

# Handbook of Research on Strategic Innovation Management for Improved Competitive Advantage

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# Chapter 16

## Relationships Between Universities and Enterprises: The Perspective of Small and Medium-Sized Firms

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### ABSTRACT

*The university-enterprise (U-E) relationship is a topic that has gathered much interest in the academic world. Universities seek to offer services and technology that help firms to build and foster a harmonious U-E relationship, allowing firms to continually renew their involvement in the relationship. This chapter seeks to analyze the role played by various factors—satisfaction, commitment as perceived by firms, perceived commitment by universities, trust, and reputation—in encouraging firms to continuously renew their involvement in the university relationship. A questionnaire was produced drawing on a literature review looking at U-E relationships, the results of which were then analyzed using partial least squares – structural equation modelling (PLS-SEM). After analyzing 80 responses from firms involved in U-E relationships, it was possible to conclude that commitment of firms, reputation, and the perceived commitment of the universities are very important in the continuous participation of firms in U-E relationships.*

### INTRODUCTION

The competitiveness among firms has increased dramatically in recent decades in such a way that firms are looking for new technologies and innovations both internally and externally. Complementarily, universities also face new international competition with the increasing mobility of students and the demand for commercial applications for the technologies they develop. For business firms, pressures have

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included rapid technological change, shorter product life cycles and intense global competitiveness that have radically transformed the current competitive landscape (Bettis & Hitt, 1995; Wright, Clarysseb, Lockett, & Knockaert, 2008). On the other hand, universities are feeling the pressure of embracing new knowledge to keep abreast of breakthrough innovation deployed in the business sectors and the challenge of rising costs and funding problems that national governments go through. This is exerting enormous resource burdens on universities that now seek cooperative relationships with business firms to remain at the leading edge in all subject areas (Hagen, 2002).

The establishment of stable relationships between universities and business firms is not new: universities have traditionally tried to commercialize brand new technologies, while firms try to acquire the latest state of the art in basic research (Perkmann et al., 2013). As such, traditional marketing strategies are being replaced by relational ones in which all marketing activities are directed to the establishment, development and maintenance of successful marketing exchanges (Morgan & Hunt, 1994; Moreira & Silva, 2015).

Universities are institutions that are involved in research activities, in the development of new technologies and in the provision of services, which lead to the development of business relationships with their various business partners (Marzo-Navarro, Pedraja-Iglesias, & Rivera-Torres, 2009; Perkmann, Neely, & Walsh, 2011). As such, by turning indifferent customers into loyal clients, universities benefit from creating strong relationships with firms by creating value for their clients. This value creation occurs jointly between the organization and its stakeholders (Morgan & Hunt, 1994). This is not new as it involves inter-organizational activities and working in innovation-based relationships (Moreira & Carvalho, 2015; Schiele, 2006).

University-industry collaborations are a particular type of inter-organizational activities as they refer to the interaction between any parties of the higher educational system and industry aiming at encouraging knowledge and technology exchange (Bekkers & Bodas Freitas, 2008; Siegel, Waldman, & Link, 2003).

Intense global competition, rapid technological change and ever shorter product lifecycles have made the current environment highly competitive. Consequently, firms are under growing pressure to continuously improve their knowledge base and generate new technologies so as to ensure economic prosperity and long-term survival. As universities also face an environment where competition is growing, building stable relationships between universities and their customers (primarily firms) becomes essential for both sets of institutions (Marzo-Navarro et al., 2009).

Innovation and knowledge creation are bind together. One way of firms keeping abreast of technological knowledge is to establish relationships with universities, which are known as being knowledge repositories (Dantas & Moreira, 2011). Over time firms have realized that they must move from a closed innovation process – focusing on internal skills – to an open innovation process, establishing relationships that envisage common goals, risk and cost sharing and the ability to achieve valuable returns for both parties in the relationship (Carvalho & Moreira, 2015). As such, firms look for universities and other technology-oriented institutions to develop new knowledge and increase competitive advantage.

Although the idea of collaborating with academic researchers seems attractive, there are some challenges that come attached. The most notable challenges that surround such relationships are: the organizational and institutional cultural differences, the misalignment of incentives and project management difficulties (Perkmann et al., 2011). As a result, it can be said that university-industry relationships must be adequately structured and managed to be productive. Moreover, Perkmann et al. (2013) demonstrated that these kinds of inter-organizational collaborations involve the active engagement of both parties to

exchange tangible and intangible resources. For Kindred and Petrescu (2014), both parties in university-industry relationships have individual and common objectives that drive their interest in the collaboration.

The importance of innovation in the supply chain has been addressed by Zimmermann, Ferreira, and Moreira (2016). The relevance of studying the relationships between firms and universities is increasingly evident as the needs of the current knowledge society become more apparent. As such, the ability of firms and universities to maintain their competitive position has become fundamental. This is addressed by Inzelt (2004) and Perkmann et al. (2011), who demonstrated that the collaboration between universities and business firms is largely seen as one approach to improve innovation in the knowledge economy and diffuse experience across sectors.

As a starting point, this work draws on a model previously studied by Marzo-Navarro et al. (2009) based on the following four variables: the commitment by firms, the overall satisfaction of firms, the perceived commitment of universities and participation of firms in university-industry relationships. This model was complemented introducing two variables to the study: trust and reputation.

