





Documentary analysis on productivity in enterprises

Maria Guadalupe Santillan-Valdelamar^{*a*}, Francelin Dimas-Díaz^{*a*}, José Isaías Martínez-Corona^{*b*} & Gloria Edith Palacios-Almón^{*b*}

^a Tecnológico Nacional de México, Campus Occidente del Estado de Hidalgo, Hidalgo, México. msantillan@itsoeh.edu.mx, fdimas@itsoeh.edu.mx ^b Tecnológico Nacional de México, Campus San Luis Potosí, San Luis Potosí México. jose.mc@slp.tecnm.mx, gloria.pa@slp.tecnm.mx

Received: April 30th, 2024. Received in revised form: August 11th, 2024. Accepted: August 16th, 2024.

Abstract

Productivity is a key indicator for the sustainable growth of enterprises. However, small and medium-sized enterprises (SMEs) often do not measure it; therefore, there is a need to develop a greater understanding of this concept as a subject of study. A study was conducted with a qualitative approach using a documentary analysis technique based on a documentary record instrument. The research objective is to locate, analyze, and synthesize scientific evidence on business productivity to strengthen the theoretical and methodological foundations for further analysis and application in future studies. The results are presented in the following categories: Productivity concepts, efficiency, effectiveness, and competitiveness; variables or factors affecting productivity; productivity techniques and tools; case studies on productivity; and productivity and human talent. The findings of this research can contribute to promoting the measurement of productivity in SMEs.

Keywords: documentary analysis; productivity in enterprises; productivity techniques.

Análisis documental sobre la productividad en las empresas

Resumen

La productividad es un indicador clave para el crecimiento sostenible de las empresas. Sin embargo, las PYMES no suelen medirla; por lo que, se requiere desarrollar un mayor entendimiento de este concepto como objeto de estudio. Se desarrolló un estudio con un enfoque cualitativo con una técnica de análisis documental basado en un instrumento de registro documental. El objetivo de la investigación es localizar, analizar y sintetizar evidencia científica sobre la productividad de las empresas para fortalecer las bases teóricas y metodológicas para profundizar su análisis y aplicación en futuros estudios. Los resultados se presentan en las siguientes categorías: Conceptos de productividad, eficiencia, eficacia y competitividad; variables o factores que afectan la productividad; técnicas y herramientas de la productividad; casos de estudio sobre la productividad; y, productividad y talento humano. Los hallazgos de esta investigación pueden contribuir a promover la medición de la productividad en las PYMES.

Palabras clave: análisis documental; productividad en las empresas; técnicas de productividad

1 Introduction

The competitiveness of a country is the ability of its economy to provide its population with a high and growing standard of living, as well as high levels of employment on a sustainable basis [1]. Additionally, it is the set of institutions, policies, and factors that determine the level of a country's productivity [1].

Thus, competitiveness is the ability of an institution to generate effective strategies aimed at maintaining and increasing its presence in the market, enhancing its productivity, negotiating capacity with other enterprises in a competitive environment determined by the market, government policies, and regional, national, and international economic alliances [2].

Productivity in a country is crucial for its sustainable and inclusive growth, which must include three fundamental pillars: strengthening human capital, improving logistical infrastructure, and fostering a business-friendly climate to encourage private investment. These three pillars should be operating within a framework of macroeconomic stability [2].

Therefore, it can be inferred that an alternative to sustain

How to cite: Santillan-Valdelamar, M.G., Dimas-Díaz, F., Martínez-Corona, J.I., and Palacios-Almón, G.E., Documentary analysis on productivity in enterprises. DYNA, 91(233), pp. 104-113, July - September, 2024.

competitiveness in these enterprises is through productivity. This concept relates to the production of goods and services in relation to resources such as labor, materials, energy, machinery, and other factors [3]. Productivity involves being both efficient and effective. In this sense, efficiency means that having many resources is not enough; it is about using available resources timely and appropriately [4].

Consequently, the measurement of productivity is an excellent way to assess a country's ability to enhance the standard of living for its population. Only through increased productivity can the standard of living be improved [5]. However, it is observed that currently, small and medium-sized enterprises (SMEs) do not employ tools to enhance production and process management because they are not aware of their importance and necessity, as well as their complexity [6]. Thus, it is relevant to delve into the topic through available scientific evidence to trigger understanding as a subject of study and provide references for offering solutions to enterprises.

Therefore, this research is proposed and justified in terms of criteria suggested by Hernández-Sampieri [7]. Firstly, considering that it will contribute to understanding the factors influencing organizational productivity (theoretical value). Secondly, the study's results will help reveal the forms of productivity in enterprises (practical implication). Lastly, through the research findings, a model will be developed to understand and enhance productivity through the study's variables (methodological value).

As a result, to provide a perspective on the subject of study, a synthesis of theory and concepts associated with productivity is presented with the intention of providing answers to the following questions: How is productivity measured? What are the main productivity tools?

In this context, Juez [8] mentions that productivity aims to measure the result of a process or processes within an organization. Therefore, an important aspect is the analysis of efficiency concerning resource utilization; the fewer resources invested to produce the same or greater number of profits, the better the efficiency. Productivity is observed by the ratio between the output obtained and the resources used. To calculate a country's productivity, the Gross Domestic Product (GDP) is divided by the hours worked. It is important to note that factors affecting productivity include the quantity and quality of human resources, the quantity and quality of natural resources, capital invested in the industry, the macroeconomic and microeconomic environment, technological level, and industry configuration.

As a means to increase productivity, various methodologies and tools have been studied, including Lean Manufacturing. Vargas-Crisóstomo and Camero-Jiménez [9] define lean manufacturing as a model of excellence and continuous improvement in management, involving the elimination of waste that does not add value to the product and comprises various tools.

In this sense, lean manufacturing has become an alternative to enhance productivity and develop manufacturing competencies that impact competitiveness. The lean manufacturing tools that have the greatest impact on enterprises' productivity include 5S, Total Productive Maintenance, Just-in-Time (JIT), Kaizen, Kanban, SingleMinute Exchange of Die (SMED), and Value Stream Mapping (VSM). The indicators that best measure productivity are those related to efficiency, effectiveness, and internal factors [10].

Meanwhile, according to Socconini [11], lean manufacturing tools are defined as the systematic and continuous process of identifying and eliminating excesses or waste. Excess refers to any activity in the process that does not add value but involves work and cost. Therefore, lean manufacturing should be understood as a set of tireless and uninterrupted activities to create innovative, effective, and efficient enterprises. Given this premise, it is considered important to explore the most relevant ones.

