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Risk Management in Latin American SMEs: A Proposal Based on Academic work run in Colombia, Mexico, and Peru

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***Abstract*–Small and medium-sized enterprises (SMEs) play an important role in the economy, particularly in developing countries such as those in Latin America, as they contribute between 25% and 40% of the national GDP and generate 60% to 70% of total employment. Nevertheless, they are highly vulnerable, as reflected in their survival time, which often depends on prevailing economic conditions. This study is the result of a collaborative project between professors of Industrial and Production Engineering from universities in Peru, Colombia, and Mexico. The researchers aimed to analyze selected Latin American SMEs to explore how they manage risk and exposure. The research was conducted with the participation of undergraduate students.**

***The methodology, following an inductive approach, included the design of the research project, implementation in collaboration with students and SMEs, qualitative data analysis, and a comparison and classification phase to generate general conclusions. Three categories of risk were defined: internal, external, and meso-level, to identify decision-making processes that contribute to risk exposure. A total of 16 companies were interviewed from different sectors: 44% manufacturing, 38% commercial, and 19% services.**

The results show that external risks (56%) are mainly related to inbound and outbound logistics and natural phenomena, particularly in the industrial sector. Internal risks predominantly affect the industrial sector (43%) and are linked to operations and management. For meso-level risks, commercial companies were the most vulnerable, with 52% related to administrative and information management issues.

***Keywords*— Latino American SMEs, risk management, vulnerability, Logistics, academic work.**

I. Introduction

Thousands of micro and small enterprises (SMEs) have been affected because of the pandemic. The effects of exposure to COVID-19 led to the closure of more than 2.6 million microenterprises in Latin America [1]. SMEs represent 99.5% of companies in Latin America and the Caribbean [2], this is why it is relevant in economic and social life, which is why it generates efforts, projects, and research to improve its survival and productivity. This paper aims to understand how an SME in Latin America (Latam) develops in the face of the risks to which it is exposed, what are its characteristics, the factors that impact it, and the relevant processes. The frequent risks faced by Latin American SMEs have been considered for the work, increasingly frequently in not only local and regional but also national and international environments.

There is a gap in the understanding of Latin American SMEs about the risks they face and their nature, as well as to propose appropriate strategies for decision-making in organizations in crises. Therefore, in this research, the processes of making the company's decisions are linked to the risks faced by SMEs, in the cases analysed, such cases represent organizations in the manufacturing, services, and commercial sectors of Peru, Colombia, and Mexico. The objective of this work is to propose an approach to understand SME evaluation and diagnosis, to reduce the impact of exposure to risks. This will allow the establishment of preventive action strategies, aimed at improving preparedness, response, mitigation, and recovery. In the long term, survival is expected to increase, through increased resilience of the supply chain, to which they belong.

II. Theoretical Framework

A. *SMEs in business and their limitations*

There is no universal definition for SMEs. Countries use different definitions depending on demographic factors and characteristics, size, location, structure, age, number of employees, sales, and production volumes among others. In countries such as Malaysia, the United Kingdom, the USA, Japan, China and Korea, SME definitions are made based on the number of employees and their sales. [3] highlight the definition made by the European Commission on the activities necessary for the development of micro-enterprises, improving access to capital, and promoting innovation. [4] demonstrates that the sustainability and resilience of Micro and SME companies are continuously vulnerable to risk. [5] found that some of the common characteristics of them, such as simple organizations, that have strong competition in the local and international market, make them vulnerable to risks, which is why they are considered exposed to failure and closure shortly after starting their activities [6].

Finance is the greatest constraint that SMEs have due to their risk profile compared to large companies, resulting in the payment of high interest on commercial loans. [7] points out that a company with contacts with banks has few financial difficulties. According to the authors [8] maintain that the greatest challenges of SMEs are financial results since while in large companies, financial decisions are made by managers, in SMEs they are unilateral and exclusive to the owners of the business. Another difference that exists is that SMEs are leveraged with short-term debt and large ones have a greater variety of financial options for their liabilities. This situation configures risk environments since in an unstable situation they will be harmed SMEs do not have audited financial statements,

generating asymmetry for the management of information. In turn, the lack of channels on the part of financial institutions to meet the needs of SMEs, promote the use of lenders. Due to this informal management of their economy, a significant number of these companies do not pay taxes [9]. In the research of [7] to Chinese SMEs, it is concluded that they have difficulties in accessing credit due to the scarce assets available to pay their financial obligations. In addition, it is considered that the adverse selection and asymmetry of the information that SMEs have are one of the greatest difficulties for banks to perceive a guaranteed profit.

