

The Application of PLS-SEM in Knowledge Management Processes in Higher Education Institutions

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Abstract: This paper aims to investigate knowledge management (KM) processes in higher education institutions and shed light on the factors that influence the dynamics behind these processes. We focused on understanding how the perceptions about the involvement in KM activities can influence two of the knowledge management skills defined in the literature: absorptive capacity and desorptive capacity. Our work is based on the Theory of Planned Behaviour because it has the power to analyse and explain, through its constructs (attitude, subjective norm, perceived behavioural control), the attitudes of individuals and their perceptions about the implementation of a particular behaviour. The methodology adopted for the empirical investigation is PLS-SEM (Partial Least Squares -Structural Equation Model). The necessary data was collected through a questionnaire sent by email to the potential academics interviewed. The results suggest that the factor impacting the relationship between KM and absorptive and desorptive capacity processes is the behavioural control perceived by academics. In addition, they demonstrate that the organizational climate within the university is an essential predictor of the behavioural intention of academics. The limitations, including the limited number of respondents and suggestions for future developments, are the conduction of a multi-group analysis and building a second-order PLS (Partial least square) model.

Keywords: Absorptive Capacity (ACAP), Desorptive Capacity (DCAP), Higher Education Institutions (HEI), Knowledge Management (KM), Structural Equation Model (SEM), Theory of Planned Behaviour (TPB).

1. Introduction

This paper aims to investigate knowledge management (KM) processes in higher education institutions and shed light on the factors that influence the dynamics behind these processes. We focused on understanding how the perceptions of these individuals about their involvement in KM activities can influence two of the knowledge management skills defined in the literature: absorptive capacity and desorptive capacity. We asked the following research question: "What factors influence the relationship between knowledge management processes and absorptive capacity and desorptive capacity in the university context?". The purpose of the investigation carried out is to answer this question. We based our research on the Theory of Planned Behaviour (TPB). We have chosen this theory to analyse and explain, through its constructs, the attitudes of academics and their perceptions about implementing a particular behaviour. The methodology adopted for the empirical investigation conducted in the Higher Education field is the PLS-SEM, frequently used by scholars, in various areas, to model structural equations in applied research projects. Among the many advantages of this methodology is the requirement for small sample size and no assumptions about the distribution of variables.

SmartPLS 3 was used to implement the PLS algorithm, user-friendly software. The latent variables were first identified with the respective indicators found in the managerial literature to create the path model. Subsequently, the hypotheses existing between them were defined. The necessary data was collected through a questionnaire sent by email to the potential academics interviewed. The report has been carefully analysed to evaluate the goodness and reliability of the structural and measurement model. Finally, bootstrapping was started using SmartPLS3, a resampling method, to verify the significance of the internal and external model and establish, in conclusion, which model hypotheses are supported. Lastly, the relationships between the significant latent variables were identified, and, therefore, the supported model hypotheses were discussed. The results suggest that the factor impacting the relationship between KM and absorptive and desorptive capacity processes is the behavioural control perceived by academics. In addition, they demonstrate that the organisational climate within the university is an essential predictor of the behavioural intention of academics, represented by the three constructs of the TPB. Our paper also features identification of the research limitations, including the limited number of respondents, and suggestions for future developments, including conducting a multi-group analysis and building a second-order PLS model. After this introduction, the second paragraph focuses on knowledge management and the SECI model. The third paragraph presents the methodology adopted for the

empirical investigation to understand how individuals' perceptions impact is the implementation of a specific knowledge-sharing behaviour on the organization's ability to absorb and transfer knowledge to the external environment. The fourth paragraph describes the birth of the ACAP and DCAP models from Knowledge Management Capacity. The fifth paragraph illustrates the Theory of Planned Behaviour. This theory analyses and explains the attitudes that academics assumed and their perceptions about implementing a specific behaviour. The sixth paragraph illustrates the Organizational climate variable. The seventh paragraph tests the model presented and explains the algorithm's start. Finally, the results obtained, and the research limits are analysed and discussed in the last paragraph.

