             |                   |                   |                   |                   |
|                        | RendF3  | -,049             |                   |                   |                   |                   |
|                        | RendF4  | ,018              |                   |                   |                   |                   |
|                        | VentF1  | -,007             |                   |                   |                   |                   |
|                        | VentF2  | ,037              |                   |                   |                   |                   |
|                        | VentF3  | -,032             |                   |                   |                   |                   |
|                        | SatAlF1 | -,011             |                   |                   |                   |                   |
|                        | SatAlF2 | -,046             |                   |                   |                   |                   |
|                        | SatGPF2 | -,064             |                   |                   |                   |                   |
|                        | SatGPF3 | ,088              |                   |                   |                   |                   |
| Anti-image Correlation | RendF1  | ,076              |                   |                   |                   |                   |
|                        | RendF2  | -,043             |                   |                   |                   |                   |
|                        | RendF3  | -,357             |                   |                   |                   |                   |
|                        | RendF4  | ,157              |                   |                   |                   |                   |
|                        | VentF1  | -,042             |                   |                   |                   |                   |
|                        | VentF2  | ,202              |                   |                   |                   |                   |
|                        | VentF3  | -,147             |                   |                   |                   |                   |
|                        | SatAlF1 | -,100             |                   |                   |                   |                   |
|                        | SatAlF2 | -,434             |                   |                   |                   |                   |
|                        | SatGPF2 | -,598             |                   |                   |                   |                   |
|                        | SatGPF3 | ,833 <sup>a</sup> |                   |                   |                   |                   |

a. Measures of Sampling Adequacy(MSA)

## 6.3.2.4. Communalities.

‘Scale 3 – Faculty’s performance scale’. Communalities.

Values are high, close to one.

### Communalities

|         | Initial | Extraction |
|---------|---------|------------|
| RendF1  | 1,000   | ,778       |
| RendF2  | 1,000   | ,821       |
| RendF3  | 1,000   | ,735       |
| RendF4  | 1,000   | ,905       |
| VentF1  | 1,000   | ,745       |
| VentF2  | 1,000   | ,819       |
| VentF3  | 1,000   | ,766       |
| SatAIF1 | 1,000   | ,888       |
| SatAIF2 | 1,000   | ,900       |
| SatGPF2 | 1,000   | ,861       |
| SatGPF3 | 1,000   | ,919       |

Extraction Method: Principal Axis Factoring.

## 6.3.2.5. Total variance.

‘Scale 3 – Faculty’s performance scale’. Total variance.

Three factors extracted. Total variance has three values higher than one. See column named ‘Cumulative%’. Three factors/ dimensions/ components are proposed which explain 83.063% of the variance.

| Component | Total |
|-----------|-------|
| 1         | 6,183 |
| 2         | 1,853 |
| 3         | 1,101 |
| 4         | ,530  |
| 5         | ,472  |
| 6         | ,233  |
| 7         | ,218  |
| 8         | ,162  |
| 9         | ,115  |
| 10        | ,081  |
| 11        | ,052  |

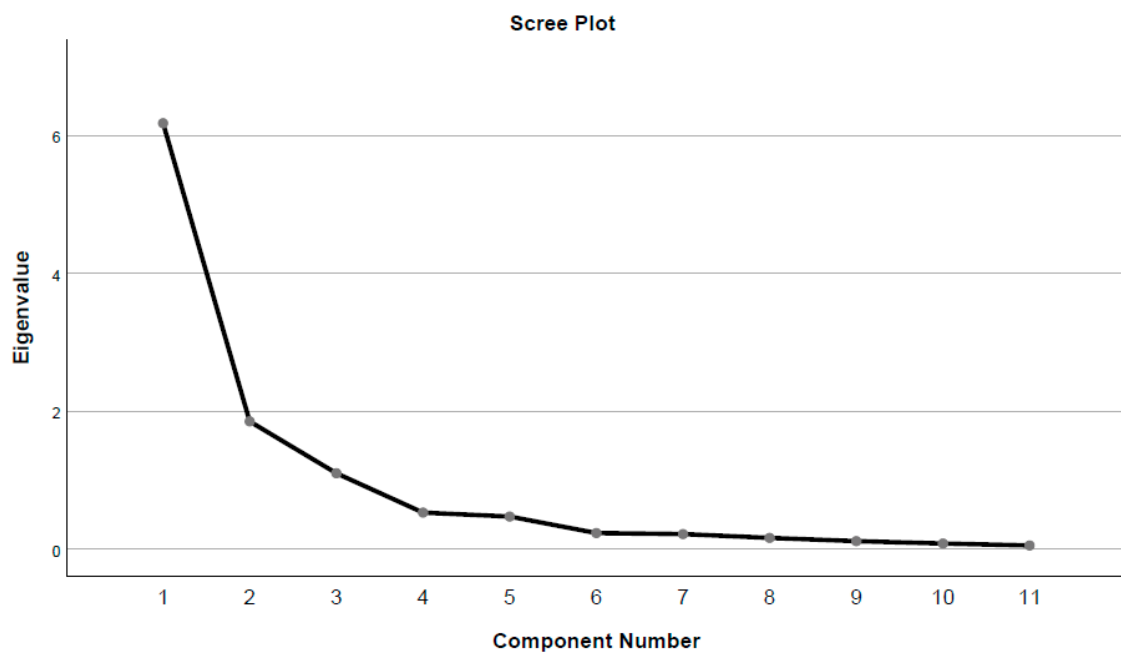
Extraction Sums .

| Component | Cumulative % |
|-----------|--------------|
| 1         | 56,206       |
| 2         | 73,055       |
| 3         | 83,063       |
| 4         |              |
| 5         |              |
| 6         |              |
| 7         |              |
| 8         |              |
| 9         |              |
| 10        |              |
| 11        |              |

Extraction Method: Principal Component Analysis.

#### 6.3.2.6. Scree Plot.

‘Scale 3 – Faculty’s performance scale’. Scree plot. Shows an inflexion point between factors3 and 4.



## 6.3.2.7. Rotated component matrix.

‘Scale 3 – Faculty’s performance scale’. Rotated Component Matrix. The items proposed for each of the factors extracted (in blue).

**Rotated Component Matrix<sup>a</sup>**

|         | Component |      |      |
|---------|-----------|------|------|
|         | 1         | 2    | 3    |
| SatAIF2 | ,922      | ,190 | ,118 |
| SatGPF3 | ,920      | ,237 | ,132 |
| SatAIF1 | ,898      | ,238 | ,155 |
| SatGPF2 | ,882      | ,251 | ,139 |
| VentF1  | ,731      | ,193 | ,416 |
| RendF4  | ,244      | ,910 | ,130 |
| RendF2  | ,238      | ,867 | ,116 |
| RendF1  | ,143      | ,858 | ,149 |
| RendF3  | ,283      | ,769 | ,252 |
| VentF2  | ,116      | ,333 | ,833 |
| VentF3  | ,273      | ,091 | ,827 |

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.



### Appendix 6.4. Scale 4 – Master’s degree performance Scale.

#### 6.4.1. Reliability (correlations and Cronbach’s Alphas)

##### 6.4.1.1. Pearson correlation.

‘Scale 4 – Master’s degree performance scale’. Pearson’s correlations.

Significant relation. Values over  $r=0.476$  generally.

|        |                     | Correlations |        |        |        |        |        |        |   |
|--------|---------------------|--------------|--------|--------|--------|--------|--------|--------|---|
|        |                     | RendM1       | RendM2 | RendM3 | RendM4 | VentM1 | VentM2 | VentM3 | S |
| RendM1 | Pearson Correlation | 1            | ,836** | ,619** | ,852** | ,337*  | ,210   | ,203   |   |
|        | Sig. (2-tailed)     |              | ,000   | ,000   | ,000   | ,044   | ,219   | ,236   |   |
|        | N                   | 36           | 36     | 36     | 36     | 36     | 36     | 36     |   |
| RendM2 | Pearson Correlation | ,836**       | 1      | ,797** | ,920** | ,473** | ,256   | ,129   |   |
|        | Sig. (2-tailed)     | ,000         |        | ,000   | ,000   | ,004   | ,132   | ,452   |   |
|        | N                   | 36           | 36     | 36     | 36     | 36     | 36     | 36     |   |
| RendM3 | Pearson Correlation | ,619**       | ,797** | 1      | ,757** | ,551** | ,327   | ,153   |   |
|        | Sig. (2-tailed)     | ,000         | ,000   |        | ,000   | ,000   | ,052   | ,372   |   |
|        | N                   | 36           | 36     | 36     | 36     | 36     | 36     | 36     |   |
| RendM4 | Pearson Correlation | ,852**       | ,920** | ,757** | 1      | ,385*  | ,276   | ,126   |   |
|        | Sig. (2-tailed)     | ,000         | ,000   | ,000   |        | ,021   | ,103   | ,465   |   |
|        | N                   | 36           | 36     | 36     | 36     | 36     | 36     | 36     |   |

##### 6.4.1.2. Spearman Correlation.

‘Scale 4 – Master’s degree performance scale’. Spearman’s correlations.

Significant relation. Values over  $r=0.4$  generally.

|                |        |                         | Correlations |        |        |        |        |        |
|----------------|--------|-------------------------|--------------|--------|--------|--------|--------|--------|
|                |        |                         | RendM1       | RendM2 | RendM3 | RendM4 | VentM1 | VentM2 |
| Spearman's rho | RendM1 | Correlation Coefficient | 1,000        | ,842** | ,681** | ,853** | ,375*  | ,12    |
|                |        | Sig. (2-tailed)         |              | ,000   | ,000   | ,000   | ,024   | ,46    |
|                |        | N                       | 36           | 36     | 36     | 36     | 36     | 36     |
|                | RendM2 | Correlation Coefficient | ,842**       | 1,000  | ,797** | ,893** | ,429** | ,18    |
|                |        | Sig. (2-tailed)         | ,000         |        | ,000   | ,000   | ,009   | ,21    |
|                |        | N                       | 36           | 36     | 36     | 36     | 36     | 36     |
|                | RendM3 | Correlation Coefficient | ,681**       | ,797** | 1,000  | ,725** | ,428** | ,27    |
|                |        | Sig. (2-tailed)         | ,000         | ,000   |        | ,000   | ,009   | ,27    |
|                |        | N                       | 36           | 36     | 36     | 36     | 36     | 36     |
|                | RendM4 | Correlation Coefficient | ,853**       | ,893** | ,725** | 1,000  | ,305   | ,11    |
|                |        | Sig. (2-tailed)         | ,000         | ,000   | ,000   |        | ,070   | ,30    |
|                |        | N                       | 36           | 36     | 36     | 36     | 36     | 36     |
|                | VentM1 | Correlation Coefficient | ,375*        | ,429** | ,428** | ,305   | 1,000  | ,21    |

## 6.4.1.3. Cronbach's Alphas.

'Scale 4 – Master's degree performance scale'. 36 responses obtained.

| Case Processing Summary                                       |                       |    |       |
|---------------------------------------------------------------|-----------------------|----|-------|
|                                                               |                       | N  | %     |
| Cases                                                         | Valid                 | 36 | 46,8  |
|                                                               | Excluded <sup>a</sup> | 41 | 53,2  |
|                                                               | Total                 | 77 | 100,0 |
| a. Listwise deletion based on all variables in the procedure. |                       |    |       |

'Scale 4 – Master's degree performance scale'. Cronbach's Alpha for the total scale.

