

Methodological Design of Risk Management and Social Responsibility in The School of Engineering of a Peruvian University

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Abstract: The objective of this study is to design the Risk Management methodology for the University Social Responsibility (USR) process, with the participation of the administrative and teaching staff of the Mechanical and Electrical Engineering School of a private Peruvian university as a contribution to the licensing project in 2021. The population consisted of 38 people involved in the USR process in the University's Mechanical and Electrical Engineering PE, including teaching and administrative staff. The methodology uses a mixed approach, explanatory scope and sequential explanatory design (DEXPLIS). Although very few universities apply risk management at the institutional level, the results show that it is feasible to design a risk management methodology applied to a specific educational management process that contributes to achieving institutional objectives. Therefore, it is concluded that the successful design of a risk management methodology facilitates the achievement of the objectives of the process to which risk management is applied and that risk management can have a direct impact on the licensing process by aligning the USR sub-processes with the sub-processes and indicators of the licensing process, being essential for a good design not only to know the dimensions of risk management but also to know the process applied, in this case, the process of University Social Responsibility.

Keywords: Risk Management, University Social Responsibility, Educational Management, Iso 31000, Licensing.

1. INTRODUCTION

Internationally, risk management has made inroads in different sectors, among them the susceptible financial sector, remember the emblematic “Barings” case that sank a bank with a loss of US\$1,168 MM in 1995 (Revista Lidera, 2013, p. 33), where the person in charge of back and front office operations was the same person, from that event the segregation of key functions was generated, as a mechanism to control the risk of fraud, and it was the beginning of operational risk in this sector. Other sectors that are also quite advanced in the management of their risks are mining, insurance, aeronautics, and the business sector, which has recently made significant progress since the update of the ISO 31000:2018 standard “Risk Management - Guidelines” (published by the International Organization for Standardization, ISO for its acronym in English), sectors that among others have been becoming aware of the strategic importance of risk management in their respective institutions. Nevertheless, at a national level, according to the Canal N news report, only in 2020 the financial system has more than S/. 4.5 million in fines from the Instituto de Defensa de la Competencia y de la Protección de la Propiedad Intelectual (INDECOP), generated mainly by risks of non-compliance with the obligation to inform, failures in the attention of claims, among

others, an example can be the sanction imposed on Caja Rural de Ahorro y Crédito CENCOSUD, for S/110,000 for discriminating against a consumer with a disability by asking for the presence of a third person when applying for a credit card (Canal, 2021).

However, in the education sector, its application is still incipient, even in the South American region, where some progress can be mentioned, such as the Universidad Tecnológica de Pereyra (Colombia) and the Universidad de Chile, which have been managing their risks under established risk methodologies. An example of loss caused by failures in risk management we can mention the fine of the National Superintendence of University Higher Education (SUNEDU, 2017) to the Autonomous University of Peru for S/9.8 million for infringement of the University Law; at the education sector level, S/8 million in fines from INDECOPI have been reported to 51 universities, a loss that could have been reduced with proper risk management, risks such as failures in the attention of requests, non-compliance with conciliatory agreements, refusal to submit the book of claims, lack of information, among others (ANDINA, 2021) are highlighted (ANDINA, 2021).

When projecting the national reality of the higher education sector, there is a worrying, even alarming context when reviewing some indicators: the notorious drop in the quality of professionals who graduated from various institutions, the unusual increase of universities in the country: from 56 in 1995 to 74 in 2016, and a very discouraging number of Peruvian universities in international rankings: one Peruvian University in the top 500 of the QS World University Rankings 2015-2016 (and remains the same in the QS World University Ranking 2021). Faced with such a scenario, the government implemented the Institutional Licensing process (SUNEDU, 2015), establishing Basic Quality Conditions - CBC necessary for a university to operate, thus making Licensing one of the main objectives to be achieved by Universities. It is here where risk management can provide an excellent contribution to a successful Licensing project, being that in the experience of organizations from a variety of sectors that have implemented risk management within their organizational strategy, they have managed to optimize and standardize their processes, reduce losses and achieve their objectives more quickly.

It is inevitable to mention the importance of the social function of the University as a key component in the structure of a country's society, forming citizens with critical awareness and humanistic values, developing science, technology and research, among other fundamental tasks of higher education, indispensable not only for the productive development of a nation but also for the generation of leaders, professionals of integrity and scholars who will drive it forward.

And in Peru, this is very well detailed in the Higher Education Quality Assurance Policy:

The requirement in the quality of the service provided by higher education institutions is not only the requirement of a constitutionally based norm that obliges the State to guarantee the integral development of the student, the common good of society and the public purpose of all university education; but a consequence of its nature that commits it to knowledge, the integral formation of professionals and the development of the country (D.S. N°16-2015-MINEDU, art. 1.1).

Through the University Law, the Peruvian government establishes a series of principles, functions and responsibilities that higher education institutions must comply with, as the general objective of this Law is to promote the improvement of educational quality (Law No. 30220, Arts. 5, 6 and 7). Likewise, the University, whether public or private, must comply with minimum requirements for the development of its operations, thus ensuring a quality education for society, being the State the guarantor of its compliance (Political Constitution of Peru, Art. 16). In this sense, in 2015, the Peruvian government through the National Superintendence of Higher Education - SUNEDU, establishes the Institutional Licensing, a process that allows it to verify compliance with the "Basic Quality Conditions" by the higher education institution, being thus only licensed universities enabled to operate. Although in this context, it becomes imperative for every higher educational institution to achieve Institutional Licensing to continue operating, it is worth mentioning that in the Licensing Model and its Implementation in the Peruvian University System, it is indicated that the licensing is temporary and renewable. Therefore, in case of an unfavorable report, the higher educational institution can reapply for licensing after one year (SUNEDU, 2015, p.7).

According to the SUNEDU report, of the 141 universities that applied for Institutional Licensing, as of May 2021, there are 92 universities licensed and 49 with a denied license (SUNEDU, 2021).

Therefore, complying with this essential public service, such as education, mentioned in Art. 3 of the University Law is a challenge for universities, which demands not only an innovative and flexible curriculum but also adequate and efficient teaching management, research and social responsibility processes, all of which are fundamental within the university educational strategy and planning since they are a requirement to obtain the mandatory institutional licensing, now a priority project for universities.

The external situation generated by the Covid-19 pandemic in the XXI century confronts universities with an unexpected context that directly impacts the fulfillment of their objectives; being that, like a science fiction movie, all social activity has been restricted by state mandate, including the option of attending classes in educational institutions, at least physically. In Peru, as reported by Jorge Mori, General Director of University Higher Education of MINEDU, in an article in *El Comercio*, he indicated that up to S/231 MM had been allocated to strengthen the capacities of virtual processes and connectivity in public universities (*El Comercio*, 2020).