2. Theoretical background

2.1 Knowledge Management

The term Knowledge Management was coined in 1986 by Karl Wiig, then president of the Knowledge Research Institute, during a conference organized by the International Workers' Organization of the United Nations. Among the most cited definitions of KM, there is one enunciated by Davenport and Prusak (1998). They define KM as the capture, distribution, and efficient use of knowledge. According to Duhon (1998), KM is a discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all the company's information resources. The resources it refers to include databases, documents, policies, procedures, skills, and experience. These definitions share knowledge management vision from an organizational and business perspective. Yew Wong and Aspinwall (2004) define KM as the systematic management of knowledge-related activities and processes that create value for the organization. Organizations adopt knowledge management systems for many reasons: to stimulate innovations, to improve their adaptability and agility, to build the organization's institutional memory, to strengthen the sense of community, and to improve the internal and external effectiveness of the organization. In general, knowledge management also leads to improved decision-making.

2.2 Knowledge management in Higher Education

Higher education institutions (HEI) are knowledge-intensive organisations and play a central role in creating and disseminating knowledge through research activities. In addition, they play a fundamental role in transferring knowledge through teaching, collaboration with other public and private organizations, sharing research results, and developing the territory by favouring and promoting the training of start-up and university spin-offs. Knowledge management in higher education institutions is increasingly being discussed. Nowadays, methodically, organizations have understood that practical knowledge, rapid acquisition, and use represent the only source of sustainable competitive advantage (Mahdi et al., 2019). If we consider the university as an enterprise and apply the concept developed by Nonaka and Takeuchi (1995), the knowledge management of university research groups is the ability to create new knowledge, spread it within the group and incorporate it into all developed research processes. Nowadays, society faces severe sustainability issues that require new knowledge, new strategies for knowledge management, and the acquisition of skills (Halberstadt et al., 2019). However, the production and transmission of knowledge are considered traditional objectives of higher education institutions.

2.3 SECI model

The contribution of Japanese professors Nonaka and Takeuchi to the managerial literature in knowledge management represents an authoritative point of reference. They distinguish tacit knowledge from explicit knowledge. Explicit knowledge refers to knowledge transmissible into a formal and systematic language. It can be expressed in words and numbers and shared in data, formulas, and manuals (Nonaka, 1994). Tacit knowledge is personal and challenging to access, formalize and communicate. It is deeply rooted in an individual's actions, experiences, ideas, values and emotions (Nonaka and Konno, 1998). In the model proposed by Nonaka and Konno (1998), the continuous interaction between tacit knowledge and explicit knowledge determines the development of new knowledge. Starting from the assumption that knowledge comes out of the continuous conversion between tacit and explicit knowledge, Nonaka and Takeuchi elaborate on the SECI model, which called for the inclusion of four modes of conversion of knowledge Socialization, Externalization, Combination, Internalization. The creation, acquisition, sedimentation, use and application of knowledge to business processes, typical of an organization, involve individuals strongly influenced by social and organizational dynamics. Knowledge management, therefore, concerns not only economic and technological aspects but also psychological and organizational aspects. According to Nonaka and Takeuchi, the creation of knowledge is to be understood as a dissemination process in which the knowledge created by individuals is systematized within the

organization's knowledge network. The SECI model is of fundamental importance in HEI as it is necessary to identify the mechanisms of exchanging information and knowledge between academics. Socialization is the process of converting tacit knowledge into another tacit knowledge. Externalization is the conversion of tacit knowledge into explicit knowledge. It is linked to the conceptualization and formalization of the contents of knowledge. Combination is the process of converting explicit knowledge into another explicit knowledge. Internalization is the process of converting explicit knowledge into tacit knowledge. Written documentation helps individuals internalize and, in addition, facilitates the transfer of explicit knowledge to other individuals, allowing them to live the experiences of others indirectly. Internalization is closely related to "learning by doing" (Nonaka and Takeuchi 1995).

3. Methodology

Partial Least Squares is a soft-modelling approach used to model structural equations in applied research projects. In the last two decades, it has found application in various fields of research such as marketing (Hajipour and Ghollamzadeh, 2010; Julien and Ramangalahy, 2008), information systems (Miranda and Saunders, 2003; Yoo and Alavi, 2001), strategic management (Tsang, 2002) and knowledge management (Lee et al., 2016). From the systematic review prepared by Cepeda-Carrion et al. (2018), many researchers in the field of Knowledge Management have used PLS-SEM, mainly for the benefit of the small sample. To pursue the objective of bringing to light the causal link between the propensity of academics to assume a behaviour of sharing their knowledge and the ability of the university to absorb and transfer knowledge to the external environment, a PLS model has been built that includes the following six latent variables, taken up and adapted from the existing managerial literature on KM and from the theory of planned behaviour (Ajzen, 1991). The variables are organizational climate, absorptive capacity, desorptive capacity, attitude, subjective norm, perceived behavioural control.