It is very high, 0.892, according to Nunnally (1978) 0.7 would be the minimum value.

| Reliability Statistics |            |
|------------------------|------------|
| Cronbach's Alpha       | N of Items |
| ,892                   | 11         |

'Scale 4 – Master's degree performance scale'. Cronbach's Alpha for 'Dimension 1'. The Alpha value is very high, 0.940, according to Nunnally (1978) 0.7 would be the minimum value.

| Reliability Statistics |            |
|------------------------|------------|
| Cronbach's Alpha       | N of Items |
| ,940                   | 4          |

‘Scale 4 – Master’s degree performance scale’. Cronbach’s Alpha for ‘Dimension 2’.

The Alpha value is very high, 0.699, according to Nunnally (1978) 0.7 would be the minimum value.

| Reliability Statistics |            |
|------------------------|------------|
| Cronbach's Alpha       | N of Items |
| ,699                   | 3          |

‘Scale 4 – Master’s degree performance scale’. Cronbach’s Alpha for ‘Dimension 3’.

The Alpha value is very high, 0.928, according to Nunnally (1978) 0.7 would be the minimum value.

| Reliability Statistics |            |
|------------------------|------------|
| Cronbach's Alpha       | N of Items |
| ,928                   | 2          |

‘Scale 4 – Master’s degree performance scale’. Cronbach’s Alpha for ‘Dimension 4’.

The Alpha value is very high, 0.949, according to Nunnally (1978) 0.7 would be the minimum value.

| Reliability Statistics |            |
|------------------------|------------|
| Cronbach's Alpha       | N of Items |
| ,949                   | 2          |

‘Scale 4 – Master’s degree performance scale’. Item Total statistics.

| <b>Item-Total Statistics</b> |                            |                                |                                  |                                  |
|------------------------------|----------------------------|--------------------------------|----------------------------------|----------------------------------|
|                              | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
| RendM1                       | 49,06                      | 72,740                         | ,547                             | ,887                             |
| RendM2                       | 48,97                      | 71,399                         | ,637                             | ,882                             |
| RendM3                       | 48,92                      | 71,679                         | ,632                             | ,882                             |
| RendM4                       | 49,03                      | 72,828                         | ,567                             | ,886                             |
| VentM1                       | 48,03                      | 69,228                         | ,765                             | ,874                             |
| VentM2                       | 48,75                      | 71,450                         | ,505                             | ,891                             |
| VentM3                       | 49,42                      | 73,679                         | ,417                             | ,897                             |
| SatAIM1                      | 47,50                      | 74,314                         | ,607                             | ,884                             |
| SatAIM2                      | 47,69                      | 68,961                         | ,744                             | ,875                             |
| SatGPM1                      | 47,72                      | 68,835                         | ,785                             | ,873                             |
| SatGPM2                      | 47,69                      | 71,761                         | ,676                             | ,880                             |

The two columns in the right are analysed in order to decide if the items should be kept in the scale or not:

- 1- ‘Corrected Item-Total correlation’: values are correct as the column values are higher than 0.4
- 3- ‘Cronbach’s Alpha if Item Deleted’: the values need to be compared with the total Cronbach’s Alpha value that is 0.892 (see Table above), if the items have a difference bigger than 0.2 an eye should be kept. . In this simulation, there is no problem so every item is kept.

#### 6.4.2. Validity (PCA analysis)

##### 6.4.2.1. Correlation matrix.

‘Scale 4 – Master’s degree performance scale’.

When correlations are below 0.3 those variables are not correlated with other variables.

|                 |         | RendM1 | RendM2  | RendM3  | RendM4  | VentM1  | VentM2 |
|-----------------|---------|--------|---------|---------|---------|---------|--------|
| Correlation     | RendM1  | 1,000  | ,836    | ,619    | ,852    | ,337    | ,210   |
|                 | RendM2  | ,836   | 1,000   | ,797    | ,920    | ,473    | ,256   |
|                 | RendM3  | ,619   | ,797    | 1,000   | ,757    | ,551    | ,327   |
|                 | RendM4  | ,852   | ,920    | ,757    | 1,000   | ,385    | ,276   |
|                 | VentM1  | ,337   | ,473    | ,551    | ,385    | 1,000   | ,429   |
|                 | VentM2  | ,210   | ,256    | ,327    | ,276    | ,429    | 1,000  |
|                 | VentM3  | ,2015  | ,129    | ,153    | ,126    | ,368    | ,512   |
|                 | SatAIM1 | ,089   | ,229    | ,268    | ,098    | ,710    | ,289   |
|                 | SatAIM2 | ,216   | ,305    | ,365    | ,192    | ,764    | ,424   |
|                 | SatGPM1 | ,288   | ,323    | ,386    | ,266    | ,737    | ,466   |
|                 | SatGPM2 | ,240   | ,230    | ,229    | ,126    | ,586    | ,380   |
| Sig. (1-tailed) | RendM1  |        | ,000    | ,000    | ,000    | ,022    | ,110   |
|                 | RendM2  | ,000   |         | ,000    | ,000    | ,002    | ,066   |
|                 | RendM3  | ,000   | ,000    |         | ,000    | ,000    | ,026   |
|                 | RendM4  | ,000   | ,000    | ,000    |         | ,010    | ,051   |
|                 | VentM1  | ,022   | ,002    | ,000    | ,010    |         | ,004   |
|                 | VentM2  | ,110   | ,066    | ,026    | ,051    | ,004    |        |
|                 | VentM3  | ,118   | ,226    | ,186    | ,233    | ,014    | ,001   |
|                 | SatAIM1 | ,302   | ,089    | ,057    | ,285    | ,000    | ,044   |
|                 | SatAIM2 | ,103   | ,035    | ,014    | ,131    | ,000    | ,005   |
|                 | SatGPM1 | ,044   | ,028    | ,010    | ,058    | ,000    | ,002   |
|                 | SatGPM2 | ,079   | ,089    | ,089    | ,232    | ,000    | ,011   |
|                 |         | VentM3 | SatAIM1 | SatAIM2 | SatGPM1 | SatGPM2 |        |
| Correlation     | RendM1  | ,2015  | ,089    | ,216    | ,288    | ,240    |        |
|                 | RendM2  | ,129   | ,229    | ,305    | ,323    | ,230    |        |
|                 | RendM3  | ,153   | ,268    | ,365    | ,386    | ,229    |        |
|                 | RendM4  | ,126   | ,098    | ,192    | ,266    | ,126    |        |
|                 | VentM1  | ,368   | ,710    | ,764    | ,737    | ,586    |        |
|                 | VentM2  | ,512   | ,289    | ,424    | ,466    | ,380    |        |
|                 | VentM3  | 1,000  | ,225    | ,365    | ,446    | ,443    |        |
|                 | SatAIM1 | ,225   | 1,000   | ,887    | ,793    | ,749    |        |
|                 | SatAIM2 | ,365   | ,887    | 1,000   | ,873    | ,879    |        |
|                 | SatGPM1 | ,446   | ,793    | ,873    | 1,000   | ,904    |        |
|                 | SatGPM2 | ,443   | ,749    | ,879    | ,904    | 1,000   |        |
| Sig. (1-tailed) | RendM1  | ,118   | ,302    | ,103    | ,044    | ,079    |        |
|                 | RendM2  | ,226   | ,089    | ,035    | ,028    | ,089    |        |
|                 | RendM3  | ,186   | ,057    | ,014    | ,010    | ,089    |        |
|                 | RendM4  | ,233   | ,285    | ,131    | ,058    | ,232    |        |
|                 | VentM1  | ,014   | ,000    | ,000    | ,000    | ,000    |        |
|                 | VentM2  | ,001   | ,044    | ,005    | ,002    | ,011    |        |
|                 | VentM3  |        | ,093    | ,014    | ,003    | ,003    |        |

|         |      |      |      |      |      |
|---------|------|------|------|------|------|
| SatAIM1 | ,093 |      | ,000 | ,000 | ,000 |
| SatAIM2 | ,014 | ,000 |      | ,000 | ,000 |
| SatGPM1 | ,003 | ,000 | ,000 |      | ,000 |
| SatGPM2 | ,003 | ,000 | ,000 | ,000 |      |

a. Determinant = 4,344E-6

#### 6.4.2.2. Kaiser-Meyer-Olkin (KMO).

‘Scale 4 – Master’s degree performance scale’. Kaiser-Meyer-Olkin (KMO) and significance.

Shows that KMO good because its value is near 1 and that the model is significant because value Sig value is below 0.05.

### KMO and Bartlett's Test

|                                                  |                    |         |
|--------------------------------------------------|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | ,771    |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 376,578 |
|                                                  | df                 | 55      |
|                                                  | Sig.               | ,000    |

#### 6.4.2.3. Anti-Image Correlation matrix.

‘Scale 4 – Master’s degree performance scale’. Anti –Image Correlation matrix.