58: The primary benefit of implementing the 5S methodology in enterprises is the increase in productivity. This results from having fewer defective products, fewer accidents, reduced unnecessary movements, less time spent on tool changes, improved quality, and ultimately, creating a conducive work environment [12].

Kaizen: As proposed by Vargas-Crisóstomo and Camero-Jiménez [9], the word Kaizen means improvement directed towards the satisfaction of functional and cross-cutting goals such as quality, costs, and human potential. All with the aim of achieving greater customer satisfaction.

TPM (Total Productive Maintenance): TPM is defined as a set of techniques aimed at eliminating breakdowns through the participation and motivation of all employees [13]. This methodological work strategy is aimed to create an operating system that increases the efficiency of all the equipment involved in the company's production process to guarantee its correct functioning, thus avoiding waste due to loss of time when equipment fails, which would lead to non-compliance with customers and higher costs for the company [14].

Kanban: Kanban focuses on limiting work in progress and visualizing the development value stream, leading to a reduction in cycle time [15]. Krishnaiyer [16] defines Kanban as a visual tool for monitoring and controlling resource consumption and production of an enterprise. It is responsible for managing inventory levels, continuous material flow, and is used to track progress in the production process [17]. The Kanban methodology seeks to achieve a productive, organized and efficient process. Its main objective is to ensure sustainable production to avoid excess final product, bottlenecks and delivery delays. Work in progress must be organized according to the capacity of work centers and teamwork. The system requires real-time communication about capacity [18].

VSM (Value Stream Mapping): Value Stream Mapping is a lean tool implemented to explore the current scenario of the enterprise and information flow [19].

SMED (Single-Minute Exchange of Die): SMED reduces setup time by changing internal tasks to external tasks during this operation [20]. SMED is a methodology for analyzing and improving time lost in production series changes due to running setups. Its original definition argues that tool changes to make on a production line should be completed in less than 10 min. It focuses on the analysis, systematization and standardization of tasks performed by the machine operator or the line crew [21].

Just-in-Time: According to Fory [22], continuous process improvement is a crucial theme for enterprises, leading them to implement strategies to reduce economic losses, time, and resources.

In this context, it is confirmed that a tool for productivity is lean manufacturing. This is essential in enterprises because it is composed, in turn, of a set of tools that help eliminate all signs of waste in the production system, with the aim of optimizing the profits, product quality, and satisfying customer needs and demands [17]. In this sense, lean manufacturing practices are not only about implementing them, but also about the development of people and the transformation of the culture of enterprises [23].

On another note, it is recognized that enterprises seek to offer more and better services at attractive prices to customers without affecting their profits. One strategy to achieve this is by minimizing production costs through process standardization, as it reduces failures, waste, and increases productivity [24]. In this regard, enterprises should use methodologies and tools to diagnose their processes, identify critical points, and invest in strategies that optimize the operations of their value chain, the use of their resources, and the quality of their products, in order to consistently exceed customer expectations and achieve differentiation in the market [25].

On their part, Quijia-Pillajo [25] indicate that the characteristics of enterprises that most significantly drive productivity are: trained human capital, relationships with other enterprises through a business group, commercial openness through exports, and foreign capital investment. These factors generate productivity benefits such as increased availability of intermediate goods, access to new technologies, technical consultancy, and the dissemination of knowledge. Meanwhile, Agudelo [27] mentions that the variables with the greatest impact on labor productivity are job satisfaction, teamwork/cohesion, and organizational climate. On the other hand, the dimensions with less impact on labor productivity are competencies and employee participation.

Given all the above, the objective of the present research is to locate, analyze, and synthesize information on the productivity of enterprises to delve into its study through a documentary analysis. Therefore, the research results will be presented in the following analysis categories: (a) category 1. Concepts of productivity, efficiency, effectiveness, and competitiveness in enterprises, (b) category 2. Identifying the variables or factors that affect productivity in enterprises, (c) category 3. Identifying the techniques and tools of productivity in enterprises, (d) category 4. Case studies on productivity in enterprises, and (e) category 5. Productivity and human talent.

2 Methodology

2.1 Study type

The present research was conducted through a qualitative approach, which, according to Vega-Malagón [28], is based on data collection methods without numerical measurement, such as description and observation of the phenomenon. The authors also assert that the process is flexible and moves between events and

Table 1.		
Analysis of categories for	r the	study

Analysis category	Main question		
Concepts of productivity, efficiency, effectiveness and competitiveness in enterprises.	What is the meaning of productivity, efficiency, effectiveness and competitiveness in an enterprise?		
Variables or factors affecting productivity in enterprises.	What are the variables or factors that affect productivity in enterprises?		
Techniques and tools for productivity in enterprises.	What are the techniques and/or tools of productivity in enterprises?		
Case studies on productivity in enterprises.	What are the case studies of productivity?		
Productivity and human talent.	What is the relationship between productivity and human talent?		

Source: Own elaboration

their interpretation. Additionally, it relies on a logical and inductive process to explore, describe, and generate theoretical perspectives by evaluating the natural development of events without manipulation or stimulation of reality [7].

On the other hand, the applied analysis technique is documentary analysis, which is a form of technical research. It involves a set of intellectual operations aimed at describing and representing documents in a unified and systematic manner to facilitate their retrieval and interpretation [29]. Martinez-Corona and Palacios-Almon [30] consider documentary analysis as a recognized scientific procedure characterized by a systematic process to investigate, collect, organize, analyze, and interpret information related to a research topic in the context of documentary research.

2.2 Data collection instrument and analysis categories

The instrument for gathering information was documentary recording. This refers to the set of strategies and methods for retrieving information documented in physical or digital documents, which, through certain tools, enable the consultation of the sources from which information is obtained [31]. The collected information possesses the characteristic of contributing to answering the central questions of the study, as outlined in Table 1.

2.3 Documentary analysis procedure and document selection criteria

The present study revolved around the subject of study called the productivity of enterprises. Therefore, this work allowed the search, retrieval, and analysis of documentary sources using fixation techniques, data localization, and content analysis guided by logical procedures for this type of research, such as reading, synthesis, and deduction [32].

In the documentary record, initially, it contains excerpts (verbatim quotes) from articles in indexed journals. Subsequently, if deemed necessary, it is supplemented with academic books and other documents that contribute to the study topic. This way, the consolidation of documents serves as a strategy to carry out the analysis of documents with the aim of systematizing, building, and communicating concepts and theories of high academic relevance based on established categories [33].