4. Knowledge Management Capacity

Knowledge management capacity refers to an organization's ability to manage its knowledge base over time. Argote et al. (2003) and Nonaka (1994) have distinguished the exploration or creation of knowledge from the exploitation or application of knowledge. Andersen and Drejer (2008) highlighted the critical role of combining internal and external knowledge in innovation processes. In light of this distinction, the authors Lichtenthaler and Lichtenthaler (2009) propose six knowledge management capacities: inventive capacity, is the ability to generate new knowledge within the organization; absorptive capacity is the ability to acquire new knowledge from the outside; transformative capacity is the ability of the organization to retain knowledge over time; connective capacity is the ability to take care of inter-organizational relationships and preserve their benefits in terms of exchanged knowledge; innovative capacity is the ability to match inventions to the internal context; desorptive is the capacity to transfer knowledge to the outside world.

4.1 ACAP Model

The ability to recognize the value of new external information, assimilate and apply it for commercial purposes is defined by Cohen and Levinthal (1990) with the term absorptive capacity (ACAP). The resulting model consists of three phases and originates at the individual level: the individual, based on previous knowledge, acquires new knowledge from the outside; the acquired knowledge is brought within the organization and, finally, is exploited to generate beneficial results (Marabelli and Newell, 2014). ACAP is defined as routines and processes through which organizations acquire, assimilate, transform and use knowledge to generate a dynamic organizational capacity (Zahra and George, 2002). Acquisition refers to the organization's ability to identify and acquire knowledge from the external environment. Assimilation refers to the organisation's routines and processes that allow the interpretation and understanding of new knowledge acquired from external sources. Transformation denotes the organization's ability to develop and refine exercises that combine existing knowledge with new knowledge acquired and assimilated. Exploitation refers to refining, extending, and exploiting existing skills, leveraging the knowledge gained, assimilated and transformed.

4.2 DCAP Model

Desorptive capacity, according to the definition formulated by Lichtenthaler et al. (2010), is the ability of an organization to identify, based on its strategy, opportunities for technology transfer to the outside world to facilitate the application of technology. Therefore, the desorptive capacity can be considered opposed to the absorptive capacity. Absorptive capacity and desorptive capacity are essential components of an organization's ability to create new knowledge. ACAP and DCAP are influenced by the degree of motivation of the actors belonging to the organizations involved to transfer knowledge (Dell'Anno and del Giudice, 2015). The DCAP

model, proposed by Lichtenthaler and Lichtenthaler (2009), consists of identifying opportunities for external exploitation of knowledge and transferring knowledge to the recipient. Thanks to desorptive capacity, organizations identify many technology transfer opportunities. Technology transfers make it possible to improve the market knowledge in which an organization operates. As a result, organizations can gain knowledge through the transfer process to external partners (Lichtenthaler and Lichtenthaler, 2010). Factors that can affect desorptive capacity and determine its success include learning ability, the personal experience of members of organizations, the purpose of the transfer (Dell'Anno and del Giudice, 2015).

5. Theory of Planned Behaviour

The Theory of Planned Behaviour (TBP) was developed in 1991 by Icek Ajzen, and it is an extension of the previous Theory of Reasoned Action (TRA). This theory has been widely applied in social psychology, marketing, and healthcare (Goh and Sandhu, 2014). The purpose of this theory is to explain voluntary behaviours. The authors excluded all those behaviours that are not spontaneous, habitual, or programmed (Liska, 1984). Therefore, Trafimow (2009) highlighted that the proximate cause of a behaviour is the behavioural intention, which indicates what one intends to do or not to do. Individuals decide whether to behave in a certain way, evaluating various factors in advance. Ajzen and Fishbein (1975) identify two main factors determining this behavioural intention: attitude and subjective norm.

5.1 Attitude

The term attitude indicates the predisposition of an individual to produce emotional or behavioural responses, determined by the family or social environment, regarding situations, people or objects. Attitude is how a subject favourably or unfavourably evaluates given conduct (So and Bolloju, 2005). As Bock and Kim (2002) argue, attitude evaluates an individual's belief and consequences in pursuing a particular behaviour. Fishbein and Ajzen (1975) define that the attitude variable is influenced by behavioural beliefs and outcome evaluation. Behavioural beliefs are individuals' beliefs about the consequences of a specific behaviour put in place. Subjects associate the performance of a specific behaviour with the ability to produce a set of results. It refers to how individuals perceive and evaluate the potential impacts of a given behaviour implemented.

