

Design To Support The Competitiveness Of Mses With University Intervention In Post-Pandemic Times

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Summary

Micro and small businesses (MSEs) in Peru employ 85% of its Economically Active Population (PEA) and were affected by the pandemic, therefore, the objective of the research focused on developing a design to support the competitiveness of Mypes with university intervention in times of pandemic and after this, using information that was investigated two years, 2018 and 2019, applying a questionnaire, focused on three aspects: innovation, productivity and human resources, to 802 entrepreneurs from across the region of Arequipa. The results showed that the innovation of Mypes allowed them to adapt to all types of situations, allowing 81.8% to implement improvements in their products. With an average of 12 years, Mypes can expand, modify and adapt to various situations. University intervention must occur in innovation actions, university education and university support. It was concluded that the impact of the pandemic on Mypes was less due to the experience they have, however, their levels of competitiveness are not so high, so the university's intervention will allow this objective to be achieved.

Keywords: companies, competitiveness, university, intervention, pandemic



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INTRODUCTION

The development of societies is achieved with individual interest that then becomes collective interest, which can be seen in their organization and in measurable indicators such as the Gross Domestic Product (GDP) (Manrique et. al, 2012). Peru recorded a positive GDP in 2021, despite the effects of the pandemic declared by the World Health Organization (WHO, 2020), this result being positive as in the last ten years. The pandemic affected the activities of all economic sectors, which is why public policies changed to safeguard life and health, as well as in the granting of economic funds for research that can contribute to combating the effects of COVID-19 such as the one granted by the National Council of Science, Technology and Technological Innovation (CONCYTEC, 2020) or the Business Support Fund for MSEs given by the Ministry of Economy and Finance of Peru (MEF, 2020). (Gobierno del Perú, 2020)

The approaches of the people who make up the public and private sectors had to adapt to know and understand this new reality given by the pandemic, and thus make various decisions to continue with the development of

society. In the private sector, the so-called Micro and Small Enterprises (MSEs), which employ more than 85% of the economically active population, had to respect the emergency provisions given by the government, modifying their activities in order to continue. In Peru, after Lima, the country's capital, the first region that contributes to GDP and concentrates the largest number of MSEs is the Arequipa region. The research carried out by the National University of San Agustín de Arequipa (UNSA), between 2018 and 2019, allows us to know the realities of competitiveness of the MSEs of Arequipa, and thus understand why in this region, despite the Pandemic situation, the GDP continued to be positive. These results are the basis for the university to intervene more actively in achieving greater competitiveness of MSEs. When it is indicated that the university intervenes, it does not refer only to the people who make up its university community, such as teachers, students and graduates, but also to the people of the community. This intervention must be direct since it is supported by the university law Law No. 30220, published in 2014 by the Ministry of Education of Peru (MINEDU, 2014), which considers since that year, three

aspects that did not occur in the country, such as: creation of vice-rectorates for research, university social responsibility (USR) activities and support for entrepreneurship, that favor people in a geographic region.

People are the main capital of any organization, as described in the review of theoretical and empirical studies of human capital, published by Efimova et al. (2016), confirming the need to develop a systemic model of human capital, by which synergy is achieved between classic concepts such as education, competencies, health, demographic potential and new concepts related to a person's qualities such as their activity and identity; the same ones that point out that the characteristics are collective and not only individual, thus understanding that it is not possible to continue with the individualization of human capital to achieve higher levels of competitiveness. Taking into account young people in this design, (since they are the decision-makers in a current time to achieve a vision of the future), they reflect that human capital integrates six aspects: the classic notions of human capital, the ideas improved by taking the collective analysis and not only the individual, the ideas of the media, the ideas of the organizations involved in the construction of human capital, the ideas of those who wish to invest in human capital, and the ideas of negative processes that cause dissipation of the human being. Therefore, the intervention of the university in people seen as human capital can be achieved since it maintains individual and collective results, means, desire to invest and ward off possible negative events, but the authors warn that it cannot be expected to have a stock of unused human capital, that is, to provide so much preparation so that it is not consolidated in activities that favor society. We must take into account Nguyen, et al. (2021) who point out the importance of having business leaders, so that better results are achieved in MSEs and technological innovations are achieved, this is indicated after they analyzed the results of 182 small and medium-sized enterprises in Ho Chi Minh, where they appreciated that entrepreneurial orientation is not related to entrepreneurial leadership for the results of MSEs, therefore, it is concluded that entrepreneurial leadership is favorable for entrepreneurial orientation. It is not only about entrepreneurship, but about having a leader who consolidates that entrepreneurship in favorable results, thanks to the fact that they achieve innovative skills that allow them to be proactive and assume the risks that arise