This study seeks to uncover what factors influence the continued involvement of firms in the relationship with universities. The overall objective set out for this study is to analyze the role played by particular factors in the continued involvement of firms in their relationship with the universities. More specifically, we are looking to identify which factors affect the success of the relationships between firms and universities and to clarify the existing relationship between the study variables (satisfaction, commitment of the university, commitment of the firm, trust, reputation and participation).

## **LITERATURE REVIEW AND RESEARCH HYPOTHESES**

### **Satisfaction**

Customers can be either satisfied or disappointed based on a comparison made between their perception and service outcome expectation (Kotler & Keller, 2006). Satisfaction is a feeling that is related to the client's perception of whether or not their expectations were met (Oliver, 1999). As such, satisfaction reflects a judgment that a service exceeds service expectations (Moreira & Silva, 2015; Oliver, 1999).

Satisfaction is a dynamic process that changes as consumers gain experience (Srijumpa, Chiarakul, & Speece, 2007). Although there is a relationship between consumer satisfaction and loyalty, there are cases where satisfied clients are not loyal (Moreira, Silva, & Moutinho, 2016; Oliver, 1999). As such, satisfaction is a necessary step for loyalty creation, but it is not sufficient.

Javadein, Khanlari, and Estiri (2008) define customer satisfaction as a judgment on the attributes of a product or service that guarantee a level of pleasure associated with its consumption. For Marques (2012), however, satisfaction with the relationship is maintained as long as it provides a high level of return and the costs are low, and while the difference between the benefits and the costs continues to exceed their expectations.

Homburg and Giering (2001) claim that customer satisfaction is a critical issue in the marketing field since satisfied customers turn into loyal customers and ensure profitability, which is crucial for most businesses. In a business context, satisfaction with the relationship has been defined as a positive affective state, which results from an assessment of all aspects of the inter-business relationship (Anderson & Narus, 1990; Ganesan, 1994). Moreira and Silva (2015) found that satisfied customers lead to trusted-based relationships. In the relationship between firms and universities, the opinions on satisfac-

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tion will determine the future of the relationship (Marzo-Navarro et al., 2009). Schartinger, Schibany, and Gassler (2001) defend that past collaborative experience is crucial because satisfaction with past interactions on a personal, technological and research level lowers individual and institutional barriers and renders collaboration more likely.

In the short term, if firms are satisfied with their relationship with the university, the desire to act on or renew such a relationship will increase.

### **Commitment**

Morgan and Hunt (1994) defined commitment as one party's belief that the relationship is so important that it is worth making an effort to keep it. Commitment can be analyzed from three perspectives (Baker, Simpson, & Sugwan, 1999): (i) a desire to develop a stable relationship; (ii) a willingness to make small sacrifices to maintain the relationship; and (iii) the desire to maintain trust in a stable relationship. Thus, if a relationship is based on the commitment of both parties, each party will make every effort towards the relationship (Casielles, Martin, & Lanza, 2003). To Steers (1977), the customer's organizational commitment reflects an identification and involvement with the organization.

Commitment and trust are central factors that contribute to the success of a relationship as a result of their ability to indirectly lead to cooperative behavior and to produce results that stimulate efficiency, productivity and efficacy (Morgan & Hunt, 1994). However, Moreira and Silva (2015) demonstrated that when customers have credible alternatives, although customer satisfaction influences customer trust and trust influences commitment, customer satisfaction does not necessarily influence customer trust.

According to Marzo-Navarro et al. (2009), in the relationship between university and business firms, if a customer is satisfied with the actions of a particular university, this same customer can develop particular actions that suggest a personal commitment towards that university.

Plewa and Quester (2006) and Selnes (1998) consider commitment to be an antecedent of satisfaction, while others have shown that the customer commitment is a consequence of satisfaction (Bettencourt, 1997; Ganesan, 1994; Kelley & Davis, 1994; Marzo-Navarro et al., 2009). As such, we propose the following hypothesis:

**Hypothesis 1:** The larger the overall satisfaction of firms with their relationships with universities, the larger the commitment of firms to such relationships.

According to Bugel, Verhoef, and Buunk (2011), business relationships are characterized by two major dimensions, one of them being commitment. According to Baron and Kenny (1986), commitment serves as a moderating variable between the satisfaction and involvement. As such, the more the firms are satisfied with their relationships with the universities, the more they perceive their level of commitment (Bettencourt, 1997; Hennig-Thurau, Qwinner, & Gremler, 2002; Hennig-Thurau, 2004; Kelley & Davis, 1994). As such, we propose the following hypothesis:

**Hypothesis 2:** The more satisfied the firms are with the services provided by the university, the more firms will perceive commitment from universities.

For Marzo-Navarro et al. (2009), the two types of commitment established in their model – commitment the firms perceive on the part of the universities and the commitment that firms show towards

maintaining that relationship – can also be related. According to Clemmer and Schneider (1996) and Eisenberger et al. (1990), the customers will be more committed to those that are able to demonstrate commitment and treat them in a responsible and trustworthy way.

**Hypothesis 3:** The more commitment firms perceive on the part of the universities, the more commitment firms will show towards maintaining that relationship.

