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Tacit and Explicit Knowledge: Drivers of the Competitiveness of Universities

Conocimiento tácito y explícito: conductores de la competitividad de las universidades

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ABSTRACT

This research examines these two cognitive dimensions through a confirmatory factor analysis to determine whether their relationship with the competitiveness variable is suitable for generating genuine competitive elements. These variables have been reviewed based on available cutting-edge literature and collected a priori from Mexican higher education institutions. Cognitive elements serve as precursors to competitiveness; however, comprehending this necessitates an analysis of the cognitive asset from a dimensional perspective, wherein formal and informal knowledge criteria are scientifically established as explicit and tacit knowledge.

Keywords: Knowledge Management, Competitiveness, Universities

JEL code: I23, O31

RESUMEN

Esta investigación analiza a estas dos dimensiones cognitivas a través de un análisis factorial confirmatorio con la finalidad de establecer si su relación con la variable competitividad resulta adecuada para la generación de elementos competitivos reales. Dichas variables han sido revisadas a partir de la literatura de frontera disponible y recolectadas a priori en instituciones de educación superior mexicanas. Los elementos cognitivos son precursores de la competitividad, no obstante, para entenderlo se requiere analizar al activo cognitivo desde una perspectiva dimensional, en las cuáles se establece el criterio del conocimiento formal e informal, más científicamente hablando, del conocimiento explícito y tácito.

Palabras clave: Gestión del conocimiento; competitividad; universidades

Código JEL: L2, I23, O31

INTRODUCTION

The university serves as the cornerstone of the framework underpinning the knowledge society. Processes of innovation and shifts in paradigms unfold within institutions of higher education and can shape activities across various sectors. While higher education institutions represent the most well-suited link in the cognitive chain, it is imperative to pinpoint the factors that create enduring changes within them.

It is imperative to understand that within the marketplace, functioning as a generator of demand, institutions must have the ability to cultivate distinctive advantages from their available resources (Štimac & Šimić, 2012). Although competitive development may lean towards tangible capabilities like profitability or technological advancement (Kovalenko, 2013), the truth remains that the abundance of intangible resources, such as knowledge, provides a more viable approach to scrutinizing the assets at the university's disposal.

In a broader sense, cognitive resources can be approached from two perspectives: tacit knowledge and explicit knowledge. Both bear significance as components, and their influence contributes to the internal advancement of the organization. However, despite their prevalence within the institution, their comprehension and utilization still need to improve within the context of higher education establishments.

While both forms of knowledge are exploitable, their inherent characteristics should be clearly defined. On the one hand, Tacit knowledge can be described as the insight of human talent (Somech & Bogler, 1999). Explicit knowledge, conversely, can be perceived as the reservoir of the organization (Harsh, 2007). Hence, for a higher education institution, identifying and utilizing these types of knowledge can function as vectors for transformation and enhancing internal advantages, solidifying a process geared toward cultivating competitive edges that set it apart within the university environment.

The central aim of the presented research is to scrutinize whether cognitive factors, encompassing both tacit and explicit knowledge, constitute foundational components for competitiveness within higher education institutions. Additionally, the research seeks to identify the components inherent in each category and the roles they take on. The study draws upon the realities of the organizational landscape of higher education institutions in western Mexico.

THEORETICAL FRAMEWORK

Universities and Knowledge Management

Knowledge management can be comprehended as one of the foremost concepts within the administrative sphere (Niqresh, 2021). Its standardized implementation in organizations, particularly within the private sector, has contributed to the augmentation of intangible assets, a term commonly employed in this context.

The potential it bestows upon organizations has effectively influenced the adoption of tailored techniques within tertiary education institutions. The orchestration, coordination, utilization, transfer, and exploitation of knowledge constitute pivotal factors in the success of those actively engaging with it (Mostofa et al., 2023).

From the standpoint of the knowledge society, it is widely acknowledged that the central objective is to contribute to maximizing organizational benefits (Raudeliuniene & Matar, 2022). It entails the premise that knowledge should serve as the bedrock for decision-making, regardless of the asset's nature, but rather its potential.