B. SMEs in Latin America

[10] mentions that three components considerably influence the functioning of SMEs in Latin America: (1) The instability of countries' economies, which discourages investment and distorts relative prices, this incentive informal economic structures, reducing confidence, economic performance and potentially cooperation between companies; (2) the inability of governments to propose effective solutions to deal with the problems of micro and SMEs, and (3) absence of adequate public policies to promote the development of companies. According to [11] He mentions that SMEs have limited and unspecialized resources, although they are highly adaptable and operate in highly competitive markets. The adaptability to these competitive environments by SMEs in Latam may be due to the existence of horizontal organizational structures and the ability to make decisions. The result as mentioned [12] is that the productivity of SMEs in Latin America is 33 times lower than large companies in Latin America. While it is 2,4 times lower than small and medium-sized enterprises in developed countries and 6 times lower than large companies. For their part, only 10% of Latin American SMEs export compared to 40% of their European counterparts. On the other hand, the 2025 USA-China trade war could create significant distortions in global trade flows and prices, affecting both producers and consumers, including Latin American providers [13]. Previous works suggest the reduction in trust between the US and China could lead to persistent global economic losses, even if the trade war ends through negotiation. [14] Some of the main characteristics of SMEs in Latam are:

1) Human Capital in SMEs: SMEs, due to the lack of financial capacity and their limited organizational structure, do not have qualified human resources to ensure the productivity of the organization in the long term [11]

Research on Micro and Small Enterprises (MSEs) in Peru *[15]* it is noted that, from surveys carried out in 2013 by the National Institute of Statistics and Informatics of Peru (INEI), it was recorded that only 25.54% of the owners had completed university education. For its part, the research carried out by [16] compiles information from the INEI 2013 which indicates that of all Peruvian SMEs analysed, 60% do not attend the different formal training programs due to lack of time since work schedules are changing and varied, being an alternative for them flexible training centres, which are better adapted to their work schedules.

2) Finance in SMEs: According to research carried out by [17] to SMEs in the Graphic Industry in Lima, 78% opt for direct loans from supplier companies and 22% do so with their funds so that if greater income is generated, these are reinvested. In Peruvian reality, SMEs make different financial reports, because it is required by regulatory entities; however, they ignore the analysis of the information that can be obtained from them [11]. On the other hand, according to the research carried out by [18] Mexican SMEs finance their businesses with loans from financial intermediaries, however, entrepreneurs who do not have access to such credits, due to high interest rates, are financed with their own capital and mainly with credit granted by suppliers, which is used by 60% of SMEs.

3) Formalization in SMEs: The informal economy is important in Latin American economies, providing 50% of jobs in the region [12]. A weak market in the process of consolidation allows the growth of informal companies that sell illegal products, which are manufactured and sold without paying taxes, this is the result of an environment where competition is not necessarily fair, invaded by products undervalued by subsidiary economies such as those of China.

4) The available infrastructure and organization in SMEs: The availability of scarce infrastructure has a significant impact on the performance of SMEs. In the research of [19] It points out that poor roads, water scarcity, erratic energy supply, and poor telecommunications systems are the obstacles facing the growth of SMEs. The scarce infrastructure that SMEs have for the provision of services makes the institution obtain it at an additional cost [9].

In the research of [20] points out that the employees of Colombian SMEs exporting to the textile-clothing sector have little feeling of security at work because they do not consider the medical assistance, hygiene, and comfort that the organization can provide them sufficiently. According to [11] in its research on SMEs in Peru, it shows that the most successful companies are characterized by having more developed control systems, advanced process technologies, certifying the quality of products and processes and the experience of the manager.

C. Risk Management models for SMEs

There are different classification models to SMEs risks, the work of [21], [22] propose a taxonomy of risk management to nine categories: (1) strategy, (2) finance, (3) business, (4) insurance, (5) projects, (6) engineering, (7) supply chain, (8) disasters, and (9) health and safety. For this work a new risk SMEs classification is proposed to analyse similarities and differences in the treatment of risks in the three countries involved in the study. To do that, it was considered the criticality of risks in each organization and the location of the responsibility for the decision-making that gives rise to the risks, taking as reference the work presented in [23], This will make it possible to determine the potential causal sources of the

treatment of risks by action and inaction. Considering the previous mentioned, next taxonomy is proposed: (i) internal risks, (ii) external risks, and (iii) meso risks.