Table 2. Documents included in the documentary record

Aspect	Latin-American	From other countries
On the subject	9	4
Contextual	5	7
Total	14	13
Source: Own elabora	ation	

In this context, based on the proposal by Martinez-Corona and Palacios-Almon [30], the development of the present study will deepen the understanding of the subject of study and contribute elements for future research studies to be conducted with scientific rigor, thus obtaining relevant and quality results. Consequently, the procedure proposed by the same authors, which also represents the document selection criteria, was developed, consisting of four phases:

- 1. Documents such as scientific articles, books, or book chapters were located in databases such as WoS, Science Direct, Scielo, Redalyc, Scopus, Latindex, and Google Scholar.
- 2. A combination of essential and complementary keywords was used.
- 3. The time range for document search was determined, considering updated information from the year 2019. Only in exceptional cases and considering the document's relevance were elements from previous years considered for inclusion.
- 4. Documents addressing at least one category determined for the study, considering one or more elements, were integrated into the analysis.
- 5. The selected articles are written in Spanish or English.

2.4 Analyzed documents (sample)

To integrate the analysis of the categories, searches were conducted in scientific databases using the following keywords: "productivity, efficiency, and effectiveness", "productivity factors", "techniques and tools of productivity", "case studies on productivity" and "productivity" and human talent." Once located, the documentary record was compiled. Out of a total of 120 located documents, in the screening process under the selection criteria, a total of 27 documents were included as the unit of analysis, which are summarized in Table 2.

3 Results

Next, once all the steps of the methodological process have been completed, the results of the documentary analysis on the topic of productivity in enterprises are presented, in accordance with the established categories.

Category 1: Concepts of productivity, efficiency, effectiveness, and competitiveness in enterprises

To initiate the study on enterprises' productivity, some concepts of great importance will be defined. Thus, Gómez-Gómez [4] indicates that efficiency is related to the intelligent management and use of available resources, avoiding waste, and contributing to the generation of value. In this sense, it involves using the few or many available resources opportunistically and appropriately; that is, when needed and for what they are needed. On the other hand, effectiveness is understood as the achievement of objectives, which can be attained regardless of the resources used, sometimes at any cost, whether for customer satisfaction, achieving production goals, and/or meeting sales quotas. Under the author's logic, it can be inferred that a concept of productivity not widely explored is as follows: achieving objectives with the intelligent use of resources or, in other words, productivity is being both efficient and effective simultaneously. In other words, efficiency and effectiveness are two interdependent concepts that, when managed together and interrelated, result in what is known as productivity.

In another context, it is known that a large number of enterprises have ceased to be competitive due to low productivity, often linked to inefficient process management, failures in information traceability, and processes that hinder the functioning of the enterprise. This scenario has created the need for enterprises to achieve a global change in their processes, aligning them based on market demands through the application of radical improvement methodologies. This involves Process Reengineering, seeking to restructure enterprises to achieve more effective results [34]. Consequently, the alternative to sustain competitiveness in enterprises is through productivity. This concept relates to the production of goods and services in relation to resources used, such as labor, materials, energy, machinery, or other factors [3].

Additionally, it is relevant to consider that, according to Momeni and Ni [35], quality and productivity are key factors after a crisis to gain competitive advantages and economic recovery. Therefore, economic development is currently reflected in an enterprise success; hence, the planning of any process is closely related to the productivity with which progress is made. When discussing productivity, it encompasses both elements and activities that come together to achieve a single result. The authors mention that improvements in measuring productivity are reflected in the fact that, with the use of fewer resources and/or activities, better results can be obtained [36].

Category 2: Variables or factors affecting productivity in enterprises

The globalization of markets has led enterprises to make constant decisions aimed at improving their competitiveness in uncertain environments. This pursuit typically focuses on reducing costs and increasing quality. The latter is reflected in the product and delivery times, especially because enterprises seek to enhance their processes, including the production process and its planning. Hence, the Master Production Schedule (MPS) involves establishing organizational decisions in advance to optimize the use of resources within a timeframe convenient for the enterprise. Simultaneously, it determines the quantities and dates at which the enterprise's distribution inventories should be available.

In this regard, the MPS is only concerned with products and components subject to external demand from the production unit, while Material Requirement Planning (MRP) is a detailed plan specifying the specific quantity and exact dates of product manufacturing, considering the foundations for shipping times and delivery to the customer. This contributes to achieving the enterprise's strategic objectives and resolves negotiations between manufacturing and marketing by effectively utilizing plant capacity [37].

Quijia-Pillajo [26] indicate that an analysis of the determinants of productivity in Ecuador shows that the characteristics of enterprises that most significantly drive productivity are: trained human capital, relationships with other enterprises through a business group, commercial openness through exports, and foreign capital investment. These factors generate productivity benefits such as increased availability of intermediate goods, access to new technologies, technical consultancy, and knowledge dissemination. Therefore, to boost the productivity of enterprises based on these results, it is recommended that they focus on incorporating employees with high levels of education. This is because such personnel possess a broader knowledge domain that would influence productivity. Additionally, fostering interaction between enterprises in any form, whether through exports or alliances, is crucial to generate new knowledge and innovation.

Under this argument, Agudelo-Orrego and Escobar-Valencia [27] mention that when descriptively analyzing the variables with the most significant impact on labor productivity, both managers and employees agree that job satisfaction is crucial. Therefore, it is important to clearly define tasks and distribute them according to the capabilities of the collaborators. Another important factor is teamwork/cohesion, which should be encouraged through cooperation and the clear definition of objectives to be achieved. Similarly, organizational climate plays a significant role, promoting the establishment of a positive work environment represented by feedback, communication, and integration. On the other hand, the dimensions with less impact on labor productivity are competencies and employee participation.

Now, according to Uemura [38], when discussing productivity with workers and plant managers, mentions efficiency given the current workspace considered as a (active) production asset. It is desirable to save not only processing time but also workspace to improve asset efficiency. Particularly, when there is a significant difference in orders due to the season, and sales during the peak season must cover fixed costs during the off-season, it is necessary to maximize asset productivity during the peak season. From this perspective, the effective use of space is an important issue because not only can the process time be shortened by consolidating excess space and shortening the production line, but also, if another production equipment can be placed in the vacant space, the production volume will increase dramatically.

Category 3: Techniques and tools for productivity in enterprises

The modern state of the global economy shows that a nation cannot proceed in isolation. For effective

development, there must be a connection between the economies of different nations. This interconnected global economy has led to strong competition among industries. Because of this, ensuring quality, cost, and production technology has become crucial. This is where the concept of lean manufacturing seems to be suitable [39].

Under this reasoning, when considering the objectives pursued by the enterprise, the most suitable tools for this strategy can be selected. These actions, accompanied by other methodologies such as job standardization and other tools, not only impact the improvement of the manufacturing process but also generate a better understanding of the process by both technical staff and factory workers [40].