Building upon this contextual foundation, universities have diligently sought and embraced knowledge management models that have heightened engagement among their constituents—faculty, students, and administrators—and have also instituted models for harnessing the cognitive resources they inherently and recurrently produce (Rodríguez-Ponce et al., 2022).

Notably, universities function as natural cognitive entities, adeptly managing diverse facets of knowledge. Moreover, knowledge generation exhibits the same level of diversity as the existing domains within the institution (Poonam & Rowley, 2018).

To fully apprehend this concept, it is imperative to recognize that the fundamental role of higher education institutions is to generate and disseminate knowledge within society (Alves & Pinheiro, 2022). In addition to the points mentioned above, the role of knowledge for such organizations constitutes a pivotal element for their growth and development while facilitating an approach to intangible capitalization (Elezi, 2021).

This multifaceted process is achieved by leveraging the institution's internal resources, maximizing human capital utilization, and furthering the transmission of knowledge to sectors where it can be harnessed, thereby providing valuable feedback to the higher education institution (Sedziuviene & Vveinhardt, 2009).

Metaphorically speaking, the university assumes a central role within the knowledge economy (Demchig, 2015). Consequently, when viewed through a business lens, its outputs can be regarded as assets with the potential to generate profitability.

From this perspective, knowledge management models embody a strategic administrative element whose impact generally yields positive outcomes within university units and among their human resources (Mahdi et al., 2018). Their implementation should be undertaken most efficiently, capitalizing on the prevailing organizational structure. As posited by Hartono and others (2023), knowledge management is best understood as a flexible and structured framework that fosters the enhancement of institutional departments.

Knowledge Management and Competitiveness in Universities

There exists a classical perspective concerning organizational administration in which tangible resources, particularly those of a financial nature, are deemed the cornerstone for crafting competitive strategies (Ogutu et al., 2023).

However, upon contemplating the realities of an era where every organization establishes growth benchmarks predicated on effectiveness and efficiency, it becomes evident that knowledge is their most prized asset. Thus, integrating this asset with the internal and external environment enables the organization to harness it to its advantage (Xiao, 2006).

Organizations, especially those within higher education, must adapt to their surroundings and reshape their preconceived visions to enhance themselves by developing internal and external cognitive components. By doing so, their environment can be enriched further, offering a tangible assurance of continuous administrative progress (Schiuma et al., 2012).

Furthermore, prior investigations have demonstrated that universities possess an inherent potential for cultivating attributes such as quality, innovation, and functionality. These focal attributes serve as the bedrock for well-established competitive advantages while effectively managing the knowledge generated in the institution's daily affairs (Sachin & Manoj, 2019).

This phenomenon becomes exceedingly intriguing when observed in action. Through its implications, prospective factors contributing to improved internal relations can be identified, offering a lucid and succinct prospect of attaining genuine competitive edges.

Superficially, a delicate thread may intertwine knowledge management and competitiveness processes. Nonetheless, the cohesiveness of these concepts possesses intrinsic robustness, as it capitalizes on existing resources, a concept traditionally construed within the framework of competitive advantage. Technological and economic elements evolve into indispensable

support pillars for knowledge to substantively emerge as the principal contrasting factor (Ordoñez et al., 2018).

Based on this vantage point, the challenge confronting universities, as pinnacles of intellectual contemplation and knowledge genesis, is rooted in the necessity for their global stature to be anchored upon transformational underpinnings that confer a fitting standing vis-à-vis their international counterparts.

Consequently, antiquated models of a purely tangible nature should be relegated to the past, enabling knowledge to be recognized as an element of strategic import (Vasiliev, 2022). Thus, a positive impact reverberates within the institution, harnessing diverse strands of knowledge and their origins to the utmost. In effect, appropriating implicit and explicit factors becomes an integral facet of astute organizational resource utilization and, naturally, realizing the sought-after competitive growth (Kireeva et al., 2018)."

Tacit and Explicit Knowledge.

The importance of actively utilizing knowledge within organizations has been emphasized, turning it into a valuable resource in various administrative structures (Li & Zhao, 2023). Its configuration enables continuous interaction between the organization's interior, exterior, and its members (von Krogh, 1998). Through these mechanisms, a precious function is generated, with an impact that can vary in visibility and transferability, ranging from nearly imperceptible to very evident (Magnier-Watanabe & Benton, 2017).