It can be said that this situation of global impact has two negative effects, like any crisis. First, the threat of death, focusing on the education sector, the closure of classrooms; in this aspect, however, and in order not to stop education and save the academic year, a supreme and global effort was made with the support of the Central Government, private institutions and international organizations, to transform face-to-face education (canceled by government mandate) in a non-presential, virtual education with the support of technology. It is here where the positive effect of this pandemic can be visualized, which has been to accelerate the process of digital transformation of educational institutions, which certainly had been taking place in "slow motion," as mentioned in the article of the specialized digital magazine *Impacto TIC* (2020, para. 1) "Now, a 'biological disruption,' COVID-19 has accelerated this digital and cultural transformation of institutions, teachers, students and public policy makers".

Faced with these regulatory requirements, the social commitment and the external situation facing higher education, several questions arise: how does the University obtain greater assurance of compliance with the basic quality conditions required to continue operating; how does it identify in advance the risks or threats that could hinder it from achieving this objective; does the University have strategic or operational mechanisms that indicate its level of risk in the fulfillment of its USR processes; and how does it identify the level of risk in the fulfillment of its USR processes, questions that are difficult to answer when there is no risk management in the organization.

Unfortunately, in most educational institutions in the country, the implementation of a documented risk management is still very incipient; even at the Latin American region level, most higher education institutions do not have a methodological guide and tools to adequately manage risks in their processes and services, a topic that focuses this research work and that seeks to design a Risk Management methodology for the process of University Social Responsibility (from now on RSU) of the Professional School of Electrical Mechanical Engineering (from now on EP Electrical Mechanical Engineering) of a private university in Peru.

And at the level of the institution under evaluation, as in most universities, it does not have a formally established risk management, i.e., a methodology, regulations, established functions, or assigned responsibilities. However, this does not mean that it does not manage its risks; it does, but it is not certain of identifying all critical risks since it does not apply a methodology in an organized and structured way, nor is it aware of the level of impact of its risks since it does not have a methodology to assess them, at least qualitatively, or it often detects risks a posteriori, i.e., when a loss occurs.

1.1 Research Questions

1.1.1 General Question

How does the design of a Risk Management methodology favor the process of University Social Responsibility (USR), with the participation of administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university, as a contribution to the licensing project in the year 2021?

1.1.2 Specific questions

- How are the context and criteria defined in the risk management of the RSU process, with the participation of administrative and teaching staff of the Mechanical and Electrical Engineering PE of a private Peruvian university in the year 2021?
- How is communication carried out in the risk management of the RSU process, with the participation of the administrative and teaching staff of the EP Mechanical and Electrical Engineering of a Peruvian private university in the year 2021?
- How is risk assessment carried out in the RSU process, with the participation of administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university in the year 2021?
- How is the treatment of risks defined in the RSU process, with the participation of administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university in the year 2021?
- How is the risk management of the RSU process monitored, with the participation of the administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university in the year 2021?
- How is the registration of risks in the RSU process carried out, with the participation of administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university in the year 2021?

1.2 Research Objectives

1.2.1 General Objective

Explain how the proposed design of the Risk Management methodology favors the process of University Social Responsibility (RSU), with the participation of administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university, as a contribution to the licensing project in the year 2021.

1.2.2 Specific Objectives

- Explain how to define the context and criteria for risk management in the RSU process, with the participation of administrative and teaching staff of the Mechanical and Electrical Engineering School of a private Peruvian university in the year 2021.
- Explain how communication is carried out in risk management in the RSU process, with the participation of administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university in the year 2021.
- Explain how risk assessment is carried out in the USR process, with the participation of administrative and teaching staff of the Mechanical and Electrical Engineering School of a private Peruvian university in the year 2021.
- Explain how the treatment of risks is defined in the RSU process, with the participation of the administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university in the year 2021.

- Explain how to follow up on the risk management of the RSU process, with the participation of administrative and teaching staff of the Mechanical and Electrical Engineering School of a private Peruvian university in the year 2021.
- Explain how to register risks in the RSU process, with the participation of administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university in the year 2021.

2. METHODOLOGY

2.1 Approach, Scope and Design

This work has been carried out with a mixed approach, explanatory scope and sequential explanatory design (DEXPLIS).

The mixed approach allows capturing two realities, the objective (areas of the University, teachers, administrative staff, community, structure, etc.) and the subjective (perceptions, experiences, experiences interactions of those involved), both present in the problem in question, and under the premise that the world must be understood from the point of view of the actors studied and the data collection (Hernández et al., 2014, pp. 10, 11), which is consistent with the third principle of the international standard in risk management: "The risk management framework and process are customized and proportional to the external and internal context of the organization related to its objectives" (ISO 31000, clause 4). Therefore, there is no single way to design risk management; the design needs to be adapted and consider the participants' point of view, experience, culture, and analysis, among others.

The explanatory scope aims to establish or explain the occurrence of a phenomenon (Hernández et al., 2014, p. 95), thus seeking to design a risk management methodology that responds to the context, reality, and problem, in this case, of the selected process.

The design was sequential explanatory (DEXPLIS), characterized by a first stage in which quantitative data are collected and analyzed, followed by another stage where qualitative data are collected and evaluated (Hernández et al., 2014, p. 471).

2.2 Population and sample

The population was determined as the people involved in the USR process in the Mechanical and Electrical Engineering PE of the University under study: administrative personnel (13) and teachers (25), total of 38 people.

A non-probabilistic or directed sample was applied, i.e., "by convenience" (Bernal, 2010, p. 162), the researcher selected the cases. In the directed sample, according to Johnson, 2014, Hernández-Sampieri et al., 2013 and Battaglia, 2008b (cited in Hernández et al., 2014), the probability is not considered but causes related to the characteristics of the research. In this case, two factors were considered: the valuable contribution of the experience and knowledge of the participants for a better understanding and deepening of the process, which in turn allowed a design of the risk management methodology adapted to their reality.

Table 1. Sample

Group	Sample	%
Administrative personnel involved in the MSW process at the Mechanical and Electrical Engineering School.	6 administrative	46% of the administrative population. 16% of the population.
Teachers of Mechanical and Electrical Engineering.	5 teachers	20% of the teaching population. 13% of the population.
Total	11 people	29% of the population

Source: Own elaboration

2.3 Techniques and Instruments

As mentioned by Hernández et al. (2014), “the work of the researcher is like that of the detective” (p.368), so it is required to use those techniques and tools that allow having the necessary and sufficient information at each stage of the investigation to help make the right decisions.

Data collection techniques used: Survey, data analysis and interview.

Instruments: Five instruments were developed.

- Three questionnaires: “A”, “B” and “C”.
- A data registration form.
- A semi-structured interview guide.

3. RESULTS AND ANALYSIS

The results and analysis are organized according to the six dimensions of variable I, “Risk Management Methodology,” and the results and analysis of variable II, “MSR Process,” are included in dimension 01 of variable I. The analysis has been carried out considering the theoretical bases and alignment matrices, using the techniques and instruments established in the methodology: surveys, documentary analysis and interview.

Table 2. Detail of the structure of the results.