To achieve an increase in competitiveness, enterprises can choose different innovative management strategies that help improve various parameters of this function. One such strategy that has been proven with favorable results worldwide is lean manufacturing [41]. Additionally, industrial enterprises currently face the challenge of identifying and implementing new organizational and production techniques that allow them to compete in a global market. Thus, the lean manufacturing model has become an alternative to increase productivity and develop manufacturing competencies that impact competitiveness. However, the effect that each of the lean manufacturing tools contributes to achieving productivity is unknown [10].

In this sense, lean manufacturing becomes a strategic tool that involves all areas of an enterprise, not only due to its various applications within an organization but also because it has the potential for application in any type of enterprise; moreover, it can be adjusted to different scenarios with excellent results. This was demonstrated in a project through the review of various lean tools that can be applied in Occupational Safety and Health and simultaneously impact process optimization [42].

The above becomes relevant since the manufacturing industry in Mexico is a key element for the country's development. This is considering that, in a highly competitive environment, enterprises seek to offer more and better services at attractive prices to customers without affecting their profits. One strategy to achieve this is to minimize production costs through process standardization, as it reduces failures, waste, and increases productivity [24].

In this regard, manufacturing enterprises implement lean manufacturing tools to maintain their competitiveness against competitors by improving the productivity of the system. It is noteworthy that Value Stream Mapping (VSM) is a fundamental tool for implementing the lean approach and can be used in many sectors of the industry [19].

As cited in Sosa-Solano and Zeña-Ramos [36], they report the analyses and tests conducted in an enterprise where the aim was to improve the productivity of the working area using the lean manufacturing concept. The authors identified the main problems affecting productivity in the production area of the product. The authors used time studies during the evaluation, yielding data that showed a significant improvement in production and product realization after the application of lean manufacturing, along with a reduction in process time.

In this context, lean manufacturing is a method that focuses on organizational improvement; thus, applying it in the enterprise will eliminate any activity or input that hinders productivity. In addition, it provides feasible solutions that focus on the growth of the enterprise [36].

Finally, lean manufacturing improves the quality and productivity of the product, minimizes taks time, manufacturing waste and inventory, and eliminates activities that do not add value [43].

Category 4: Case studies on productivity in enterprises

An example of the consequences of not having measures to ensure quality and productivity can be found in the scientific literature. In this regard, it is worth mentioning that, according to Flores-Meza [6], there is a significant percentage of small and medium-sized enterprises (SMEs) in the Peruvian textile market that incur economic losses due to penalties paid to customers, mainly related to delays in delivering order batches. The authors argue that this is due to poor production management and a lack of focus. It is also important to note that the manufacturing sector is crucial for its substantial contribution to the country's gross domestic product. This is because SMEs do not employ methodologies to improve production and process management, as they are unaware of the importance and necessity of such methodologies, as well as how complex they can be. Thus, these models will help enterprises avoid incurring economic losses due to penalties for orders not delivered on time.

The authors propose a model, and to validate it, a time simulation was conducted in the manufacturing area of the mentioned textile enterprise. In particular, the Lean Production Management Model integrates knowledge and change management along with 5S and Kanban techniques to achieve better implementation results. It is essential to consider the human factor as a primary factor for success.

Now, in the competitive, dynamic, and changing environment in which enterprises operate today, new challenges are posed to grow and sustain over time. Therefore, aspects such as customer satisfaction, innovation, and social responsibility are increasingly used objectives by enterprises. However, elements like quality and productivity continue to be critical factors in the sustainability of the business. To achieve this, enterprises must use methodologies and tools to diagnose their processes, identify critical points, and invest in strategies that optimize the operations of their value chain, the use of their resources, and the quality of their products. All with the aim of consistently exceeding customer expectations and achieving differentiation in the market [25].

In this sense, the use of tools from the Toyota Production System, also known as Lean Manufacturing, plays a fundamental role in eliminating waste and continuously improving industrial production levels. It can also be implemented in various sectors of the enterprise, as well as in any industry area, enabling continuous improvement of production processes [44].

Related to the above, it is asserted that lean is recognized as one of the most effective methodologies for improving production processes. This can be observed in a study in the packaging labeling sector [45]. Where the idea of optimizing first and then automating is followed. This approach contributed to the following: reduced operation times, increased production rates, and better use of human resources. From this perspective, it is an improvement method through which production problems and methods of operation are examined to find a solution that ensures quality and greater efficiency; with this approach, there is a constant search to use fewer resources.

Another case is proposed by Veres [46], aiming to help enterprises take the initial steps in the lean implementation project. A conceptual model was developed to simplify the process and define specific steps to follow. The four phases are: Planning, Training, Development, and Coaching. The model was tested in the healthcare environment, in the Romanian public sector, and the results showed increased productivity, improved employee workplace perception, reduced time loss, reduced movement, and other enhancements.

It is important to mention that Juan de Dios-Pando [17] state that organizations tend to generate the need to implement lean manufacturing tools (TPM, 5S, SMED, Kanban, Heijunka, among others); these tools are useful for competing and excelling efficiently in their industry. In the authors' study, it is revealed that lean manufacturing is essential in the footwear industry because it consists of a set of tools that help eliminate all signs of waste in the production system with the aim of optimizing the enterprise's profits, product quality, and meeting customer needs and demands.

In another study, the practice of the 5S principles in the manufacturing of small and medium-sized enterprises (SMEs) has been widely discussed in scientific studies related to critical success factors (CSF) and challenges for improving organizational performance. The importance of performance measurement for sustaining 5S becomes a strategic value in the improvement process and waste elimination [47].

In this context, there are several examples of successful lean practices in manufacturing and service; to reduce costs, achieve quality, and increase competitiveness. However, some enterprises still do not adopt lean practice. Lean practices are not just about implementing tools but also about developing people and transforming the enterprise culture [23].

Category 5: Productivity and human talent

The independent variables, climate, and job satisfaction, although two distinct topics, are related. The former refers to the attributes of the entity, while the latter focuses on the attitudes of its workers in their job [48]. In relation to these variables, it is considered that they are subdivided into the dimensions of leadership and motivation for work climate, while commitment is related to job satisfaction [49].

Therefore, for Ramírez-Torres [50], it is of utmost importance to invest in intellectual capital through knowledge management to increase productivity, competitiveness, and the overall capacity of the enterprise to perform in context. Thus, managerial management in the current globalization framework implies a high level of adaptation to changes for enterprises, in addition to planning, direction, coordination, and control in resource management to enhance their competitive capabilities. Hence, it is important to enhance human behavior at work, increasing people's ability to be efficient and effective by incorporating and/or appropriating the philosophy, values, and corporate culture of the enterprises. This aims to raise awareness of occupational activity with a socially responsible sense concerning learning, goal achievement based on assigned functions, relationships, and interpersonal and professional growth, among others.