The initial conceptualizations that framed the current meanings of tacit and explicit knowledge were shaped by the research of Michael Polanyi in the mid-20th century. These empirical approaches resulted in a specific classification where not only definitions were generated but also the elements that constitute each dimension. Thus, tacit, and explicit knowledge paved the way for functional cognitive integration in an SECI model (Nonaka & Takeuchi, 1995).

It was the first time that knowledge was analyzed not only epistemologically but also from a strategic administrative position whose benefits would be fully reflected in the operational elements of the organizations implementing it (Houessou et al., 2023).

Consequently, the elements of each type of knowledge can vary based on the type of organization that exists. That is why a comprehensive analysis of the specific factors provided by each dimension was required to perform instrumental measurement in higher education institutions.

Directly referring to tacit knowledge, is to speak about the interpersonal interaction of individuals within an organization (Sial et al., 2023). Its elusive and almost cryptic nature

has been deeply studied. Its existence has made it a necessary factor for organizational innovation and even for enhancing the performance of internal processes (Houessou et al., 2023).

According to the review of various theoretical and conceptual approaches, it was concluded that three factors constitute it within the framework of higher education institutions: organizational values, organizational wisdom, and technical skills.

Organizational values refer to the specific characteristics that organizations propose in their future vision and are interpreted empirically by employees (Gil-Cordero et al., 2023). These elements may have a purely explicit backing. However, their use and dissemination constitute a completely individual belief, which generates ambiguity in their application and understanding by those who execute them (Rubio-Andrés & Abril, 2022).

Regarding organizational wisdom, it establishes a hierarchy concerning the activities established to improve the personal growth elements of the individual (Reber, 2013; Roediger, 1990). Based on this factor, it becomes possible to establish measurement criteria for individual learning. Through the concept of higher-level learning, the determination of wisdom can be reached (Stelmaszczyk et al., 2021), implying that the individual has been able to carry out the assigned task in a specific, clear, and skillful manner.

As for technical skills, studies have shown that they constitute an individual's expertise in generating functional responses to fortuitous events (Alzhrani et al., 2023). Their utilization is closely linked to the everyday aspects of the job position. According to research criteria in various fields, individuals who interact more with external clients tend to be more efficient in this type of skill.

On the other hand, it is necessary to refer to tacit knowledge. Its essence is materialized in the transfer of knowledge and its concrete recording in databases, organizational documents, and formal elements (Gamble, 2020). In this context, the organization can leverage the gathered elements fully, thereby promoting organizational learning (Nawaz et al., 2020).

Measuring the elements constituting tacit knowledge in the proposed research model identifies four factors that have implications for universities. Each of them provides an approach to the expected formality in this dimension. The considered factors are knowledge acquisition, knowledge transfer, innovation, and problem-solving.

Initially, it is necessary to identify the sources from which knowledge is obtained. Whether formal or informal, organizational design requires that organization employees clearly

identify which documents provide more specific information and are therefore highly usable (Vega, 2009).

Knowledge transfer, the second factor of explicit knowledge, has been recognized as a competitive growth element in organizations (Situmorang & Japutra, 2024). This activity is the most human one that exists since the formation of human resources can be found in every organization (Wang et al., 2023). It is even more pronounced in institutions whose primary role is education.

Even though they have been separated in the model due to methodological needs, the reality is that innovation and problem-solving go hand in hand. Based on these two factorial dimensions, the potential of explicit knowledge can be envisioned. Various organizational levels can benefit from them, so measuring them can lead to tangible efficiency elements (Ganguly & Talukdar, 2019).

METHODOLOGY

The research design is based on an in-depth descriptive review, establishing scientific criteria to connect existing theories of knowledge management and competitiveness, with a particular focus on higher education institutions. Emphasis is placed on conducting a documentary search in digital databases, incorporating classical and cutting-edge elements.