This classification responds to identifying the origin of decision-making in the organization, to generate exposure to the identified risk. This means that, if the risk is generated inner processes the company, is spoken of as a type of internal risk, if the risk is generated outer processes the company, is referred to as a type of external risk, and the meso category was assigned to risks whose origin shares their processes company's internal and external decision-making.

III. Methodology

The research methodology used is inductive, which seeks to generalize the findings found on the treatment of various organizations in the micro and small enterprises sector and their supply chains to deal with risks, in the context of three countries of Latin America: Peru, Colombia and Mexico. The risks considered are of natural or man-made origin. The research work proposed the elaboration of academic research tasks (TAs), to be developed by undergraduate students of engineering careers, in a group form. The research work was designed, proposed and controlled with the advice of the professors of the courses, and dealt with the study of supply chain management dealing with risks to which they are exposed. These courses belong to the curriculum of undergraduate studies of the industrial engineering and production engineering careers of the Pontificia Universidad Católica del Perú (PUCP), the Universidad EAFIT, and Tecnológico de Monterrey. The research was proposed in four phases: (1) elaboration of the learning experience for students, based on the elaboration of TAs to be developed by students, following a common content structure to obtain qualitative and quantitative data on the performance of companies in the face of historical risks, (2) development of TAs by students in the three universities during a semester (August-December 2020 period), (3) analysis of the data collected in the field and (4) conclude a proposal for a roadmap to face risks by SMEs.

In the first phase, the experience of the project-based learning didactic method was designed, following the work of [24], [25], [26] which allowed students to develop both disciplinary and transversal competencies, and which allows the student to be in contact with the reality of organizations through interviews with decision-making managers in operations, data analysis and information on the results of their activities and guided tours of the facilities. For this phase, the team of teachers defined a guide for the preparation of the TA, organizing the content of the guide as follows: description of the context of execution of the TA to be carried out, objective of the task, risk taxonomy, risk measurement protocol, analysis and diagnosis of information and data, and proposal of the roadmap. These elements generated a common framework between the institutions and the students.

In the second phase of the research work, during the academic semester, the student teams were integrated. Micro and small enterprises were selected and contacted by the working groups. Due to the COVID-19 pandemic, the works were of the collaborative type using the virtual and digital means available such as zoom.com for student coordination meetings, as well as for interviews with company managers. In their entirety, the visits were carried out following health protection care to avoid contagion to the pandemia. Other means used were WhatsApp for communications. The tracking of the work done by the teachers of the course was weekly, where the index proposed in the guide for the preparation of the TA was used for the controls. In this phase, approximately halfway through the academic period of the course, an exchange of experiences was carried out between students from the 3 countries, through a virtual meeting via zoom.com. In this event, the students exchanged their opinions on the main problems and limitations to carry out their work, learning and results that they had had until that moment with the progress of the work carried out. Finally, at the end of the semester, the projects with the best grades obtained by the professors of the courses were selected, these works were presented by the groups of students in a webinar.

In the third phase, the analysis and evaluation of the data received was carried out, on general data of the academic tasks carried out. The total number of SMEs investigated were 16 companies: Colombia (4), Mexico (3) and Peru (9). The total number of students who participated was 64: Colombia (15), Mexico (9) and Peru (40). The average number of students who participated per group was four. The companies investigated had the following representations by the sector of their activities: Manufacturing (44%), Commercial (38%) and Services (19%). Distribution of companies by sector, number of workers and average seniority, as shown in Table I.

TABLE I
SMEs DATA BY TYPE AND COUNTRY

Type	Colombia	Mexico	Peru	Workers average	Antiquity average
Industrial	0–0%	0–0%	7-43,75%	21	15
Commercial	2–12,5%	2–12,5%	2–12,5%	2	5
Services	2–12,5%	1–5,25%	0–0%	8	23

The teams identified risks in each of the companies where they carried out the work, awarding a score according to the identified criticality defined by each team, and then normalized the scores to start from a common base. At least 10 risks were identified for each company.