In addition to the above, it is mentioned that there are enterprises that consider human talent a fundamental part of the organization and, therefore, focus on providing workers with training in social areas relevant to their work. This approach aims to create a trustful environment with appropriate instructions for their employment, allowing them to contribute maximally to the enterprise. This leads to the conclusion that the productivity of human talent goes hand in hand with training, as it can have a positive impact on workers, making them more committed to their work. In this way, they navigate smoothly within their workspace without any issues and feel motivated by the effort the enterprise puts into creating an environment of trust, providing suitable knowledge to achieve short and longterm objectives set by the enterprise as a whole [51].

In light of all the above, [52] warns that enterprises should invest and develop in the following areas: research and development (R&D) processes, topics related to human capital, managerial skills, the application of ICTs, healthy virtual workspaces, hybrid work (in-person and virtual), technical competencies, emotional salary, professional development plans within the enterprise, friendly physical and operational infrastructures, social responsibility, creativity and innovation, added value to the job position, motivational leadership, emotional intelligence, among other topics. It is also crucial to observe their impact on personal and team performance. Therefore, it is essential for enterprises to genuinely and comprehensively link the human component of collaborators in the administrative and strategic management of the business as a key success factor. This is driven by the vigor, effort, intellect, ability, and attitude that only the workforce of people can make possible in relation to all the mission processes of enterprises.

4 Discussion and conclusions

As a result of the documentary analysis, it is highlighted that efficiency and effectiveness are two interdependent concepts, and when managed together and interrelated, it leads to what is known as productivity. On the other hand, competitiveness refers to the ability of an enterprise or individual to compete in a market, involving the capacity to offer quality products or services at competitive prices. Competitiveness is based on productivity, effectiveness, and efficiency, as a more productive, effective, and efficient enterprise tends to be more competitive in the market.

Therefore, in the business context, the concepts of productivity, efficiency, effectiveness, and competitiveness are fundamental for the success and growth of an enterprise. For this purpose, proper strategic planning, clear task allocation, and effective work organization, along with the correct standardization of

processes, can optimize productivity.

Additionally, the use of technologies provides appropriate tools and well-maintained equipment, factors that can enhance productivity in enterprises. Likewise, training, motivation, job satisfaction, and the competence of personnel can influence an enterprise's productivity, underscoring the importance of having trained and motivated employees while fostering teamwork. Similarly, a positive and well-organized work environment, with a collaborative culture and good working atmosphere, can significantly impact productivity.

Moreover, the economic environment, government regulations, competition, changes in market demand, and other external factors can affect an enterprise's productivity. It is important to note that these variables may vary depending on the industry type, enterprise size, and other specific factors in each case.

Implementing productivity techniques and tools in enterprises can help improve efficiency and performance. Identifying and addressing issues affecting productivity and promoting business growth through the development of human talent and integrating the human component into administrative and strategic business management are crucial.

Enterprises should use methodologies and tools to diagnose their processes, and the use of tools from the Toyota production system plays a fundamental role in waste elimination and continuous improvement. To achieve an increase in competitiveness, enterprises use various tools to minimize production costs through process standardization, reducing errors and waste.

Enterprises select specific tools to increase their competitiveness, and one tool they have adopted for continuous improvement is lean manufacturing, transforming it into a strategic tool that involves all areas of the enterprise. Applying this tool in the enterprise eliminates any activity or input that may cause delays in productivity while providing feasible solutions focused on the enterprise's growth.

Ensuring that responsibilities are evenly distributed and that each team member understands their role and responsibilities promotes greater efficiency and prevents duplicated efforts. Similarly, fostering a culture of continuous improvement, where employees identify and propose ways to optimize existing processes and procedures, encourages team members to provide regular feedback and implement improvements when necessary.

Investing in the training and skill development of employees is also essential. This helps improve their effectiveness and quality of work, as well as their ability to implement new productivity techniques and tools.

Various case studies on productivity in enterprises were analyzed, where some authors implemented a production management model that integrates knowledge and techniques such as 5S or Kanban, highlighting the importance of the human factor. In the case study of the packaging labeling sector, it is stated that the lean methodology has been one of the most effective for improving production processes. Other lean implementation projects, where a model of planning, training, development, and coaching was developed, showed an increase in productivity, an improvement in the perception of the workplace, and a reduction in time and movements.

Adding to the above, we can observe that enterprises that

have applied some lean model or practice have achieved a reduction in waste, time, and streamlined processes, moving towards a culture of continuous improvement.

Productivity and human talent are intrinsically related in an enterprise. Human talent refers to the skills, knowledge, and competencies of the members of a workforce. The effective management of human talent can have a significant impact on the productivity and overall performance of an enterprise.

It is crucial to recruit and select candidates with the right skills for the job. Identifying and hiring talented individuals with potential can increase long-term productivity and ensure a better cultural fit. Investing in employee development and training is essential to harness their talents and skills to the fullest. Providing professional development programs and training opportunities enhances employees' competencies and knowledge, which can boost their productivity.

Effective communication among team members promotes a collaborative work environment and encourages the exchange of ideas and knowledge. Recognizing and rewarding employees' achievements can increase their motivation and commitment. Intrinsically motivated individuals are often more productive and willing to make an effort to achieve results.

Promoting a healthy work-life balance helps employees maintain high levels of energy and commitment. This can prevent burnout and improve job satisfaction, ultimately translating into higher productivity.

In conclusion, with the results of this study, a better understanding of the study object, namely productivity in enterprises, has been achieved. In this regard, further analysis can be conducted in future studies or approaches on the same topic.