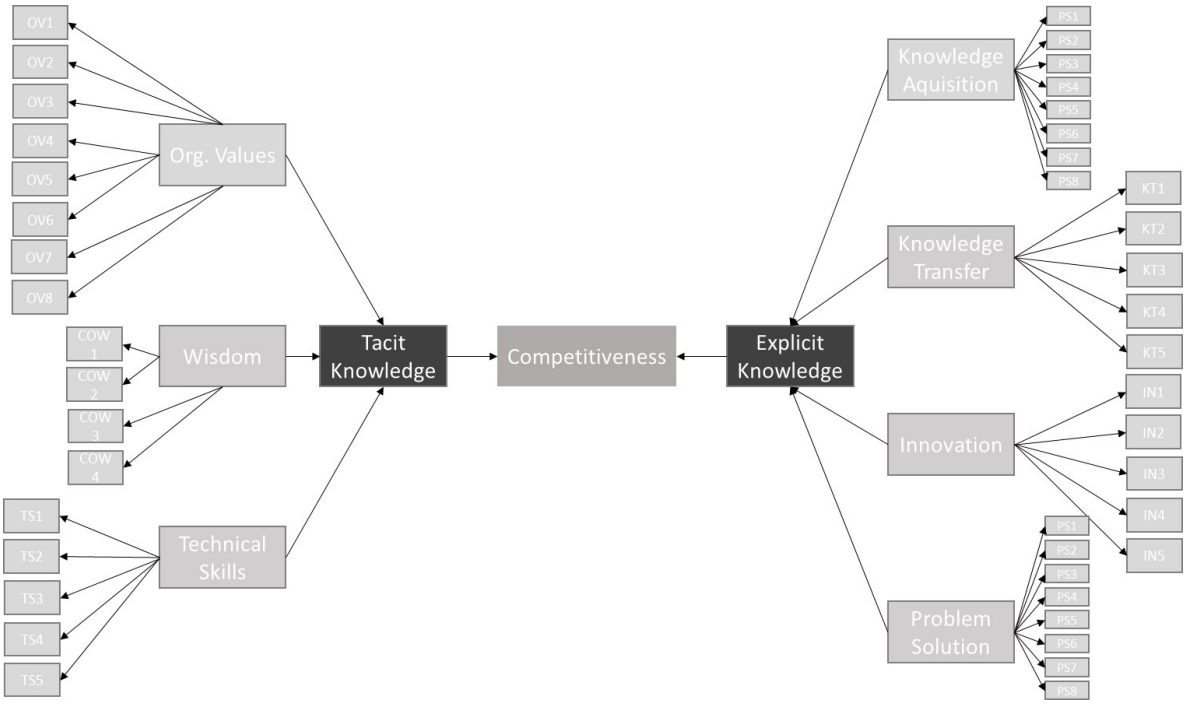
This study is non-experimental, comprising primary and secondary data compilation. A correlational approach is employed to develop and analyze the variables used. The primary intention is to identify common grounds and intersections within the model used. Subsequently, this model serves as the foundation for creating a quantitative measurement instrument derived from confirmatory data analysis models employing structural equations.

The model's outcomes are based on the quantitative data produced by the program and the correlations found among the analyzed variables. Consequently, the explanation of the model goes beyond the subjectivity of the theories utilized.

Research Outcomes

The analysis of the elements constituting the dimensions referred to as 'tacit knowledge' and 'explicit knowledge' was undertaken, along with modeling their correlations as observed in AMOS. The resulting diagram is provided below. Due to the substantial number of variables, it is included in the document purely for illustrative purposes; the correlations and outcomes will be reviewed explicitly in this section.

Figure 1
Correlation Diagram Modeling



Source: Own elaboration.

To adequately analyze the presented model, an initial assessment of questionnaire reliability was conducted. The selected sections comprise 43 items, designed on a Likert scale for enhanced control in multivariate studies. Based on the Cronbach's Alpha result, the model exhibited a reliability value of 0.992, equivalent to 99.2%, indicating its validity for establishing interpretive criteria.

Each of the variables represented in the model corresponds to an item from the sections of the questionnaires titled 'Tacit Knowledge' and 'Explicit Knowledge.' These elements will be cross-referenced through a confirmatory factor analysis in the AMOS software. The dimension of 'Competitiveness' is set as the independent variable. To review the nomenclature for each item, please refer to Appendix 1.