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In accordance with the conclusions reached by Huang et al. (2014), when they indicate that the creativity of a human team is based on the leadership that motivates it, even if the owner has the characteristics of an entrepreneurial leader (Gupta et al., 2004), the resource that is available later is maximized and the creative resource is taken to have the highest performance (Ahlin et al., 2014; Fillis & Rentschler, 2010; Matthews, 2007; Ward, 2004). When maximizing the resource, it must be pointed out that in Latin America, it occurs in the

exploitation of natural resources, as pointed out by Wood et al. (2019) when they indicate that to achieve economic development, it is necessary to leave that "old economy" and adopt the use of all resources, as a new economy. where MSEs provide great ideas and have an entrepreneurial spirit that allows them to introduce innovation and increase competitiveness, taking into account that to strengthen this fact the intervention of three organizations is presented in a model, such as government agencies, the public institution and MSEs, so they conclude that in their model called VITAL, Public and private organizations must foster global entrepreneurship. The entrepreneurial spirit is also related to the education of MSME entrepreneurs, Bartoš et al. (2015), as confirmed by surveying 449 owners of MSEs in the Czech Republic and Slovakia through a survey that was applied to two groups of entrepreneurs; those who had a university degree and those who did not, obtaining as a result a significant difference between the motivation to undertake between both groups and that formal education does increase the management capacity of the person when becoming an entrepreneur, but they point out that the educational system is not at the expected level in several developing countries; they point out the dissatisfaction of those who complete studies about the academic part they receive. They also conclude that university graduates start their own businesses under different circumstances than those who are not graduates, since the latter do so to earn something in the living since they do not generally find work.

But education, intuition and creativity are the basis of innovations Müller (2021), people maintain a rational and emotional learning process that allows them to better enhance the teaching and learning process, both inherent characteristics of the human being would manage to profile a leading entrepreneur who achieves constant competitiveness in MSEs and achieves economic development, the author points out that education today is a constant of adaptation and development of the human being due to its own dynamism, and bases his proposal on Carl Gustav Jung's model of perception and judgment, which attributes to intuition characteristics of influence on education and creativity. In this model, the dimensions of perception are proposed, in which the feeling and intuition of people and the perception of evaluation are considered, which considers thinking and feeling, both dimensions are of the same individual and due to their own environments, experiences and internalization of facts, they achieve a level of knowledge that can reach scales of creativity that motivate the continuity of the educational process. Taking into account the Nobel Prize in physics, Prof. Dr. Gerd Binnig, it is stated that creativity is "the ability to evolve" (Binnig, 1989, p. 20; translated by the author), that is why Müller (2021), continues to indicate that lifelong education is what generates creative knowledge, therefore, education can be seen as an activity without end, if it is confined to training the skills and abilities for the future, emphasizing that education and inspiring intuition connect existing and accessible knowledge with the possible knowledge of the future. So the human

being, who becomes human capital, can be the leader who extends his knowledge in an unlimited way through the process of creativity, which is the result of education and intuition in his process of rationality and perception, this can be appreciated with the process of innovation that occurs over time. especially in MSEs, which are located in the lowest position of the economic structure of a country, but with very important contributions for governments.

Abd-Allah (2014), observes in three years of research related to the competitiveness of MSEs, that the innovation system is the constant that gives survival, profits or expansion of markets to MSEs. Innovation adheres to its activities a categorization of open innovation (OI), for de las Heras-Rosas et al (2021), they also consider that innovation is the basis for the sustainability and competitiveness of any organization and therefore of the economy, with the university being the one who must assume an important role in open innovation that brings together the company-industry in this activity, R+D, networks and knowledge transfer. From the systematic review of the authors, it can be seen that since 2005 they have introduced this topic and since 2009 they have developed great contributions, mainly by identifying that MSEs in their study units have the presence of families, which should also be investigated, since they seek to improve their quality of life through MSEs. As Erdin et al (2020) point out, the most developed and productive cities have better quality of life, so they conclude a very close relationship between quality of life and socioeconomic development with the presence of investments and companies. All these synergies that have been presented, maintain what Susanti et al. (2020) proposed as a triple helix and quintuple helix (Susanti & Pradana, 2021), in the first case they point out that the competitiveness of MSEs must be raised from the organization and combination of activities that occurs between the university, industry and government. with which human capacities, quality and products produced are improved, while in the quintuple helix the media and the natural environment are added, in both cases, it is the university that in its actions complies with educating, researching and providing a service to society, actions that strengthen the competitiveness of MSEs.