For this work, the risks were classified considering whether the risks forced decision-making in the external, internal or meso spheres of the activities related to the causes that gave rise to the risk in relation to the macro process in which the organization participates. For each category mentioned, subcategories of risks are defined considering the causes that promote them and considering the micro decision-making processes within the company's operations. The resulting categories are as follows:

1) *External risks:* when the organization is affected by the environment and must adapt its decision-making. decisions with factors that are beyond their control. These risks are divided into 5 subcategories: Strategic, Financial, Inbound logistics, Outbound logistics and Catastrophe.
2) *Internal risks:* risks in which decision-making has a high degree of responsibility on the part of the company. These risks are divided into Financial, Administrative Operations and Management, Production operations, and Inbound logistics.
3) *Meso:* risks that both internal and external factors have an impact on decision-making, which in turn are divided into Strategic, Information, Administrative Operations and Management, Inbound logistics and Outbound logistics.

In the case of financial risks, they are those that will adversely affect the financial situation of the organization, which directly affect the profitability, liquidity and ability of the company to meet its obligations, endangering its survival. These risks can be external, such as devaluation or exchange rates, or internal due to inadequate management of the environment. internal of the company that lead to affect the organization from the economic point of view.

Logistics risks are those that can affect a company's operations and supply chain, which are related to the flow of materials, resources, products or services and information between the different stages or links that make up the chain. These may be external incoming, such as lack of supplies, or delays in deliveries caused by third parties, or external outgoing, such as unexpected changes in supply and demand that do not allow us to meet the needs of customers. Logistics risks can also be internal, incoming, such as the receipt of defective products due to lack of control in the company, or outgoing, such as the dispatch of incomplete orders due to lack of verification. Finally, the risks associated with logistics may be meso, of an inbound nature such as dependence on suppliers, or outbound such as dependence on customers or delays in deliveries that in both cases can affect the supply chain of any organization.

Operational risks are divided into those that directly affect the correct production of products or the provision of services according to customer requirements in an effective and efficient ways, and that due to their characteristics may be of an administrative or production nature. The first may be internal or meso, while the second are internal. Thus, the lack of adequate market studies, the definition of an inadequate business model or poor inventory management are examples of internal operational risks, while poor management of the cold chain or absenteeism are of a meso nature. On the other hand, constant machine breakdowns, lack of capacity or inefficiencies in processes are risks that are in this category

Finally, catastrophe risks refer to natural or man-made events that can disrupt any supply chain, such as floods, earthquakes or fires

IV. RESULTS

Using the proposed taxonomy explained for the classification of risks, the risks were analysed and prioritized according to a particular rating used by the groups of students. This rating was then normalized to have a common basis of comparison. At least 10 risks were identified for each company, and the 16 companies included in the study defined a total of 157 risks (an average of 9.81 risks per company). These risks were classified according to the previous section, obtaining a total of 74 risks. Table II shows the synthesis of risks by type and category.

TABLE II
FINAL CLASSIFICATION OF RISKS BY TYPE AND CATEGORY

Category	External	Internal	Meso	Total by Category
Disasters	5-18,5%			5-6,8%
Strategic	2-7,4%		2-12,5%	4-5,4%
Financial	7-25,9%	8-25,8%		15-20,3%
Information			3-18,8%	3-4,1%
Inbound Logistics	10-37%	1-6,3%	1-6,3%	12-16,2%
Outbound Logistics	3-11,1%		4-25,0%	7-9,5%
Operational/Management		11-35,5%	6-37,5%	17-23,0%
Operational/Production		11-35,5%		11-14,9%
Total by Type	27-100%	31-100%	16-100%	

It is important to clarify that some risks were grouped into the same type of risk and category because they represented the same risk. For example, poor inventory management, excess or deficit of inventories and low inventory turnover. they were all grouped in the same category as internal risks.

For the 157 risks mentioned by the companies, they were grouped into internal, external and meso, obtaining the information shown in Figure 1.