Dimension 01	Context and criteria
Indicator 1.1	Understanding of the context, including <u>Variable II: MSR process</u>
Indicator 1.2	Sub-process prioritization
Indicator 1.3	Risk assessment criteria and controls aligned with the University’s management strategy
Dimension 02	Communication
Indicator 2.1	Identification of stakeholders and key personnel
Dimension 03	Evaluation
Indicator 3.1	Identification of existing risks in the process
Indicator 3.2	Risk analysis
Indicator 3.3	Risks assessed according to established criteria
Dimension 04	Treatment
Indicator 4.1	Information on the action plans: description, responsible party, date of implementation
Dimension 05	Follow-up
Indicator 5.1	Definition of the periodicity of risk management monitoring
Dimension 06	Registration
Indicator 6.1	Risk register with complete information

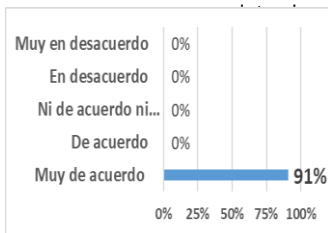
Source: Own elaboration

Note: For the purposes of this article, the first indicator of the first dimension will be shown below, without altering the conclusions or final considerations.

3.1 Dimension 01: Context and Criteria in The Risk Management Methodology

Table 3. Results and Analysis of Dimension 01: Context and Criteria

Analysis and results of data recording	Analysis and results of the Questionnaire "B".	Analysis and results of the Interview	Analysis and results of the Questionnaire "C"	Interpretation
INDICATOR 1.1: UNDERSTANDING OF THE CONTEXT				
<ul style="list-style-type: none"> The <i>data analysis</i> allowed the collection of information from the University's strategic and operational documents and related governmental regulations. It was found that the focus of the University's mission and vision includes the social aspect; RSU is considered in the quality policies, has a mission, strategic and operational objectives. It is found that the management model focuses on achieving licensing, strengthening research and university leadership, with a focus on sustainable development and participatory management based on process-based management (see Annex 6: data recording sheets 1 to 4). 	<ul style="list-style-type: none"> Based on the information gathered in the <i>data analysis</i>, Questionnaire "B" was prepared, through which the specialist assigned by the University, head of RSU, gave his agreement and the following suggestions: <ul style="list-style-type: none"> Item 3: Regulatory documents related to MSW are compliant, and requested to add the Environmental Policy. Item 4: It expressed conformity with the institutional mission, vision and strategy, the quality policy linked to MSR, the MSR process and its mission, strategic and operational objectives. It requested to include the values linked to USR: quality, commitment, innovation, integrity, responsibility, solidarity. Item 5: requested to add in Threats: family disintegration affects the social development of the community. In Opportunities: quality higher education is recognized as a factor for national development, and the existence of international practices and trends in USR issues is an opportunity. Strengths: Much of the infrastructure has been improved and 	<ul style="list-style-type: none"> The exercise of applying the risk management methodology to the component: <i>Safety in the use of Laboratories</i> (environmental management sub-process), through interviews to key personnel allowed recognizing the context in laboratory safety: <ul style="list-style-type: none"> Item 2: The objectives were identified and described by the stakeholders themselves: 2 main objectives and 3 secondary objectives. <ul style="list-style-type: none"> It was observed that on average 76% of key personnel are aware of the main objectives. Item 3: Standards related to laboratory safety were identified: 6 internal standards, 1 external. Item 4: The SWOT was prepared, identifying: 4 strengths, 6 weaknesses, 1 opportunity and 2 threats. Item 5: 2 formalized indicators were identified. The results of the detailed interviews are shown in the following tables. The participation of key personnel, with knowledge and experience, allowed for relevant information and effective use of time. Analyzing the responses, it was observed that in some cases the personnel only knew about topics related to their area (e.g., standards, indicators), so a sample of key personnel from different areas provided a global view of the context. 	<ul style="list-style-type: none"> Key personnel indicated the following regarding the understanding of the context, in the methodology application exercise: <ul style="list-style-type: none"> Item 3. Were the objectives and SWOT of the MSR process reviewed and agreed upon? 	<p>91% of the participating staff "Strongly Agree" that the risk management methodology designed allowed them to identify and deepen their understanding of the objectives and SWOT needed to understand the context.</p> <p>The collection of information through semi-structured interviews, with key information provided in the analysis of the data. Even so, it was observed that participants were not satisfied with their area, so an initial diagnosis would help to consolidate more information.</p> <p>The MSW specialist expressed his agreement with the MSW context elaborated. His suggestions were also collected and included in the results shown in the following diagrams:</p> <ul style="list-style-type: none"> ❖ Strategic Alignment ❖ Regulatory basis and SWOT ❖ MSW risk management organization chart at the Mechanical and Electrical Engineering School.



Note: 1 person out of 11 did not respond to this questionnaire.

Analysis and results of data recording	Analysis and results of the Questionnaire "B".	Analysis and results of the Interview	Analysis and results of the Questionnaire "C"	Interpretation
INDICATOR 1.1: UNDERSTANDING OF THE CONTEXT				
	modernized. Weaknesses: very few volunteer activities and very few social projects.			

Strategic Alignment Of Risk Management Of The RSU Process

VALUES (linked to risk management): Quality, Commitment, Innovation, Integrity, Responsibility, Solidarity.

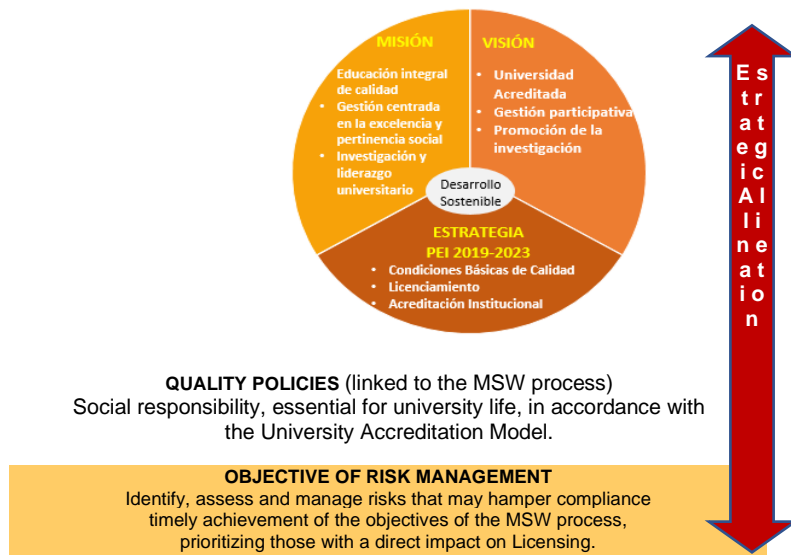


Figure 1. Strategic Alignment. Information collected in the data analysis and questionnaire.

