

# Planning and Management Competency Among Business Students in East-central Mexico

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**Abstract:** Managerial skills are of utmost importance because they are continually required by the majority of industries worldwide. In the case of Latin America, more than 80% of organizations continue to have job vacancies due to underqualified applicants. In Mexico, more than 70% of these positions are still vacant. Puebla, a city located in east-central Mexico, is considered a cosmopolitan hub and a business center in the manufacturing industry, in data analysis, sales, cybersecurity, and certified operators, administrative management, human capital management, and customer service positions. It has been proposed that employers provide courses to develop employability skills and other development activities. Nonetheless, some soft skills and other competencies continue to be lacking in most employment candidates. This paper consists of an exploratory approach of a descriptive cross-sectional, qualitative, and broader study that aims to identify students' (64 participants) competencies (communication, planning and management, teamwork, strategic action, multicultural, and self-management) by collecting data through an instrument of 95 items proposed by Hellriegel. This study looks to 1) highlight the preliminary results of the planning and management competency of graduates of a Business School from a private higher education institution (Tecnologico de Monterrey) in east-central Mexico (Puebla). This competency consists of the ability to anticipate decision-making to respond to internal and external changes of global organizations. Some of the characteristics that imply the development of this competency are data collection, problem-solving, organization and project planning, time administration, budget preparation and financial administration. We found that students showed an average development in this competency (72.6 points out of 100 according to the instrument). Thus, institutions are encouraged to undertake strategies to enhance this competency among students, such as: assessment for the development and analysis of problems in real-life companies, proposing alternative solutions, and assuming calculated risks, among other tasks. These preliminary findings can help higher education institutions determine the skills they can develop more before graduating. Identifying areas for improvement in students' skills can strengthen skill development program designs to equip them for Industry 4.0.

**Keywords:** Business, Competencies, Educational innovation, Higher education, Planning and management, Public and private sector

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## 1. Introduction

In the last five years, employment across countries has changed significantly, from labor environments (hybrid and remote) to the skills and competencies needed (digital, soft skills). Today's global market continues to demand more technology-based qualified candidates who can adapt to rapid changes and adopt innovative practices. Overall, the development of competencies is essential for individuals to secure employment upon graduation.

According to the World Economic Forum (WEF), some of the competencies needed the most were leadership and active listening, among others (2023). There is a shortage of skilled candidates in different areas, plus other competencies have emerged as significantly important for individuals to acquire (digital competencies). Such skills are crucial for the individual, society, and rising business expectations (Ballester-Miquel et al, 2025; Viviers, et al., 2026; Ding and Xie, 2026). Therefore, enhancing competencies is a priority for organizations for professional sustainability (Guevara-Ramirez et al., 2026; Ballester-Miquel et al., 2026; Pribadi et al., 2026). This development improves competitiveness and satisfies the needs of labor tendencies (Duan et al, 2024).

There is a global need to strengthen "the teaching-learning-application chain" (Gan y Liu, 2026), with competencies being a combination for effective development in the workforce (OECD, 2025). The aim is to overcome deficiencies in pre-university programs that facilitate the enhancement of skills (Rincón et al, 2026). In countries such as Australia, Canada, and China, among others, there has been an emphasis on the imbalance of skills in graduates who are not adapted to the needs of the labor market, which leads them to face greater job instability (Liu et al., 2026).

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has provided a set of skills and competencies that people should possess and achieve its Sustainable Development Goals (SDGs). In the Education for Sustainable Development Goals (2017) report (2017), UNESCO notes that:

*“Competencies describe the (...) attributes (...) [needed] for action and self-organization in various complex contexts and situations. They include cognitive, affective, volitional, and motivational elements (...). [They] cannot be taught, but have to be developed by the learners themselves” (p. 10).*

Tecnologico de Monterrey is a private HEI in Mexico and the highest-ranked in the country and 187 globally by QS World University Rankings (2024). Through its academic model, *Modelo Tec*, students develop competencies.