|                        |         | RendM1            |
|------------------------|---------|-------------------|
| Anti-image Covariance  | RendM1  | ,204              |
|                        | RendM2  | -,034             |
|                        | RendM3  | ,032              |
|                        | RendM4  | -,057             |
|                        | VentM1  | -,009             |
|                        | VentM2  | ,046              |
|                        | VentM3  | -,042             |
|                        | SatAIM1 | ,027              |
|                        | SatAIM2 | ,006              |
|                        | SatGPM1 | ,009              |
|                        | SatGPM2 | -,028             |
| Anti-image Correlation | RendM1  | ,858 <sup>a</sup> |
|                        | RendM2  | -,251             |

|                        |         |                   |
|------------------------|---------|-------------------|
|                        | RendM3  | ,133              |
|                        | RendM4  | -,411             |
|                        | VentM1  | -,042             |
|                        | VentM2  | ,134              |
|                        | VentM3  | -,121             |
|                        | SatAIM1 | ,151              |
|                        | SatAIM2 | ,046              |
|                        | SatGPM1 | ,068              |
|                        | SatGPM2 | -,226             |
|                        |         | VentM2            |
| Anti-image Covariance  | RendM1  | ,046              |
|                        | RendM2  | ,005              |
|                        | RendM3  | -,014             |
|                        | RendM4  | -,030             |
|                        | VentM1  | ,006              |
|                        | VentM2  | ,589              |
|                        | VentM3  | -,227             |
|                        | SatAIM1 | ,048              |
|                        | SatAIM2 | -,039             |
|                        | SatGPM1 | -,033             |
|                        | SatGPM2 | ,025              |
| Anti-image Correlation | RendM1  | ,134              |
|                        | RendM2  | ,023              |
|                        | RendM3  | -,033             |
|                        | RendM4  | -,127             |
|                        | VentM1  | ,015              |
|                        | VentM2  | ,830 <sup>a</sup> |
|                        | VentM3  | -,384             |
|                        | SatAIM1 | ,158              |
|                        | SatAIM2 | -,186             |
|                        | SatGPM1 | -,147             |
|                        | SatGPM2 | ,120              |
|                        |         | SatGPM2           |
| Anti-image Covariance  | RendM1  | -,028             |
|                        | RendM2  | -,024             |
|                        | RendM3  | ,033              |
|                        | RendM4  | ,031              |
|                        | VentM1  | ,061              |
|                        | VentM2  | ,025              |
|                        | VentM3  | -,036             |

|                        |         |                   |
|------------------------|---------|-------------------|
|                        | SatAIM1 | ,028              |
|                        | SatAIM2 | -,047             |
|                        | SatGPM1 | -,059             |
|                        | SatGPM2 | ,075              |
| Anti-image Correlation | RendM1  | -,226             |
|                        | RendM2  | -,289             |
|                        | RendM3  | ,228              |
|                        | RendM4  | ,366              |
|                        | VentM1  | ,453              |
|                        | VentM2  | ,120              |
|                        | VentM3  | -,168             |
|                        | SatAIM1 | ,258              |
|                        | SatAIM2 | -,617             |
|                        | SatGPM1 | -,740             |
|                        | SatGPM2 | ,658 <sup>a</sup> |

a. Measures of Sampling Adequacy(MSA)

## 6.4.2.4. Communalities.

‘Scale 4 – Master’s degree performance scale’. Communalities.

Values are high and close to one.

## Communalities

|         | Initial | Extraction |
|---------|---------|------------|
| RendM1  | 1,000   | ,801       |
| RendM2  | 1,000   | ,935       |
| RendM3  | 1,000   | ,757       |
| RendM4  | 1,000   | ,932       |
| VentM1  | 1,000   | ,737       |
| VentM2  | 1,000   | ,711       |
| VentM3  | 1,000   | ,801       |
| SatAIM1 | 1,000   | ,887       |
| SatAIM2 | 1,000   | ,941       |
| SatGPM1 | 1,000   | ,899       |
| SatGPM2 | 1,000   | ,831       |

Extraction Method: Principal Component Analysis.

## 6.4.2.5. Total variance.



‘Scale 4 – Master’s degree performance scale’. Total variance.

Three factors extracted. Total variance has three values that are higher than one.

See column named ‘Cumulative%’. Three factors/ dimensions/ components are proposed which explain 83.926% of the variance.

| Component | Total | Initial Eigenvalues |              | Extraction Sums of Squared .. |               |
|-----------|-------|---------------------|--------------|-------------------------------|---------------|
|           |       | % of Variance       | Cumulative % | Total                         | % of Variance |
| 1         | 5,543 | 50,394              | 50,394       | 5,543                         | 50,394        |
| 2         | 2,603 | 23,665              | 74,059       | 2,603                         | 23,665        |
| 3         | 1,085 | 9,867               | 83,926       | 1,085                         | 9,867         |
| 4         | ,591  | 5,372               | 89,297       |                               |               |
| 5         | ,418  | 3,796               | 93,094       |                               |               |
| 6         | ,257  | 2,339               | 95,433       |                               |               |
| 7         | ,186  | 1,692               | 97,124       |                               |               |
| 8         | ,122  | 1,110               | 98,235       |                               |               |
| 9         | ,098  | ,888                | 99,123       |                               |               |
| 10        | ,067  | ,611                | 99,734       |                               |               |
| 11        | ,029  | ,266                | 100,000      |                               |               |

| Component | Extraction Sums ... | Rotation Sums of Squared Loadings |               |               |
|-----------|---------------------|-----------------------------------|---------------|---------------|
|           | Cumulative %        | Total                             | % of Variance | Cumulative %  |
| 1         | 50,394              | 4,066                             | 36,960        | 36,960        |
| 2         | 74,059              | 3,523                             | 32,031        | 68,991        |
| 3         | <b>83,926</b>       | 1,643                             | 14,935        | <b>83,926</b> |
| 4         |                     |                                   |               |               |
| 5         |                     |                                   |               |               |
| 6         |                     |                                   |               |               |
| 7         |                     |                                   |               |               |
| 8         |                     |                                   |               |               |
| 9         |                     |                                   |               |               |
| 10        |                     |                                   |               |               |
| 11        |                     |                                   |               |               |

Extraction Method: Principal Component Analysis.

## 6.4.2.6. Rotated component matrix.

‘Scale 4 – Master’s degree performance scale’. Rotated Component Matrix.

The items proposed for each of the factors extracted (in blue).

**Rotated Component Matrix<sup>a</sup>**

|         | Component |      |      |
|---------|-----------|------|------|
|         | 1         | 2    | 3    |
| SatAIM2 | ,942      | ,136 | ,188 |
| SatAIM1 | ,941      | ,046 | ,010 |
| SatGPM1 | ,881      | ,185 | ,298 |
| SatGPM2 | ,867      | ,057 | ,276 |
| VentM1  | ,744      | ,373 | ,210 |
| RendM4  | ,045      | ,960 | ,096 |
| RendM2  | ,176      | ,950 | ,042 |
| RendM1  | ,069      | ,882 | ,132 |
| RendM3  | ,253      | ,828 | ,087 |
| VentM3  | ,217      | ,040 | ,867 |
| VentM2  | ,251      | ,194 | ,781 |

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

## Appendix 7. Surveys

### *Appendix 7.1. Surveys of the principal study*

Two different surveys were used for the principal study. The first one corresponded to the managerial profile and was composed by three scales: the one that measured IMC level in the HEI where the managers belong to (Scale 1), the one that measured performance at the HEI level (Scale 2) and the third one, to measure performance at faculty level (Scale 3). Survey for managers (3 scales) is available in the following link: <https://bit.ly/3bdNm9U> (34 responses)

The second survey that we used in this research corresponded to the academic profile and was composed by four scales: the one that measured IMC level in the HEI where the academics belong to (Scale 1), the one that measured performance at the HEI level (Scale 2), the third one, to measure performance at faculty level (Scale 3). The fourth, and last scale measured performance at master's degree level (Scale 4). Survey for academics (master's degrees directors) is available here: <https://bit.ly/2VzohQ8> (33 responses) (the difference with the surveys for managers is that the fourth scale related to master's degree performance is added).

The previous links to surveys consist of the following title, introductory text and scales for the questionnaires:

**Survey's title:** Comunicación y Marketing en el sector de la educación superior

**Survey's introductory text:**

La presente encuesta es parte del trabajo empírico de la Tesis Doctoral titulada "La Comunicación Integrada de Marketing en el sector de la Educación Superior" que está siendo elaborada por la doctoranda Janire Gordon y dirigida por los profesores de la Universidad de Deusto, Lorea Narvaiza y Juanjo Gibaja.

Su colaboración respondiendo la encuesta será de gran ayuda para conocer cómo mejorar la comunicación y el marketing en la educación superior. Por ello, le agradecemos de antemano que le dedique unos minutos a responder esta encuesta.

En cuanto al tratamiento de datos de carácter personal, serán objeto de tratamiento confidencial y solo serán utilizados con finalidad investigadora. Serán publicados de forma agregada y de ninguna forma se le podrá identificar con sus respuestas.

Si está interesado en recibir los resultados de la presente investigación, al final del cuestionario nos podrá facilitar su dirección de correo electrónico y le enviaremos los resultados.

Tiempo estimado del cuestionario: 15-20 minutos.

Glosario de términos\* (lectura opcional): Hemos creado el siguiente glosario para clarificar conceptos que podrían resultar ambiguos <https://bit.ly/3ci7yaI>

Muchas gracias.

\*Ver glosario de términos:

| GLOSARIO DE TÉRMINOS                                                                                                                                       |                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>POSICIONAMIENTO ESTRATÉGICO</b><br>La ventaja competitiva que diferencia a una compañía de otra y que la hace más atractiva para los grupos de interés. | <b>COMUNICACIÓN INTERNA HORIZONTAL</b><br>Comunicación entre personas de la organización sin diferencias jerárquicas.                                                     |
| <b>COMUNICACIÓN INTERNA VERTICAL</b><br>Comunicación entre personas de la organización que se encuentran en diferentes niveles jerárquicos.                | <b>UNIVERSIDAD COMPETIDORA</b><br>Institución con características similares en cuanto a estudios ofertados, localización, precio, entre otros.                            |
| <b>CUOTA DE MERCADO</b><br>Proporción en la que el alumnado decide estudiar en tu universidad en lugar de en otra de características parecidas.            | <b>CRECIMIENTO DE VENTAS</b><br>El aumento en el número de las matriculaciones.                                                                                           |
| <b>NIVEL DE CONCIENCIA DE LA MARCA</b><br>Asociación del nombre de la Universidad                                                                          | <b>FIDELIDAD</b><br>La proporción en la que elegiría esta Universidad si tuviera que estudiar algo y/o aconsejaría a sus familiares y personas conocidas que lo hicieran. |

### ESCALA 1: Medición del nivel de la Comunicación Integrada de Marketing (CIM) en instituciones de educación superior

Como persona que forma parte de la Universidad, por favor, indique su nivel de acuerdo con las siguientes afirmaciones (1 = totalmente en desacuerdo, 7 = totalmente de acuerdo) según su percepción respecto a la Universidad a la que pertenece.