## **Trust**

Moorman, Zaltman, and Deshpandé (1992) define trust as a willingness to rely on an exchange partner in whom one has confidence. For Grönroos (2000), trust can be described as the expectation that both parties involved in a relationship will behave predictably. In a way, trust is the result of integrity and certainty, in which mutual trust results in positive behavioral intentions towards the other party. Trust encourages both parties to work towards preserving the investment in the relationship.

For Casaló, Flavián, and Guinalú (2008), the concept of trust can be divided into two distinct perspectives. The first considers satisfaction to be an affective predisposition supported by the economic conditions. The second considers satisfaction to be supported by non-economic conditions, such as psychological factors, like fulfilling promises made by the partners or the ease with which they can relate to the partners.

According to Ndubisi (2007), trust means shared values, common goals, certainty, actions with common results, commitment or promises, and a sense of opportunity. Following Sahay (2003), trust-based inter-organizational relationships underpin the reduction of transaction costs, lead to desirable behaviors, reduce the length of formal contracts, facilitate the resolution of disputes, allow the different parties to focus on long-term benefits from the relationship and facilitate future planning by frequent and transparent exchange of information.

Trust can also be defined as the belief that one partner has in their cooperative partners after a rational analysis (Das, 2004). Mutual trust is a key characteristic of successful social exchange (Keh & Xie, 2009).

According to Liu (2012), trust is crucial for establishing long-term relationships and eliminating unnecessary disputes, helping to encourage a trust-based relationship between the parties.

Several studies advocate that customer satisfaction is important for developing customer trust and commitment (Kantsperger & Huntz, 2010). Hultèn (2007) defends that it is more profitable for a firm to establish long-term customer relationships than to adopt a short-term transaction-oriented approach. Moreira and Silva (2016) support the fact that customer satisfaction leads to positive word-of-mouth. Generically, trust and commitment seem to be inseparable: i.e. if both are not in place, a relationship is more likely to be a loose and unstable arrangement. Accordingly, we propose:

**Hypothesis 4:** There is a positive relationship between firm satisfaction and firm trust.

Trust increases tolerance in the face of conflict and reduces the differences between the parties (Liu, 2012). Commitment requires dedication shown by actions and exposure to a certain element of risk, which makes it a key success factor (Burgess & Turner, 2000). According to Barnes, Pashby, and Gibbons (2002) and Herzog (2001), a lack of trust between partners (due to direct competition) affects the exchange of information between partners and distracts from the principal objective of the project. The

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importance of trust-commitment dynamics between partners is expressed by Moreira and Alves (2016) in conflict resolution in market entry strategies in Brazil. As such, we propose the following hypotheses:

**Hypothesis 5:** Trust between the firm and the university positively affects the exchange of information between the parties and, as a result, the commitment shown by firms.

**Hypothesis 6:** Trust between the firm and the university positively affects the exchange of information between the parties and, as a result, the commitment shown by universities.

## **Reputation**

Herbig, Milewicz, and Golden (1994) define reputation as an estimation of consistency over time of an attribute or an entity. A firm may not have the same reputation across all its stakeholders. According to Herbig et al. (1994) and Nguyen and Leblanc (2001), corporate reputation is built up from a base using accumulated judgements over time from the various groups that interact with firms. From a marketing perspective, reputation has frequently been associated with the idea of brand value (Aaker, 1997), or the credibility of an organization (Gosschalk & Hyde, 2005; Herbig et al., 1994). The reputation of an entity is constructed by the credibility of its actions, but the impact of a poorly chosen action on the consumers is much stronger than a good action (Herbig et al., 1994). Reputation depends on the result of the perception of the actions in this period. If firms are repeatedly able to fulfil their promises, they are expected to have a favorable reputation. On the contrary, if they fail, they can create a negative reputation for themselves.

Working with universities also acts as a reputational signal, which increases the attractiveness of firms, employers and partners in exchanging scientific and technical knowledge (Hicks, 1995).

Reputation is the result of the past actions of a firm (Dowling, 1986; Nguyen & Leblanc, 2001). According to Nguyen and Leblanc (2001) and Yoon, Guffey, and Kijewski (1993), corporate reputation can be seen as a reflection of the organization's history, helping provide signaling information (aimed at their target groups) focused on the quality of their products or services compared to their competitors. For Nguyen and Leblanc (2001), firms with good reputation are perceived by consumers as more trustworthy and credible. As such, we propose the following research hypotheses:

**Hypothesis 7:** The higher the level of general satisfaction of firms in their relationships with universities, the higher the perceived reputation of a university.

**Hypothesis 8:** The higher the reputation of a university, the more trust firms have in that university.

**Hypothesis 9:** The higher the reputation of a university, the more commitment firms are toward that university.

**Hypothesis 10:** The higher the reputation of a university, the more commitment the universities are to provide added value services.

## **Participation**

Van Dyne, Graham, and Dienesch (1994) define participation as including customer behaviors that indicate an active and responsible involvement in the strategic direction and development of an organization. Firms can participate actively with universities, given that they are in a good position to supply relevant information.