In 2007, the Principles of Responsible Management Education (PRME) was created to shift conceptions of business (Russo et al., 2023). However, “under the increasing pressures (...), Business Schools [have been] forced to resemble (...) enterprises (...), rather than critically reflective and globally thinking citizens who can challenge and change these very conditions” (p. 8). According to Shoemaker (2008), the boom that business schools produced in the early 2000s caused some programs to focus on research production; the real-world application, competency development and soft skills of business and management were neglected.

In Mexico, the Mexican Institute for Competitiveness A.C. (IMCO for its initials in Spanish) reported that one of the main difficulties companies report when filling positions is the lack of qualified candidates (IMCO, 2023; ManpowerGroup, 2024; 2025). Despite this, the National Institute of Statistics and Geography (INEGI for its initials in Spanish) reported that 87.1% of unemployed personnel had a higher level of instruction (INEGI, 2024). The Institute for the Future of Education reported that out of 100 employers globally, only 24 fill vacancies (Pacheco, 2024).

The state of Puebla (Mexico) has a strong industrial market. But, a study by IMCO and the Employers' Confederation of the Mexican Republic (Coparmex) found that it has a 75% shortage of qualified personnel to fill vacancies (IMCO, 2023). The market demands competencies that contribute to skill development (Ramírez-Díaz, 2020). With this said, Coparmex identified that possible candidates for employment should have developed their soft skills (Mora, 2023).

In 2023, the WEF reported that companies relied on competencies for their operations and success (2023). Therefore, this study's problem statement reads as follows: HEIs need to adopt strategies to develop students' planning and management competencies at a higher level for the workforce. The study is relevant in Mexico (ManpowerGroup, 2024; IMCO, 2023; SIC, 2024) and in the European markets as well, where there is a need for qualified candidates (CEDEFOP, 2018).

By identifying students' planning and management competencies, HEIs can enhance them. Therefore, the results of the study can be of aid for HEIs to have more employable students in the workforce at the end of their studies. This study intends to identify the gaps in competency development of graduates from a business school, from the perspective of employers (ManpowerGroup, 2024; IMCO, 2023; SIC, 2024 and CEDEFOP, 2018).

## **2. Literature Review**

The study of the development of competency management and planning continues to be central for today's workforce (Tushar and Sooraksa, 2023). This competency is essential for micro, small, and medium businesses worldwide (ONU, 2026; BBVA, 2025; Zambrano *et al.*, 2021; Delgado-Caramutti, 2026).

Previous studies have noted that some of the competencies the industry requires are teamwork and multicultural work, among others (Edmonds et al., 2024). Additionally, other studies have presented more than twenty competencies and skills needed by employers, to highlight a few: strategic management and data analysis (Ardika et al., 2026). In 2023, the Mexican Institute for Competitiveness A.C. (IMCO) reported that there is the lack of qualified candidates (IMCO, 2023).

There is a need for the industry to collaborate in the development of education programs oriented to the workforce needs (Pang, 2019). Also, studies such as that of Edmonds et al. (2024) found that students who completed their studies after the COVID-19 pandemic experienced a breach between acquired competencies and those sought by employers. Regarding curriculum or project co-creation to enhance planning and management competencies, there is not enough literature that evaluates the level achieved by students. Nonetheless, several studies present successful case studies where both actors participated for a week or a semester, but without these competencies to develop in mind.

This study intends to disseminate the preliminary results of students' competencies through Hellriegel's (2021) instrument, specifically those related to planning and management skills. Disseminating the results of this competency to the corresponding higher education institutions may benefit future graduates by presenting

them with the skills in demand by industries. Thus, it reduces gaps between the supply and demand of skills in the labor market.

This study looks to highlight the preliminary results of the planning and management competency of graduates of a Business School from a private higher education institution (Tecnologico de Monterrey) in east-central Mexico (Puebla). The study aims to answer the following research questions: 1) Do graduates' competencies satisfy the demands of companies in the state of Puebla? 2) How are graduate students' planning and management competencies in relation to Hellriegel's instrument? This study allowed us to know competency gaps of recently graduated students and those the industry demands (Tushar & Sooraksa, 2023; IMCO, 2023; Delgado-Caramutti, 2026).