Mi Universidad...:

| <b>Coherencia del mensaje</b>                                                                                                                                                                                                                                        | Totalmente en desacuerdo |   |   |   |   | Totalmente de acuerdo |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|---|-----------------------|---|
| 1. ...coordina cuidadosamente todos los mensajes planificados por todos los departamentos y centros con el objetivo de mantener la coherencia de su posicionamiento estratégico, es decir, con cómo desea que le perciba el alumnado y la comunidad                  | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 2. ...mantiene la coherencia en todos los elementos visuales de la comunicación: en la utilización de la marca, del nombre, de los anuncios en distintos soportes, de la página web, etc.                                                                            | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 3. ...revisa periódicamente todos sus mensajes planificados para determinar su nivel de coherencia con el posicionamiento estratégico, es decir, con cómo desea que le perciba el alumnado y la comunidad.                                                           | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 4. ...considera que es primordial mantener la coherencia entre los mensajes emitidos y lo que se deriva de la experiencia con la universidad, sus trabajadores, sus agentes y sus programas educativos.                                                              | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| <b>Interactividad</b>                                                                                                                                                                                                                                                | Totalmente en desacuerdo |   |   |   |   | Totalmente de acuerdo |   |
| 5. ...dispone de canales y procedimientos específicos para facilitar las consultas y quejas de estudiantes actuales, estudiantes potenciales, alumni, empresas y otros, sobre nuestros programas formativos, marcas, productos y servicios, y la propia universidad. | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 6. ...recoge toda la información sobre estudiantes actuales, estudiantes potenciales, alumni, empresas y otros, en una única base de datos que es accesible a todos los niveles de la organización.                                                                  | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |

## Mi Universidad....:

| <b>Interactividad (continuación)</b>                                                                                                                                                                                                                    | Totalmente en desacuerdo |   |   |   |   | Totalmente de acuerdo |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|---|-----------------------|---|
| 7. ...considera que es primordial para el conjunto de la misma, y para todo su personal, tener una actitud receptiva hacia los mensajes recibidos de estudiantes actuales, estudiantes potenciales, familias y empresas, entre otros grupos de interés. | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 8. ...considera que el uso estratégico de las Tecnologías de la Información (TICs) mejora la velocidad de respuesta de la universidad en su conjunto.                                                                                                   | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 9. ...practica la escucha activa de los mensajes generados en el boca-oreja para definir la estrategia de comunicación.                                                                                                                                 | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 10. ...practica la escucha activa de los mensajes generados en las redes sociales para definir la estrategia de comunicación.                                                                                                                           |                          |   |   |   |   |                       |   |
| 11. ...considera que la relación entre la universidad y estudiantes actuales, estudiantes potenciales, familias, etc. debe ser bidireccional con el fin de establecer un diálogo continuo y basado en la confianza.                                     | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 12. ...utiliza de manera proactiva las redes sociales y escucha las conversaciones existentes para promover un diálogo con estudiantes, estudiantes potenciales, familias, empresas, entre otros.                                                       | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| <b>Enfoque estratégico centralizado en los grupos de interés</b>                                                                                                                                                                                        | Totalmente en desacuerdo |   |   |   |   | Totalmente de acuerdo |   |
| 13. ...considera que su misión es un elemento clave que se tiene en cuenta en la planificación de sus comunicaciones.                                                                                                                                   | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 14. ...difunde su misión entre estudiantes actuales, estudiantes potenciales, familias, empresas, entre otros.                                                                                                                                          |                          |   |   |   |   |                       |   |

## Mi Universidad...:

| <b>Enfoque estratégico centralizado en los grupos de interés (continuación)</b>                                                                                                                                                                          | Totalmente en desacuerdo |   |   |   |   | Totalmente de acuerdo |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|---|-----------------------|---|
|                                                                                                                                                                                                                                                          | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 15. ...lleva a cabo estudios sistemáticos para evaluar la coherencia de sus comunicaciones a nivel de universidad, a fin de construir y mantener relaciones sólidas con todos sus grupos de interés.                                                     | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 16. ...considera que es fundamental la identificación de cuáles son los principales puntos de contacto entre la universidad y sus grupos de interés para hacer más eficaz la comunicación.                                                               | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 17. ...pone las redes sociales a disposición de estudiantes actuales, estudiantes potenciales, familias, empresas, entre otros, para comunicarse con ella.                                                                                               | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 18. ...intenta que las personas de todas sus áreas colaboren en la comunicación con el fin de lograr establecer y mantener relaciones con los estudiantes actuales, estudiantes potenciales, familias, empresas, entre otros, para comunicarse con ella. | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 19. ...está compuesta por personas que persiguen el objetivo de proporcionar soluciones o modos de comunicación centrados en estudiantes actuales, estudiantes potenciales, familias, empresas, entre otros, en cada una de sus áreas organizativas.     | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 20. ...entabla y cultiva las relaciones con los grupos de interés con el fin de lograr modos de comunicación valiosos para dichos grupos.                                                                                                                | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 21. ...se asegura de que tiene varios contactos cada cierto tiempo con sus grupos de interés.                                                                                                                                                            | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |

## Mi Universidad...:

| <b>Alineación organizacional</b>                                                                                                                                                                                             | Totalmente en desacuerdo |   |   |   |   | Totalmente de acuerdo |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|---|-----------------------|---|
| 22. ...gestiona cuidadosamente la comunicación interna horizontal asegurándose de que todas las áreas de la organización conocen cuáles son los objetivos perseguidos por esta.                                              | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 23. ...gestiona cuidadosamente la comunicación interna vertical asegurándose de que la información fluya a través de todos los niveles jerárquicos de la universidad.                                                        | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 24. ...considera que la cooperación para la comunicación interna horizontal es crucial porque todos los departamentos influyen en la reputación de la universidad.                                                           | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 25. ...considera que la cooperación para la comunicación interna vertical es crucial porque todos los niveles jerárquicos influyen en la reputación de la universidad.                                                       | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 26. ...considera que las personas trabajadoras y la dirección comparten los valores corporativos y los principales objetivos de la universidad y los usan como guía para el desempeño de sus tareas y funciones específicas. | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 27. ...considera muy relevante alentar y promover una cultura y clima colaborativos para activar mecanismos de coordinación interfuncionales.                                                                                | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 28. ...forma a todo su personal para que pueda desarrollar habilidades de cooperación.                                                                                                                                       | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| 29. ...forma a todo su personal para que pueda desarrollar habilidades de coordinación.                                                                                                                                      | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |



## ESCALA 2 Medición del rendimiento de la comunicación integrada de marketing (CIM) en instituciones de educación superior.

Como persona que forma parte de la Universidad

Desde el punto de vista de la Institución a la que pertenece.

Por favor, valore su percepción acerca de los siguientes ítems en comparación con la Institución competidora más cercano.

| <b>Constructos e ítems relacionados con la marca a nivel <u>Universidad</u><br/>(rendimiento a nivel <u>Universidad</u>)</b>                                                        |          |   |       |   |          |   |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---|-------|---|----------|---|---|
| <i>Rendimiento relacionado con las ventas<br/>(considerando las ventas el número de matrículas<br/>aproximado)</i>                                                                  | Muy bajo |   | Igual |   | Muy alto |   |   |
| 1. Participación de mercado (o cuota de mercado) en comparación con su competidor más cercano en los últimos 5 años                                                                 | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 2. Crecimiento de ventas en comparación con su competidor más cercano en los últimos 5 años                                                                                         | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 3. Rentabilidad en cuanto a matrículas en comparación con su competidor más cercano en los últimos 5 años                                                                           | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 4. Ingreso total de ventas en comparación con su competidor más cercano en los últimos 5 años                                                                                       | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| <i>Ventajas de la marca<br/>(considerando la marca el nombre de la Universidad a la que pertenece)</i>                                                                              | Muy bajo |   | Igual |   | Muy alto |   |   |
| 5. En la actualidad, nivel de reputación de la marca de la universidad (identifica, asocia, recuerda) de sus estudiantes en comparación con su competidor más cercano               | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 6. Capacidad para fijar precios superiores a los de otras universidades competidoras similares en su mercado principal                                                              | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 7. Nivel de cooperación de los medios de comunicación que recibe en relación con universidades competidoras                                                                         | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| <i>Satisfacción del alumnado</i>                                                                                                                                                    | Muy bajo |   | Igual |   | Muy alto |   |   |
| 8. Nivel de satisfacción del alumnado con su universidad en comparación con estudiantes de su competidor más cercano                                                                | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 9. Nivel de fidelidad de su alumnado hacia su universidad en comparación con estudiantes de su competidor más cercano                                                               | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| <i>Satisfacción de grupos de interés<br/>(familias, empresas, entre otros)</i>                                                                                                      | Muy bajo |   | Igual |   | Muy alto |   |   |
| 10. Nivel de satisfacción de sus grupos de interés (familias, empresas, entre otros) con su universidad en comparación con los grupos de interés de su competidor más cercano       | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 11. Nivel de <i>fidelidad</i> de sus grupos de interés (familias, empresas, entre otros) hacia su universidad en comparación con los grupos de interés de su competidor más cercano | 1        | 2 | 3     | 4 | 5        | 6 | 7 |

*Nota: Se les pidió a las personas encuestadas que se centraran en la **institución** en su totalidad.*

### ESCALA 3 Medición del rendimiento de la comunicación integrada de marketing (CIM) de una facultad de las instituciones de educación superior.

#### Como persona que forma parte de la Universidad

En la presente sección las preguntas son similares a la anterior, pero en esta ocasión nos gustaría recibir su respuesta desde el punto de vista de la Facultad que más conoce o a la que pertenece como persona trabajadora de la Universidad.

Desde el punto de vista de la Facultad que más conoce o a la que pertenece como persona trabajadora: Por favor, valore su percepción acerca de los siguientes ítems en comparación con la facultad de su competidor más cercano.

| <b>Constructos e ítems relacionados con la marca a nivel <u>Facultad</u><br/>(rendimiento a nivel <u>Facultad</u>)</b>                                                     |          |   |       |   |   |          |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---|-------|---|---|----------|---|
| <i>Rendimiento relacionado con las ventas<br/>(considerando las ventas el número de matrículas<br/>aproximado en su facultad)</i>                                          | Muy bajo |   | Igual |   |   | Muy alto |   |
| 1. Participación de mercado (o cuota de mercado) en comparación con su competidor más cercano en los últimos 5 años                                                        | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 2. Crecimiento de ventas en comparación con su competidor más cercano en los últimos 5 años                                                                                | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 3. Rentabilidad en cuanto a matrículas en comparación con su competidor más cercano en los últimos 5 años                                                                  | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 4. Ingreso total de ventas en comparación con su competidor más cercano en los últimos 5 años                                                                              | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| <i>Ventajas de la marca<br/>(considerando la marca el nombre de la Facultad a la que pertenece)</i>                                                                        | Muy bajo |   | Igual |   |   | Muy alto |   |
| 5. En la actualidad, nivel de reputación de la marca de la facultad (identifica, asocia, recuerda) de sus estudiantes en comparación con su competidor más cercano         | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 6. Capacidad para fijar precios superiores a los de otras facultades competidoras similares en su mercado principal                                                        | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 7. Nivel de cooperación de los medios de comunicación que recibe en relación con facultades competidoras                                                                   | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| <i>Satisfacción del alumnado</i>                                                                                                                                           | Muy bajo |   | Igual |   |   | Muy alto |   |
| 8. Nivel de satisfacción del alumnado con su facultad en comparación con estudiantes de su competidor más cercano                                                          | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 9. Nivel de fidelidad de su alumnado hacia su facultad en comparación con estudiantes de su competidor más cercano                                                         | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| <i>Satisfacción de grupos de interés<br/>(familias, empresas, entre otros)</i>                                                                                             | Muy bajo |   | Igual |   |   | Muy alto |   |
| 10. Nivel de satisfacción de sus grupos de interés (familias, empresas, entre otros) con su facultad en comparación con los grupos de interés de su competidor más cercano | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| 11. Nivel de fidelidad de sus grupos de interés (familias, empresas, entre otros) hacia su facultad en comparación con los grupos de interés de su competidor más cercano  | 1        | 2 | 3     | 4 | 5 | 6        | 7 |

*Nota: Se les pidió a las personas encuestadas que se centraran en las **facultades** de la institución (todas las facultades en general o la suya en particular).*

### Just for academic profiles (33 responses). ESCALA 4 Medición del rendimiento de un programa de Máster Universitario de una Institución de Educación Superior

#### Como persona que dirige o ha dirigido un Máster en la Universidad

En la presente sección las preguntas también son similares a la anterior, pero en esta ocasión nos gustaría recibir su respuesta desde el punto de vista del Máster que dirige en la Universidad.