Similarly, Chmykhalo et al, (2015) in the Special Economic Zone of technological development type "Tomsk" (SEZ) of Russia, pointed out that it is the university that provides innovations and allows necessary conditions to establish a modern innovation center, finding the need to propose changes in the educational, research and motivation activities of universities so that their university community achieves innovations, thus pointing out that these are not something unique to large companies, but about the talent capacity that can occur in each student, so programs must be proposed that in vocational training manage to consolidate the innovation that is required. Students are experienced or potential entrepreneurs, as classified by Ferreira et al (2017), when they compared

424 university students in the motivation they have to undertake, business planning and risk management, obtaining that potential entrepreneurs have a higher motivation to undertake than experienced entrepreneurs, just as their concern for planning is greater in potential entrepreneurs and that in both groups they are equally cautious in the management of risks that are presented to them.

The risks that can be seen in the competitiveness of MSEs are seen in the entry of Chinese products into the markets, as indicated by Haryono et al (2017), so greater added values must be sought to the products than the marketing prices themselves, one of the ways to achieve this form of positioning is given by social networks. as they support the competitiveness of companies, as indicated by Tomášková (2020), who researched 359 European companies between 2017 and 2019 and concludes that MSEs that use social networks have greater possibilities of innovating, since always being in an environment of constant information makes them see and analyze possible opportunities that are strengthened between their strategic planning and the control of the management they have. so they can propose innovation plans. Within these networks, there are also the so-called informal SMEs, from which we can learn (Ibidunni et al, 2020), since they also transfer their knowledge between people and this can be observed in the market; the knowledge that university students may have may be in the curricula, but these must be put into practice, so that changes are achieved in companies, achieving higher levels of innovation and therefore greater competitiveness (Kopiec et al, 2019).

So, the next point ends by pointing out that there are three important aspects in competitiveness: (i) innovation, understood as the result of the changes given over time that each individual and/or collectivity requires and have their origins in knowledge that is strengthened by intuitive education, which is included in reason and perception (ii) productivity, understood as the results of the management decisions made in the company and (iii) human resources, taken as human capital, which is the owner of knowledge and actor of its use.

The objective of the research was to develop a design that allows the university to intervene as a support for MSEs to be more competitive in times of pandemic.

A sample was taken from 802 MSEs located in the Arequipa region, of which 70% were distributed to the province of the same name and the remaining 30% to the other seven provinces of the region. Throughout the region, activities are present from the coast to the mountains, these being the predominant natural regions of the area, so all the activities of the country's economic sectors are located in the region. A survey was applied in person, that is, the companies were visited, in order to confirm the answers they gave and it was stratified according to the level of education: 35% for those who finished higher education, 26% for incomplete higher

education, 34% for the secondary level and 5% in the case of primary level below. The data were processed with descriptive and inferential statistics, to then develop an analysis and design the approach of the University's intervention proposal.

RESULTS

The results have been grouped into: innovation, productivity and human resources, as these are the axes that the university would intervene to improve the competitiveness of MSEs. It should be noted that 90% of the businessmen who provided information were owners and/or general managers of the companies and 10% were heads of them. Also, at the time of applying the associativity test between the results obtained and the degrees of instruction, it was possible to see that the P-

value is less than 0.05 in the Chi-squared, so there is no significant associativity between the indicators of each grouped axis and the degree of instruction, this means that the intervention of the university can consider everyone as entrepreneurs who execute their activities and have knowledge of the themselves, due to the fact of the daily practice and the competitiveness in which they are, since the average time of them in the market is 12 years.