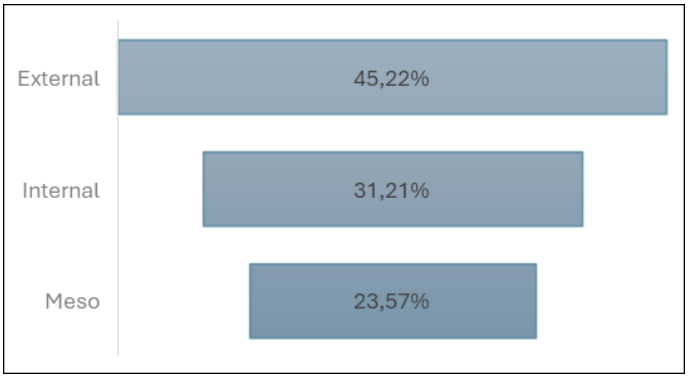

Fig. 1 Classification of risks by type

It is observed that, of the total risks detected, 68.79% are risks that come mostly from the environment and many of them are not controlled by the company (external + meso), while 54.78% of these risks have some degree of control and responsibility on the part of the company (internal + meso). Additionally, according to the information provided, the risks

found by industrial sector and classified by type are shown in Figure 2.

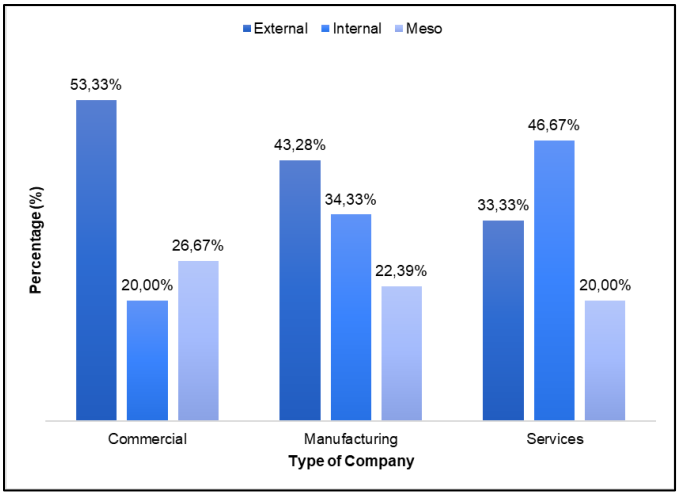

Fig. 2 Types of Risks by Industrial Sector

With the above graph, it is possible to show that for the commercial and manufacturing sectors, external risks are the ones that most affect the operations of this type of company with 53.33% and 43.28% respectively; while, for service companies, it is internal risks that would mostly affect them, with about 46.67% of the risks mentioned. Table 3 reinforces the above, since the manufacturing and commercial companies of each country show that it is external risks that can have the greatest impact on companies, and it is internal risks that could most affect operations in services. This allows us to conclude that regardless of the country, the concerns in general terms of risks are shared by the companies included in the study.

TABLE III
TYPES OF RISKS BY COUNTRY AND INDUSTRY SECTOR

	Company Type	External	Internal	Meso
Colombia	Commercial	60,00%	0,00%	40,00%
	Services	40,00%	45,00%	15,00%
Mexico	Commercial	45,00%	30,00%	25,00%
	Services	20,00%	50,00%	30,00%
Peru	Commercial	55,00%	30,00%	15,00%
	Manufacturing	43,28%	34,33%	22,39%

Table 4 shows the percentage share of the risks defined in the companies that participated in the study. It is evident that, in the three countries, the external risks associated with inbound and outbound logistics are that present the largest participation of the total risks mentioned, with 24.2%, which represents about a quarter of the total risks in which companies do not have control. Internally, it is observed that, in the three countries, the risks are mainly in the categories of Operational, Administrative and Financial Management, with 21.0%.

Finally, at the meso level, it is the operational risks of administrative management that have the greatest presence in Colombia and Mexico with 5.1% while in Peru it is the risks associated with information with 3.18%