### **3. Methods**

This study was conclusive, meaning that, according to Malhotra (2020), this type of result "supports decision-making, evaluation, and the selection of [an] adequate course of action" (p.67). The research design was descriptive, which is regarded as "a type of conclusive research [that looks to describe], usually the characteristics or function of the market" (Malhotra 2020, p. 70; Bernal, 2016, p. 143). Identifying the competencies is intended to be a descriptive exercise to "show, narrate (...) and identify facts, situations, aspects, characteristics of an object". Also, the study was intended to be cross-sectional and non-experimental, meaning that without deliberate manipulation of variables, participants would be studied in their environment (HEI) for analysis (Hernández et al, 2014).

To understand the planning and management competency among graduates, participants in the study were invited via email. They had to be graduating students from the School of Business of Tecnológico de Monterrey (Puebla campus). Sixty-four individuals agreed to participate in the study; their ages ranged from 24 to 26 years old. Forty-two percent were men and 58% were women.

Participants were informed of the objective, duration, and procedure (questionnaire via Google Forms) of the study. They were informed that their participation was voluntary and they were able to decline or withdraw at any moment during the study. They were informed of the potential risks (none), the confidentiality of their personal information, and the people with access to their answers to the questionnaire. All participants provided informed consent. A non-probabilistic sample by convenience was conducted, one which "looks to obtain a sample of convenient elements"(Malhotra 2020, p. 342).

Documentary research techniques were used for the bibliographic review, and field techniques were used for gathering information from the participants of the study through questionnaires. The questionnaire was intended to understand the level reached in the dimension of the competencies developed, as proposed by Hellriegel et al. (2021) (see Table 1), and their definition of competencies: "the set of knowledge, abilities, conduct, and attitudes that a person should possess to be effective in a wide variety of positions, and in different types of organizations".

**Table 1: Planning and Management competency and its dimensions according to Hellriegel's et al. (2021)**

| Competencies            | Dimensiones                                                                                                                                        |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Planning and Management | Information gathering, analysis, and problem-solving<br>Project planning and organization<br>Time management<br>Budgeting and financial management |

Our proposed questionnaire is based on these six competencies, which are also aligned with those suggested by the institution (Tec de Monterrey), the OECD, and UNESCO. It was aligned and suggested due to prior knowledge of the industry needs in the state of Puebla. Lastly, it was based on experience (one of the authors has worked closely with Coparmex).

These competencies were measured through a 95-item survey. This study only presents preliminary results of the planning and management competency, which consists of defining which activities will be affected and how, as well as the use of resources and the evaluation of the activities. This competency was selected due to it being among the most sought after for industry roles in need of qualified candidates in the region (Puebla). The

questionnaire was self-administered individually (Hernandez et al., 2014); it was composed of closed questions so participants could select between several options (Meneses and Rodriguez, 2016). The results were evaluated and analyzed according to the proposed weighting of the survey (Hellriegel et al, 2021).

#### 4. Results and Discussion

The survey was conducted with undergraduate students from a business program. Exploratory data analysis (EDA) is being conducted at the moment. Overall, some preliminary results from this data collection of the six competencies indicate that communication and self-management competencies are key. However, this paper presents the preliminary results of the planning and management competency only.

Initial results indicated that students are at an average level in the competency. Also, to determine the level reached in each dimension by participants, five development levels are considered (Hellriegel et al., 2021) (see Table 2).