Innovation

Markets are not static, they are dynamic, and they are constantly changing, because they have a relationship with time, people and the knowledge that is given. The results in this environment that could be observed are presented in the following table:

Table 1 Innovation

	Yes	No	Total
Do you have a formal planning process?	49.8%	50.2%	100%
If you have a formal planning process, do you execute it?	47.8%	52.2%	100%
Have you made product/process improvements?	81.8%	18.2%	100%
Do you plan to make improvements to the product/process in the future?	87.4%	12.6%	100%
Does your company have a production plan?	80.8%	19.2%	100%
Do you have automated equipment/processes?	68.2%	31.8%	100%
Do you perform product improvement, process, or equipment modification testing?	47.5%	52.5%	100%
Do you test to launch new products?	54.4%	45.6%	100%
Do you have an export or export expansion plan?	10.1%	89.9%	100%
Do you have a quality system?	49.6%	50.4%	100%
Do you run your quality system?	47.8%	52.2%	100%
Does your company have a registered trademark?	31.5%	68.5%	100%
Do they reduce, recycle, reuse?	70.7%	29.3%	100%

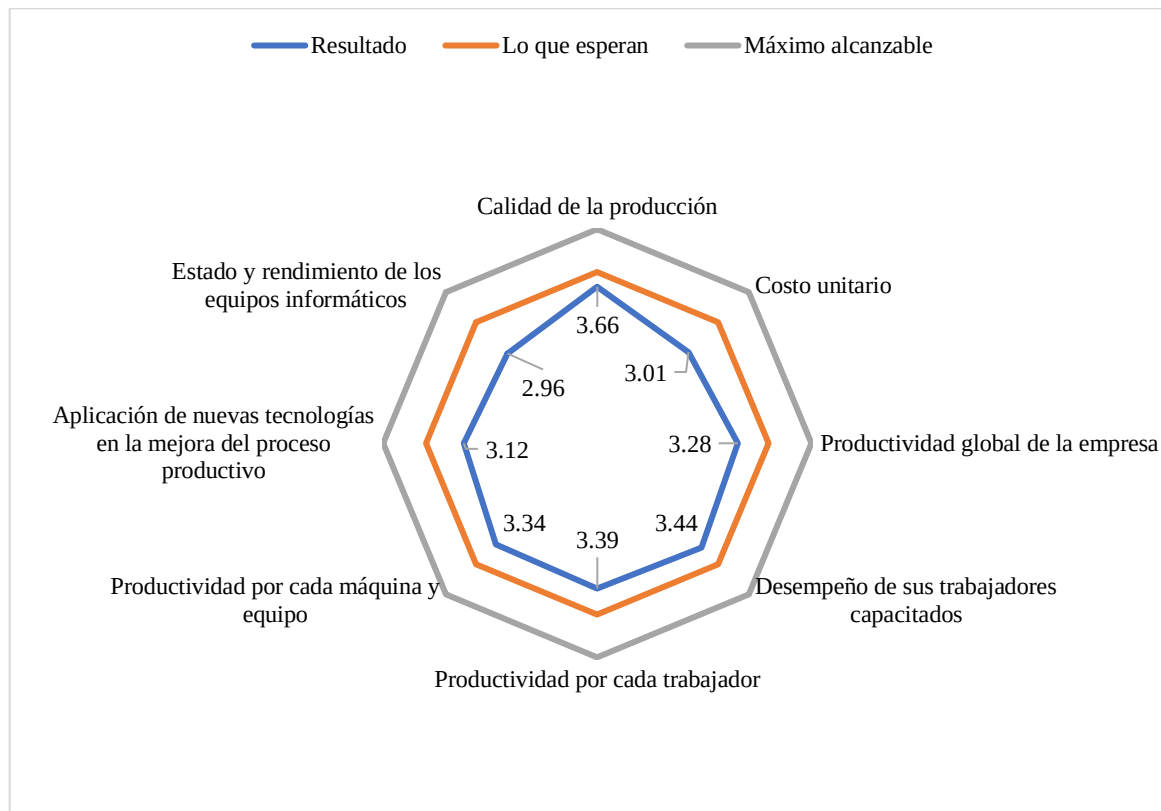
Planning is developed by 49.8% of entrepreneurs and of this only 47.8% execute it, so they plan but do not execute, it is as if they did not plan. One of the key activities is the improvements they make to their products and/or processes, since 81.8% carry it out and this is what has allowed them to adapt to the demands of the so-called new normal, that is, the MSEs of Arequipa, to maintain this form of activity. It has allowed them to continue with adaptations given in the market, and it can also be seen that 84.4% of them thought that in the future there would be changes to them. If you have been in the market for more than 10 years and have adapted from the use of social networks that you did not have so much usability before, it has become easier for you to adapt to

these changes, this is related to the production plan that could be seen in entrepreneurs, where 80.8% have one. The other actions that lead to an innovation that would make them more competitive, fall below the median and these are the items where the university must intervene in order to level them and thus achieve constant innovation.