5.2 Subjective norm

The variable Subjective Norm, provided by Ajzen and Driver (1992), is: "a person's subjective probability that a particular referent wants the person to perform a given behaviour". From this explanation, the subjective norm represents the social pressure the subjects perceive to perform or not a specific behaviour. Social pressure is the set of opinions of those who enjoy a particular consideration on the part of the individual, such as exerting a specific influence on their behavioural choices (Ajzen and Fishbein, 1975). Ajzen and Fishbein identify two variables that impact the level of influence that the opinions of others have on the behaviour of the individual: normative beliefs and motivation to comply. Normative beliefs include beliefs about other individuals who enjoy consideration from the subject and whose essential preferences, except concerning a specific behaviour.

5.3 Perceived behavioural control

Ajzen and Driver (1992) introduce the variable perceived behavioural control in the Theory of Planned Behaviour. Perceived behavioural control refers to the ease or difficulty of performing a specific behaviour. Ajzen (2002) considers a recent graduate who intends to secure a job position within a high-tech company. The realization of this intention is not entirely under the voluntary control of the individual. While doing everything within his possibilities, sending his resume and showing himself available for a possible interview, he cannot secure employment. Two variables impact perceived behavioural control: control belief and perceived power. Control belief refers to the perception of individuals about any factors that can facilitate or inhibit the execution of a specific behaviour. These factors include both elements of internal control, such as information, skills, abilities, difficulties, and external features such as opportunities barriers. Perceived power refers to the perceived capacity of a particular control factor to facilitate or inhibit the execution of a particular behaviour (Ajzen, 1991).

6. Organizational climate

The organizational climate is the set of relatively durable characteristics that distinguish each organization and influence individuals' behaviour (Forehand and Von Haller, 1964). The organizational climate explains the features of the organization from the point of view of employees. It concerns the subjective impressions, feelings, perception of the actions of the organisation members (Gray, 2008). The organizational climate guides

the conduct of employees by communicating to them what behaviour is desirable and appropriate in the organization (Al-Kurdi, 2020). Ajzen (1991) and Chennamaneni et al. (2012) argue that the organizational climate influences subjective norms. Bock et al. (2005) have particularized the organizational climate in fairness, innovativeness, and affiliation. Fairness refers to the employee's perception that organizational practices are fair. This creates trust between individuals and motivates them to share their knowledge. Innovativeness is the perception of individuals that change, and creativity are fostered within the organization. Finally, affiliation is the sense of belonging that employee perceive.

7. Data collection

The latent variables presented in the previous paragraph are measured by indicators or items adapted from the existing literature. Five items for attitude variable and ten items for the organizational climate variable (4 for affiliation, 3 for innovativeness, 3 for fairness). Concerning the latent variables subjective norm and perceived behavioural control, the items are taken from the SEM conducted by Zhang et al. (2013). The 16 manifest variables measuring absorptive capacity (4 for each dimension) are adapted by Pavlou and El Sawy (2006). Finally, the five items that measure the desorptive capacity construct are adapted from Kalar and Antoncic (2015). The items of each latent variable are subject to a 7-point Likert scale, where 1 represents the lowest acceptance value and seven the more excellent value. The decision to proceed through an electronic questionnaire involves individuals who live in different geographical places of the planet in a relatively short period. The number of valid and complete responses received is 161. Therefore, it can be deduced that the limited sample number of 161 is appropriate for using the PLS-SEM methodology. Table 1 shows the demographic information of the respondents.