**Table 2: Levels reached for each competency dimension according to Hellriegel's et al. (2021)**

| Level | Description of level reached                                                                                          |
|-------|-----------------------------------------------------------------------------------------------------------------------|
| 1     | I have very little relevant experience. I haven't even started developing this feature yet.                           |
| 2     | I consider myself weak in this area. I have relevant experience, but my performance has not been good.                |
| 3     | I consider myself about average in this area. I will need a significant, focused effort to be consistently effective. |
| 4     | I believe I'm above average in this area. I'll need to develop it further to become truly effective.                  |
| 5     | I believe I excel in this area. I must maintain my high effectiveness in the same way.                                |

To understand the level of competency development, scores given to each of the questions comprising each dimension were added together; then, they were divided by the number of questions. Once the average of the 4 dimensions was obtained, all of them were added together and divided by four, which are the dimensions that comprise the planning and management competency, and multiplied by 20. This puts it on the proposed scale according to the development of the competence (see Table 3).

**Table 3: Interpretation of the results obtained in the competency according to Hellriegel's et al. (2021)**

| Grade / Points achieved | Description of the level of competence achieved                                                                                 |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 20-39                   | The individual has little relevant experience and is quite weak in this competency.                                             |
| 40-59                   | Overall, the individual is weak in this competency, but performs satisfactorily or a little better in some features.            |
| 60-74                   | Overall, the individual is at an average level in this competency and above average or slightly above average in some features. |
| 75-89                   | Overall, the individual is at an average level in this competency and excels in some areas.                                     |
| 90-100                  | In general, the individual excels in this competency.                                                                           |

The results of each dimension of the competency are presented.

### *Information gathering, analysis, and problem-solving*

This dimension had between 16 and 20 items in the questionnaire. The average score was 3.67 points. This dimension measures the ability to identify information that allows an individual to identify problems, propose solutions, make decisions, and take risks. This dimension comprises items 16 through 20. The sum of these scores yields an average of 3.67 points. Out of a possible 5 points, they achieved 73.4%.

### *Project planning and organization*

The second dimension had from 21 to 25 items in the questionnaire. The average score was 3.59. This dimension measures the capacity to organize agendas and plans that allow managing resources effectively, prioritizing task order, and delegating responsibilities. There is a need to enhance their short- and long-term presentation skills, as well as resource organization.

### *Time management*

This dimension had 26 to 30 items in the questionnaire. It measures how an individual handles multiple tasks simultaneously and under time pressure without losing control. The average score was 3.71 points. Participants were able to achieve focus without losing patience to execute several projects under time constraints.

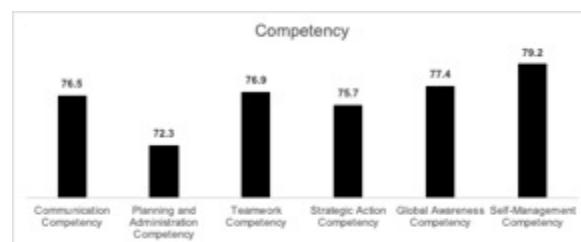
### *Budgeting and financial management*

The last dimension had 31 from 35 items in the questionnaire. The average score was 3.50 points. This measures the ability to understand, execute, and maintain financial reports that enable decision-making. This dimension scored the lowest. Participants had to develop their knowledge of budgets, cash flow, and reading of financial reports for decision-making, which in turn is highly useful for decision-making and optimal use of resources.

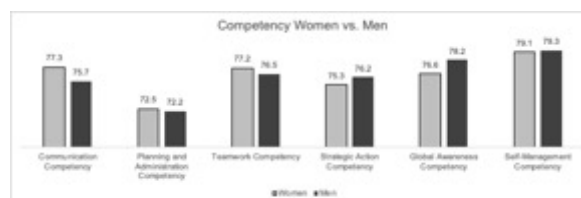
Today, there continue to be studies on development of competencies to reduce gaps between workforce qualifications and those of graduates (Lewis y Barder, 2026); volitional skills and their influence on group collaboration and cohesion (Taruona, H. y Botha, M. (2025); technical, cognitive and methodological competencies and interpersonal and socioemotional ones (Keller y Dern, 2026).

This study aimed to reduce the gap between graduates and the industry's demand by identifying the opportunity areas of competency development. With this, academia can strategize to strengthen those competencies that respond to the industry's needs.