When firms are satisfied with their relationships with universities, they should treat favorably the relationship with the university to such an extent that firms may contribute to the university's success. In this way, firms that are satisfied with their relationship with a university should help the university to achieve success. However, this relationship can be positive or negative. Some authors find that positive relationships are the result of a perspective of social exchange, given that the customers like to receive favorable reciprocal treatment for their useful suggestions and comments which help the firm (Bagozzi, 1995; Zeithaml, Berry, & Parasuraman, 1996). On the other hand, taking the perspective of those customers that have complaints, less satisfied customers will probably participate less (Singh, 1990; Moliner-Velázquez, Berenguer-Contrí, Gil-Saura, & Fuentes-Blasco, 2008).

The perspective taken by the study of Marzo-Navarro et al. (2009) was one of social exchange reflecting the turbulent nature of the environment where relationships are developed. This perspective suggests a positive relationship. As such, the following hypothesis is set out:

**Hypothesis 11:** The more satisfied firms are in their relationships with the universities, the more they participate and invest in those relationships.

Business firms that feel committed to universities feel the need to deepen their relationships with universities. If there is commitment on both sides of the relationship, both parties will make an effort to help the other side (Vázquez, Díaz, and Ría, 2003). As such, we propose the following hypothesis:

**Hypothesis 12:** The commitment shown by firms will positively affect continued involvement with universities.

The level of commitment by universities as perceived by firms should lead to an obligation by firms to respond to that level of commitment and develop behaviors that help universities to achieve their goals (Eisenberger et al., 1990; Shore & Wayne, 1993). As such, we propose the following hypothesis:

**Hypothesis 13:** The commitment of universities as perceived by firms will positively affect the continued participation of firms in the activities developed by universities.

According to Barnes et al. (2002) and Herzog (2001), trust is a key factor which affects the effectiveness and the success of such collaborations. For Liu (2012), trust is crucial in establishing a long-term relationship.

**Hypothesis 14:** The higher the level of trust in the U-E relationship, the higher the level of success from this collaboration, and the more continued participation will occur on both sides.

## **DATA AND RESERACH METHODOLOGY**

A quantitative approach was adopted. The instrument used was a survey questionnaire, which was developed by extensively reviewing the literature on satisfaction, trust, commitment, reputation and participation to identify reliable measures used in previous studies. We established the research model and hypothesis shown in Figure 1, based on the theoretical background presented in the previous section.

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All constructs were measured using five-point multi-item Likert scales, which “strongly disagree” and “strongly agree” served as anchors. The scales used for measuring the latent variables have been adapted from previous studies to ensure their content and validity.

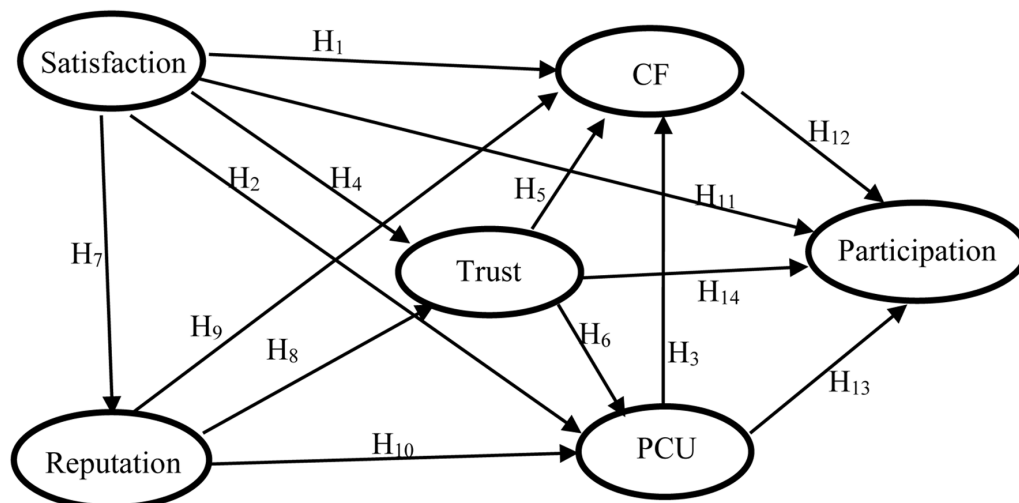
Five items adapted from Ganesan (1994) and Bettencourt (1997) were used to measure the overall satisfaction of the firms. The perceived commitment of the universities (PCU) was evaluated by five items adapted from Bettencourt (1997). Commitment of the firm (CF) was assessed using four items, adapted from Kelley and Davis (1994), Bettencourt (1997), Garbarino and Johnson (1999) and Bansal, Irving, and Taylor (2004). Trust was evaluated using four items adapted from Garbarino and Johnson (1999) and Clark, Ellen, and Boles (2010). Reputation was evaluated using six items adapted from Casaló et al. (2008) and Veloutsou and Moutinho (2009). Finally, the continuous participation was evaluated using four items adapted from Zeithaml et al. (1996) and Bettencourt (1997).

This empirical study was based on a non-random convenience sample consisting of industrial small and medium-sized enterprises (SMEs) that have relationships with universities. Data were originally obtained from a database that contained contacts of U-E relationships involving innovation vouchers (i.e. innovation projects funded by the state, in which there is a clear need for firms to work together with universities). The information obtained was complemented with information from a regional business association. In total, 505 questionnaires were sent. We obtained 86 responses, but only 80 questionnaires had valid responses.