References

- Meller, P., Productividad, competitividad e innovación: perspectiva conceptual [en línea], 2019 [consulta, 28 de junio de 2023]. Disponible en: chromeextension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.ciepla n.org/wp-content/uploads/2019/10/Perspectiva-Conceptual-e-Interrelaci%C3%B3n.pdf
- [2] Benites-Gutiérrez, L.A., Ruff-Escobar, C., Ruiz-Toledo, M., Pérez, A, M., Inca-Alayo, M., and Juica-Martínez, P., Análisis de los factores de competitividad para la productividad sostenible de las PYMES en Trujillo (Perú), Revista de Métodos Cuatitativos para la Economía y la Empresa, 29, pp. 208-236, 2020. DOI: https://doi.org/10.46661/revmetodoscuanteconempresa.3513
- [3] Morris-Molina, L.H., Entre ingeniería, tecnología y productividad. Entre Ciencia e Ingeniería, 14(28), pp. 7-9, 2020. DOI: https://doi.org/10.31908/19098367.1849
- Gómez-Gómez, I.O., Dos palabras: productividad y competitividad. LUPA Empresarial, 20(20), pp. 1-7, 2019. DOI: https://doi.org/10.16967/01232061.752
- [5] Heizer, J., and Render, B., Principios de Administración de Operaciones. México, Pearson Educación, 2009.
- [6] Flores-Meza, S., Limaymanta-Perales, J., Eyzaquirre-Munarriz, J., Raymundo-Ibañez, C., and Pérez, M., Lean manufacturing model for production management to increase SME productivity in the non-primary manufacturing sector. IOP Conference Series: Materials Science and Engineering, Vol. 796, The 9th AIC 2019 on Sciences & Engineering (9thAIC-SE) 18-20 September 2019, Banda

Aceh, Indonesia. DOI: https://doi.org/10.1088/1757-899X/796/1/012019
[7] Hernández-Sampieri, R., Metodología de la Investigación. México, Mc Graw Hill, 2014.

- [8] Juez, J., Productividad Extrema. Cómo ser más eficiente, producir más, y mejor. [en línea], 2020. [consulta, 23 de julio de 2023]. Disponible en: https://books.google.com.mx/books?id=2YznDwAAQBAJ&printsec=fr ontcover&hl=es&source=gbs_ge_summary_r&cad=0#v=onepage&q&f =false
- [9] Vargas-Crisóstomo, E.L., and Camero-Jiménez, J.W., Aplicación del Lean Manufacturing (5s y Kaizen) para el incremento de la productividad en el área de producción de adhesivos acuosos de una empresa manufacturera, Producción y Gestión, 24(2), pp. 249-260, 2021. DOI: https://doi.org/10.15381/idata.v24i2.19485
- [10] Favela-Herrera, M., Escobedo-Portillo, M., Romero-López, R., and Hernández-Gómez, J., Herramientas de manufactura esbelta que inciden en la productividad de una organización: modelo conceptual propuesto, Revista Lasallista de Investigación, 16(1), pp. 115-133, 2019. DOI: https://doi.org/10.22507/rli.v16n1a6
- [11] Soconini, L., Lean maufacturing paso a paso, Barcelona, Marge Books, 2019.
- [12] Inga-Salazar, K., Coyla-Castillon, S., and Montoya-Cárdenas, G., Metodologías 5S: una revisión bibliográfica y futuras líneas de investigación. Revista de Investigación Científica y Tecnológica Qantu Yachay, 2(1), pp. 41-63, 2022. DOI:https://doi.org/10.54942/qantuyachay.v2i1.20
- [13] Obeso-Alfaro, A.P., Yaya-Sarmiento, J.J., y Chucuya-Huallpachoque, R.C., Implementación del mantenimiento productivo total en la mejora de la productividad y mantenibilidad del proceso de harina de pescado, Ingnosis, 5(2), pp. 126-138, 2019. DOI:https://doi.org/10.18050/ingnosis.v5i2.2334
- [14] Carrillo-Landazábal, M.S., Alvis-Ruiz, C.G., Mendoza-Álvarez, Y.Y., and Cohen-Padilla, H.E., Lean Manufacturing: 5s y TPM, herramientas de mejora de la calidad: caso empresa metalmecánica en Cartagena, Colombia. Signos, 11(1), pp. 71-86, 2019. DOI: https://doi.org/10.15332/s2145-1389.2019.0001.04
- [15] Hofmann, C., Lauber, S., Haefner, B., and Lanza, G., Development of an agile development method based on Kanban for distributed part-time teams and an introduction framework. 8th Conference on Learning Factories 2018 - Advanced Engineering Education & Training for Manufacturing Innovation, Procedia Manufacturing, 23, pp. 45-50, 2018.
- [16] Krishnaiyer, K., Frank-Chen, F., and Bouzary, H., Cloud kanban framework for service operations management. 28th International Conference on Flexible Automation and Intelligent Manufacturing (FAIM2018), June 11-14, 2018, Columbus, OH, USA.
- [17] Juan de Dios-Pando, J., Pariona-Huaycuchi, R., Pichardo-Flores, F., y Malpartida-Gutiérrez, J.N., Aplicación de Lean Manufacturing en empresas productoras de calzado, Revista de Investigación Científica y Tecnológica, 2(4), pp. 77-98, 2021. DOI: https://doi.org/10.47797/llamkasun.v2i4.65
- [18] Castellano-Lendínez, L.K., Metodología para aumentar la eficiencia de los procesos. 3C Tecnología, Glosas de innovación aplicadas a la pyme, 8(1), pp. 30-40, 2019. DOI: https://doi.org/10.17993/3ctecno/2019. v8n1e29/30-41
- [19] Mojib-Zahraee, S., Tolooie, A., Jameh-Abrishami, S., Shiwakoti, N., and Stasinopoulos, P. Lean manufacturing analysis of a heater industry based on value stream mapping and computer simulation. 30th International Conference on Flexible Automation and Intelligent Manufacturing (FAIM2021), Athens, Greece. Procedia Maufacturing, 51(1), pp. 1379-1386, 2020.
- [20] Vieira, A.M, Silva, F.J.G., Campilho, R.D.S.G., Ferreira, L.P., Sá, J.C., and Pereira, T., SMED methodology applied to the deep drawing process in the automotive industry. 30th International Conference on Flexible Automation and Intelligent Manufacturing (FAIM2021), Athens, Greece. Procedia Manufacturing, 51, pp. 1416-1422, 2020.
- [21] Silva, A., Sá, J.C., Santos, G., Silva, F.J.G., Ferreira, L.P., Pereira, M.T., Implementation of SMED in a cutting line. 30th International Conference on Flexible Automation and Intelligent Manufacturing (FAIM2021), Athens, Greece. Procedia Manufacturing, 51, pp. 15-18, 2021.
- [22] Fory-Lucumi, J.E., Calderón-Rosero, C.E., Martínez-Escobar, N., Implementación de Justo a Tiempo en el proceso de abastecimiento de materia prima en una empresa de refrigeradores industriales, Ingeniería Industrial [online]. 2019. [date of reference 23 de octubre de 2023].

