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PROPUESTA DE MODELO PARA INNOVACIÓN: CASO DE ESTUDIO DE UNA GRAN EMPRESA INDUSTRIAL MEXICANA

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RESUMEN

Este artículo presenta un modelo de innovación desarrollado para una gran empresa mexicana donde el proceso actual de innovación es informal y no sistemático. Para este propósito, se aplicó un cuestionario. El tamaño de la muestra es relevante y representativo debido a la respuesta de casi el 75% de la población total, considerando individuos con personal a cargo, hasta nivel directivo; se realizó un análisis descriptivo. Los resultados revelaron como principal conclusión que los colaboradores no entienden cuál es la estrategia de innovación de la empresa; más de la mitad de la muestra mencionó que para tener una mejor forma de cultura de la innovación debe haber una mayor participación de personas con puestos gerenciales y/o directivos dentro de la organización, así como la integración de toda la organización en un modelo de implementación

efectiva. Finalmente, se realizó una propuesta de modelo, enfocada en la industria minera y basada en herramientas de gestión ya conocidas.

ABSTRACT

MODEL PROPOSAL FOR INNOVATION: A CASE STUDY OF A LARGE INDUSTRIAL MEXICAN COMPANY

This paper presents a model for innovation developed for a large Mexican company where the current process to innovate is informal and non-systematic. For this purpose, a questionnaire was applied. The size of the sample is relevant and representative due to the response of almost 75% of the entire population, considering individuals with personnel in charge, up to the management level. A descriptive analysis was carried out. The results revealed, as main conclusion, that employees do not understand what the company's innovation strategy is; more than half of the informants mentioned that in order to have a better way of innovation culture there must be more management involvement and integration of the entire organization into a model of effective implementation. Finally, a model proposal was made, focusing on the mining industry and based on established management tools.

KEYWORDS: *innovation, knowledge management, project, model.*

PALABRAS CLAVE: *innovación, gestión del conocimiento, proyecto, modelo*

INTRODUCTION

Until just a few years ago, when we did not have such a globalized world and the economy was closed, the most common innovation model of any company was based on the ability to follow the trends in products and technologies of the best around the world (Benchmarking), in order to introduce themselves in the appropriate markets. Back then, it was considered that capital and labor were the only factors that were directly linked to economic growth. Intellectual capital, on the other side, knowledge and education were considered external factors, of relative incidence in the economy.

Nowadays, the current market in all sectors has changed. We currently live times of oversaturated and dynamic markets, free trade and globalization at its best, consumers have gained access to a large number of options available globally, they are becoming more demanding, they pass from being passive to active by also participating in the market process. For this reason, companies must seek an organizational culture centered on the consumer, as an essential element in decision making rather than strategies to attract new customers; in the face of such challenges, it is required that in order to achieve the creation of value in the business world, the possibility of surviving an exacerbated level of competitiveness, as well as a permanent appearance of changes and the high level of uncertainty and risk, require new approaches and attitudes to be able to prosper in this new environment.

In relation to people considered as the determinant of the culture of innovation in organizations, this research poses and develops two fundamental pillars of its creation and management.

From a perspective focused on the members of the organization, on the one hand, and on the essential role of people in innovation and creativity, on the other, their efforts and commitment to innovation are crucial in the construction of organizations capable of making innovation and creativity flow smoothly.

The necessary conditions to enable an environment conducive to innovation and creativity in organizations requires the understanding of organizations as places for meeting and collaboration between people, favorable to join forces and exchange experiences.

This mining company faces several complex difficulties. The deposits are increasingly lower grades, more complex content and are deeper, which makes mining more difficult from the technical point of view and more expensive; production costs have skyrocketed, that is why innovation must be implemented and seen as an organizational culture as soon as possible. An aspect of great importance for the company to obtain good results from innovation is that it can encourage among all its employees an innovative spirit — bearing in mind that currently, the general environment is unstable, it will be decisive for the company to

take advantage of and enhance the talent of any creative individual and ensure that all business units adopt a positive attitude towards change. The company must decentralize the tasks and responsibilities and grant great autonomy and independence to teams and people. Through this management mode, the creativity of the people is encouraged since they are given freedom of action within wider margins as they are allowed to implement improvements on the activities they are carrying out. This support for innovative people must be complemented with training in tolerance for failure and stability (Ruiz & Mandado, 1989).

Navarro and Zuñiga (2011) mention that innovation arises to generate a new business model, as well as understanding the needs and habits of consumers to generate improvements in products and/or services that will achieve a clear differentiation of competition. It has become the main reference of productive life because it includes the search for compliance and satisfaction of needs to generate value; for the authors, innovation is the very essence of sustainable competitive advantage, increased productivity and economic progress.