Source: Own elaboration

Table 4. Regulatory Basis / SWOT

USW Policy Basis	SWOT
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<ol style="list-style-type: none"> 1. Law No. 23733, University Law 2. Licensing Model and its implementation in the Peruvian university system (SUNEDU, 2015). 3. Institutional Accreditation Model for Universities (SINEACE, 2017). 4. Institutional Strategic Plan (PEI) 5. Institutional Operating Plan (POI) 6. Institutional Organization Chart 7. ROF 8. MOF 9. Environmental management plan 10. Mechanical Electrical Engineering Study Plan 11. Scholarship Regulations 12. Agreement Regulations 13. Resolution of security protocols 14. Environmental policy 15. Internal rules and regulations for employees <p>Main Indicators</p> <ul style="list-style-type: none"> • Number of inter-institutional agreements with national and international entities. • Number of social outreach programs. • % of teachers participating in USR projects. 	<p>Threats</p> <ul style="list-style-type: none"> • Increased insecurity affecting the local population and university personnel. • High level of informality and corrupt practices in local commercial activity that may affect compliance with agreements. • Massive immigration of foreigners affecting the city's service and security capacity. • Family disintegration negatively impacting the social development of the community. 	<p>Opportunities</p> <ul style="list-style-type: none"> • Local economic stability favors community ventures and projects. • Globalization favors contact with NGO's and other entities with common social goals • Quality higher education is recognized as a factor in national development. • Existence of international practice and trends on USR issues.
	<p>Strengths</p> <ul style="list-style-type: none"> • Vision, mission and strategic plan aligned with the RSU. • Promotes participation in competitive funds for research on USR issues. • Existence of plans, policies and activities for environmental protection 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Low technological development that could affect innovation in MSV projects. • Lack of inter-faculty integration in the management of agreements. • Do not strengthen the dissemination of environmental protection practices.

Source: Information collected in the data analysis and questionnaire. Elaboration: Own

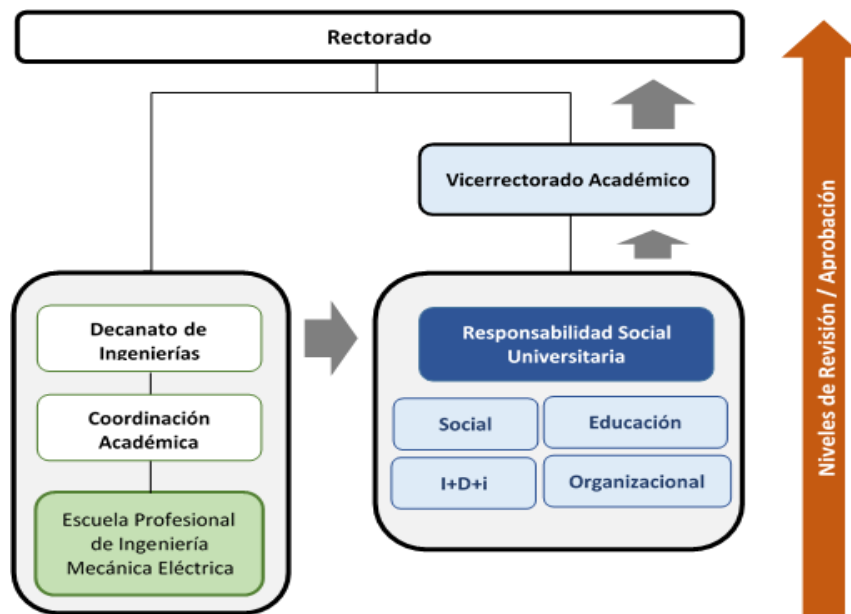


Figure 2. Risk management flowchart of the RSU process in EP Ing. Mec.

Source: Own elaboration based on information gathered from data analysis and questionnaires.

RESULT OF THE INTERVIEWS - Exercise of application of the methodology in Safety in the use of Laboratories:

Item 2: Mention the main objectives of safety in the use of laboratories:

MAIN OBJECTIVE / SECONDARY OBJECTIVE(S)		Participants	TT	%
M O	Establishes safety norms to improve laboratories' use, ensuring the operation does not cause damage to users, teachers, students, administrative staff, etc.	P1, P2, P5, P8, P10, P9, P7, P11	8	73%
M O	Identifies and evaluates risks during practices, establishes control measures for risks of accidents, falls, etc., and ensures safety within the laboratory.	P1, P3, P4, P5, P6, P10, P8	7	64%
S O	Promotes the commitment and interest of laboratory users for health and safety in laboratories.	P1, P6, P5	3	27%
S O	Promotes safe material handling practices in the laboratories and protects the person and students in the laboratory activities.	P1, P7, P9, P2	4	36%
S O	Enforces the norms on the use of laboratories and environmental protection and establishes rules to improve the use of laboratories.	P1, P10, P8, P2	4	36%

Item 3: Which standards are related to this component?

IDENTIFIED STANDARDS	Mentioned by the Participants	TT	%
Laboratory Safety Protocols	ALL	11	100%
Solid, hazardous and non-flammable waste management plan	P1, P5, P3, P8, P10, P6, P7	7	64%
Electrical and electronic waste management plan	P1, P5, P3, P8, P10, P11	6	55%
Maintenance plan	P1, P2, P5, P10, P4	5	45%
Mechanical and Electrical Engineering PE Study Plan	P1, P7, P9	3	27%
Working procedures for risk activities	P1, P8, P10, P4	4	36%
D.S.N° "005 -2012-TR Work Safety Law and Regulations.	P1, P2, P5, P3, P8, P10, P9, P11	8	73%

Item 4: Mention strengths, weaknesses, opportunities and threats (SWOT):

<p>Threats</p> <ul style="list-style-type: none"> Few suppliers for hazardous material waste. SUNEDU inspections could occur and sanctions could be imposed for not having adequate safety measures in the laboratories or by the municipality in the event that suppliers do not comply with procedures for the disposal of hazardous materials. <p>Reported by: P1, P6, P5</p>	<p>Opportunities</p> <ul style="list-style-type: none"> Coordination with local municipal services for the use of laboratories through student projects. <p>Reported by: P9, P6, P5</p>
<p>Strengths</p> <ul style="list-style-type: none"> Relatively new equipment and furniture Complete and disseminated emergency plans. Effective cleaning service Having a nursing unit in all premises <p>Reported by: P1, P2, P3, P4, P5, P7, P8, P11, P10, P11</p>	<p>Weaknesses</p> <ul style="list-style-type: none"> Lack of laboratory capacity for the number of students, lack of materials or failure to obtain them in a timely manner. There is a lack of more safety and risk assessments, and periodic ones by the University itself. There is a lack of training for administrators and students on how to use the equipment and tools correctly, as well as awareness of their care and

	<p>maintenance.</p> <ul style="list-style-type: none"> • delays in the delivery of materials, in some cases can be detrimental to students. • lack of coordination for integrated activities and procedures between laboratories and nursing and safety services. • lack of training in the safe use of hazardous materials, order, labeling. <p>Reported by: P1, P2, P4, P5, P6, P7, P8, P9, P110, P11</p>
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Item 5: What indicators do you have related to safety in the use of laboratories (formalized or not)? If not, could you mention some that you would recommend?