Desde el punto de vista del Máster que dirige:

Por favor, valore su percepción acerca de los siguientes ítems en comparación con la facultad de su competidor más cercano.

| <b>Constructos e ítems relacionados con la marca a nivel <u>Programa (máster universitario)</u><br/>(rendimiento a nivel <u>máster universitario</u>)</b>               |          |   |       |   |          |   |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---|-------|---|----------|---|---|
| <i>Rendimiento relacionado con las ventas<br/>(considerando las ventas el número de matrículas<br/>aproximado en su facultad)</i>                                       | Muy bajo |   | Igual |   | Muy alto |   |   |
| 1. Participación de mercado (o cuota de mercado) en comparación con su competidor más cercano en los últimos 5 años                                                     | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 2. Crecimiento de ventas en comparación con su competidor más cercano en los últimos 5 años                                                                             | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 3. Rentabilidad en cuanto a matrículas en comparación con su competidor más cercano en los últimos 5 años                                                               | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 4. Ingreso total de ventas en comparación con su competidor más cercano en los últimos 5 años                                                                           | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| <i>Ventajas de la marca<br/>(considerando como marca el nombre del máster que dirige o ha dirigido)</i>                                                                 | Muy bajo |   | Igual |   | Muy alto |   |   |
| 5. En la actualidad, nivel de reputación de la marca del máster (identifica, asocia, recuerda) de sus estudiantes en comparación con su competidor más cercano          | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 6. Capacidad para fijar precios superiores a los de otros másteres competidores similares en su mercado principal                                                       | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 7. Nivel de cooperación de los medios de comunicación que recibe en relación con másteres competidores                                                                  | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| <i>Satisfacción del alumnado</i>                                                                                                                                        | Muy bajo |   | Igual |   | Muy alto |   |   |
| 8. Nivel de satisfacción del alumnado con su máster en comparación con estudiantes de másteres competidores más cercanos                                                | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 9. Nivel de fidelidad de su alumnado hacia su máster en comparación con estudiantes de másteres competidores más cercanos                                               | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| <i>Satisfacción de grupos de interés<br/>(familias, empresas, entre otros)</i>                                                                                          | Muy bajo |   | Igual |   | Muy alto |   |   |
| 10. Nivel de fidelidad de sus grupos de interés (familias, empresas, entre otros) hacia su máster en comparación con los grupos de interés de su competidor más cercano | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| 11. Nivel de fidelidad de sus grupos de interés (familias, empresas, entre otros) con su máster en comparación con los grupos de interés de su competidor más cercano   | 1        | 2 | 3     | 4 | 5        | 6 | 7 |

Nota: Se les pidió a los encuestados que se centraran en los **programas de másteres universitarios** la institución.

## ***Appendix 7.2. English version. ‘Scale 1- IMC level in an HEI Scale’***

This version was not used in the principal study. It is not validated neither reliable in this language. We have translated the Spanish (the language in which this research’s survey has been carried out) version into English just to ease the understanding of the reader.

### **Dimension 1**

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#### **Institution’s communication alignment (9 items)**

The HEI were I belong...

COHER1... carefully coordinates all the messages originated by all departments and functions with the aim of maintaining the consistency of its strategic positioning, indeed, maintaining the way in which it wants to be perceived by students and university community. [Not validated item – English]

COHER2... maintains consistency in all the visual components of communication: in the use of its brand, name, advertisements in different media, webpage, etc. [Not validated item – English]

COHER3... periodically reviews all its planned messages to determine its level of strategic positioning consistency, ergo, maintaining the way in which it wants to be perceived by students and community. [Not validated item – English]

COHER4...it is paramount to maintain the consistency between product messages, that are inferred from, and comprise everything embedded in the organization’s product and service messages, deriving from the experience of dealing with the organization, its staff, agents and products. [Not validated item – English]

ENFO3...develops and implements systematic studies to assess the consistency of its corporate communications to build and maintain sound relationships with all its groups of interest. [Not validated item – English]

ALIN1... carefully manages horizontal internal communication by ensuring that all organizational areas acknowledge the goals pursued by the organization. [Not validated item – English]

ALIN2... carefully manages vertical internal communication by ensuring that the information flows through all the hierarchical levels of the organization. [Not validated item – English]

ALIN7... trains all human resources to enable them to develop cooperation skills. [Not validated item – English]

ALIN8... trains all human resources to enable them to develop coordination skills. [Not validated item – English]

## **Dimension 2**

---

### **Active listening (7 items)**

The HEI were I belong...

INTER5... practices actively listening to messages generated via word of mouth (WOM and e-WOM), is of vital importance in setting its communication strategies. [Not validated item – English]

INTER6... practices actively listening to messages generated in social media, is of vital importance in setting its communication strategies. [Not validated item – English]

INTER8... proactively implements social media by listening to the existing conversations to promote a dialogue with its students, prospective students, families, enterprises, etc. [Not validated item – English]

ENFO8 ... establishes and maintains relationships with its groups of interest, with the aim of achieving value communication ways to each groups [Not validated item – English]

ENFO9 ...makes sure that contacts periodically their groups of interests. [Not validated item – English]

ENFO5...uses social media to communicate with students, prospective students, families and companies, among others. [Not validated item – English]

ENFO6 ... In working towards the goal of establishing and maintaining students, prospective students, families and enterprises relationships, human resources in all organizational areas must collaborate as needed. [Not validated item – English]

## **Dimension 3**

---

### **Interactivity (7 items)**

The HEI were I belong...

ENFO4 ... acknowledgement of the main touch-points between the company and its stakeholders is paramount to strengthen for more effective communication. [Not validated item – English]

INTER1 ... promotes the creation of special channels and processes to facilitate students', prospective students', families', former students', enterprises' and others' inquiries and complaints about our training programs, brands, products, services and the company itself. [Not validated item – English]

INTER2 ... gathers students', prospective students', former students', enterprises' and others' information that is collected into a unified database that is configured to be useful and easily accessible to all the organizational levels. [Not validated item – English]

INTER3...it is crucial for the organization as a whole and for all its human resources to have a receptive attitude towards the messages received from its students, prospective students, families and companies, among other groups of interest. [Not validated item – English]

INTER4...the strategic use of the ICTs enhances the speed of response of the organization as a whole. [Not validated item – English]

ENFO7...its constituted by people whose aim is to provide solutions or communication ways centered in students, prospective students, families, enterprises, among others, in each of its organizational areas [Not validated item – English]

INTER7... considers that relationship between the institution and students, prospective students, families, etc. should be bidirectional with the aim of establishing a continuous dialogue based in trust. [Not validated item – English]

#### **Dimension 4**

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##### **Institution's values and mission (3 items)**

The HEI were I belong...

ALIN5... employees and managers share the corporate values and the main goals of the institution that guide them in carrying out their specific tasks and functions. [Not validated item – English]

ENFO1... considers that its mission is a key consideration in its communications planning. [Not validated item – English]

ENFO2... promotes its mission between students, prospective students, families and companies, among others. [Not validated item – English]

#### **Dimension 5**

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##### **Collaborative culture and climate (3 items)**

The HEI were I belong...

ALIN3... considers that cooperation for horizontal communication is crucial because all departments affect the corporate reputation. [Not validated item – English]

ALIN4... considers that cooperation for vertical communication is crucial because all departments affect the corporate reputation. [Not validated item – English]

ALIN6...encourages and promotes a collaborative culture and climate in order to activate cross-functional coordination mechanisms. [Not validated item – English]

## Appendix 8. Final version of the scales

After fulfilling validity and reliability procedures explained in chapter III and Appendix 3, the following are the proposed final versions of the scales.

### ESCALA 1: Medición del nivel de la Comunicación Integrada de Marketing (CIM) en instituciones de educación superior

Como persona que forma parte de la Universidad, por favor, indique su nivel de acuerdo con las siguientes afirmaciones (1 = totalmente en desacuerdo, 7 = totalmente de acuerdo) según su percepción respecto a la Universidad a la que pertenece.

Mi Universidad...:

| <b>Coherencia de la comunicación de la institución</b><br>Institution's communication alignment                                                                                                                                                   | Totalmente<br>en<br>desacuerdo |   |   |   |   |   | Totalmente<br>de<br>acuerdo |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---|---|---|---|---|-----------------------------|
| ...coordina cuidadosamente todos los mensajes planificados por todos los departamentos y centros con el objetivo de mantener la coherencia de su posicionamiento estratégico, es decir, con cómo desea que le perciba el alumnado y la comunidad. | 1                              | 2 | 3 | 4 | 5 | 6 | 7                           |
| ...mantiene la coherencia en todos los elementos visuales de la comunicación: en la utilización de la marca, del nombre, de los anuncios en distintos soportes, de la página web, etc.                                                            | 1                              | 2 | 3 | 4 | 5 | 6 | 7                           |
| ...revisa periódicamente todos sus mensajes planificados para determinar su nivel de coherencia con el posicionamiento estratégico, es decir, con cómo desea que le perciba el alumnado y la comunidad.                                           | 1                              | 2 | 3 | 4 | 5 | 6 | 7                           |
| ...considera que es primordial mantener la coherencia entre los mensajes emitidos y lo que se deriva de la experiencia con la universidad, sus trabajadores, sus agentes y sus programas educativos.                                              | 1                              | 2 | 3 | 4 | 5 | 6 | 7                           |
| ...lleva a cabo estudios sistemáticos para evaluar la coherencia de sus comunicaciones a nivel de universidad, a fin de construir y mantener relaciones sólidas con todos sus grupos de interés.                                                  | 1                              | 2 | 3 | 4 | 5 | 6 | 7                           |
| ...gestiona cuidadosamente la comunicación interna horizontal asegurándose de que todas las áreas de la organización conocen cuáles son los objetivos perseguidos por esta.                                                                       | 1                              | 2 | 3 | 4 | 5 | 6 | 7                           |
| ...gestiona cuidadosamente la comunicación interna vertical asegurándose de que la información fluya a través de todos los niveles jerárquicos de la universidad.                                                                                 | 1                              | 2 | 3 | 4 | 5 | 6 | 7                           |
| ...forma a todo su personal para que pueda desarrollar habilidades de cooperación.                                                                                                                                                                | 1                              | 2 | 3 | 4 | 5 | 6 | 7                           |

|                                                                                     |   |   |   |   |   |   |   |
|-------------------------------------------------------------------------------------|---|---|---|---|---|---|---|
| ...forma a todo su personal para que pueda desarrollar habilidades de coordinación. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------------------------------------------------------------------------------------|---|---|---|---|---|---|---|