Birkner and Máhr (2016) point out that in recent decades, innovation has become one of the most important sources of today's global economy. Subsequently, the revelation of innovation processes, the recognition of entities involved in the renovation, as well as the investigation of relationships are increasingly important.

Mining all over the world has been under pressure to implement cost reduction projects, after a period in which commodity prices have fallen to record lows. Furthermore, mines are now deeper and more dangerous, geology is more difficult to explore and continuous improvement is no longer enough to survive.

The mining sector understands the concept of innovation, but has been slow to realize its benefits. Significant research has been carried out to date, however, it is imperative now to join the points and capitalize on the base. Innovation worldwide has taken root in a laboratory mentality, being limited to a focus on technology. The sector is beginning to understand that there is enough space to do things differently and innovate throughout the organization and in all stakeholders involved (Lane, 2016).

Bryant (2015) identifies as one of the most important challenges for mining companies, the fact that none will face the challenges currently facing the sector. Companies must recognize that a variety of actions will be needed and that these must be supported by a changing mindset that reevaluates the role of mining companies in societies in which they operate. Because the industry is somewhat unique, this new mindset must reflect the specific characteristics, challenges and opportunities of the sector.

LITERATURE REVIEW

Innovation

According to the Oslo Manual (OECD & EUROSTAT, 2005), innovation is the application, for the first time, of knowledge and rational practices to satisfy socioeconomic needs. The innovation process is only completed when it has been introduced into the market. In particular, the manual describes innovation as "...the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations."

Also, the Oslo Manual defines four different types of innovation (1) product innovation: it corresponds to the introduction of a new good or service, or a significantly improved one in terms of its characteristics or the use to which it is intended, this definition implies a significant improvement of the technical characteristics, components and materials, integrated computing, ease of use or other functional characteristics; (2) innovation in process: it refers to the introduction of a new, or significantly improved, production or distribution process, this implies changes in techniques, materials, and/or computer programs; (3) innovation in marketing: it is the application of new marketing methods that imply significant changes in the design or packaging of the product, its positioning, its promotion or pricing, and finally, (4) innovation in the organization: which refers to the introduction of a new organizational method in the practices, the workplace organization or the external relations of the company.

Knowledge Management and Innovation

The process of innovation and knowledge management have a correlation tending to become one, since knowledge constitutes a fundamental input to this process, and in turn, simultaneously, an outcome, for the results of innovation (products or processes) constitute applications thanks to the generation of new knowledge. Nonaka and Takeuchi (1995) consider innovation as a process of knowledge creation, whose main component is the knowledge already available, which needs to be capitalized and transferred to those workers who participate in that process.

Innovation refers to the organizational capacities to manage tangible and intangible resources to such an extent that they generate processes, ideas and products that allow them to be competitive in uncertain and dynamic markets. However, for this element to be configured as a source of competitive advantages, it is required that the managerial strata deploy activities related to the exploration and exploitation of knowledge (Acosta & Luiz, 2013).

Organization knowledge can become a source of sustainable competitive advantage through the deployment of an effective strategy of knowledge management, which allows innovative actions to originate; thus, creating products, services, processes and management systems that optimize the resources and capabilities of the company.

Knowledge management has become an elementary tool in the search for a competitive position. Indeed, through the implementation of a structure conducive to the management of assets derived from intellectual capital, the organization can develop innovative processes, products and services that generate added value and differentiate itself in the market (Nagles, 2007).

Ishak (2017) believes that the forces behind the resurgence of corporate R&D departments have implications for innovation efforts in almost every company. The author argues that every organization needs mechanisms and a culture that encourage the embrace of new technologies, encourages the passion for knowledge, and ease barriers to creativity and unexpected advances. In addition, the author also suggests that a company must ground creative people in accountability for the organization's objectives, key focus areas, core capabilities,

and commitments to stakeholders, granting them broad discretion to conduct their work in service of those parameters. It is important to consider that assessing too much about budget and deadlines will kill ideas before they get off the ground.

In this sense, there must be a strategic surveillance from the management to analyze information related to the behavior of the variables immersed in the macro and micro environment, in order to establish the actions of the factors that determine the business competitiveness such as customers, suppliers, substitute products, existing and potential competitors (Castro, 2007; Porter, 2008). Once the elements of the market that shape the corporate strategy have been identified, the company must bring the strategic surveillance processes together around four pillars related to the analysis of information, namely: the effects derived from current and potential competitors, the negotiation power of customers and suppliers, the influence of technological advances in the development of value proposals and the presence of socioeconomic, political, environmental and legal variables that could affect the future of the business (Castro, 2007) (see Table 1).