INDICATORS	Mentioned by the Participants	TT	%
Incident records (fires, brakes of tolos, etc.)	P1, P2, P5	3	27%
Record of accidents of students, teachers and administratives	P5	1	9%

3.1 Discussion of Results

The results show for the first specific question: *In what way are the context and criteria defined in the risk management of the RSU process, with the participation of administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university in the year 2021?* Although, the context can be explained according to the reality of the University under evaluation, objective and subjective reality, as mentioned by (Hernández, Fernández, & Baptista, 2014), a hybrid approach also attends to the nature of risk management that considers not only the quantitative but also exploits the knowledge and experiences of those involved.

In the context and criteria dimension, a consensus was reached among the participating key personnel on understanding the context and definition of criteria for the risk assessment of the USR process. The documentary analysis shows that the main focus of the University’s mission and vision includes the social aspect; also, the USR is considered in the quality policies and has a mission and specific strategic and operational objectives. However, in practice, its development is still incipient since this was recognized by the participants in the questionnaires, where the social dimension of variable II (USR Process) was “incipient”. This reality is corroborated by Rincón et al. (2017), who analyze that the USR is an important bulwark of the University to society, however, they note that, in reality, the process is still immature and requires enhancing efforts to be sustained and generate alliances between internal and external actors. To define and deepen the context, it has been essential to identify the normative documents related to the USR and risk management process, which has allowed extracting relevant data such as values, objectives, strengths, opportunities, weaknesses and threats, organization, levels of review and approval of risks, among others. This information, among others, allowed the elaboration of the alignment diagram (alignment of the MSR strategic objectives with those of the institution and those of risk management), the normative base, the SWOT and the organization chart of MSR risk management in the Mechanical and Electrical Engineering School; hence the importance of having an initial diagnosis of the process. The participating key personnel reviewed and validated all this information, went deeper into each topic and enriched the information with their contribution and final validation. As a result, 91% of the participating personnel “strongly agreed” that the risk management methodology allowed them to describe and understand the context, objectives and SWOT of the USR process.

This context analysis is enriched with the analysis of Variable II: the USR process. The data analysis allowed the collection of information from strategic and operational documents of the University, which was reviewed, compared and complemented with the theoretical basis and international trends of MSW presented in Chapter II, which

included the analysis of the historical background of MSW, governmental regulations and the international standard ISO 26000 for MSW. This information and in coordination with the USR specialist appointed by the University, the level of development of the USR process is verified (intermediate), which is presented in the following graph by dimension; this gives us a global vision of this process, a similar study performed by Rincón, Caridad and Salazar (2017) when analyzing the maturity level of the USR process in universities in Barranquilla to deepen in this topic. To be able to compare the results, these were taken to a base standard 3. The level reached by the USR process results from the average of its four dimensions, and the scale described in the technique and Instruments was used for rating the scale described

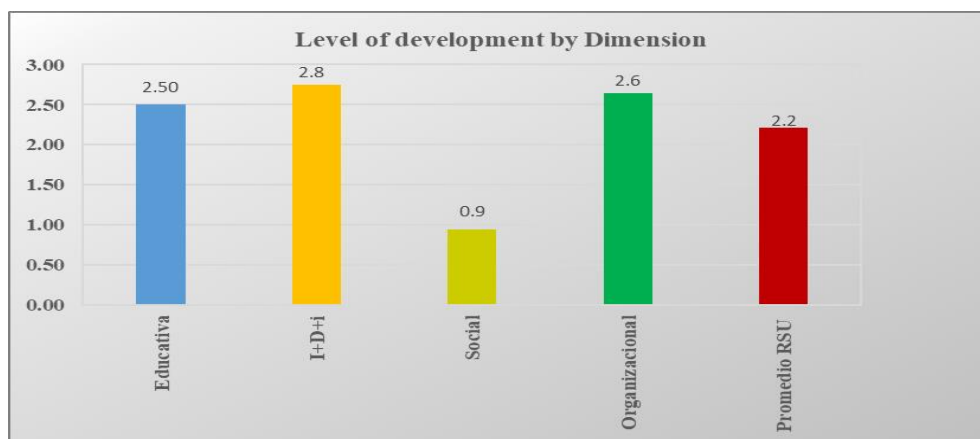


Figure 3. Variable: MSW Process: Results by Dimension.

Source: Own elaboration

In the analysis of the USR Process, it is observed among the lowest aspects the social aspect, in terms of participation in projects in the locality, knowledge of local problems and development of impact studies in the locality, which indicates that being the main objective of the USR, social commitment, there is still an incipient development in its practice, upon reflection of these results differ from Vallaeys (2018), who finds the USR, within its epistemological connotation as a social commitment of the academy with society, within the transversal axes that the RSU intends to act, likewise this contradicts with (Limo et al., 2019), due to the fact that it is stated that university social responsibility is one of the vertebral axes of the RSU, which is oriented to project the science that is generated from universities to meet the needs of society, however it coincides with Rincón et al. (2017) who conclude that Social responsibility is a matter under construction at the university level, not yet achieving a level of institutional development.

Regarding the prioritization of sub-processes, 91% of the participating personnel “Strongly Agree” that the risk management methodology designed allows them to identify and prioritize the RSU sub-processes considering the CBCs of the Licensing, an indispensable requirement to achieve the Licensing (SUNEDU, 2015).

In terms of prioritization, it is worth mentioning that the USR sub-processes were cross-referenced with the basic quality conditions (BQC) and their respective indicators (Licensing Model, point 2.2.4), and it was found that Licensing has a direct impact on three USR sub-processes, and a cross-check was also made with the objectives and projects of the PE. The key personnel involved found this mechanism very dynamic and practical since, in the future, it will allow them to update the table according to changes in the projects and strategic objectives; thus, risk management is presented as a key strategy for the fulfillment of objectives, supporting its contribution to university processes, as mentioned by Gutiérrez and Sánchez-Ortiz (2017) when applying the ISO 31000 risk management model in undergraduate teaching processes.

Regarding the risk and control assessment criteria, 82% of the participating key personnel “strongly agreed” that the risk levels (frequency and impact) are reasonably in line with the University’s risk tolerance; at this point, it is

worth highlighting the importance of the contribution of the RSU specialist appointed by the University, who contributed with his knowledge and experience regarding the frequency of historical events and their impact. It is worth mentioning that the impact is the potential loss or opportunity in case a risk materializes, and the frequency is the number of times the risk could occur in a year, the Risk Map the result of the frequency of the impact.