Available at: https://www.studocu.com/pe/document/servicionacional-de-adiestramiento-en-trabajo-industrial/formacionpractica-remota/implementacion-de-justo/27761385

- [23] Raweewan, M., and Kojima, F., Digital Lean manufacturingcollaborative university-industry education in systems design for lean transformation. 10th Conference on Learning Factories, CLF2020, Procedia Manufacturing, 45, pp. 183-188, 2020.
- [24] Espíndola-Pérez, M.A., y Hernández-González, J.C., Revisión de la literatura sobre la estandarización de procesos productivos a nivel científico. Memorias del Congreso Internacional de Investigación Academia Journals Tabasco 2020. Academia Journal, 12(6), pp. 1-10, 2020.
- [25] Genett-Jimenez, G.S., Sá, J.C., Ricardo, S., Pulido, J., Pizarro, A., and Hernández, H., Improvement of Productivity and quality in the value chain through lean manufacturing: a case study. 8th Manufacturing Engineering Society International Conference. Procedia Manufacturing, 41, pp. 882-889, 2019.
- [26] Quijia-Pillajo, J., Guevara-Rosero, G.C., and Ramírez-Álvarez, J., Determinantes de la productividad laboral para las empresas ecuatorianas en el periodo 2009-2014. Revista Politécnica, 47(1), pp. 17-26, 2021. DOI: https://doi.org/10.33333/rp.vol47n1.02
- [27] Agudelo-Orrego, B.E., y Escobar-Valencia, M., Análisis de la productividad laboral en el sector panificador del Valle del Cauca, Colombia. Revista de Ciencias Sociales, XXVIII (2), pp. 122-136, 2022. [date of reference February 26th of 2022]. Available at: https://produccioncientificaluz.org/index.php/rcs/index
- [28] Vega-Malagón, G., Ávila-Morales, J., Vega-Malagón, A.J., Camacho-Calderón, N., Becerril-Santos, A., and Leo-Amador, G.E., Paradigmas de la investigación. enfoque cuantitativo y cualitativo. European Scientific Journal, 10(15), pp. 523-528, 2014.
- [29] Arredondo-Cortés, S.A., Educación y formación docente para el desarrollo social sostenible: un comentario desde la socioformación. Religación. Revista de Ciencias Sociales y Humanidades, 5(4), pp. 39-48, 2020. DOI: https://doi.org/10.46652/rgn.v5i24.638
- [30] Martínez-Corona, J.I., and Palacios-Almón, G.E., and Oliva-Garza, D.B., Guía para la revisión y el análisis documental: propuesta desde el enfoque investigativo. Revista Científica Ra Ximhai. En prensa., 19(1), pp. 67-83, 2013. DOI: https://doi.org/10.35197/rx.19.01.2023.03.jm
- [31] Téllez-Carvajal, E., Análisis documental sobre el tema del big data y su impacto en los derechos humanos. Revista de la Facultad de Derecho, Derecho PUCP, 84, pp. 155-188, 2020. DOI: https://doi.org/10.18800/derechopucp.202001.006
- [32] Salas-Medina, P.E., and Velastegui-Sánchez, J.R., and Salas-Álvarez, W.T., Análisis documental sobre calidad y seguridad turística en las festividades de Tungurahua, Ecuador. Uniandes Episteme. Revista digital de Ciencia, Tecnología e Innovación [Online], 6(1), pp. 96-110, 2019. [date of reference April 21st of 2023]. Available at: https://revista.uniandes.edu.ec/ojs/index.php/EPISTEME/article/vi ew/1172
- [33] Tobón, S., Guzmán, C.E., Hernández, J.S., y Cardona, S., Sociedad del conocimiento: estudio documental desde una perspectiva humanista y compleja. Revista Paradigma, 36(2), pp. 7-36, 2015. [date of reference June 25th of 2023]. Available at: https://ve.scielo.org/scielo.php?script=sci_arttext&pid=S1011-22512015000200002
- [34] Sánchez-Comas, A., Vásquez-Osorio, L.E., Pérez-Vargas, M., Caicedo-García, M., Neira-Rodado, D., and Troncoso-Palacio, A., Herramienta de diagnóstico para la mejora radical de los procesos de negocio. Conferencia de la OIO. Categoría: Ciencia e ingeniería de materiales. Expotecnología 2019. Investigación, Innovación y Desarrollo en Ingeniería, 844, pp. 1-15, 2020. DOI: https://10.1088/1757-899X/844/1/012052
- [35] Momeni, F., and Ni, J., Quality Improve as productivity increases: machining as proof. 49th SME North American Manufacturing Research Conference, NAMRC 49, Ohio, USA. Procedia Manufacturing, 53, pp. 299-309, 2021.
- [36] Sosa-Solano, M.P., and Zeña-Ramos, J.L., Lean manufacturing and productivity in compalies: a bibliographic review and future lines of research. Journal of Scientific and Technological Research

Industrial, 3(1), pp. 30-48, 2022. DOI: https://doi.org/10.47422/jstri.v3i1.24

- [37] Urbano-Aparicio, J., García-Santamaría, L.E., De la Mora-Ramírez, T., Vargas-González, J., and Cruz-García, V., Mejora de la productividad en una empresa manufacturera del norte del estado de Veracruz. Conciencia Tecnológica, 61, pp. 1-18, 2021. [date of reference November 1st of 2023]. Available at: https://www.redalyc.org/articulo.oa?id=94467989005
- [38] Uemura, T., Kani, Y., Yamada, T., Hamamoto, K., Ilyina, A. D., Miller, S.D., Rodionov, A.A., and Ono, H., Mejorando el éxito de Kaizen en los países de la CEI: una lista de verificación de 4M-7W-5K para obtenga ideas de los gerentes y trabajadores. Diario de Negocios Globales, 7(1), pp. 10-21, 2021.
- [39] Kumar, N., Shahzeb-Hasan, S.S., Srivastava, K., Akhtar, R., Yadav, R. K., Choubey, V.K., Lean manufacturing techniques and its implementation: a review. Materials Today: Proceedings, pp. 1-5, 2022. DOI: https://doi.org/10.1016/j.matpr.2022.03.481
- [40] Pérez, S., Gallego, S., and García, M., Production optimization oriented to value-added: from conceptual to a simulation case study. 9th Manufacturing Engineering Society International Conference (MESIC 2021). IOP Conf. Series: Materials Science and Engineering, 1193, pp. 1-9, 2021. DOI: https://10.1088/1757-899X/1193/1/012100.
- [41] Juárez-León, S., García-González, R., and Guevara-Ramírez, I. Capítulo 4, Mejoramiento de la productividad en Pymes de la industria manufacturera del vestido aplicando manufactura esbelta. En: Los sistemas de calidad en las operaciones fomentando la competitividad de las empresas, Fondo Editorial Uiniversitario, Universidad de Guadalajara, 2019. [en línea]. [date of reference February 26th of 2023]. Available at: Chrome-

extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.cucea.udg. mx/sites/default/files/documentos/adjuntos_pagina/sistemas_de_calidad _en_las_operaciones_2019.pdf