TABLE IV
TYPES OF RISKS BY COUNTRY AND INDUSTRY SECTOR

	External	Internal	Meso	Total
Colombia				
Disasters	4,46%	0,00%	0,00%	4,46%
Financial	0,64%	2,55%	0,00%	3,18%
Information	0,00%	0,00%	0,64%	0,64%
Inbound Logistics	5,10%	0,00%	1,27%	6,37%
Outbound Logistics	2,55%	0,00%	1,91%	4,46%
Operational/ Management	0,00%	1,91%	3,18%	5,10%
Operational/Production	0,00%	1,27%	0,00%	1,27%
Mexico				
Disasters	1,27%	0,00%	0,00%	1,27%
Strategic	1,27%	0,00%	0,64%	1,91%
Financial	0,64%	1,91%	0,00%	2,55%
Information	0,00%	0,00%	1,27%	1,27%
Inbound Logistics	1,91%	0,00%	1,27%	3,18%
Outbound Logistics	1,91%	0,00%	0,00%	1,91%
Operational /Management	0,00%	3,82%	1,91%	5,73%
Operational/Production	0,00%	1,27%	0,00%	1,27%
Peru				
Disasters	3,82%	0,00%	0,00%	3,82%
Strategic	5,10%	0,00%	1,27%	6,37%
Financial	3,82%	3,18%	0,00%	7,01%
Information	0,00%	0,00%	3,18%	3,18%
Inbound Logistics	8,28%	1,27%	2,55%	12,10%
Outbound Logistics	4,46%	0,00%	2,55%	7,01%
Operational/ Management	0,00%	7,64%	1,91%	9,55%
Operational/Production	0,00%	6,37%	0,00%	6,37%
Total	45,22%	31,21%	23,57	100,00

A. External Risk Analysis

In external risks, it is evident that those associated with inbound and outbound logistics and catastrophes represent 74.65% of risks in which the company has little control. Figure 3 shows the synthesis of external risks according to their categories.

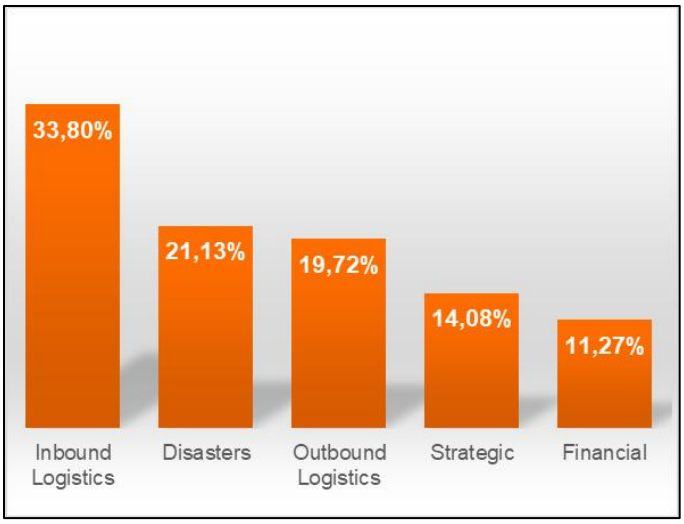

Fig. 3 Classification of external risks by category

By industrial sector, it is evident that again in the three categories mentioned above are the main risks identified in each company. Adding the percentages of the first three risks by type of company in Table 5, we obtain: 75.01% in commercial companies: 68.96% in manufacturing companies and 90% in service companies.

TABLE V
MAIN TYPES OF EXTERNAL RISKS BY INDUSTRIAL SECTOR

External Risks Category	Type of company		
	Commercial	Manufacturing	Services
Inbound Logistics	34,38%	34,48%	30,00%
Disasters	25,00%	10,34%	40,00%
Outbound Logistics	15,63%	24,14%	20,00%
Strategic	9,38%	20,69%	10,00%
Financial	15,63%	10,34%	0,00%

Table 6 shows the 5 main risks identified by category, showing that together they account for 56.34% of external risks.

TABLE VI
MAIN TYPES OF EXTERNAL RISKS BY CATEGORY

Category	Risk	%
Inbound logistics	Lack of transport due to multiple causes that cause delays in deliveries	9,86%
	Unreliable suppliers in delivery in terms of time and quantity	5,63%
Outbound Logistics	The volatility and variability of demand	12,68%
	Lack of security in distribution processes	7,04%
Disasters	Earthquakes, landslides and fires, among others	21,13%
	Total	56,34%

It is important to mention that the risks shown above are identified in the manufacturing, commercial and service companies of the three countries, so it is possible to show that both the companies and the countries included in this study share a high percentage of what are the external risks that can affect their supply chains.