The statistical data analysis was carried out by applying the partial least squares method of structural equation modelling (PLS-SEM) using SmartPLS 3.0 software. This methodology was selected because it is robust when working with non-normal data, when research is at an early stage of theoretical development, testing and validating an exploratory model, and when dealing with small to medium sample sizes (Chin, 1998).

When using the PLS-SEM analysis, we estimated and interpreted the model, and then validated it using PLS bootstrapping. Bootstrapping is useful for conducting hypothesis tests and it is a robust alternative to statistical inference based on parametric assumptions when those assumptions are in doubt as is the

Figure 1. Research model



case of small samples. According to Jack, Russell, and Bert (2001), bootstrapping is a versatile tool that enables estimation of the distribution of any statistic for any type of distribution.

PLS estimates the model parameters using the original sample. However, to statistically validate the estimated model, PLS makes use of resampling method to determine the confidence interval of the model parameters. Hence, PLS is suitable where the sample size is relatively small (Fornell & Bookstein, 1982), and when normality assumption is in doubt. For example, Aibinu and Al-Lawati (2010) used only 64 samples, Wong and Cheung (2005) used only 51 valid responses, while Islam and Faniran (2005) used 52 responses.

The model was evaluated in terms of reliability, convergent validity and discriminant validity. The results support the reliability of the measurement indicators used. All loadings are statistically significant at the 1% level. The factor loadings are larger than the cross-loadings, and, with the exception of one item, all items have higher loadings than the minimum recommended threshold of 0.7 (Götz *et al.* 2010). Table 1 provides the average variance extracted (AVE), the composite reliability (CR) and the correlations of each latent variable. The CR values are higher than the recommended minimum of 0.6 (Götz *et al.* 2010), indicating that all constructs have adequate internal consistency. Moreover, the AVE of each construct is greater than the expected minimum threshold of 0.5 (Götz *et al.* 2010), which ensures its convergent validity. Finally, discriminant validity was confirmed for each construct, as the square root of the AVE is greater than the absolute value of all correlations with other constructs.

Notes: the bold scores (diagonal) are the squared root AVEs of the individual constructs. Off-diagonal are the correlations between the constructs.

The path of the structural model is assessed next. Each path (Figure 1) corresponds to a hypothesis. The test of each hypothesis was achieved by looking at the sign, size, and statistical significance of the path coefficients ( $\beta$ ) between each latent variable and the dependent variable (Wixon & Watson, 2001). The hypotheses were considered supported based on the conventional statistical significance level of 0.05.

## ANALYSIS AND RESULTS

The results of the structural model are shown in Figure 2. Not all structural relationships have parameters with compatible signal (positive) with the assumptions made in the research model. As such, as presented in Table 2, from the 14 hypotheses tested, eight were validated at a 1% significant level and

*Table 1. Average variance extracted, composite reliability and discriminant validity*

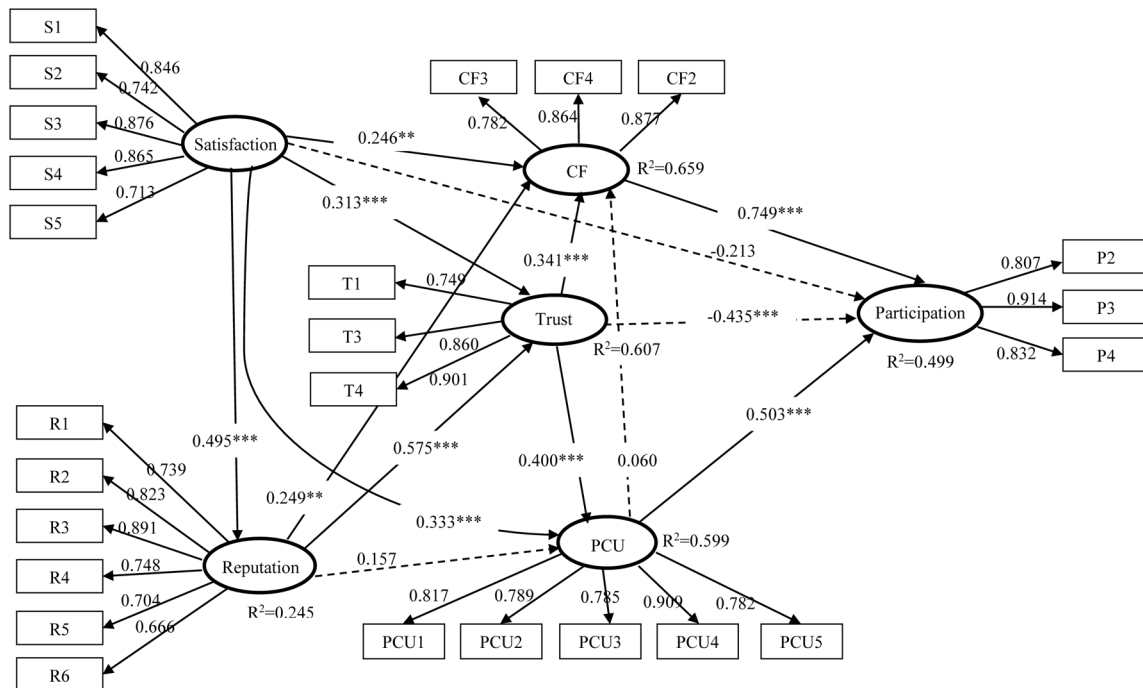
	AVE	CR	Cronbach alpha	Correlations					
				CF	PCU	Participation	Reputation	Satisfaction	Trust
CF	0.709	0.879	0.793	<b>0.842</b>					
PCU	0.669	0.910	0.875	0.648	<b>0.818</b>				
Participation	0.727	0.888	0.810	0.609	0.539	<b>0.852</b>			
Reputation	0.586	0.894	0.856	0.689	0.614	0.374	<b>0.765</b>		
Satisfaction	0.658	0.905	0.868	0.639	0.650	0.332	0.495	<b>0.811</b>	
Trust	0.704	0.877	0.787	0.757	0.714	0.364	0.730	0.598	<b>0.839</b>