Table 1: Respondent demographics

	Categories	Frequency	Percentage
<i>Gender</i>	Male	102	63,30%
	Female	58	37,70%
<i>Age</i>	Less than 25	1	0,62%
	25-34	44	27,30%
	35-44	57	35,40%
	45-54	33	20,50%
	More than 54	26	16,20%
<i>Country</i>	Africa	15	9,30%
	North America	8	4,90%
	South America	9	5,70%
	Asia	63	39,10%
	Europe	62	38,50%
	Oceania	3	2,50%
<i>Position</i>	Full Professor	32	19,90%
	Associate Professor	29	18,10%
	Assistant Professor/Researcher	42	26,10%
	Ph.D. Student	34	21,10%
	Other Academic Position	24	14,90%
<i>Working Experience</i>	0-5 years	44	27,40%
	6-10 years	24	14,90%
	11-15 years	29	18%
	More than 15 years	64	39,70%

7.1 Theoretical model and hypothesis development

The PLS-SEM model in the Higher Education sector was built and analysed using the SmartPLS3 software. The hypotheses formulated recall some works present in the literature. The first six hypotheses were developed from the survey conducted by Lo and Tian (2020). They hypothesised a relationship between the knowledge sharing behaviour assumed by academics and the university's ability to absorb and surrender knowledge. They suppose the relationships between the constructs of the TPB, which express the behavioural intentions of the subjects (Ajzen, 1991), and the absorptive and desorptive capacity. The other three hypotheses were defined based on empirical investigations (Bock et al., 2005 and Lo and Tian, 2020). In the light of the contributions in

the literature just described the nine hypotheses that led to the construction and representation of the model have been formulated are:

- H1:** The attitude of academics significantly influences the university's absorptive capacity (ACAP).
- H2:** The attitude of academics significantly influences the university's desorptive capacity (DCAP).
- H3:** The subjective norm of academics significantly influences the university's absorptive capacity (ACAP).
- H4:** The subjective norm of academics significantly influences the university's desorptive capacity (DCAP).
- H5:** The perceived behavioural control of academics significantly influences the university's absorptive capacity (ACAP).
- H6:** The perceived behavioural control of academics significantly influences the university's desorptive capacity (DCAP).
- H7:** The university's organizational climate significantly influences the attitude of academics.
- H8:** The university's organizational climate significantly influences the subjective norm of academics.
- H9:** The university's organizational climate significantly influences the perceived behavioural control of academics.