Productivity

The following figure shows the results of productivity, where it can be seen that the majority, that is, more than half of the companies, qualify as medium, less than they expect, the characteristics quality, cost, productivity, performance of workers, among others.

Figure 1 Productivity



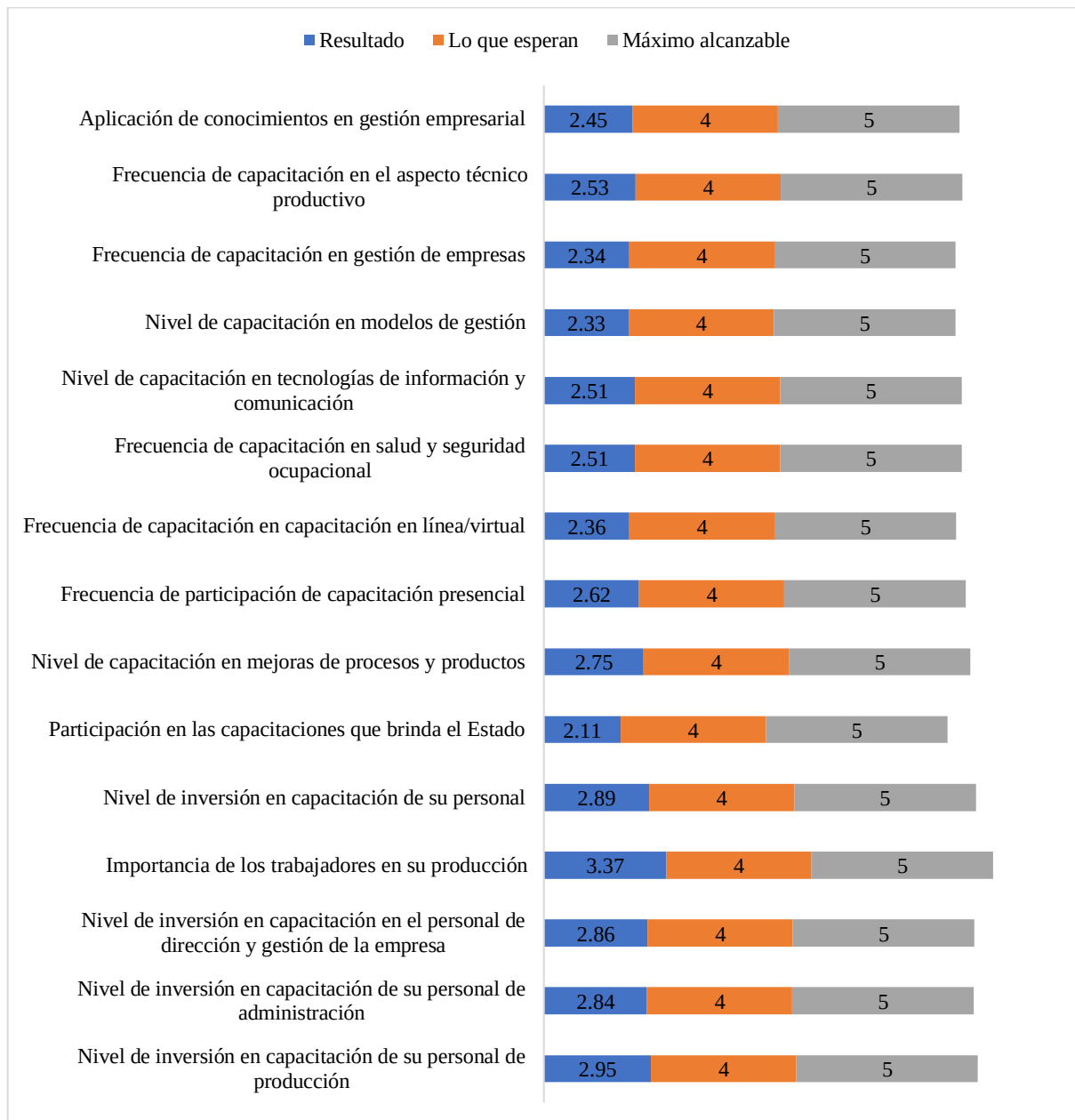
Taking into consideration that all these characteristics are innovation, none reaches the value of 4, which is what they expect as a minimum, but it has been detected that the eight points are intervention in innovation and have a bias up to five, which is the maximum score from 2.04 to 1.34, which is an improvement from 27% to 41%. so it is a significant difference.