B. Internal Risk Analysis

For internal risks, it is observed that the categories of Management Operations, Production Operations, and Financial are 95.92% of the low risks under which the company has control, with management operations having the highest percentage. Graph 4 shows the percentages of internal risks belonging to each of the categories described in the previous section

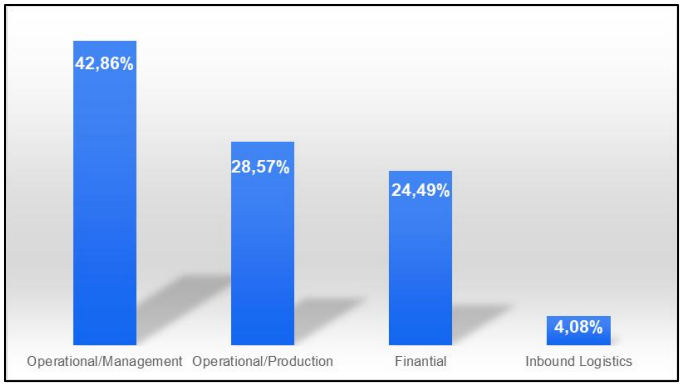

Fig. 4 Classification of internal risks by category

If the analysis is made by industrial sector, as shown in Table 7, it can be seen that the internal risks of the three categories are those that include most of the risks, although a very marked difference is already observed by type of company, since a large percentage of the risks for commercial companies, they concentrate on Operational Management risks, while for manufacturing companies, it is Operational Production risks, followed by Operational Management risks where the main risks are found. For their part, service companies distribute the risks in greater proportion among the Operational, Management and Financial. It is not surprising to find that very few risks are associated with the inbound logistics of internal risks, this is because, for many micro and small companies, the supply depends on third parties, over whom this type of company has little or no control.

TABLE VII
SHARE OF INTERNAL RISKS ACCORDING TO THE TYPE OF COMPANY

Category of Internal Risk	Type of company		
	Commercial	Manufacturing	Services
Operational/Management	58,33%	34,78%	42,86%
Operational/Production	16,67%	43,48%	14,29%
Financial	16,67%	17,39%	42,86%
Inbound Logistics	8,33%	4,35%	0,00%

Table 8 shows the main risks identified by category of internal risks, which can affect the management of the companies included in the study. At first glance, it does not seem representative, but it is important to clarify that the percentages are calculated based on 31 different risks (as shown

in Table 8 Final classification of risks by type and category) out of a total of 49 defined by the companies.

TABLA VIII
MAIN TYPES OF INTERNAL RISK BY CATEGORY

Category	Risk	%
Operational/Management	Poor administration and inventory management	12,24%
	Poorly trained staff	6,12%
Financial	Lack of Liquidity	8,16%
Operational/Production	Limited capacity to respond to demand requirements	6,12%
	Total	32,65%

It is observed that poor inventory management is one of the main risks faced by companies, possibly due to the lack of personnel trained in administration issues. There is no doubt that one of the main consequences of poor inventory management is that it leads to a lack of liquidity in the company. This leads us to propose the following hypothesis: "The lack of trained personnel in inventory management is one of the main risks faced by Micro and Small & Medium Enterprises (MSMEs), since this leads to excesses and shortages that affect companies financially, which affect different financial indicators, including turnover and liquidity of companies." Although this hypothesis is not the objective of this work, it can be a starting point for future research on the subject.

C. Meso Risk Analysis

Finally, for meso risks, 91.89% of the risks are in a similar proportion between the Operational categories of Management, Information, Inbound Logistics and Outbound Logistics, which provide information on those risks over which the company has control in part, but another part depends on third parties. Figure 5 shows the percentages of meso risks belonging to each of the categories described above.

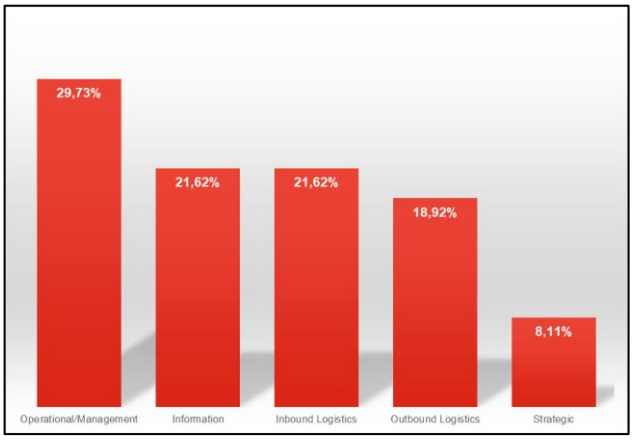

Fig. 5 Rie Classification of Meso risks by category

If an analysis of the same risks is made by type of company, Table 9 shows that the risks in the Operational Management category are the ones that represent the greatest impact for commercial companies, while for manufacturing companies, it is the risks associated with information that stand out the most. For their part, for service companies, the meso risks of the Operational categories of Management and Incoming Logistics are the ones that share the first place. This shows that there are many risks faced by MSMEs in which the environment and the company can affect the operation of the company, making its operations difficult.