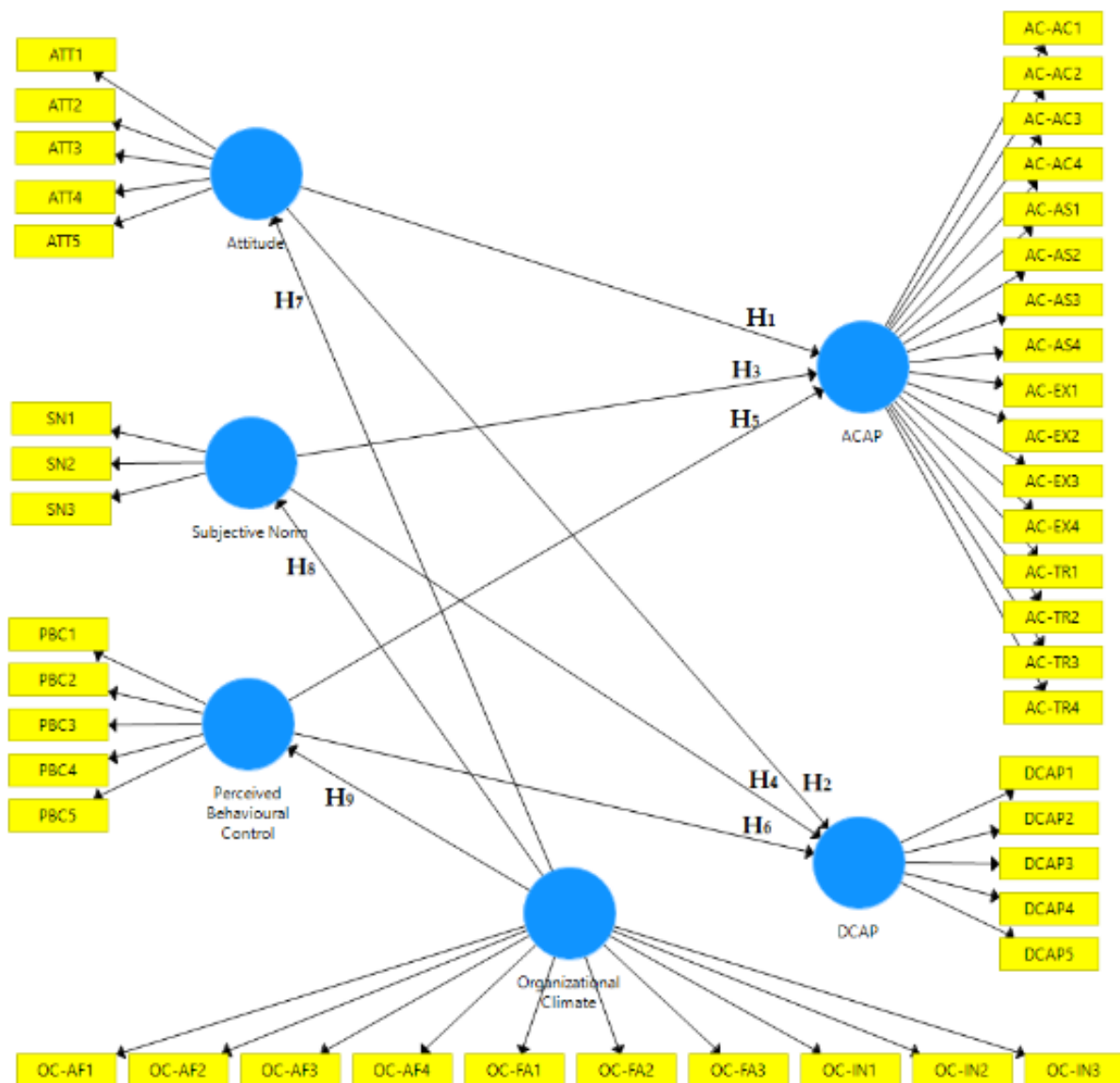


Figure 1: Path model

8. Data analysis

To analyse and validate the external model, we proceed with verifying the reliability of the internal consistency, the reliability of the indicators, the convergent validity, and the discriminant validity. As long as the block turns

out to be one-dimensional, Cronbach alpha values, rho_A and Composite reliability at least equal to 0.7 are preferable (Bagozzi and Yi, 1988).