Table 1
Strategic surveillance processes

Competitive surveillance	Technological surveillance
1. Identification of direct, indirect and potential competitors. 2. Presence of entry barriers for new competitors.	1. Identification and knowledge of technological tools.
Commercial surveillance	Environmental surveillance
1. Identification of the bargaining power of the suppliers. 2. Identification of the bargaining power of customers. 3. Cooperation strategies with suppliers.	1. Analysis of the macro environment 2. Analysis of opportunities 3. Analysis of environmental policies 4. Consideration of social variables

Source: Own elaboration based in Castro (2007).

From the perspective of knowledge management, innovation requires, in brief, the development of three fundamental actions, namely: identify opportunities for innovation, identify relevant knowledge to take advantage of innovation opportunities, and generate sustainable and profitable solutions for the

organization; this implies: "...innovative organizations have developed, retained and reproduced the innovation and knowledge creation routines that depend on learning processes and specific routines that are difficult to imitate and constitute sources of strategic advantage." (Lewin & Massini, 2003, p. 4).

Innovation Management Models

There is a lot of information related to innovation that describes the phases and management of an innovative process; from the initial idea to the final product. According to the relevant literature (Meissner & Kotsemir, 2016), innovation models have evolved in different generations from simple, linear to increasingly complex models.

First Generation Model – Technology Push

In the case of the first generation, Meissner and Kotsemir (2016) claim that new industries mostly emerge from new technological opportunities which resulted in technology-led regeneration of 'old' sectors, requiring rapid applications of technology to enhance the productivity and quality of production. Also, these authors indicate that the logic of the 'technology-push' model approach was, that the greater the R&D 'input' the more success for new products 'as output'; this model presupposes a linear process of technological change (industrial innovation), spanning scientific discovery, technological product development, and product sales.

Second Generation Model – Technology Pull

The second generation, 'market-pull' models, appeared in the second half of the 1960s, and the early 1970s and emphasized how technologies contribute to decelerated growth of new product markets and a balancing of supply and demand on new product markets, as well as how they assume that new products are based on existing technologies (Meissner & Kotsemir, 2016). According to this sequential model, the needs of consumers become the main source of ideas to trigger the innovation process.

The market is conceived as a source of ideas to direct R&D, which plays a merely reactive role in the innovation process, although it still plays an essential role as a source of knowledge to develop or improve products and processes (European Commission as quoted in Velasco, Zamanillo & Intxaurburu, 2007).

Third Generation Model – Coupling Model

This generation underlined the interaction between technological capabilities on the one hand, and the needs of the market, on the other. In addition, these models highlight in some way the importance of the retroactive processes that are generated between the different phases of innovation, although, as it will be seen, they are still sequential models (Kline & Rosenberg as quoted in Velasco, Zamanillo & Intxaurburu, 2007).

The first stage of the model is called the central chain of innovation. It begins with an idea that is embodied in an invention and/or analytical design, which must logically respond to a market need.

The second stage consists of feedback series links where the small circle of feedback connects each phase of the central chain with its previous phase (for example, distribution and marketing with design and production) and the feedback, which provides information on the market needs to the preceding phases of the technological innovation process, given that the final product may present some deficiencies and may require making some corrections in the previous stages (Kline as quoted in Velasco, Zamanillo & Intxaurburu, 2007).

The third path of innovation is the link between knowledge and research with the central chain of innovation. When a problem occurs in an activity of the central chain of technological innovation, we look to existing knowledge.

Finally, the fourth path relates to the connection between research and invention. Sometimes, new scientific discoveries make possible radical innovations (Kline as quoted in Velasco, Zamanillo & Intxaurburu, 2007), as it recalls the push model of science. The model also involves all processes from the innovation to the launch of the initial idea.

Fourth Generation Model – Interactive Model

The fourth generation or ‘chain-linked’/integrated innovation process model considered the innovation process, fundamentally, as a parallel process in which the corporate functions are connected through numerous backward (feedback) loops (Kline & Rosenberg as quoted in Meissner & Kotsemir, 2016).