Below is the risk map elaborated with frequency and impact levels for the RSU process of the EP Ing. Mecánica Eléctrica, which was validated by key personnel; a similar matrix is used by Gutiérrez and Sánchez-Órtiz (2017), who applied a five-level matrix when designing a risk management methodology for a Chilean university:

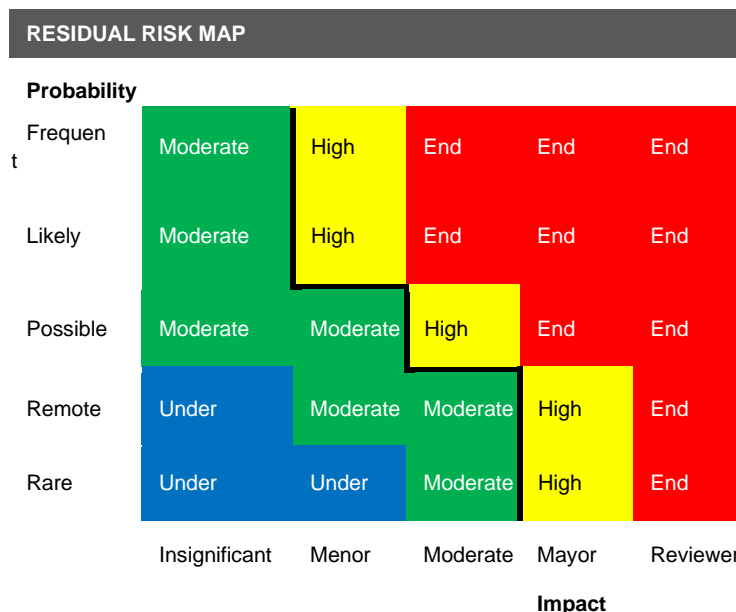







Figure 4. Residual risk map of the MSW process at the Mechanical and Electrical Engineering Plant.

The results show the second specific question: *How is communication carried out in the risk management of the RSU process, with the participation of the administrative and teaching staff of the Mechanical and Electrical Engineering PE of a Peruvian Private University in the year 2021?* To achieve successful communication, first of all, it is necessary to identify stakeholders and key personnel; this is corroborated with the ISO 31000:2018 standard, which states that all points of view must be considered and communication between members must be honest so that adequate awareness is carried out to generate the necessary actions. The participants in the interview and in the questionnaire “C” gave their agreement to the list of stakeholders, pointing out the key personnel and recognizing the importance of these; 91% “strongly agreed” that their identification facilitates having relevant information, facilitates decision making by personnel with adequate level, and allows adequate feedback by having personnel with knowledge and experience in the subject, this being considered a key success factor as well as the leadership of Senior Management, as mentioned by Priyasono et al. (2019) in their experience of implementing risk management in Indonesia. Data analysis becomes important here, as it allows collecting information to identify stakeholders and their expectations (information requirements), which the University’s designated USR specialist supported.

The results show the third specific question: *In what way is risk assessment performed in the RSU process, with the participation of administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university in the year 2021,* in the exercise of applying the methodology, 89% of the participating key personnel “strongly agreed” that the risk management methodology allowed them to identify and deepen on the risks in the laboratories. To perform the risk assessment, it was necessary first to identify potential sources of risk, considering mainly the fundamental MSW issues and international trends, which the MSW specialist validated. In

the application exercise, the key participants provided several risk sources related to the assessment process. Considering the risk sources, then for risk identification 5 steps were determined; considering as a guide the ISO 31000:2018 standard, some quality tools are also considered (flowcharts, failure analysis, etc.) as suggested by Suarez and Nieto (2020), proposed methodology to manage risks in the postgraduate; also included questions such as: from your experience, what aspects do you consider that could fail or represent a risk in safety in the use of laboratories, Why do you think this failure or risk is generated, what consequences could it have if it occurs, is there any control to prevent or mitigate it, do you have any indicator to monitor it, do you have any indicator to monitor it? Do you have any indicators to monitor it?

Table 5. Steps for risk identification

Risk Identification	
	<p>Documentation review</p> <ul style="list-style-type: none"> Structured review of management, normative, regulatory, SWOT and other documents related to the MSW process.
	<p>Checklist analysis</p> <ul style="list-style-type: none"> Identify risks through a preliminary list of risks or a list of historical events (materialized risks).
	<p>Interviews</p> <ul style="list-style-type: none"> Semi-structured interviews, individual or collective, allow for the collection of extensive information that must be analyzed and validated.
	<p>Cause-Effect Analysis</p> <ul style="list-style-type: none"> Block diagram or flow chart: Analyze activities to detect failures (optionally other techniques can be applied at the risk specialist's discretion).
	<p>Identify risk controls and indicators</p> <ul style="list-style-type: none"> Review of policies, standards, audit reports, contracts, etc.

Once the risk has been identified, identify its root cause, consequences and controls, if any. Finally, these tools are applied to key personnel, it is an iterative activity, and the final risk register must have the final validation of the participants.

Table 6. Risk register

ID	MSW subprocess	Risk description	Causes	Source of Risk	Consequences	Control Description	Indicator Description
RSU1							
RSU2							
RSU3							
Signature of Participants:						Date:	
Signature Responsible for RSU:							

Regarding the risk analysis, a qualitative analysis has been considered, being that it would be the first experience of this University with a formally established risk management; 3 steps were established for the risk analysis, having as a guide the ISO 313000:2018 standard: (1) Determination of the inherent risk level (frequency by the impact), (2) Qualification of controls: design and effectiveness and (3) determination of the residual risk level. The residual risk is that which is evaluated considering the controls:

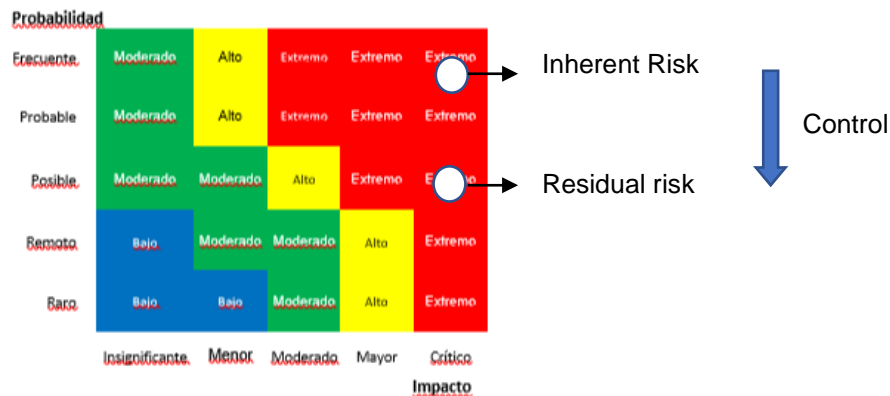


Figure 5. Map of risks and controls

It is worth mentioning that due to the pandemic situation, telephone interviews were conducted; however, according to what was mentioned by some participants, in the future, face-to-face interviews are recommended for these cases and, if the pandemic continues, a videoconference. For this reason, in the application exercise, 45% of the participating personnel “strongly agreed” with the methodology applied, and 27% “agreed,” making a total of 72%.

The results show that for the fourth specific question: *How is the treatment of risks defined in the USR process, with the participation of administrative and teaching staff of the Mechanical and Electrical Engineering PE of a private Peruvian university in the year 2021*, the participation of key personnel is fundamental since they contribute with their expert judgment to the selection of risk treatment options. According to what was coordinated with the RSU specialist designated by the University and then validated by the key personnel, it was defined that extreme and high risks would have mandatory treatment options, as detailed in the table above. The treatment options are defined in coordination with the Head of RSU, by expert judgment of key personnel and according to the risk appetite of the University (amount of risk that the institution decides to take in the case of the RSU process). The most effective option is implemented and the effectiveness of the implemented treatment is evaluated. The treatment options are (according to ISO 31000:2018):

- Accept: the University accepts the risk.
- Mitigate: actions are taken to mitigate the probability or impact of the risk.
- Transfer: to transfer to a third party the responsibility for the risk.
- Avoid: eliminate the causes to avoid the risk.