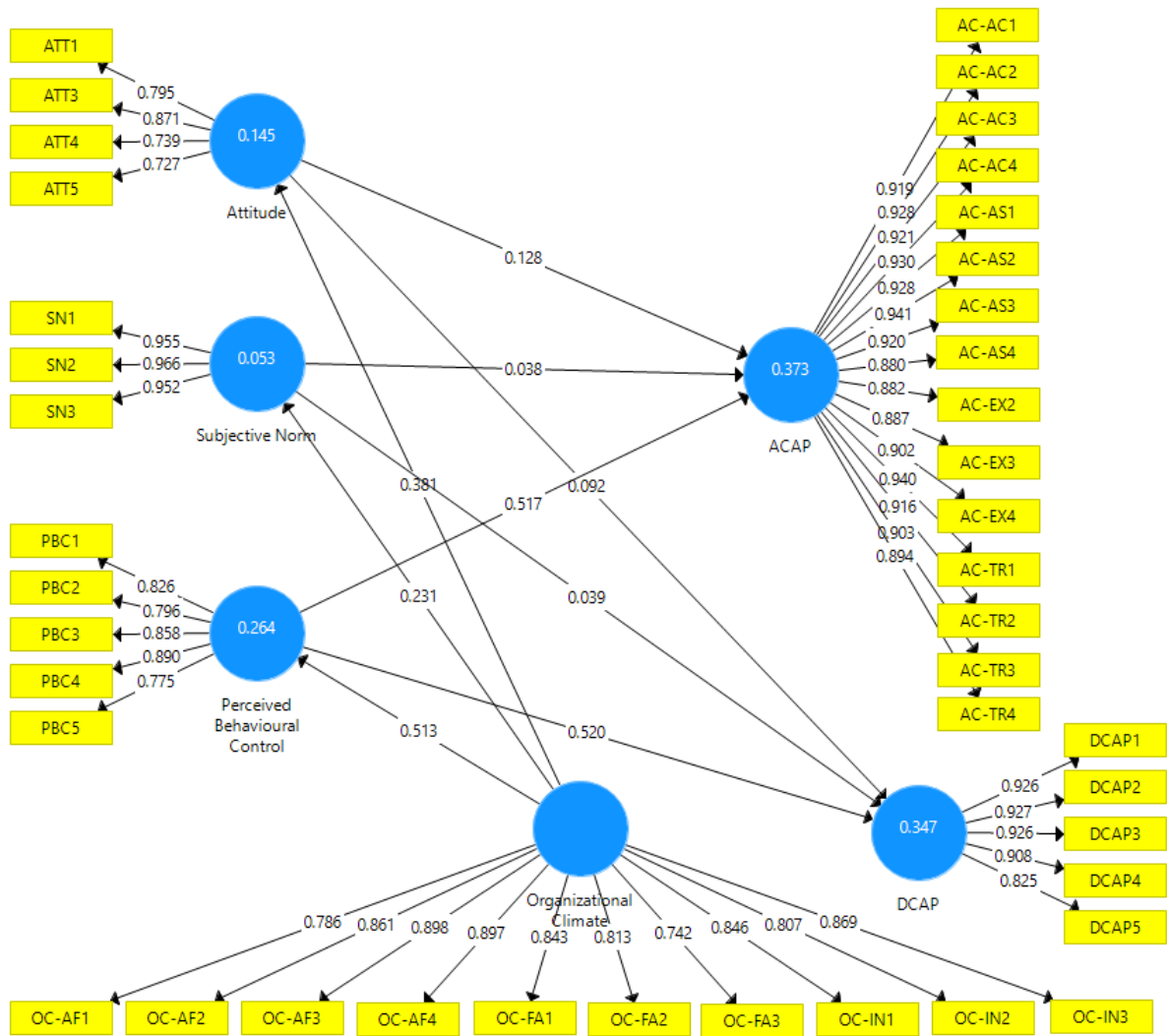


Figure 2: PLS Algorithm Results

From Figure 2, the three indices relating to each block of variables assumed values greater than 0.7: this demonstrates the one-dimensionality of the blocks. Convergent validity indicates the correlation between the indicators and their latent variable. We accept models with an AVE greater than 0.5, models in which the latent variable explains more than half of the variance of its indicators (Bagozzi and Yi, 1988). From Figure 3 in the model in question, the AVE is more significant than 0.5 for each latent variable. The discriminant validity is expressed by the Fornell-Larcker concept, whereby the square root of the AVE, in each latent variable, must be greater than the values of the correlations between the latent variables (Fornell and Larcker, 1981).

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
ACAP	0.986	0.986	0.987	0.833
Attitude	0.803	0.842	0.865	0.616
DCAP	0.944	0.956	0.957	0.816
Organizational Climate	0.952	0.955	0.959	0.702
Perceived Behavioural Control	0.888	0.907	0.917	0.689
Subjective Norm	0.955	0.962	0.971	0.917

Figure 3: Construct reliability and validity

8.1 Evaluation by resampling methods: Bootstrapping

When adopting the PLS methodology, the distribution is unknown, and therefore, conventional methods for testing significance are not applicable (Garson, 2016). SmartPLS3 software can generate T statistics to verify the relevance of the internal and external model, using a resampling method called *bootstrap*. This procedure takes many data from the original sample to calculate a statistic and estimate its distribution without making assumptions about the distribution model. In Figure 4, the *T-statistics* column allows understanding if the structural model's path coefficients are significant.

	Original Sampl...	Sample Mean (...)	Standard Devia...	T Statistics (O/...	P Values
Attitude -> ACAP	0.128	0.135	0.082	1.562	0.119
Attitude -> DCAP	0.092	0.095	0.095	0.968	0.334
Organizational Climate -> Attitude	0.381	0.396	0.083	4.596	0.000
Organizational Climate -> Perceived Behavioural Control	0.513	0.521	0.064	7.963	0.000
Organizational Climate -> Subjective Norm	0.231	0.230	0.094	2.455	0.014
Perceived Behavioural Control -> ACAP	0.517	0.515	0.083	6.235	0.000
Perceived Behavioural Control -> DCAP	0.520	0.520	0.095	5.453	0.000
Subjective Norm -> ACAP	0.038	0.036	0.069	0.548	0.584
Subjective Norm -> DCAP	0.039	0.040	0.066	0.591	0.555

Figure 4: Bootstrap results for the internal model

Using a T-test with a significance level of 5%, the path coefficient will be significant if the T statistic is greater than 1.96. The table shows that the links Attitude – ACAP, Attitude – DCAP, Subjective Norm – ACAP, and Subjective Norm – DCAP are not statistically significant in the model under consideration. All other path coefficients in the internal model are statistically significant.