Although mixed or interactive models incorporate retroactive communication processes between various stages, they essentially remain sequential models, so that the beginning of a stage is subject to the completion of the stage that precedes it. From the consideration of development time as a critical variable of the innovation process, the phases of the process of technological innovation begin to be considered and managed, as simultaneous processes (Hidalgo as quoted in Velasco, Zamanillo & Intxaurburu, 2007). Therefore, these new models try to capture the high degree of functional integration that takes place within companies, as well as their integration with activities of other companies, including suppliers, customers, and in some cases, universities and government agencies (Hobday as quoted in Velasco, Zamanillo & Intxaurburu, 2007).

Fifth generation model – Network Model

The fifth model emphasizes the learning that takes place within and between companies, and suggests that innovation is general, and fundamentally, a distributed process within a network. The strategic trends observed in the 1980s continue to occur in the 2000s, but with greater intensity — leading companies remain committed to technological accumulation (technological strategy), companies continue to establish strategic networks, the speed to reach the market is still a key competitiveness factor, efforts to achieve a better integration between product and production strategies (design for manufacturing) persist, companies increasingly show greater flexibility and adaptability (organizational, productive and in products), and product strategies emphasize quality and performance (Rothwell as quoted in Velasco, Zamanillo & Intxaurburu, 2007).

It was recognized that successful corporate innovation strategies were driven by centrally integrated and parallel development processes, strong and early vertical linkages, and the use of electronics-based design and information systems. Integrated innovation models highlight a reasonably strong presence of collaborative, pre-competitive research, joint R&D ventures and R&D-based strategic alliances. As a result, the speed and efficiency of developing innovation increased with the emergence of radical new products and developments along established design trajectories (Meissner & Kotsemir, 2016).

Sixth Generation Model – Innovation Model

This model is based on knowledge and connectivity, focusing on exploiting existing resources and maintaining tacit knowledge as a means to the growth of the company. The priority of the model is to provide mechanisms for the company to identify its areas of critical knowledge and create the opportunity to connect and integrate knowledge, as well as increase the motivation to share it (Adler, 2002).

Three stages are proposed to implement this model, namely:

- I) Create motivation: High management creates awareness and understands the concept of intellectual capital.
- II) Evaluate the potential of intellectual capital: Through interviews and evaluations of the intellectual capital potential that it has in the company, to focus on where to work your intellectual capital and introduce radical organizational innovations.
- III) Execution

Based on the results of the interviews and evaluations, we proceed to implement the model where the most important thing is for the company to learn to think in terms of knowledge transfer, to exchange experiences and ideas and not in terms of industrial machines and functional training courses (Rey, 2016).

Seventh Generation Model – Open Innovation

Open Innovation is defined by professor Henry Chesbrough, faculty director of the Garwood Center for Corporate Innovation at the Haas School of Business at the University of California, as the practice that allows the use of intellectual

property developed outside the organization to accelerate innovation within the organization, share internally developed products, and know how to help others outside the company (Forrest, 1991).

Forrest (1991) posits that organizations “...do not use their ideas promptly risk losing them for the benefit of external organizations” (p.5). This affirmation encourages to see new ideas as an opportunity for the market, rather than threats. This opportunity for the market consists of sharing and giving solutions, as well as the chance for companies to use external and internal best practices (Chesbrough as quoted in Meissner & Kotsemir, 2016).

Technology Management Model in Mexico

In México, the Technology Management National Model (*Fundación Premio Nacional de Tecnología e Innovación*, 2016) is in charge of functions and processes of technology management that integrate the activities carried out in an organization that is committed to development and technological innovation; it consists of five functions: monitor, plan, enable, protect, and implement.

Additionally, technology management processes, which allows compliance with the functions described, are mentioned in table 2.

Table 2

Technology management processes

Functions	Processes
Surveillance of technologies	1. Benchmarking. 2. Preparation of market and client studies. 3. Technological monitoring.
Technology planning	4. Preparation and review of the technological plan and the project portfolio. 5. Acquisition of technology: purchase, license, alliances, others. 6. Assimilation of technology.
Enabling technologies and resources	7. Technology development: research and technological development, scaling, etc. 8. Technology transfer. 9. Portfolio management of technological projects. 10. Management of technological personnel. 11. Management of financial resources.
Protection of	12. Knowledge management. 13. Intellectual property management.

technological heritage

Functions	Processes
Implementation of innovation	14. Process innovation.
	15. Product innovation.
	16. Marketing innovation.
	17. Organizational innovation.

Note: Own translation from the original.

Source: *Fundación Premio Nacional de Tecnología e Innovación* (2016).