The selected treatment is recorded in the following table for monitoring, and the person responsible for each treatment must report weekly progress to the MSW Manager:

Table 7. Follow-up of Action Plans

ID	Risk description	Residual Risk Level	Risk Response	Treatment	Responsible	Implementation Date	Progress % to	Current status
RSU 1								
RSU 2								
RSU 3								
Signature of Participants: Signature Responsible for RSU:						Date:		

Source: Own elaboration

In the application exercise, 82% of the participants “strongly agreed” that the risk follow-up forms had sufficient information for proper monitoring and would allow them to have a follow-up log. Also, it is worth mentioning that, to validate and make adjustments to the design of the Risk Management methodology, the application exercise was carried out by selecting one of the prioritized sub-processes linked to the Licensing process at the request of the Head of RSU the component was selected: Safety in the use of laboratories, which is located in the Environmental Management sub-process. Then, it was applied to the key personnel selected as a sample, 11 people: 6 administrative and 5 teachers of the PE Electrical Mechanical Engineering and the RSU Office and a Semi-Structured Interview Guide. In this exercise, 8 risks were identified, of which 3 were high and 1 extreme, to which action plans were defined, responsible for monitoring, start and end date and a status report. It is important to highlight that action plans are one of the main benefits of risk management, in addition to identifying risks and evaluating risk factors, according to Mayta (2018).

The results show the fifth specific question: *How is the risk management of the USR process monitored, with the participation of the administrative and teaching staff of the Mechanical and Electrical Engineering PE of a private Peruvian university in the year 2021?* An annual review is appropriate to monitor risk management since a complete application cycle is needed to obtain results that can be evaluated and, based on this, make adjustments to the established criteria or required improvements. Considering this, an annual periodic risk management review has been established for the present design of the risk management methodology and in coordination with the Head of University Social Responsibility. This review will provide reasonable assurance that risks are adequately managed, that risk management deficiencies are identified and continuous improvement is sought, and that risk management remains aligned with the University’s strategy over time. The results showed that 91% of the participants “strongly agreed” with this policy.

The follow-up includes the review of each dimension of risk management, the established parameters, the organization, the methodology, the entire management, and the effectiveness of its results. The Head of RSU is responsible for the review, the review must be documented and a report will be submitted with the following: analysis performed, updates made, recommendations for changes, trends of indicators, action plan to make the updates and alignment of objectives, which according to Almuiñas and Galarza (2016) is relevant to link the planning and deployment of risk management with the university strategic objectives. As defined with the Head of RSU and according to the risk management organization chart, the report will be submitted to the Academic Vice Rector’s Office for review, who will submit it to the Rector’s Office for knowledge.

The results show the sixth specific question: *How is the registration of risks in the RSU process carried out, with the participation of administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university in the year 2021?* The risk register format allows reporting the activities and results of risk management, thus providing information to senior management for decision-making and support in fulfilling their obligations; the key personnel participants also mentioned that they are practical, 91% of the participants indicated that they “strongly agreed” with the formats used for the risk register, it should be noted that the formats may vary according to the needs of the institution, another format for the risk register is presented by Suárez and Nieto (2020) for the case of risk assessment. It is important to mention that in the risk management methodology to perform the

risk register, some policies must be defined, which were coordinated with the RSU specialist designated by the University, such as:

- The Chief of RSU will be responsible for storing risk registers and reporting to all stakeholders.
- Consider risk registers as confidential information, so reporting to external parties must be validated by senior management and be specific and understandable.
- Risk reports and reports shall consider the information expectations of stakeholders.
- Formats must be version-controlled and stored physically and virtually.
- Documents to be controlled:
- Risk Register
- Follow-up of action plans
- Historical record of incidents
- Risk reports submitted
- Substantiation (historical data used, documents reviewed, etc.).

For the general question: How does *the design of a Risk Management methodology favor the process of University Social Responsibility (USR), with the participation of the administrative and teaching staff of the EP Mechanical and Electrical Engineering of a private Peruvian university, as a contribution to the licensing project in the year 2021?* The results show that the design of a Risk Management methodology framed in the ISO 31000 standard:2018 allowed explaining the real context of the RSU process, considering not only quantitative data but also exploiting the knowledge and experiences of key stakeholders and staff, which facilitated effective communication; it allowed identifying the strengths, opportunities and recognizing the weaknesses and threats of the process, and through a deep analysis it was possible to define the “intermediate” level of development of the RSU process; Also, the participating personnel agreed that the methodology allowed prioritizing the RSU sub-processes to manage the risks considering the Licensing process, which will favor the fulfillment of one of the main objectives of the University, which is to achieve the University Licensing.

The risk management methodology also made it possible to explain and define how to identify and evaluate risks, with the participating personnel being “very much in agreement” with the methodology designed, which included the evaluation of controls and the expert judgment of the stakeholders and key personnel, all of which made it possible to assess the risks of the RSU process and make substantiated decisions when selecting the action plans to mitigate them; the methodology designed also allows monitoring progress in risk management, through pre-established formats, naming those responsible for the action plans and follow-up until risk mitigation is achieved.

As has been presented throughout this chapter, in questionnaire “C,” whose objective was to validate and adjust the design of the methodology by the participants, the majority obtained a fairly satisfactory result of “very much in agreement,” as shown below:

Table 8. Results of Questionnaire “C.”

Items	Strongly Agree	Agreed	Neither Agree Nor Disagree	Disagree	Strongly Disagree
1. Did The Knowledge And Experience Of Key Personnel Provide Relevant And Sufficient Information For Risk Assessment?		-	-	-	-
3. Were The Objectives And SWOT Of The MSR Process Reviewed And Consensus Reached?		-	-	-	-
4. Will The Prioritized MSW Sub-Processes Positively Impact The Licensing Process?		-	-	-	-
5. Do The Resulting Risk Levels Reasonably Match The University's Risk Tolerance?		-	1	-	-
7. Did The Methodology Allow To Identify Risks In The Process?		1	-	-	-
8. Did The Methodology Provide Information For An In-Depth Risk Analysis?	5	3	2	-	-
9. Did The Methodology Allow To Assess The Risks In Order To Make Decisions According To The Level Of Risk Reached?		-	-	-	-
11. Do The Action Plan Forms Contain Sufficient Information For Follow-Up?		1	-	-	-
13. Is The Periodicity Established For Monitoring Risk Management Adequate For Its Execution?		-	-	-	-
15. Do The Formats Used Facilitate The Recording Of Risks?		-	-	-	-

Source: Own elaboration

Finally, the annual review of risk management will allow continuous improvement considering the results obtained during the year; and as sustained by Limo and Peña (2019), universities in Lima require strengthening their RSU processes to visualize a greater impact of risk management in this process; however, based on the results obtained it could be observed that a risk management methodology designed according to the reality of the University and the process will provide greater security in the fulfillment of the objectives of the process.