9. Discussions

Higher education institutions have tried to change their internal structures and strategies in recent decades. As a result of these increasing pressures and needs in higher education, the growing attention of scholars has been directed to show the great potential of KM for HEI (Quarchioni et al., 2020). The literature has discordant opinions regarding its impact on KM in HEI. For example, researchers have suggested that university culture is individualistic and sometimes selfish and instrumental (Fullwood et al., 2013; Tian et al., 2009). Technology, especially information technology, which plays a critical role in supporting strategies and operations, is seen as an enabler for KM in HEI. In addition, many authors agree that while the use of appropriate information and communication technologies can help universities move towards a knowledge-based organization, a good adaptation between information technology, socio-organizational factors, and sustainable organizational culture is also needed (Arntzen et al., 2009; Gill, 2009; Raj Adhikari, 2010). On the other hand, two recent studies do not agree on the importance of sharing knowledge. In the UK, academics are neutral about the importance of technology, probably because of their high level of autonomy and engagement in disciplinary communities. On the other hand, in the public universities of developing countries. Devi Ramachandran et al. (2013) have identified IT (Information Technology) as the methods and technologies used to store, transmit, and process data and information using networks, computers, and telecommunications equipment as the strategic enabler of the most used KM. Rewards and incentives are seen as critical motivators of behaviours. Universities must ensure, through incentives, the recognition of the contribution of each academic to any system of knowledge sharing (Arntzen et al., 2009; Gill, 2009). Academics expect their commitment to knowledge sharing to improve and extend their relationships with colleagues and offer internal promotion and career development opportunities at other universities (Fullwood et al., 2013). Such an incentive system can further foster collaboration in research, contributing innovative ideas and solutions.

9.1 Comparison of hypotheses and results

This article examined the behavioural factors, expressed by the constructs of TPB (attitude, subjective norm, perceived behavioural control), that influence the relationship between KM and absorptive and desorptive capacity processes in the university context. Inside the model was inserted the exogenous variable Organizational Climate, which acts as a predictor of the endogenous variables Attitude, Subjective Norm and Perceived Behavioural Control. The results processed by the software after bootstrapping start suggests that Organizational Climate is a good predictor of the three latent variables that express the behavioural intention of academics to be involved in KM activities. Therefore, the hypotheses H7, H8 and H9 appear to be supported.

These results align with the survey conducted by Bock et al. (2005). The organizational climate has a positive impact on the intention of academics to share their knowledge. Wu and Zhu (2012) also supported the hypothesis that the organizational climate, characterized by a high level of equity, innovativeness and affiliation, positively impacts the behavioural variables attitude, subjective norm and perceived behavioural control. The results obtained in this work, on the other hand, show that the only behavioural control perceived by academics (perceived behavioural control) influences the abilities above. According to, among the factors that impact the university's ability to yield (desorptive) and acquire (absorptive) knowledge, there is precisely the perception of control and, in general, power perceived by the members of the organization who occupy top positions. The hypotheses supported are H1, H2 related to the supposed relationships between Perceived behavioural control – ACAP and Perceived behavioural control – DCAP.

9.2 Limits of research and suggestions for future developments

The investigation has some limitations that could represent the starting point for future research developments. First, the number of samples could be increased by extending the number of interviews. In the present case, the total number of valid answers is 160 and, therefore, the minimum requirement of the PLS-SEM analysis is met. Nevertheless, a larger sample would give rise to greater statistical power. Therefore, the results of this study should be verified with a larger model since greater statistical power would lead to greater generalizability of the same results (Lo and Tian, 2020). The reduced number of the answers is due to the short period dedicated to the survey and, also, to the type of survey chosen (electronic questionnaire via email). In addition, the presence of incomplete answers is probably due to many questions proposed. Finally, although the variable data are considered to be valid and reliable, it is possible that some academics, in the survey, provided socially desirable answers (Podsakoff et al., 2003). To this end, in a brief introduction, the participants were reassured about the anonymity of the questionnaire. According to Tan et al. (2010), according to which the administrative staff of universities play a significant role in the process of knowledge sharing, future research could extend the investigation to non-academic staff involved, in some way, in knowledge management processes. A suggestion for future research developments is to proceed to a multi-group analysis, which allows testing if predefined data groups have significant differences in their estimates of the parameters of the PLS model (Sarstedt et al., 2011). Finally, for some of the latent variables in the PLS model, second-order constructs could be created, that is, constructs involving more than one dimension. This would reduce the number of relationships in the structural model, making PLS-SEM more sparing and, at the same time, less complex (Edwards, 2001; Law et al., 1998).

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