The main purpose of this model is to promote its development within Mexican organizations of any size to project them in an orderly fashion at competitive levels of world class through an explicit, sustained and systematic technology management. Companies maximize their competitive advantages based on their capacity for technological development and innovation, as well as by obtaining and using systematically the technological and organizational means necessary to do so; the model also gives organizational congruence and method to the efforts of technological development, incorporation of distinctive technologies, and technological innovation, which are carried out to create, transform and deliver value to customers and consumers.

METHOD

The research is aimed at making a management proposal on innovation for the optimization of the entire supply chain within a mining company; it covers all existing business units in Mexico with approximately 1004 employees, among which 593 are unionized. In order for the study to be completed, a research was carried out from August 2017 to May 2018.

First, the primary intention of the study was to obtain and interpret information about the level of preparedness and use of innovative strategies among the people working in the medium and large hierarchy levels inside the company. For that, a survey was conducted, the questionnaire accounted a total of 6 multiple choice questions. The key informants were directors and managers of high and middle level management; the survey also took into account individuals with people in charge. The sample size was 117 respondents for the desired 95% confidence interval and maximum permissible error of 5%. Since the research involved a total population of 157 respondents, the sample considered is representative. People

engaged with the research were divided up as follows: top-level management (3.42%), from middle managers (29.10%) and first-level managers (67.48%). Collected data was analyzed using descriptive statistics.

Second, another intention was to develop a model for innovation based on the answers obtained.

RESULTS

Results of the Survey

The biggest problem found was the correct understanding of the fundamentals of innovation strategy, which is only average. Only 29.91% of the respondents referred the correct understanding of the fundamentals of the innovation strategy; these people also agreed with the company's innovative direction as well as the challenges to face for a better positioning in the market.

Up to 55.56% of the informants defined the company's innovation strategy as one focused on products and services, while the rest (44.44%) perceived the strategy as the innovation of business processes.

When asked about where an innovation project could be implemented in order to obtain a positive result for the company, 58.97% pointed out that what is most urgent at the moment is related to the mineral sorting process since it is not automated and the risk of having impurities is very high. On the other hand, 23.93% of the respondents indicated that the most advisable thing would be to make a general change in the current logistics, including transporters and distribution centers in order to improve the quality and delivery times of the product, finally, 17.09% identified the opportunity for innovation in the cement business, as it is a potential growing sector.

Up to 48.72% of the informants identified, as a major problem for applying innovation strategy in the business, the low level of knowledge to be able to implement a project; they do not know which process needs to be followed to carry out an effective implementation that does not compromise the policies of the company. Other problems included the lack of necessary funds to invest in projects (26.50%) and the low level of employee motivation (14.53%) to generate creative

ideas that could optimize their daily activities. The rest, 10.26%, did not know how to answer.

The way of looking at innovation implies a change within the company, making it necessary to incorporate it into its genetics; 41.03% of the respondents thought that it is necessary that the general manager is aligned with the strategic vision of the company in order to achieve innovation. Up to 27.35% of surveyed people said that the company must generate a culture of innovation and integrate the entire organization into a model of effective implementation. 18.80% said that it was not only about generating ideas, but also about maintaining a growing flow of them over time and being able to execute the projects. Finally, 12.82% of the employees that responded the survey indicated that, in order to make a possible change within the company, it is necessary to first generate internal and external information flows that unite and consolidate the entire system.

When asking the interviewed people to describe some of the most important business risks that innovation can bring within a company, 62.39% indicated that it might be due to the fact that the product is not accepted by the market; creativity is always positive if it is kept within an adequate sales context. Therefore, it is important to spend time with the client to learn more about the keys to their motivation, so that the company can innovate and ensure a level of potential benefits (Govindarajan, 2010). Finally, 24.79% mentioned that it could be due to economic loss, whereas 12.82% said that it could be due to lack of resources.