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Table 2. Results of hypotheses testing

Hypotheses and causal relationships	Std structural coefficient	Results (T value)	Acceptance Rejection
H <sub>1</sub> : Satisfaction → Commitment_F	0.246	(1.989)**	✓
H <sub>2</sub> : Satisfaction → Commitment_U	0.333	(3.349)***	✓
H <sub>3</sub> : Commitment_U → Commitment_F	0.060	(0.489)	•
H <sub>4</sub> : Satisfaction → Trust	0.313	(4.833)***	✓
H <sub>5</sub> : Trust → Commitment_F	0.385	(2.808)***	✓
H <sub>6</sub> : Trust → Commitment_U	0.400	(2.871)***	✓
H <sub>7</sub> : Satisfaction → Reputation	0.495	(5.688)***	✓
H <sub>8</sub> : Reputation → Trust	0.575	(7.810)***	✓
H <sub>9</sub> : Reputation → Commitment_F	0.249	(2.116)**	✓
H <sub>10</sub> : Reputation → Commitment_U	0.157	(1.277)	•
H <sub>11</sub> : Satisfaction → Participation	-0.213	(1.634)	•
H <sub>12</sub> : Commitment_F → Participation	0.749	(4.707)***	✓
H <sub>13</sub> : Commitment_U → Participation	0.503	(4.618)***	✓
H <sub>14</sub> : Trust → Participation	-0.435	(2.852)***	•
Note: *** p<0.01; **p<0.05; *p<0.1			

Figure 2. Structural model



two were validated at a 5% significance level.  $H_3$ ,  $H_{10}$  and  $H_{11}$  were not statistically significant, and  $H_{14}$  has an incompatible sign with what was originally expected.

The results indicate that the continuous participation of firms is explained in 49.9% by the variation of commitment of firms, perceived commitment of universities, trust and satisfaction, having the former the strongest impact. On the other hand, the variation of commitment of firms is explained by 66.0% of the variation of satisfaction, reputation, perceived commitment of universities and trust, the first two being the most influential. Finally, the variation of perceived commitment of universities is explained in 52.0% by the variation of satisfaction, reputation.

One can say that firms' overall satisfaction has a significant effect on the level of commitment of the firms in their relationships with universities, validating  $H_1$ . The results show that an increase in the level of the firms' overall satisfaction leads to the perception of higher levels of commitment by universities, validating  $H_2$ . However, the level of perceived commitment of the universities does not seem to influence the level of the commitment of firms to maintain this relationship, rejecting  $H_3$ . Also, the validation of  $H_4$  shows that there is a positive effect between the level of the firms' overall satisfaction and trust.

The acceptance of  $H_5$  and  $H_6$  proves that mutual trust between both parties enhances the commitment between firms and universities. The validation of  $H_7$  implies that the perceived reputation of the university is generally proportional to the general satisfaction of firms in their relationship with universities.

$H_8$  and  $H_9$  were confirmed. As such, one can argue that the perceived reputation of a university increases both trust and the level of commitment of the firms in their relationships with universities.  $H_{10}$  was not statistically significant, which shows that reputation is irrelevant to the perceived commitment of universities towards working in U-E partnerships.

$H_{11}$  was also rejected, which was surprising. This means that the continuous participation of firms in the relationship with universities is not explained by the satisfaction with the services provided during the relationship. On the other hand,  $H_{12}$  and  $H_{13}$  behaved similarly, as both were confirmed. This means that the commitment of firms is a strong indicator of their continued participation in U-E relationships, and that the perceived commitment of universities supports the continuous participation of firms with universities.

Finally,  $H_{14}$  was rejected as it was found that trust negatively affects the participation in the relationship, which was opposite to what was expected.

Table 3 shows direct, indirect and total effects among variables analyzed. Continuous participation is directly influenced by commitment of firms, perceived commitment of universities and trust – although negatively – and indirectly influenced by satisfaction and reputation. The strongest total effect on continuous participation is achieved by commitment of firms ( $\beta=0.749$ ), followed by perceived commitment of universities ( $\beta=0.548$ ).

The importance of reputation is shown in the direct effect on trust ( $\beta=0.575$ ), in the direct effect on commitment of firms ( $\beta=0.249$ ), in the indirect effect on continuous participation ( $\beta=0.314$ ), in the total effect on commitment of firms ( $\beta=0.494$ ), and in the total effect on the perceived commitment of universities ( $\beta=0.387$ ). It is worth noticing that reputation does not directly influence perceived commitment of universities, as this relationship is not statistically significant.