Human Capital

The human being, being a member of companies, becomes the most important capital, because he learns

and teaches, so he can adapt more quickly to all the changes that are required in the market. The following figure shows the values found in the MSEs for the shares that are considered with human capital, which expresses that it is of constant rotation, due to the remunerative values that they demand, that is, 83% of the staff of the MSEs rotated, in an average frequency of 2.6 years, so there is this problem, since new personnel must be induced to the processes of the companies.

Figure 2 Human Capital



Human capital maintains a rating that is at an average of 2.63, that is, it does not reach 3 and therefore is far from the expected or maximum rating, being a bias from 42% to 58% to improve, which means that the difference is significant, greater than the productivity axis.

The three axes have to be improved, since innovation is the support of productivity and human capital, that is why the design that the university involves within its activities in the following mathematical function is proposed:

$$\begin{aligned}
 MC_{f(x)} &= C/MT \\
 C_{f(x)} &= i + ed + ac \\
 i_{f(x)} &= R + D + in \\
 \text{and } f(x) &= eg + ee \\
 Ac_{f(x)} &= MSW + E
 \end{aligned}$$

Where:

Letter	Description	Measurement
MC	Improving competitiveness	Relationship Results
TM	Total number of MSEs	Number of companies (annual goal)
C	Mype Competitiveness	Resulting Quantity
i	Innovation	Resulting Quantity
and	College Education	Resulting Quantity
Ac	University accompaniment	Resulting Quantity
I	University Research	Number of investigations with collaborating companies and/or entities involved
D	University technological development	TRL 5 to TRL 9 quantity with collaborating companies and/or entities involved
in	University Innovation (OI)	Number of patents
Eg	General Education	Number of companies served
Usa	Specialized Education	Number of companies served
Msw	University Social Responsibility	Number of companies served
and	Entrepreneurship	Number of new companies

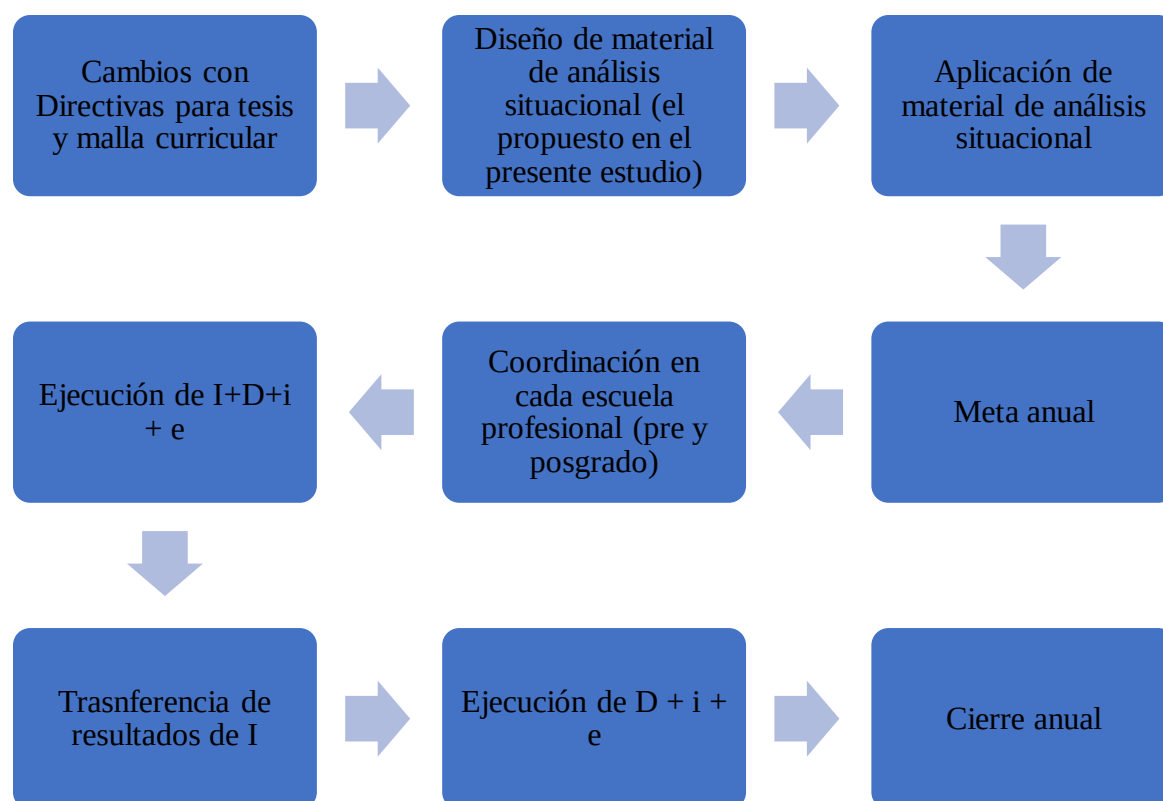
In the case of the University with public management, the number of companies that will be supported must be considered in the annual Institutional Strategic Plans (PEI) and Institutional Operational Plans (POI), these being grouped in each sector and with the characteristics of MSEs, since the maximum objective is that processes are standardized and strengthened, so that they can improve their levels of competitiveness and achieve the expansion of national and foreign markets. since local economies can suffer economic variations that allow them to take advantage of or surpass them and external ones will no longer allow them to give a use to natural resources but a possibility of added value, then, if they are educated, innovated and grow collectively, higher levels of competitiveness will always be achieved. In the case of private universities, through the agreements they have signed through their business incubators that belong to the vice-rectorates for research, they can establish the goals of how many they will help.