TABLA IX
SHARE OF MESO RISKS ACCORDING TO THE TYPE OF COMPANY

Category of Meso Risk	Type of company		
	Commercial	Manufacturing	Services
Operational/Management	37,50%	20,00%	33,33%
Information	12,50%	33,33%	16,67%
Inbound Logistics	18,75%	20,00%	33,33%
Outbound Logistics	18,75%	20,00%	16,67%
Strategic	12,50%	6,67%	0,00%

According to the analyses carried out, it is observed that dependence on suppliers with 19.4% (incoming logistics category), non-compliance with the regulations imposed by law with 13.9% (management operations category), lack of regulations or ignorance of regulations with 11.1% (information category) and lack of communication with 8.3%. They represent 52.8% of meso risks. Here it is worth noting that dependence on third parties is both an internal and external factor since in some cases there are only very few suppliers and the company is forced to have a single supplier, and in other cases it is due to bad negotiations or lack of a supplier evaluation model. In which case it is something depending on the company. On the other hand, the lack of formalism that is handled in many companies and the lack of clear regulations and legislation for MSMEs, especially in Latin America, are risks that these types of organizations constantly face.

DISCUSSION

Whatever been the country, SMEs shared similar vulnerabilities. Even though, the external risks that threaten SMEs in the three countries are similar, but there are differences between the internal and meso risks related to regulatory policies. Whether the risks are natural or man-made, SMEs will always be inherently vulnerable due to their nature and characteristics. These organizations must be prepared to react to complex scenarios in random environments. Therefore, they must be able to anticipate threats by analysing their environment and forging strategic alliances with their stakeholders.

On the other hand, on their logistics risks in the supply chain: The risks associated with inbound and outbound logistics highlight the fragility of SME supply chains, posing vulnerabilities in transportation, supplier reliability, and the response to demand volatility.

On their human capital and inventories: the lack of trained personnel, and weak stock management suggest critical

analysis in SMEs; overstocks and shortages generate costs in organizations that grow their competitive capacity. In addition, the lack of trained personnel increases the vulnerability of these organizations.

IV. Conclusions

Small and medium-sized enterprises (SMEs) in Latin America face significant barriers to accessing formal financing, which limits their ability to manage risks and sustain growth. Most SMEs in the region lack structured tools to identify, assess, and mitigate risks. This makes them more vulnerable to economic crises and changes in the business environment. Macroeconomic factors, such as exchange rate fluctuations, as well as social risks, such as insecurity, are recurring barriers that affect the performance and sustainability of these companies.

External risks represent 56% of the risks identified in the SMEs studied, with the most critical being those related to inbound and outbound logistics (24.2%) and natural disasters (21.13%). This shows that companies have a high vulnerability to external factors over which they have little control. Internal risks, which are the ones that companies can control to a greater extent, account for 31% of total risks. Among them, operational risks of administrative management (12.24%) and financial (8.16%) stand out, such as poor inventory management and lack of liquidity. Meso risks, which combine internal and external factors, account for 13% of the total and are mainly related to inbound logistics (18.75%) and lack of effective communication, highlighting dependence on third parties as a major concern for companies.

The results show that manufacturing companies face greater external risks (43.28%), while service companies mainly deal with internal risks (46.67%). Commercial companies have a more balanced distribution between external (53.33%) and internal risks. The lack of training and being able to find trained personnel are some of the main problems associated with internal risks, which directly affects the ability of companies to respond to demand and their inventory levels. The project, in which 64 students and 14 companies from Colombia, Mexico and Peru participated, made it possible to classify a total of 157 risks into internal, external and meso categories, contributing to a deep understanding of vulnerability in SMEs in Latin America. Future research is proposed to ensure the resilience of supply chains involving SMEs. Given the current situation of the tariff war between the United States and China, important trading partners for Latin American countries, the strengthening of the participation of local, regional, and national actors as long-term partners should be evaluated. Although the results of the study cannot be generalized, the proposed methodology can be replicated in a larger number of SMEs, allowing identifying the main risks faced by this type of company. And it will allow defining strategies to improve their survival and competitiveness in today's complex environment.

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