The values obtained from these cross-references will be expressed in Table 1. Each name in this graphical representation signifies an individual item from the questionnaire. The analysis intends to ascertain the most pertinent elements in terms of factors and establish a quantitative assessment of the elements that can foster competitive advantages in higher education institutions.

Table 1
The adjusted model of primary correlations Tacit and explicit knowledge versus competitiveness

Dimension	High Value	Medium Value	Low Value	No Related
Campus Divisions	0.868			
University Regulations	0.852			
Social Impact Projects	0.815			
Mutual Support	0.805			
University Management	0.796			
Labor Union Needs	0.787			
Campus Union Rep	0.761			
High Profitability Projects	0.743			
Government Investors	0.741			
University Academics	0.739			
Democracy	0.72			
Academic Planning	0.717			
Alum Employers	0.711			
Equity	0.711			
External Experience of the Teaching Staff	0.708			
Labor Union	0.703			
University Data Bases		0.699		
Forums		0.698		
Honesty		0.694		
University Executives		0.693		
Solidarity		0.681		
Academic Develop		0.68		
Online Platform		0.667		
Private Investors		0.662		
Teaching Needs		0.66		
Classroom Tech		0.659		
Academic Training		0.642		
Entrepreneurship		0.628		
Justice		0.621		
Social Development		0.614		
Equality		0.607		
Respect		0.604		
Peace Education (Inclusion)		0.601		
Entrepreneurship recruitment		0.6		
Professional Experience Staff			0.592	
Professors Problems			0.568	
Scientific Sources			0.538	
Professional Training			0.527	
Administrative Staff				0.493

Campus Department Chief				0.485
Professors				0.464
Academic Freedom				0.455
Students				0.374

Source: Own elaboration.

The values derived from the analyzed model have been categorized into four distinct types. Higher values represent the most significant opportunities for fostering competitiveness. In this analysis, elements exhibiting correlation levels ranging from 0.89 to 0.70 were taken into consideration, following a descending model.

Similarly, elements displaying moderate values indicate the potential for competitive processes, though adjustments or opportunity analyses are required to establish competitive advantages. For this study, elements with values falling between 0.59 and 0.5 were given consideration. In the case of elements with lower values, they can sporadically trigger competitiveness, and their utilization within the environment may not always be imperative.

Conversely, values lacking practical application are deemed unrelated to the competitiveness factor. While they may hold importance for the organization, they do not constitute essential components for the desired competitive edge.

As indicated in Table 1, the primary drivers for generating competitive advantages predominantly center on internal facets of the university. The most notable factor is the "campus divisions," with a numeric value of 86.6%, underscoring the need for an in-depth review of this sector to become a catalyst for competitiveness.

Other noteworthy elements encompass highly profitable projects and public investment participation, both boasting a correlation value of 70%. It is important to underscore that in these instances, the projects' potential is realized through meticulous evaluation and appropriate financial incentives, a pivotal requirement.

Moreover, it is imperative to acknowledge that correlation between environmental factors does not inherently denote optimal performance. In certain instances, a functional overhaul is indispensable to attain competitive development.

Table 2
Main components analysis

	Independence Model
CMIN/DF	10.7
RMR	0.004
RMSEA	0.015
Hoelter	0.5

Source: Own elaboration.

Except for the first component, CMIN/DF, the values fit a normal model, which indicates that the correlations given in the table above are valid for generating the interpretation of the model. With this, the analysis created from a structural equation model is entirely satisfactory.

Even though there may be other tables of components, the reality is that these four presented are sufficient to establish the validity of the variable intersections that were generated.

It is important to mention that the complementary values can be useful when considering specific variables in generating competitive advantages in higher education institutions.

This facilitates the understanding of the competitive advantages necessary to maximize their presence in international rankings, thus promoting the growth of the university institution.

CONCLUSIONS

The study conducted provides valuable insights into the process of generating competitiveness for higher education institutions. The proposed dimensions, "tacit knowledge" and "explicit knowledge," underwent analysis, and the results presented in the previous section yield conclusive elements.