If the CM results are higher than the value of 1, it means that higher levels than planned are being reached, and when they are further away from 1 towards the infinite "+", the intervention goal is considered to be low, or the levels of improvement in competitiveness are higher; the opposite is if results are obtained less than 1, because the planned levels are not being reached and the closer it is to "-"infinity, the less intervention it will be.

If the question is, but what should be intervened, in table 1 and figure 3, you can see the points in which the intervention of the university is grouped to achieve a collective strengthening, while in figure 2 the input line is shown, before the intervention of the university and

the same items, as a starting line. The results obtained will be the approach of companies to the university, at least two of the three or quintuple helixes would be the ones that initiate a change in competitiveness. In order for academic and research activities to be involved in each professional school of the universities, there are graduate schools, who would be motivated (by changes in the regulations of degrees and degrees) to carry out during their studies a case of improvement in a sector that they determine, involving graduate and undergraduate students in their research teams. since the development of theses must cease to be a compulsory process without impact on society (Manrique, 2019), while undergraduate students will have the opportunity to carry out each year, activities to improve competitiveness, supported by the courses or subjects they receive as teaching, to be involved in university social responsibility, As established by the University Law and/or in the research works that they present in their theses, there is always a company that is related to any topic of the University, because in the economic cycle there are three agents: State, families and companies, which are related by the supply and demand that exists in the goods and/or services they require. therefore, it is considered that any topic, directly as a unit of study or indirectly, influences a business activity. Finally, the curricular meshes, in compliance with the requirements of the National Superintendence of University Higher Education (SUNEDU, 2017), as a quality criterion, must involve R+D+i+e activities, renewed every three years, then, every three years activities to be developed must also be compared and/or modified, society and the university cannot be left separately.

Figure 3 Engagement Process



The impact of the pandemic on MSEs in the region has been less, because their adaptability that they have during the average 12 years in the market, makes them modify processes and innovate new ways of continuing in the market, this is the strength that can be taken advantage of to achieve higher levels of competitiveness in a process of collective education. that achieves rationality and perception in an academic way and leads to constant and unlimited improvement over time and under the results of Open Innovation (OI)

The intervention of the university is the best way to achieve levels of competitiveness of MSEs in the short term, since their R+D+i+e activities are part of their functions and these must be closely related to the situation of their region, where companies provide jobs and taxes, and if they improve in these two aspects, it will also improve people's quality of life. R+D+i+e activities must be modified or adapted every three years as established by the law that regulates them, so the design approach is essentially based on innovation, university education and the university accompaniment that can be given in the MSEs that are established as annual goals to be supported. for this, the curricular meshes, the thesis processes, both administrative and execution, have to be modified, with the support of management documents that allow the improvement of the competitiveness of MSEs to be measured, according to the results that are given over time.

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