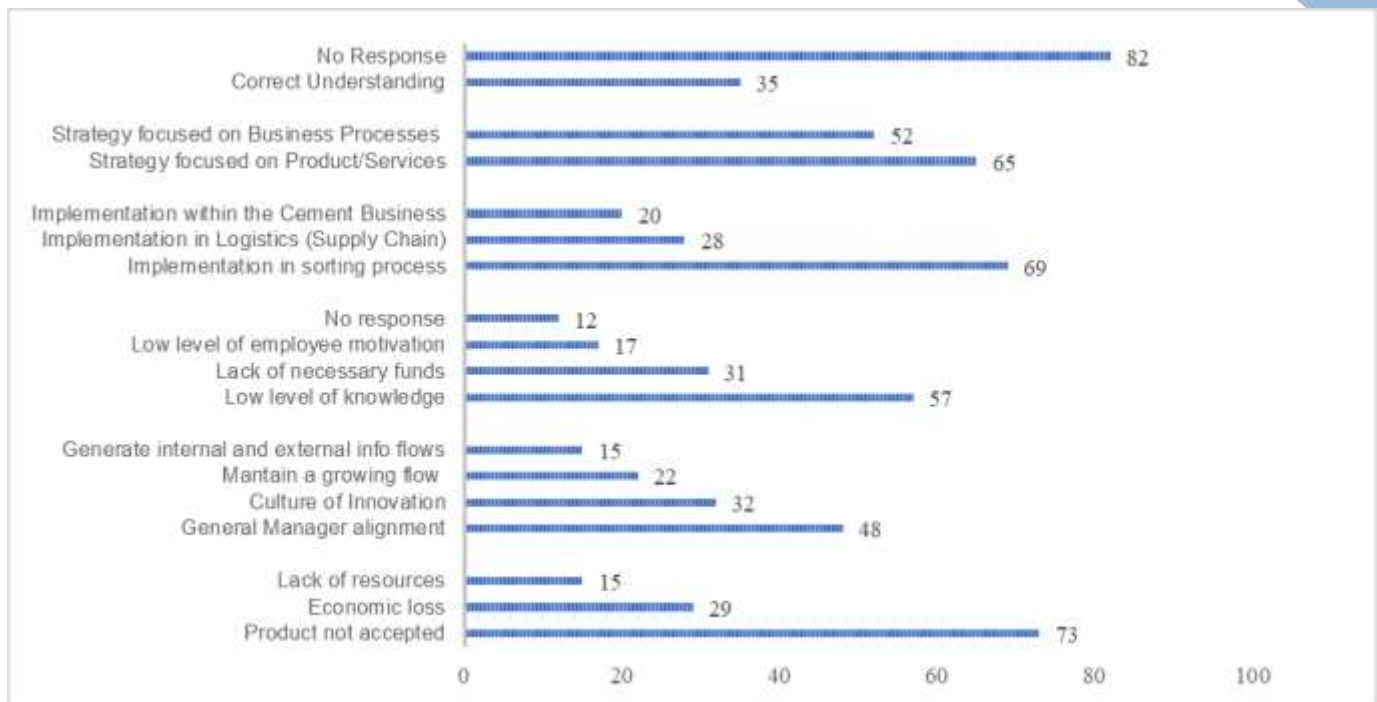


Figure 1. Results of the survey

Source: own elaboration

Proposed Innovation Model

The proposed model seeks to define and create synergies, in a structured manner, in the actions and responsibilities of the different departments involved in order to improve current operating processes (increase efficiency level), as well as to develop new products, services or businesses and to reduce processes lead times and costs.

This model is intended to be implemented with the commercial principle of fulfilling the client's demand and launching new uses of its products or services in a successful way through a system that allows identifying and solving problems.

By having a good structure and administration, the company would identify cost-saving opportunities and promote innovation by seeking greater efficiency. In addition to being aligned with the vision of the organization, this model would promote collaboration within the organization, ensuring the application of continuous improvement during the planning and development process, creating a standardized process.

Figure 2 shows the process of the Innovation Management Model that the mining company would have, which is a process completely oriented to the customer. One of the main goals of this model is the satisfaction of the clients, covering their expectations, their needs—which have to do with their beliefs—, lifestyle and values. The setting of objectives and strategies considers the customer as the most important reference, for this reason, the first stage of the model should start with an internal research base that allows the identification of all those areas of opportunity that could be detected, so that a benefit or a product/service that the client needs could be generated. These ideas arise from a variety of sources, ranging from scientific theory to pure practical experience. Technological progress generates knowledge that, in part, reaches public domain through fairs, specialized magazines, congresses, patent files, and especially, through the ideas and needs provided by customers, as they are indeed a decisive factor for the success of products.

Once the opportunities for improvement have been identified, it will be necessary to organize them according to the business strategy of the company and establish strategies with the support of benchmarking, market research and technological monitoring.