- [42] Tortorella, G., Cómbita-Niño, J., Monsalvo-Buelvas, J., Vadal-Pacheco, L., and Herrera-Fontalvo, Z., Design of a methodology to incorporate Lean Manufacturing tools in risk management, to reduce work accidents at service companies. 11th International Conference on Emerging Ubiquitous Systems and Pervasive Networks (EUSPN 2020). Procedia Computer Science, 177, pp. 276-283, 2020.
- [43] Khubalkar, H., Jibhakate, R.A., Walke, PV., and Kadu, R., Productivity enhancement by using VSM tools in farm equipment manufacturing company. International Conference on Advances in Mechanical Engineering ICAME 2022, IOP Conf. Series: Materials Science and Engineering, pp. 1-7, 2022. DOI: https://doi.org/10.1088/1757-899X/1259/1/012043
- [44] Santos, D.M.C., Santos, B.K., and Santos, C.G., Implementation of a standard work routine using Lean Manufacturing tools: a case study. Gestão & Produção, 28(1), pp. 1-15, 2021. DOI: https://doi.org/10.1590/0104-530X4823-20.
- [45] Diogo-Alves, Ferreira, L.P., Pereira, T., Sá, J.C., Silva, F.J.G., and Fernandes, N.O., Analysis and Improvement of the packaging sector of an industrial company. 30th International Conference on Flexible Automation and Intelligent Manufacturing (FAIM2021)15-18 June 2021, Athens, Greece. Procedia Manufacturing 51, pp. 1327-1331, 2020. DOI: https://doi.org/10.1016/j.promfg.2020.10.185
- [46] Veres, C., Conceptual model for introducing lean management instruments. 13th International Conference Interdisciplinarity in Engineering (INTER-ENG 2019). Procedia Manufacturing 46, pp. 233-237, 2020.
- [47] Setiawan, N., Salleh, M.R., Aariff, H., A-Rahman, M.A., Mohamad, E., Sulaiman, M.A., Zaini, F.F., and Ito, T., Una propuesta de modelo de gestión y medición del desempeño para la sustentabilidad 5S en PYMES manufactureras: una revisión. Journal of Advanced Mechanical Design, Systems and Manufacturing. 15(2), art. 0017, 2021. DOI: https://doi.org/10.1299/jamdsm.2021jamdsm0017
- [48] Manosalvas-Vaca, C.A., Manosalvas-Vaca, L.O., and Nieves-Quintero, J., El clima organizacional y la satisfacción laboral: un análisis cuantitativo riguroso de su relación. AD-minister, 26, pp. 5-15, 2015. DOI: https://doi.org/10.17230/ad-minister.26.1
- [49] Ordoñez-Freire, D.T., Salazar-Samaniego, J.E., Tapia-Espinoza, N.J., and Pacheco-Molina, A.M., Influencia del clima y la satisfacción laboral en el desempeño del talento humano de las empresas comercializadoras. 593, Digital Publisher CEIT, 5(6-1), pp. 410-422, 2020. DOI: https://doi.org/10.33386/593dp.2020.6-1.437

- [50] Ramírez-Torres, W., Gestión del capital humano por competencias laborales en el contexto empresarial: una revisión de literatura. Lúmina, Revista Iberoamericana de Desarrollo y Organizaciones, 1-31, 2022. 23(1).DOI pp. https://doi.org/10.30554/lumina.v23.n1.4081.2022
- [51] Obando-Changuán, M., Capacitación del talento humano y productividad: una revisión literaria. ECA Sinergia, 11(2), pp. 166-173, 2020. DOI: https://doi.org/10.33936/eca sinergia.v11i2.2254
- [52] Ramírez-Torres, W.E., Análisis de la gestión del talento humano en el contexto empresarial actual: una revisión bibliográfica. INNOVA Research Journal, 8(2), pp. 83-106, 2023. DOI: https://doi.org/10.33890/innova.v8.n2.2023.2234

M.G. Santillan-Valdelamar, is BSc in Physics and Mathematics in 2002 and MSc. in Economics from the Instituto Politécnico Nacional in 2004. Currently pursuing a doctorate in Business Training and Education at the Centro Universitario de Negocios y Estudios Profesionales. Full-time Professor at the Tecnológico Nacional de México/ IT Superior del Occidente del Estado de Hidalgo. She has the recognition of Desirable Profile PRODEP. She is an active member of the Academic Group of Industrial Engineering, as well as of the Red de Estudios Latinoamericanos en Administración y Negocios RELAYN. She has published articles in indexed journals in engineering areas. ORCID: 0000-0002-3789-9983

F. Dimas-Diaz, Is BSc. in Industrial Engineering, MSc. in Quality Management. Currently pursuing a doctorate in Business Training and Education at the Centro Universitario de Negocios y Estudios Profesionales, Full Time Professor at the Tecnológico Nacional de México /IT Superior del Occidente del Estado de Hidalgo. Recognition of the Desirable Profile PRODEP. Leader of the Academic Group of Industrial Engineering, as well as member of the Network of Latin American Studies in Business and Management RELAYN. Publications in indexed journals in the area of Engineering.

ORCID: 0000-0002-9414-5424

J.I. Martínez-Corona, is PhD. in Socio-training and Knowledge Society from the Centro Universitario CIFE. He is a Full Time Professor at the Tecnológico Nacional de México / Instituto Tecnológico de San Luis Potosí and Researcher at CUNEP. He has a trajectory as an author with publications in national and international journals. He has been recognized by institutions such as CONAHCYT as a member of the National System of Researchers (Candidate Level) and as a professor with the Desirable Profile of PRODEP. He is the leader of the Academic Group in Training and Senior Management Studies. He has extensive experience as a public servant at state and federal level. ORCID: 0000-0003-3465-5606

G.E. Palacios-Almón, Dr. in Education and PhD. in Socio-training and Knowledge Society. She is a Full Time Professor at the Tecnológico Nacional de México / Instituto Tecnológico de San Luis Potosí and Researcher at CUNEP. She has extensive experience as a public servant at state and federal level. She has published articles in national and international peer-reviewed scientific journals. She is a member of the National System of Researchers of CONAHCYT. She has the distinction of Professor with Desirable Profile of the PRODEP. Her research areas include organizational innovation, management, training and educational innovation.

ORCID: 0000-0002-2411-5553