Mi Universidad:

| <b>Escucha activa</b><br>Active Listening                                                                                                                                                                                                            | Totalmente en desacuerdo |   |   |   |   | Totalmente de acuerdo |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|---|-----------------------|---|
| ...practica la escucha activa de los mensajes generados en el boca-oreja para definir la estrategia de comunicación.                                                                                                                                 | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| ...practica la escucha activa de los mensajes generados en las redes sociales para definir la estrategia de comunicación.                                                                                                                            | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| ...utiliza de manera proactiva las redes sociales y escucha las conversaciones existentes para promover un diálogo con estudiantes, estudiantes potenciales, familias, empresas, entre otros.                                                        | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| ...pone las redes sociales a disposición de estudiantes actuales, estudiantes potenciales, familias, empresas, entre otros, para comunicarse con ella.                                                                                               | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| ...intenta que las personas de todas sus áreas colaboren en la comunicación con el fin de lograr establecer y mantener relaciones con los estudiantes actuales, estudiantes potenciales, familias, empresas, entre otros, para comunicarse con ella. | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| ...entabla y cultiva las relaciones con los grupos de interés con el fin de lograr modos de comunicación valiosos para dichos grupos.                                                                                                                | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| ...se asegura de que tiene varios contactos cada cierto tiempo con sus grupos de interés.                                                                                                                                                            | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |

Mi Universidad...:

| <b>Interactividad</b><br>Interactivity                                                                                                                                                                                                                            | Totalmente en desacuerdo |   |   |   |   | Totalmente de acuerdo |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|---|-----------------------|---|
| ...considera que es fundamental la identificación de cuáles son los principales puntos de contacto entre la universidad y sus grupos de interés para hacer más eficaz la comunicación.                                                                            | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| ...dispone de canales y procedimientos específicos para facilitar las consultas y quejas de estudiantes actuales, estudiantes potenciales, alumni, empresas y otros, sobre nuestros programas formativos, marcas, productos y servicios, y la propia universidad. | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| ...recoge toda la información sobre estudiantes actuales, estudiantes potenciales, alumni, empresas y otros, en una única base de datos que es accesible a todos los niveles de la organización.                                                                  | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |
| ...considera que es primordial para el conjunto de la misma, y para todo su personal, tener una actitud receptiva hacia los mensajes recibidos de estudiantes                                                                                                     | 1                        | 2 | 3 | 4 | 5 | 6                     | 7 |



|                                                                                                                                                                                                                                                  |   |   |   |   |   |   |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|
| actuales, estudiantes potenciales, familias y empresas, entre otros grupos de interés.                                                                                                                                                           |   |   |   |   |   |   |   |
| ...considera que el uso estratégico de las Tecnologías de la Información (TICs) mejora la velocidad de respuesta de la universidad en su conjunto.                                                                                               | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ...está compuesta por personas que persiguen el objetivo de proporcionar soluciones o modos de comunicación centrados en estudiantes actuales, estudiantes potenciales, familias, empresas, entre otros, en cada una de sus áreas organizativas. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ...considera que la relación entre la universidad y estudiantes actuales, estudiantes potenciales, familias, etc. debe ser bidireccional con el fin de establecer un diálogo continuo y basado en la confianza.                                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

## Mi Universidad...:

| <b>Valores y misión de la institución</b><br>Institution's values and mission                                                                                                                                            | Totalmente en desacuerdo |   |   |   |   |   | Totalmente de acuerdo |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|---|---|-----------------------|
| ...considera que las personas trabajadoras y la dirección comparten los valores corporativos y los principales objetivos de la universidad y los usan como guía para el desempeño de sus tareas y funciones específicas. | 1                        | 2 | 3 | 4 | 5 | 6 | 7                     |
| ...considera que su misión es un elemento clave que se tiene en cuenta en la planificación de sus comunicaciones.                                                                                                        | 1                        | 2 | 3 | 4 | 5 | 6 | 7                     |
| ...difunde su misión entre estudiantes actuales, estudiantes potenciales, familias, empresas, entre otros.                                                                                                               | 1                        | 2 | 3 | 4 | 5 | 6 | 7                     |

## Mi Universidad...:

| <b>Cultura y clima colaborativo</b><br>Collaborative culture and climate                                                                                           | Totalmente en desacuerdo |   |   |   |   |   | Totalmente de acuerdo |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|---|---|---|---|-----------------------|
| ...considera que la cooperación para la comunicación interna horizontal es crucial porque todos los departamentos influyen en la reputación de la universidad.     | 1                        | 2 | 3 | 4 | 5 | 6 | 7                     |
| ...considera que la cooperación para la comunicación interna vertical es crucial porque todos los niveles jerárquicos influyen en la reputación de la universidad. | 1                        | 2 | 3 | 4 | 5 | 6 | 7                     |
| ...considera muy relevante alentar y promover una cultura y clima colaborativos para activar mecanismos de coordinación interfuncionales.                          | 1                        | 2 | 3 | 4 | 5 | 6 | 7                     |

## ESCALA 2 Medición del rendimiento de la comunicación integrada de marketing (CIM) en instituciones de educación superior.

Como persona que forma parte de la Universidad

Desde el punto de vista de la Institución a la que pertenece.

Por favor, valore su percepción acerca de los siguientes ítems en comparación con la Institución competidora más cercano.

| <b>Constructos e ítems relacionados con la marca a nivel <u>Universidad</u><br/>(rendimiento a nivel <u>Universidad</u>)</b>                                                                                                                |          |   |       |   |   |          |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---|-------|---|---|----------|---|
| <b><i>Rendimiento relacionado con las ventas y la marca<br/>(considerando las ventas el número de matrículas<br/>aproximado y la marca el nombre de la Universidad a la<br/>que pertenece)<br/>Sales- and brand-related performance</i></b> | Muy bajo |   | Igual |   |   | Muy alto |   |
| Ingreso total de ventas en comparación con su competidor más cercano en los últimos 5 años.                                                                                                                                                 | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Participación de mercado (o cuota de mercado) en comparación con su competidor más cercano en los últimos 5 años.                                                                                                                           | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Crecimiento de ventas en comparación con su competidor más cercano en los últimos 5 años.                                                                                                                                                   | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Rentabilidad en cuanto a matrículas en comparación con su competidor más cercano en los últimos 5 años.                                                                                                                                     | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| En la actualidad, nivel de reputación de la marca de la universidad (identifica, asocia, recuerda) de sus estudiantes en comparación con su competidor más cercano.                                                                         | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Capacidad para fijar precios superiores a los de otras universidades competidoras similares en su mercado principal.                                                                                                                        | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Nivel de cooperación de los medios de comunicación que recibe en relación con universidades competidoras.                                                                                                                                   | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| <b><i>Satisfacción del alumnado y de grupos de interés<br/>(familias, empresas, entre otros)<br/>Students' and Group of interests' satisfaction</i></b>                                                                                     | Muy bajo |   | Igual |   |   | Muy alto |   |
| Nivel de satisfacción del alumnado con su universidad en comparación con estudiantes de su competidor más cercano.                                                                                                                          | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Nivel de fidelidad de su alumnado hacia su universidad en comparación con estudiantes de su competidor más cercano.                                                                                                                         | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Nivel de satisfacción de sus grupos de interés (familias, empresas, entre otros) con su universidad en comparación con los grupos de interés de su competidor más cercano.                                                                  | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Nivel de fidelidad de sus grupos de interés (familias, empresas, entre otros) hacia su universidad en comparación con los grupos de interés de su competidor más cercano.                                                                   | 1        | 2 | 3     | 4 | 5 | 6        | 7 |

Nota: Se les pidió a las personas encuestadas que se centraran en la **institución** en su totalidad.

### ESCALA 3 Medición del rendimiento de la comunicación integrada de marketing (CIM) de una facultad de la instituciones de educación superior.

#### Como persona que forma parte de la Universidad

En la presente sección las preguntas son similares a la anterior, pero en esta ocasión nos gustaría recibir su respuesta desde el punto de vista de la Facultad que más conoce o a la que pertenece como persona trabajadora de la Universidad.

Desde el punto de vista de la Facultad que más conoce o a la que pertenece como persona trabajadora: Por favor, valore su percepción acerca de los siguientes ítems en comparación con la facultad de su competidor más cercano.

| <b>Constructos e ítems relacionados con la marca a nivel <u>Facultad</u><br/>(rendimiento a nivel <u>Facultad</u>)</b>                                                  |          |   |       |   |          |   |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---|-------|---|----------|---|---|
| <b><i>Rendimiento relacionado con las ventas (considerando las ventas el número de matrículas aproximado en su facultad)</i></b><br><i>Sales-related performance</i>    | Muy bajo |   | Igual |   | Muy alto |   |   |
| Participación de mercado (o cuota de mercado) en comparación con su competidor más cercano en los últimos 5 años.                                                       | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| Crecimiento de ventas en comparación con su competidor más cercano en los últimos 5 años.                                                                               | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| Rentabilidad en cuanto a matrículas en comparación con su competidor más cercano en los últimos 5 años.                                                                 | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| Ingreso total de ventas en comparación con su competidor más cercano en los últimos 5 años.                                                                             | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| <b><i>Ventajas de la marca (considerando la marca el nombre de la Facultad a la que pertenece)</i></b><br><i>Brand advantage</i>                                        | Muy bajo |   | Igual |   | Muy alto |   |   |
| En la actualidad, nivel de reputación de la marca de la facultad (identifica, asocia, recuerda) de sus estudiantes en comparación con su competidor más cercano.        | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| Capacidad para fijar precios superiores a los de otras facultades competidoras similares en su mercado principal.                                                       | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| Nivel de cooperación de los medios de comunicación que recibe en relación con facultades competidoras.                                                                  | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| <b><i>Satisfacción del alumnado y de grupos de interés (familias, empresas, entre otros)</i></b><br><i>Students' and Group of interests' satisfaction</i>               | Muy bajo |   | Igual |   | Muy alto |   |   |
| Nivel de satisfacción del alumnado con su facultad en comparación con estudiantes de su competidor más cercano.                                                         | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| Nivel de fidelidad de su alumnado hacia su facultad en comparación con estudiantes de su competidor más cercano.                                                        | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| Nivel de satisfacción de sus grupos de interés (familias, empresas, entre otros) con su facultad en comparación con los grupos de interés de su competidor más cercano. | 1        | 2 | 3     | 4 | 5        | 6 | 7 |
| Nivel de fidelidad de sus grupos de interés (familias, empresas, entre otros) hacia su facultad en comparación con los grupos de interés de su competidor más cercano.  | 1        | 2 | 3     | 4 | 5        | 6 | 7 |

*Nota: Se les pidió a las personas encuestadas que se centraran en las **facultades** de la institución (todas las facultades en general o la suya en particular).*

#### ESCALA 4 Medición del rendimiento de un programa de Máster Universitario de una Institución de Educación Superior (Just directed to academic profiles.)