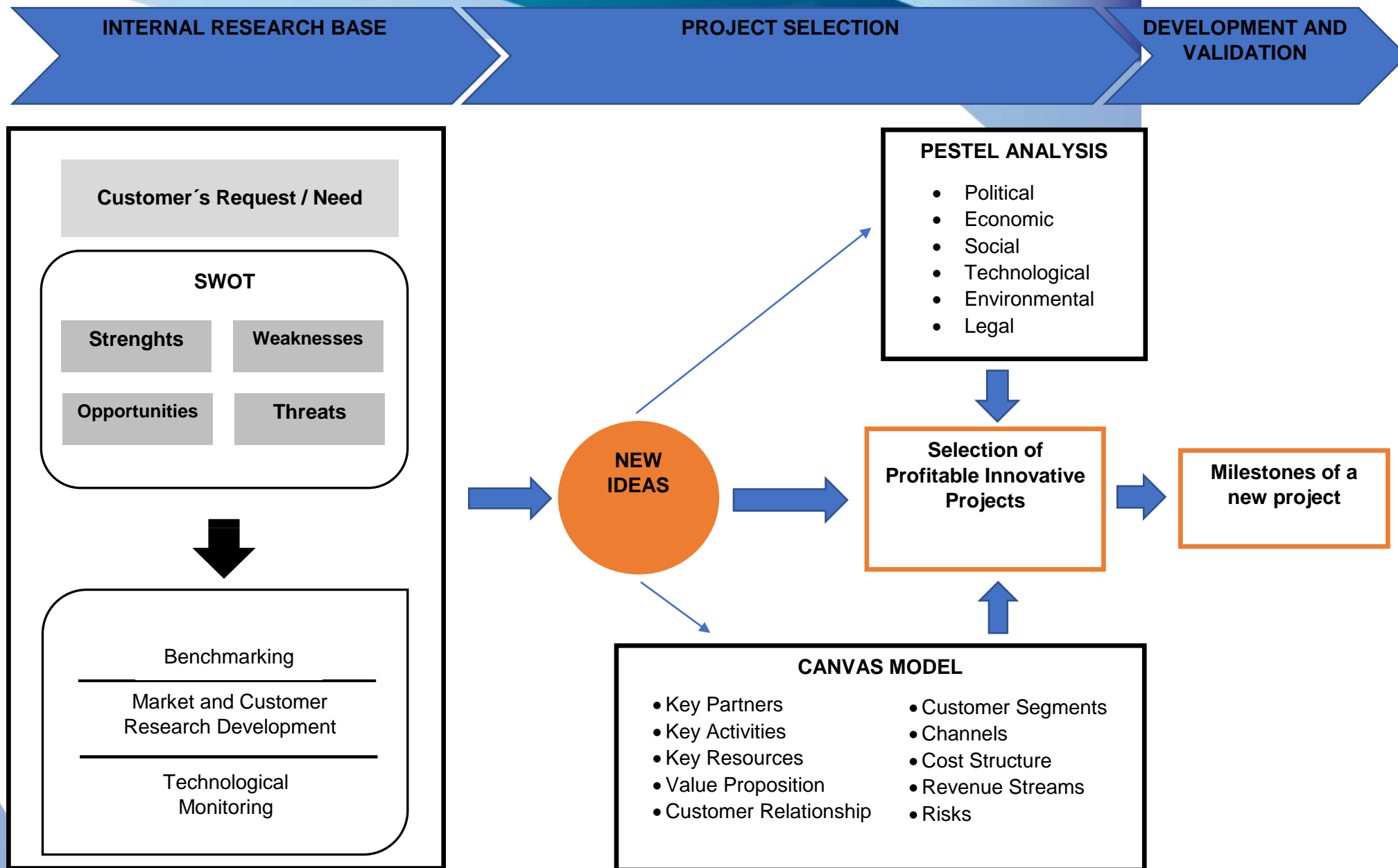


Figure 2. Innovation Management Model
Source: Own elaboration.

As soon as the new idea has been generated, an analysis will have to be conducted. The general environment factors that will affect the companies will be identified, as well as the people involved and the consequent, including the return on the investment of the project. The analysis must be meticulously and thoroughly conducted to assess the feasibility of carrying out the proposed project.

In case that the general manager evaluates the project satisfactorily, it will be time to move on to the milestones of a new project.

Figure 3 explains the phases that a project would need to accomplish once it is approved, these have to be implemented by a central multidisciplinary team is created with the aim of having a brainstorm and thus provide the best practices, tools and experiences during the development and optimization of production processes and launching new uses from minerals. This central team is in charge of integrating all the involved areas of the mining company in the development of a new project.

For this model to remain within the company, the following elements cannot be neglected:

- Monitor: continuous exploration of the environment (internal and external) to identify and process signals or indications of a potential innovation (needs, opportunities arising from research, legislative changes, and behavior of competitors).
- Focus: development of a strategic response that offers the greatest possibilities for obtaining a competitive advantage.
- Train: choose an option, have the knowledge and dedicate the necessary resources to put it into practice.
- Implement innovation: start from the idea and follow the different phases of the development and validation stage until the project is launched.
- Learn: reflect on previous elements and review experiences of success and failure (capture knowledge derived from experience).