Overall results of all six competencies, including planning and management, of the 64 participants are represented in Figure 1. Additionally, Figure 2 shows results of all six competencies from participants divided by gender. It is to note that women stood out in planning and management competency, while male participants ranked higher in strategic action, multiculturality, and management competencies (see Figure 2).



**Figure 1: Results of the acquired competencies by participants**



**Figure 2: Results of the acquired competencies by participants (by gender)**

For the discussion section, the interpretation of findings suggests that students have an overall good understanding of the planning and management competency. However, there were slight differences between each dimension and the level of comprehension among the participants.

Additionally, as Ardika et al. (2026) noted, the industry continues to change at a rapid pace. With the arrival of artificial intelligence (AI), the workforce has taken up a different approach to hiring and scouting for future employees. Skills such as data analysis and strategic management, among others, are highly attractive to employers looking to reduce the number of employees and increase their revenues.

If students do not have their planning and management competency properly developed, it is highly likely that they will be overlooked by the industry and will be considered outdated when referring to competitiveness in today's AI-driven workforce. As Giraud, Zaher, Hernandez & Akram (2023) pointed, "if managerial skills are automated or augmented, organisations must remain attentive to how they can ensure optimal human-AI interactions" (p. 23).

Nonetheless, the efficiency of planning and management skills will also depend on different aspects, such as "(1) corporate and regional culture regarding risk taking, (2) data availability and quality, (3) digital transformation strategy, (4) level of discretion regarding AI ethics, (5) organisational structure and context, and (6) collective intelligence and power sharing" (Giraud, Zaher, Hernandez & Akram, 2023, p. 22).

In Puebla, most of the industries that have reported vacant positions need candidates with management competencies broadened (Mora, 2023). This last one is key for industries in east-central Mexico. As noted by Mora (2023), this competency can enhance team performance, and essential in this competitive AI-driven market (Ardika et al., 2026).

The results of the planning and management competency of graduates reflect the need to reinforce it. Without a stronger level of such competency, graduates will continue to lack the sufficient competencies and the required profile that companies look for in successful candidates. Without this key competency properly developed, individuals lack employment opportunities not only in the AI market but also in most management positions (Mora, 2023).

## **5. Limitations of the Study**

This paper presents preliminary results of a broader research study; the planning and management competency is only one of six of the instrument. It is suggested to compare this level of competency with the others to understand if graduates are developing all of these at an acceptable level. The study addresses a small number of participants and does not reflect all graduates of East-Central Mexico. However, it does incorporate other participants from four different types of HEIs (public and private), which can be of aid to future curriculum design educators.

## **6. Conclusion**

Competencies for today's technology-driven job market are an important issue to develop and track for higher education institutions (HEIs). While students acquire and develop needed skills and competencies during their undergraduate studies, there are still a vast number of jobs available due to the lack of a skilled labor force. This study aimed to identify the level of planning and management competency of graduates of a private HEI. Additionally, our approach to understanding the level of this competency was to align it with those sought after by industries from several fields in east-central Mexico, and the regions where industries need candidates.

We expect that this initial report of findings can contribute to the creation of competencies and skill development programs early on in HEIs, and in the onboarding process of new hires. This is to enrich students' skills and develop new talents and existing competencies in those who have already concluded their studies.

### *Future studies*

It is intended to conduct semi-structured interviews with some of the participants, subsequently to inquire about their perception of their competencies and skills. Also, cross-collaboration work, with a proper diagnosis of students, can provide competencies at a high or above-average level. Future research is intended to produce an analysis of all of the competencies, and AI competencies as well.

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**Ethics declaration:** The information obtained through the forms was collected with the written consent and anonymity of the participants for the publication of the results obtained. The questionnaire was revised and approved by field experts of two higher education institutions.

**Competing interests:** This is to acknowledge that the authors report no competing interests to declare.

**Declaration of generative AI and AI-assisted technologies in the writing process:** During the preparation of this work, the author(s) used the free version of Grammarly to check the correct grammar of our original text, since our native language is not English but Spanish (Mexico).

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