##### Como persona que dirige o ha dirigido un Máster en la Universidad

En la presente sección las preguntas también son similares a la anterior, pero en esta ocasión nos gustaría recibir su respuesta desde el punto de vista del Máster que dirige en la Universidad.

Desde el punto de vista del Máster que dirige:

Por favor, valore su percepción acerca de los siguientes ítems en comparación con el máster de su competidor más cercano.

| <b>Constructos e ítems relacionados con la marca a nivel <u>Programa (máster universitario)</u><br/>(rendimiento a nivel <u>máster universitario</u>)</b>                                                                          |          |   |       |   |   |          |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---|-------|---|---|----------|---|
| <b><i>Rendimiento relacionado con las ventas<br/>(considerando las ventas el número de matrículas en el máster que dirige o ha dirigido)<br/>Sales-related performance</i></b>                                                     | Muy bajo |   | Igual |   |   | Muy alto |   |
| Participación de mercado (o cuota de mercado) en comparación con su competidor más cercano en los últimos 5 años.                                                                                                                  | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Crecimiento de ventas en comparación con su competidor más cercano en los últimos 5 años.                                                                                                                                          | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Rentabilidad en cuanto a matrículas en comparación con su competidor más cercano en los últimos 5 años.                                                                                                                            | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Ingreso total de ventas en comparación con su competidor más cercano en los últimos 5 años.                                                                                                                                        | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| <b><i>Ventajas de la marca<br/>(considerando como marca el nombre del máster que dirige o ha dirigido)<br/>Brand advantage</i></b>                                                                                                 | Muy bajo |   | Igual |   |   | Muy alto |   |
| En la actualidad, nivel de reputación de la marca del máster (identifica, asocia, recuerda) de sus estudiantes en comparación con su competidor más cercano.                                                                       | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Capacidad para fijar precios superiores a los de otros másteres competidores similares en su mercado principal.                                                                                                                    | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Nivel de cooperación de los medios de comunicación que recibe en relación con másteres competidores.                                                                                                                               | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| <b><i>Satisfacción del alumnado y de grupos de interés<br/>(familias, empresas, entre otros) (considerando la satisfacción respecto al máster que dirige o ha dirigido)<br/>Students' and Group of interests' satisfaction</i></b> | Muy bajo |   | Igual |   |   | Muy alto |   |
| Nivel de satisfacción del alumnado con su máster en comparación con estudiantes de másteres competidores más cercanos.                                                                                                             | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Nivel de fidelidad de su alumnado hacia su máster en comparación con estudiantes de másteres competidores más cercanos.                                                                                                            | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Nivel de fidelidad de sus grupos de interés (familias, empresas, entre otros) hacia su máster en comparación con los grupos de interés de su competidor más cercano.                                                               | 1        | 2 | 3     | 4 | 5 | 6        | 7 |
| Nivel de fidelidad de sus grupos de interés (familias, empresas, entre otros) con su máster en comparación con los grupos de interés de su competidor más cercano.                                                                 | 1        | 2 | 3     | 4 | 5 | 6        | 7 |

Nota: Se les pidió a los encuestados que se centraran en los **programas de másteres universitarios** de la institución.

## Appendix 9. Regression code in R

Corresponding legend:

PI - Performance of the institution. Dependent variable.

PF - Performance of the faculty. Dependent variable.

PM - Performance of the master's degree. Dependent variable.

I - IMC level. Independent variable.

U - University where respondents belong. Independent variable.

P - Profile of the respondents. Independent variable.

### Appendix 9.1. Simple linear regression models

Linear regression models will simulate the relation between IMC and Performances (PI, PF and PM). Just one independent variable, I, is going to be reflected.

#### Model 1.1. PI dependent variable

```
> summary(lm(PI~I,data=datos))

Call:
lm(formula = PI ~ I, data = datos)

Residuals:
    Min       1Q   Median       3Q      Max
-0.25243 -0.07464  0.01225  0.08493  0.24853

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.44097     0.05424   8.130 6.75e-12 ***
I            0.40044     0.08104   4.941 4.59e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.'
0.1 ' ' 1

Residual standard error: 0.1133 on 75 degrees of freedom
Multiple R-squared:  0.2456,    Adjusted R-squared:
0.2355
F-statistic: 24.42 on 1 and 75 DF, p-value: 4.591e-06
```

*Model 1.2. PF dependent variable*

```
> summary(lm(PF~I,data=datos))
```

Call:  
lm(formula = PF ~ I, data = datos)

Residuals:

|  | Min      | 1Q       | Median  | 3Q      | Max     |
|--|----------|----------|---------|---------|---------|
|  | -0.39730 | -0.07385 | 0.00053 | 0.08464 | 0.31053 |

Coefficients:

|             | Estimate | Std. Error | t value | Pr(> t ) |     |
|-------------|----------|------------|---------|----------|-----|
| (Intercept) | 0.51590  | 0.06210    | 8.307   | 3.1e-12  | *** |
| I           | 0.29608  | 0.09278    | 3.191   | 0.00207  | **  |

---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1297 on 75 degrees of freedom  
Multiple R-squared: 0.1195, Adjusted R-squared: 0.1078  
F-statistic: 10.18 on 1 and 75 DF, p-value: 0.002071

*Model 1.3. PM dependent variable*

```
> summary(lm(PM~I,data=datos))
```

Call:  
lm(formula = PM ~ I, data = datos)

Residuals:

|  | Min      | 1Q       | Median  | 3Q      | Max     |
|--|----------|----------|---------|---------|---------|
|  | -0.27097 | -0.06542 | 0.01438 | 0.06753 | 0.21430 |

Coefficients:

|             | Estimate | Std. Error | t value | Pr(> t ) |     |
|-------------|----------|------------|---------|----------|-----|
| (Intercept) | 0.36530  | 0.07721    | 4.731   | 3.82e-05 | *** |
| I           | 0.44179  | 0.11967    | 3.692   | 0.000776 | *** |

---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1202 on 34 degrees of freedom  
(41 observations deleted due to missingness)  
Multiple R-squared: 0.2861, Adjusted R-squared: 0.2651  
F-statistic: 13.63 on 1 and 34 DF, p-value: 0.0007761

## Appendix 9.2. Multiple linear regression models

Multiple linear regression models will simulate the relation between IMC, P, U and Performances (PI, PF and PM). Three independent variables: IMC (I), Profile (P) and University (U) are going to be studied.

*Model 2.1. PI dependent variable. I, P and U independent variables.*

```
summary(lm(PI~I+PERFIL+as.factor(UNIVERSIDAD),data=datos))

Call:
lm(formula = PI ~ I + PERFIL + as.factor(UNIVERSIDAD), data
= datos)

Residuals:
    Min       1Q   Median       3Q      Max
-0.23694 -0.06427  0.01427  0.06968  0.23078

Coefficients:
(Intercept)      0.43801      0.04977      8.800 7.75e-13 ***
I                0.30566      0.07703      3.968 0.000177 ***
as.factor(P)1    0.07627      0.02423      3.148 0.002444 **
as.factor(U)2    0.11146      0.03143      3.546 0.000712 ***
as.factor(U)3   -0.06478      0.05348     -1.211 0.229921
as.factor(U)4    0.04246      0.03700      1.147 0.255208
as.factor(U)5    0.11334      0.07398      1.532 0.130166
as.factor(U)6    0.01946      0.07297      0.267 0.790478
as.factor(U)7   -0.09066      0.07298     -1.242 0.218401
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1007 on 68 degrees of freedom
Multiple R-squared:  0.4589,    Adjusted R-squared:  0.3952
F-statistic: 7.209 on 8 and 68 DF,  p-value: 7.107e-07
```

*Model 2.2. PF dependent variable. I, P and U independent variables.*

```
summary(lm(PF~I+PERFIL+as.factor(UNIVERSIDAD),data=datos))

Call:
lm(formula = PF ~ I + PERFIL + as.factor(UNIVERSIDAD), data
= datos)

Residuals:
    Min       1Q   Median       3Q      Max
-0.38577 -0.10048  0.01273  0.09008  0.30620

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.5237049  0.0633656   8.265 7.24e-12 ***
I            0.2303513  0.0980676   2.349  0.0217 *

```

```

as.factor(P) 1  0.0350655  0.0308503  1.137  0.2597
as.factor(U) 2  0.0786276  0.0400126  1.965  0.0535 .
as.factor(U) 3 -0.0665923  0.0680817 -0.978  0.3315
as.factor(U) 4  0.0336305  0.0471032  0.714  0.4777
as.factor(U) 5  0.1064610  0.0941856  1.130  0.2623
as.factor(U) 6  0.0002516  0.0928960  0.003  0.9978
as.factor(U) 7 -0.0880098  0.0929091 -0.947  0.3469

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1283 on 68 degrees of freedom
Multiple R-squared:  0.2192,    Adjusted R-squared:  0.1273
F-statistic: 2.386 on 8 and 68 DF,  p-value: 0.02492

```

### *Model 2.3. PM dependent variable. I and U independent variables*

```

> summary(lm(PM~I+as.factor(U),data=datos))

Call:
lm(formula = PM ~ I + as.factor(U), data = datos)

Residuals:
    Min       1Q   Median       3Q      Max
-0.25866 -0.04901  0.00000  0.06014  0.18822

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    0.38211    0.08960   4.265 0.000206 ***
El             0.41984    0.14998   2.799 0.009173 **
as.factor(U) 2 -0.01423    0.05569  -0.255 0.800220
as.factor(U) 3  0.07862    0.07890   0.996 0.327577
as.factor(U) 4 -0.01445    0.07046  -0.205 0.838988
as.factor(U) 5  0.02946    0.12942   0.228 0.821573
as.factor(U) 6  0.02020    0.12878   0.157 0.876469
as.factor(U) 7 -0.18390    0.13354  -1.377 0.179382

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1247 on 28 degrees of freedom
(41 observations deleted due to missingness)
Multiple R-squared:  0.3673,    Adjusted R-squared:  0.2092
F-statistic: 2.322 on 7 and 28 DF,  p-value: 0.05315

```

### **Appendix 9.3. CART regression trees**

With the aim of providing a more detailed estimation, regression trees predicted different units of performance (PI, PF and PM) considering three dependent variables: IMC level (I), Profile (P) and University (U). Except for the third regression tree which predicted



PM just considering I and U (dependent variables) because there was not variability in variable P as every respondent were academics.