CONCLUSIONS

FIRST - The design of a risk management methodology in the University Social Responsibility process of the EP Ing. Mecánica Eléctrica had a very positive impact on the management of this process; it should be noted that by mitigating the high and extreme risks of the RSU process, the participants are in better conditions for successful management of the process since it is easier for them to achieve their objectives, which coincides with the analysis of Almuiñas and Galarza (2016) who indicate the need to create a space in the university strategic direction for risk management for its contributions to the university management. Likewise, the participating key personnel provided favorable opinions regarding a better understanding and deepening of the context of the process, identifying its strengths and weaknesses as well as its threats and opportunities; defining mechanisms that allowed them to identify and evaluate their risks preventively, prioritizing the sub-processes related to the PD objectives and projects as well as those linked to the compliance with the CBC of the Licensing. By identifying their risks, the participants could evaluate them using the risk assessment criteria established in the methodology and become aware of high and extreme risks, to which they proposed treatment plans to mitigate them, as established in the risk management methodology. The assigned RSU specialist and the participants agreed on the established criteria, so it was possible to verify that the design of the risk management methodology under the ISO 31000:2018 standard can be adapted to the reality and complexity of the process applied.

SECOND - The context and criteria in the MSR process risk management methodology are defined in depth through strategic and operational management documents, internal and external regulations related to the MSR

process and above all, with the expert judgment of key personnel involved in the process. The specialist and key participants were involved in the analysis and recognized the threats and weaknesses of the process, as well as its strengths and opportunities, which they identified and recognized. A diagnosis of the MSR process in its four dimensions enriched the understanding of the context and allowed participants to ground themselves in the reality and complexity of the MSR process and, on this basis, establish risk assessment criteria. The design of the methodology allowed the participants to align the strategic objectives with those of the USR process and those of risk management, an aspect highlighted by Almuiñas and Galarza (2016) when supporting in their analysis the relevance of linking risk management planning with the university strategic objectives; the participants were also able to prioritize the USR sub-processes according to the objectives and projects of the PD and the Licensing CBC, which the participants found very practical for future updates in case the objectives and projects of the PD change.

THIRD - Risk management communication in the MSW process is carried out effectively and timely, being fundamental to identifying stakeholders and key personnel in the MSW process properly. The participants gave their agreement and contributions to identifying stakeholders and key personnel. They thought that their identification facilitates having relevant information and adequate decision-making and allows adequate feedback by having personnel with knowledge and experience in the subject, which coincides with the analysis of Suárez and Nieto (2020), who conclude that the ISO 31000 model combined with teamwork can be favorably implemented in the self-assessment process of the master's degree programs for the accreditation process. The documentary analysis becomes important here, as it allows collecting information to identify stakeholders and their expectations. Communication in risk management directed to stakeholders should be effective, timely and relevant, not neglecting two characteristics of communication in risk management: confidentiality and integrity.

FOURTH - The risk assessment in the RSU process is qualitative and is performed systematically and following steps established in the risk management methodology using the ISO 31000:2018 standard as a guide. In the risk assessment, the key participants were able first to identify the risks of the process, then analyze them and finally assess them according to the criteria established in the methodology. The participants mostly agreed that the methodology allowed them to identify the risks and go deeper into them. The participants carried out the risk assessment using the criteria defined in the previous stage, so the success of the risk assessment is closely linked to deep analysis and knowledge of the MSW process and management. By evaluating the risks in their probability and impact, the participants were able to prioritize the residual risks and define the actions to be taken (accept, mitigate, transfer, avoid); a similar methodology is presented by Gutiérrez and Sánchez-Órtiz (207) who conducted an exploratory study given the still incipient application of risk management in the education sector, presenting a practical guide for risk assessment on the undergraduate teaching process.

FIFTH.- The treatment of the risks of the RSU process is defined from the expert judgment of the key participants and according to the residual risk levels (low, moderate, high, extreme); in this case, in coordination with the RSU specialist, it was defined that the University would take action before the high and extreme risks, representing these improvement actions one of the main advantages or benefits of risk management to the university management, as mentioned by Mayta (2018) in his article on risk management and its influence on the accreditation of academic programs of Peruvian universities. At this point, it is decided by the most effective and efficient option to mitigate the risk, which is recorded in the action plan follow-up formats for monitoring until its completion, formats on which the participants mostly indicated that they had sufficient information for adequate follow-up.

SIXTH - The monitoring of risk management of the RSU process is annual, as coordinated with the RSU specialist assigned by the University and as established in the risk management methodology. It is known that all management must be evaluated and monitored periodically, and risk management is no exception. The follow-up establishes monitoring policies agreed upon with the Head of RSU, a person with authority and knowledge designated by the University. The head of RSU will carry out the monitoring of risk management. It will validate the dimensions, established parameters, organization, methodology and results of risk management, thus assuring the RSU office and the Rectorate that risk management will mature and strengthen with experience, which can be compared with the results of Arteta (2020) that showed that the greater the maturity in the implementation of

internal control (including risk management), the better the management of the process, which for his study was the Treasury office.

SEVENTH - The risk register is carried out in an organized and structured way, to facilitate the effective monitoring of both risks and action plans through formats established in the methodology, which were validated by key participants, considering that the register complements the identification, evaluation and monitoring of risks, as mentioned by Arteta (2020) who demonstrates how an adequate identification of risks is highly correlated with good treasury management (the process on which his study is based). At this point, it is important to consider the identification of stakeholders and their expectations in terms of information requirements to address the reports and their content properly, considering the confidentiality of the information. It is also worth mentioning the importance of proper recording in cases of performance audits.

Recommendations

FIRST - It is recommended to implement Risk Management in the University Social Responsibility process at the institutional level, thus facilitating compliance with the objectives of the RSU process by mitigating its risks on time and under an established methodology, which also considers the CBC to favor successful management of the Licensing.

SECOND - Include in the analysis of the context and criteria international trends in the MSW process and modern versions, this will not only provide a global vision of the context and greater capacity to interpret the level of development of MSW management but will also enrich the risk analysis and treatment options in an innovative way.

THIRD - It is recommended to establish sensitization strategies such as awareness workshops on the benefits and opportunities of risk management, goal setting, incentives and sanctions so that stakeholders and key personnel are engaged in communication, consultation, feedback and timely attention to risk mitigation plans.

FOURTH - It is recommended to have at least one risk management specialist on the team so that their experience can adequately address, moderate and guide the risk assessment activities, such as risk identification, analysis and evaluation.

FIFTH. - It is recommended that those responsible for the action plans should be established at the level of the Chiefs of Staff or equivalent, with authority for timely decision-making and effective monitoring of compliance with the treatment plans.

SIXTH - It is recommended that for the following risk management reviews, and as its maturity level progresses, management review formats be considered that allows historical recording information on results, as well as indicators, for comparison and identification of improvements or weaknesses in risk management.

SEVENTH - It is recommended that a copy of the virtual archive of risk management records be kept in the backup of backup information in case of disasters, given that risk management handles strategic and confidential information for the management of the University.

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