Satisfaction plays an important role directly influencing reputation, trust, perceived commitment of universities and commitment of firms and, indirectly, influencing participation ( $\beta=0.332$ ). Although it may sound controversial, satisfaction not only does not directly influence continuous participation, but also the direct effect is negative. This will be dealt with in more detail afterwards.

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Table 3. Direct, indirect and total effects

Total effects	Direct Effects	T Statistics (p-values)	Indirect Effects	T Statistics (p-values)	Total Effects	T Statistics (p-values)
CF → Participation	0.749	4.707 (0.000)			0.749	4.707 (0.000)
PCU → CF	0.060	0.489 (0.625)			0.060	0.489 (0.625)
PCU → Participation	0.503	4.618 (0.000)	0.045	0.476 (0.634)	0.548	4.980 (0.000)
Reputation → CF	0.249	2.116 (0.034)	0.245	2.479 (0.013)	0.494	6.326 (0.000)
Reputation → PCU	0.157	1.277 (0.202)	0.230	2.540 (0.011)	0.387	4.673 (0.000)
Reputation → Participation			0.314	3.093 (0.002)	0.314	3.093 (0.002)
Reputation → Trust	0.575	7.810 (0.000)			0.575	7.810 (0.000)
Satisfaction → CF	0.246	1.989 (0.047)	0.393	4.472 (0.000)	0.639	7.683 (0.000)
Satisfaction → PCU	0.333	3.349 (0.001)	0.317	4.440 (0.000)	0.650	9.544 (0.000)
Satisfaction → Participation	-0.213	1.634 (0.102)	0.545	6.308 (0.000)	0.332	2.828 (0.005)
Satisfaction → Reputation	0.495	5.688 (0.000)			0.495	5.688 (0.000)
Satisfaction → Trust	0.313	4.833 (0.000)	0.285	5.682 (0.000)	0.598	8.661 (0.000)
Trust → CF	0.385	2.808 (0.000)	0.024	0.476 (0.634)	0.409	3.078 (0.002)
Trust → PCU	0.400	2.871 (0.005)			0.400	2.871 (0.005)
Trust → Participation	-0.435	2.852 (0.004)	0.508	2.907 (0.004)	0.073	0.375 (0.708)

Trust has a controversial result. It is very important influencing directly commitment of firms (0.385) and PCU (0.400). Differently, the direct effect of trust on continuous participation is negative (-0.435). However, this direct effect is overrun by the indirect effect commitment of firms and perceived commitment of universities exercise, which leads to a non-significant effect (0.073). This certainly needs to be addressed afterwards.

## DISCUSSION OF RESULTS AND CONCLUSION

The U-E relationship is a very important, although complex, topic in which the marketing relationship plays an important role. The rapid technological change, the open innovation perspective, the continuous changes in customer needs, the need for up-to-date skills, technology and knowledge that universities hold are very important in U-E relationships, even for SMEs.

The aim of this study was to examine the role of antecedents in the continuous participation of SMEs in their relationship with universities. The importance of this study stems from the fact that understanding the active and continuous U-E participation can provide relevant information that universities and SMEs could use to improve their offers, both at academic and at a research level, in order to face future challenges.

According to the model used, the aim was to understand if the overall satisfaction of the SMEs influences the commitment between both parties of the relationship and leads SMEs to a continuous participation in the relationship. It also aimed to understand if the reputation of the university affects SMEs trust in the relationship and, in turn, if this influences the continuous participation of the SMEs.

One of the first conclusions is that satisfaction does not have a significant effect on the continuous participation of SMEs in the U-E relationship (rejecting  $H_{11}$ ). This result is contrary to what Marzo-Navarro et al. (2009) found. However, satisfaction has a positive effect on trust, reputation, perceived commitment of universities and commitment of firms in U-E relationships. As such, one has to take into account Oliver's (1999), Moreira and Silva's (2015) and Moreira et al.'s (2016) assertions regarding the fact that not all satisfied customers are loyal.

The commitment between both parties involves maintaining and ensuring a continued long-term relationship. As such, commitment can be conceived as the intention to establish and maintain long term relationships. Thus, if both parties are really committed, each will make every effort in favor of the relationships (Casielles, Martin, & Lanza, 2003; Moreira & Silva, 2015). The commitment between the parties showed not to be statistically relevant, i.e. the commitment felt by SMEs is not influenced by the perceived commitment from universities, which is in accordance with the findings of Marzo-Navarro et al. (2009), leading to the rejection of  $H_3$ . This means that there are clear perceptual differences between universities and SMEs, as SMEs realize that universities do not commit themselves to SMEs.

Another conclusion is that  $H_{14}$  – the relation between trust and participation – was rejected, when it would have been expected that the higher the trust in the U-E relationship, the greater the continued participation of both parties.