### *Model 3.1. PI's CART regression tree*

In the following regression tree performance of institution (PI) is going to be predicted. PI is the dependent variable and P, U and I are the independent variables.

```
> require(rpart)
> rpart(PI~I+PERFIL+as.factor(UNIVERSIDAD), data=datos)
n= 77

node), split, n, deviance, yval
* denotes terminal node

1) root 77 1.27541700 0.7012987
 2) I< 0.5258621 20 0.31891640 0.6090909
   4) I< 0.4224138 7 0.09858324 0.5497835 *
   5) I>=0.4224138 13 0.18245390 0.6410256 *
 3) I>=0.5258621 57 0.72678940 0.7336523
   6) I< 0.8390805 47 0.53190510 0.7124436
     12) as.factor(P)=0 23 0.20794910 0.6831357
       24) as.factor(U)=1,3,5,6 12 0.11729030 0.6351010 *
       25) as.factor(U)=2,4 11 0.03276567 0.7355372 *
     13) as.factor(P)=1 24 0.28526740 0.7405303
       26) I>=0.6436782 17 0.22632740 0.7219251 *
       27) I< 0.6436782 7 0.03876427 0.7857143 *
   7) I>=0.8390805 10 0.07438017 0.8333333 *
```

### **R<sup>2</sup> value for 3.1. CART regression tree**

```
> r2.PI<-1-((sum((datos$PI-
predict(arbol.PI))^2))/(var(datos$PI, na.rm=TRUE)*76))
> r2.PI
[1] 0.3958326
```

### *Model 3.2. PF's CART regression tree*

The next regression tree predicts the performance of faculty (PF). PF is the dependent variable and P, U and I are the independent variables.

```
> require(rpart)
> rpart(PF~I+PERFIL+as.factor(UNIVERSIDAD), data=datos)
n= 77

node), split, n, deviance, yval
* denotes terminal node

1) root 77 1.43257800 0.7083825
 2) I< 0.8304598 66 1.17725500 0.6882461
```

```

4) I< 0.5747126 24 0.31722530 0.6376263
8) as.factor(U)=1,3,7 17 0.19840110 0.6140820 *
9) as.factor(U)=2,4,6 7 0.08651450 0.6948052 *
5) I>=0.5747126 42 0.76339150 0.7171717
10) I>=0.7816092 7 0.19992130 0.6082251 *
11) I< 0.7816092 35 0.46376750 0.7389610
22) I>=0.6408046 26 0.28336690 0.7208625
44) I< 0.7327586 18 0.18514690 0.6944444 *
45) I>=0.7327586 8 0.05739210 0.7803030 *
23) I< 0.6408046 9 0.14728090 0.7912458 *
3) I>=0.8304598 11 0.06799399 0.8292011 *
R2 value for 3.2. CART regression tree
>r2.PF<-1-((sum((datos$PF-
predict(arbol.PF))^2))/(var(datos$PF2,na.rm=TRUE)*76))
> r2.PF
[1] 0.3419901

```

### Model 3.3. PM's CART regression tree

The next regression tree predicts the performance of master's degree (PM). PM is the dependent variable and U and I are the independent variables. We have not considered P as an independent variable because there is no variability in the type of profile as every respondent is academic, profile code '0'.

```

> require(rpart)
> rpart(PM~I+as.factor(UNIVERSIDAD),data=datos)
n=36 (41 observations deleted due to missingness)
node), split, n, deviance, yval
* denotes terminal node

1) root 36 0.68806750 0.6405724
2) I< 0.4827586 7 0.13590450 0.4848485 *
3) I>=0.4827586 29 0.34143950 0.6781609
6) I< 0.7212644 18 0.23483570 0.6506734 *
7) I>=0.7212644 11 0.07074881 0.7231405 *

```

### R<sup>2</sup> value for 3.3. CART regression tree

```

>r2.PM<-1-((sum((datos$PM[1:36]-
predict(arbol.PM))^2))/(var(datos$PM,na.rm=TRUE)*35))
> r2.PM
[1] 0.3583638

```

## Appendix 10. Summary of results of linear regression models

### Appendix 10.1. Simple linear regressions

Model 1.1. Simple linear regression. Descriptive conclusions.

| Model 1.1.<br>Are 'IMC' and 'PI' associated?                                                                                                           |                      |                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------|
| P-value<br>0.00                                                                                                                                        |                      | Estimate of 'IMC' (I)<br>0.40 |
| low, below 0.05                                                                                                                                        | significant relation | positive                      |
| Significant and positive relation between IMC (I) and PI<br><b>When IMC increases PI increases too.</b><br><b>PI and IMC are positively associated</b> |                      |                               |

Source: own elaboration.

Model 1.2. Simple linear regression. Descriptive conclusions.

| Model 1.2.<br>Are 'IMC' and 'PF' associated?                                                                                                     |                      |                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------|
| P-value<br>0.00                                                                                                                                  |                      | Estimate of 'IMC'<br>0.30 |
| low, below 0.05                                                                                                                                  | significant relation | Positive                  |
| Significant and positive relation between I and PF<br><b>When IMC increases PF increases too.</b><br><b>PF and IMC are positively associated</b> |                      |                           |

Source: own elaboration.

Model 1.3. Simple linear regression. Descriptive conclusions.

| Model 1.3.<br>Are 'IMC' and 'PM' associated?                                                                                                     |                      |                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------|
| P-value<br>0.00                                                                                                                                  |                      | Estimate of 'IMC'<br>0.44 |
| low, below 0.05                                                                                                                                  | significant relation | positive                  |
| Significant and positive relation between I and PM<br><b>When IMC increases PM increases too.</b><br><b>PM and IMC are positively associated</b> |                      |                           |

Source: own elaboration.

## Appendix 10.2. Multiple linear regressions

Model 2.1. Multiple linear regression. Descriptive conclusions.

| <b>Model 2.1.</b><br><b>Are IMC, P, U and PI associated?</b>                                                                                                                                                                                                                                                                   |                      |                                          |                                                                                               |                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| P-value                                                                                                                                                                                                                                                                                                                        |                      | Estimate                                 |                                                                                               |                                                                                                                 |
| 0.00                                                                                                                                                                                                                                                                                                                           |                      | 'I'<br>0.31                              | 'P'<br>0.08                                                                                   | 'U'<br>U2 = 0.11                                                                                                |
| low, below<br>0.05                                                                                                                                                                                                                                                                                                             | significant relation | This result is positive and significant. | If the respondent is a practitioner (coded as '1'), the estimated performance increases 0.08. | Just U2 is significant ( $p=0.00$ ). Respondents from U2 perceive a 0.11 higher PI value than the ones from U1. |
| <b>Summary</b><br>'I' - Significant and positive relation between IMC (I) and PM. When IMC increases PM increases too. PF and IMC are positively associated.<br>'P' – Practitioners perceive a higher PI (when P is '1', PI perception increases 0.08)<br>'U' - Respondents from U2 perceive a higher PI than the ones from U1 |                      |                                          |                                                                                               |                                                                                                                 |

Source: own elaboration.

Model 2.2. Multiple linear regression. Descriptive conclusions.

| <b>Model 2.2.</b><br><b>Are IMC, P, U and PF associated?</b>                                                                                                                                                                                                                                                                                         |                      |                                                             |                                     |                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| P-value                                                                                                                                                                                                                                                                                                                                              |                      | Estimate                                                    |                                     |                                                                                                                           |
| 0.02                                                                                                                                                                                                                                                                                                                                                 |                      | 'I'<br>0.23                                                 | 'P'<br>0.04                         | 'U'<br>U2 = 0.08                                                                                                          |
| low, below<br>0.05                                                                                                                                                                                                                                                                                                                                   | significant relation | This result is positive and significant. $P$ value of 0.02. | Not significant. $P$ value of 0.26. | U2 is almost significant ( $p = 0.05$ ). Respondents from U2 would perceive a 0.08 higher PI value than the ones from U1. |
| <b>Summary:</b><br>'I' - Significant and positive relation between I and PF. When IMC increases PF increases too. PF and IMC are positively associated.<br>'P' – Not significant because its $p$ value is 0.26.<br>'U' - U2 is almost significant. Not significant because its $p$ value is 0.05 and we just consider significant values below 0.05. |                      |                                                             |                                     |                                                                                                                           |

Source: own elaboration.

*Model 2.3. Multiple linear regression. Descriptive conclusions.*

| <b>Model 2.3.</b>                                                                                                                                                                                |                      |                 |                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------|-----------------------------------------------------------------------------------------|
| <b>Are IMC, U and PM associated?</b>                                                                                                                                                             |                      |                 |                                                                                         |
| <b>P-value</b>                                                                                                                                                                                   |                      | <b>Estimate</b> |                                                                                         |
| 0.05                                                                                                                                                                                             |                      | 'I'<br>0.42     | 'U'                                                                                     |
| over 0.05                                                                                                                                                                                        | significant relation | positive        | There are no significant variables.<br>Every university has a <i>p</i> value over 0.05. |
| <p><b>Summary:</b></p> <p>'I' - Significant and positive relation between I and PM. When IMC increases PM increases too. PF and IMC are positively associated.</p> <p>'U' – Not significant.</p> |                      |                 |                                                                                         |

*Source: own elaboration.*



**Appendix 11. Descriptive statistics: measures provided in this dissertation***1) Minimum and Maximum values*

The sample minimum and sample maximum are also called the smallest and largest observation. The values provide the least and the greatest elements of the respondents.

*2) 1<sup>st</sup> quartile (Q<sub>1</sub>)*

The first quartile is the value of the median of the lower half of the data set. This means that about 25% of the numbers in the data set lie below the first quartile which is denoted as 1<sup>st</sup> quartile (Q<sub>1</sub>).

*3) Median (Me)*

It is the value that separates the lower half of a data sample. Is a more resistant value than the mean as it does not provide a randomly large or small result.

*4) Mean ( $\bar{x}$ )*

The statistical mean is the average of the values and it is calculated by adding all the numbers of a data set and then dividing the total amount by the number of data points. It is an arithmetic mean process that is calculated as follows:

$$Mean(\bar{x}) = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})}{n - 1}}$$

$\bar{x}$  is the mean value of the data set

$$\sum X_i = X_1 + X_2 + X_3 + \cdots + X_n$$

$n$  is the number of elements in a group

### 5) 3<sup>rd</sup> Quartile ( $Q_3$ )

The third quartile is the value of the median of the upper half of the data set. This means that about 75% of the numbers in the data set lie below the third quartile which is denoted as 3<sup>rd</sup> quartile ( $Q_3$ ).

### 6) Standard Deviation ( $\sigma$ )

The Standard Deviation (the square root of the variance) measures the dispersion of a dataset (how spread out values are) relative to its mean. The Standard Deviation is calculated with the following formula:

$$\text{Standard Deviation } (\sigma) = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}}$$

$x_i$  is the value of the  $i^{\text{th}}$  in the data set

$\bar{x}$  is the mean value of the data set

$n$  is the number of the data point in the data set