Firstly, regarding the internal segment of universities, it was discovered that the main factors contributing to the development of competitive advantages lie within the university itself. This highlights the fundamental role of university resources, dependencies, and representations in determining their competitive position.

Secondly, the importance of "campus divisions" was recognized, particularly in the departmental model of the university. Among all the elements, "campus divisions" emerged as the most critical factor, with a significant numerical value of 86.6%. This underscores the

need for a comprehensive review and improvement of these divisions to harness their potential as a key driver of competitiveness.

Thirdly, the study emphasized the significance of private and government investment in promoting profitable student-generated projects. Such projects showed notable importance, with a correlation value of 70%. This emphasizes the necessity of carefully evaluating and providing appropriate economic incentives to maximize the benefits of these projects, thereby enhancing the university's competitive advantage.

The study also revealed that the mere correlation between elements within the university environment does not guarantee optimal performance. Positive relationships between certain factors do not necessarily translate into their maximum performance. Therefore, a strategic focus on functional restructuring becomes crucial for effective competitive development.

In conclusion, the results suggest that to strengthen its competitive position, the university should focus on internal aspects, particularly "campus divisions." Additionally, it should prioritize the appropriate evaluation and support of highly profitable projects and government investments. However, it is essential to recognize that mere positive correlations between factors are insufficient to ensure maximum performance. A well-planned functional restructuring approach is necessary to unleash the university's full competitive potential.

Overall, considering these key findings and implementing strategic actions accordingly can enhance the university's competitive advantages, improve its international rankings, and facilitate its growth as a distinguished higher education institution.

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APPENDIX

TACIT KNOWLEDGE AND EXPLICIT KNOWLEDGE QUESTIONNAIRE

SECTION B.- KNOWLEDGE MANAGEMENT

B1. TACIT KNOWLEDGE

Organization Values - OV
Your community always participates in:

		1	2	3	4	5	N/A
OV1	Democracy						
OV2	Fairness						
OV3	Honesty						
OV4	Justice						
OV5	Equality among individuals						
OV6	Solidarity						
OV7	Education for peace						
OV8	Respect						

Organizational Wisdom
Does your institution always

		1	2	3	4	5	N/A
COW1	Focuses on meeting the individual needs of the teachers.						
COW2	Focuses on meeting the collective needs of teachers.						
COW3	Conducts forums for teachers to express themselves						
COW4	Supports the development of collective knowledge						

Technical Skills
Does your institution, always…

		1	2	3	4	5	N/A
TS1	Recognizes the academic experience of the teacher						
TS2	Recognizes the professional experience of the teacher						
TS3	Recognizes academic freedom						
TS4	Encourages academic/pedagogical training of teachers						
TS5	Encourages the professional training of teachers						

B2.- EXPLICIT KNOWLEDGE

Knowledge Adquisition
Your institution provides knowledge from…

		1	2	3	4	5	N/A
KA1	Obtained through scientific sources						
KA2	Obtained from teachers						
KA3	Obtained from students						
KA4	Obtained from administrative staff						
KA5	Obtained from managers						
KA6	Develops functional projects with social impact						
KA7	Is focused on entrepreneurship development						
KA8	Promotes and supports entrepreneurial skills						

Knowledge Transfer
In your university, knowledge is used to…

		1	2	3	4	5	N/A
KT1	Develop functional projects with social impact						
KT2	Develop functional projects with high profitability						
KT3	To develop entrepreneurship projects by students.						
KT4	Develop collaborative projects with private companies						
KT5	Develop collaborative projects with government						

Innovation
Innovation is working into

		1	2	3	4	5	N/A
IN1	Academic Management Systems (Lists, Grading, etc.)						
IN2	Administrative Management Systems (Procedures, Certificates, etc.)						
IN3	Academic platforms for teaching online classes.						
IN4	Use of information technologies in the classroom.						
IN5	Access to local databases						

Problem solution
When a problema is active your university search in…

		1	2	3	4	5	N/A
PS1	University regulations						
PS2	The academic secretariat						
PS3	The administrative secretariat						
PS4	The divisions						
PS5	The Heads of the departments (where it is attached)						
PS6	The academic delegation						
PS7	The Union of Academic						
PS8	Talks with other academics						