There are clearly several justifications for these anomalies. The first one is related with the type of firms. Effectively, SMEs are firms that sporadically team up with universities because of the existing gap in terms of technology, skills and innovation needs, as the vast majority of SMEs has no research or innovation departments. The second has to do with the type of product analyzed: innovation vouchers (i.e. innovation projects funded by the state, in which there is a clear need for firms to make a 'partnership' with universities). As a result, it can be concluded that most U-E relations for this type of product is still at an early stage of development. On one hand, from the public policy point of view, there is a clear need to strengthen the relationship between universities and SMEs. On the other hand, there is still a wide cultural and relational gap between the two. A third possible explanation is the fact that universities are institutions with a long-term science-based perspective strongly dependent on the State funds (at least in Portugal), whereas companies have very applied-based technological perspective tuned to deal with short-term competitive needs. Finally, in terms of orientation, while universities are focused on the education and development of basic research that contribute to society, SMEs are focused on products, processes and customer satisfaction. These differences may explain the difficulty of U-E relationships among SMEs.

Unlike postulated by Herzog (2001), trust was found not to be key factor affecting the participation in U-E collaborations. However, the greater the trust, the greater the commitment of SMEs and universities. This indicates that there is a clear need for SMEs and universities to adapt to each other. If the product

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analyzed, innovation vouchers, is interesting from a public policy point of view to bring SMEs closer to universities, there is a clear need for both institutions to develop more intense relational practices. This means that, on one hand, SMEs need to master innovative technologies in order to be able to work closely with universities and, on the other hand, universities have to understand more properly the gap that separates them from SMEs. This is imperative for a future relational perspective.

Reputation influences trust, confirming Nguyen and Leblanc (2001). The better the reputation of the university, the more SMEs perceive them as reliable and trustable. Commitment requires dedication, being considered a key success factor. The lack of trust shown by firms can affect both the exchange of information with universities and the commitment in the relationship.

The reputation of the university has no influence on the perceived commitment by universities as seen by SMEs, thus rejecting  $H_{10}$ . In contrast, satisfaction influences the perceived commitment by universities, trust and reputation. One possible reason for these results may be the fact that the projects analyzed indicate that SMEs seek universities exclusively on projects that are funded by the State. Thus, while the SMEs may be satisfied with their relationships, they will not evolve in future relationships as they were established based on short-term financial support. One question remains: would SMEs be willing to establish new U-E relationships with universities if such State support/funds were absent? As such, one can conclude that there are factors outside the relationship that may influence its future. The primary issue is the different type of technological time-horizon between the firm and the university in their relationship. While firms seek short-term solutions, including participation in projects, technology acquisition and applied research results, universities have in basic and applied research a long-term horizon.

What this study may indicate is that universities may not be applying a correct relationship marketing approach, i.e., there are flaws to be improved so that universities are able to conquer and keep SMEs as 'loyal customers'. There must be greater investment by universities in initiatives that appeal firms to interact with universities and maintain the relationship, as they are beneficial to both parties and are a source of useful resources and competitiveness, helping both parties in their evolution, innovation and ability to overcome competitors. All marketing activities can be helpful in providing value to the parties involved in the relationship. Thus, it is concluded that it is important to focus on developing appropriate marketing strategies in order to win customers and make them become 'regular' customers.

## **FUTURE RESEARCH DIRECTIONS**

This study has some limitations that should be further developed in future investigations. The results and implications drawn from the study were obtained with a convenience sample; as such, the generalization of the findings to the population should be viewed with caution. The study was conducted based on the perspective of SMEs. Thus, it is recommended that this study be complemented with a qualitative approach to companies and universities (which has already started) to capture additional positions that were not obtained by a positivist study. In the future, we recommend the inclusion of large companies, for reasons of comparability of results. In this study, it was not possible to analyze the impact by type of project, type of company or sector of activity.

It was found that the size of the companies of the business fabric where the study was realized was one of the limitations. As indicated above, most of the firms analyzed were SMEs. As such, it would be interesting to include large firms in future research to compare their behavior. We should also note

that the study was analyzed from the firms' perspective. Thus, it would be interesting to analyze the perspective of universities.

At academic level, the study provides some insights into the dilemmas of universities in their relationship with a specific audience, as is the case of SMEs, which have particular needs and are still unexplored. At company level, this study allows us to understand that SMEs have a relatively specific behavior and the relationship with universities is not similar to the reality experienced by large companies.

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## **KEY TERMS AND DEFINITIONS**

**Commitment:** Commitment exists when both parties in a relationship believe that the other party will invest in the relationship aiming at maintaining and strengthening that relationship.

**Participation:** Participation includes customer behaviors that indicate an active and responsible involvement in the strategic direction and development of a business and/or organization. Companies can participate actively with the universities, given that they are in a good position to supply relevant information.

**Relationship Orientation:** It is a concept that addresses how firms or entities seek to interrelate to each other. It involves the commitment of one party that believes that a relationship is worth working on to ensure that it endures throughout time. The relationship orientation is built on the foundation of mutual trust and commitment.

**Reputation:** Is the estimation in which a person or company is held, especially by the community or the public. It may be favorable, when the person, entity or company has managed to consistently develop a favorable and publicly recognized name over time.

**Small and Medium-Sized Enterprises (SMEs):** Although there are plenty of definitions across the world, the working definition used in this document is the one that was created by the European Commission to permit a coherent and effective access of SMEs to European community funds.

**Trust:** It is the belief that in an existing relationship, the actors/parties will act with the sole purpose of both parties having benefits with the relationship. In business exchange processes, it means that one party has confidence in the other party's reliability and integrity.

**University-Enterprise Relationships:** Business relationship in which one company is involved in a business relationship in the supply chain with a university, involving the transfer of technology, or the provision of products or services.