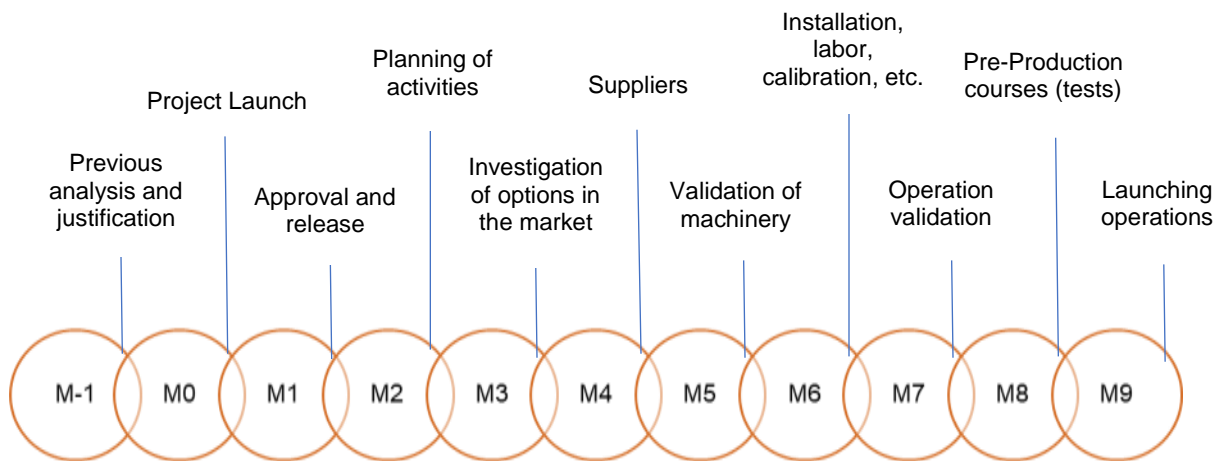


Figure 3. Scheme of evolution based on milestones of a new project
Source: Own elaboration

CONCLUSIONS

Organizational innovations to adopt new or significantly improved innovation management systems require a conceptual model that supports the conception, design and implementation of changes. The model proposal presented in this article has such purpose; it seeks to improve the practices of organizational performance, capacity and results; it serves as a working tool to understand and manage performance and to guide organizational planning and learning opportunities; it delivers value to clients and stakeholders; it contributes to organizational sustainability, and finally, it strengthens personal and organizational learning.

For this reason and through the results shown in the article, the mining company needs to start focusing more on the internal knowledge management and communication processes in order to develop an innovative culture and able to introduce changes in the way of working to transform new ideas into results. These changes must be supported by a multidisciplinary group of collaborators capable of sharing and implementing the feasible and profitable selected projects throughout the company. In this way, ideas can be conceptualized, knowledge can be

evaluated to prioritize efforts, design prototypes to validate and qualify them in the market and achieve the success of initiatives.

In addition, the rise in awareness of the need of giving broad support for innovation should become a top management priority, since the general manager is a key piece in the change of mentality of employees; the real perception of the employees about the participation of people with high hierarchical level, does not admit that there is a good delegation of attributions in this responsibility.

Due to all these reasons, the top management must emphasize the correct use of the proposed model, as well as having the right tools to manage the knowledge of the company to ensure that this proposal would be successful.

Finally, the proposed model will allow the company to move towards a sustainable competitive advantage through the management improvement of these processes and their knowledge management, describing the cycle of how these processes encourage innovation, being that innovating is the key to profitable and sustained growth of the company, rather than just competing. Thus, the company once managing innovation in a better way and understanding that it is not only about new products and services, the business will improve its competitive position in the market through the use of technology, improvement in business processes or improvement of management processes. All of this, thanks to a good internal innovation culture.

REFERENCES

- Acosta, J. & Luiz, A. (2013) Condiciones de la gestión del conocimiento, capacidad de innovación y resultados empresariales. Un modelo explicativo. *Pensamiento y Gestión*, pp 25- 63.
- Adler, K. (2002) Social Capital: prospect for a new concept. *Academy of Management review*.
- Birkner, Z. & Máhr, T. (2016) Interpreting Innovation – In another way. pp 39-51.
- Bryant, P. (2015) The Case for Innovation in the Mining Industry. *Clareo*. Chicago, EUA. pp 14.
- Castro, S. (2007) Guía práctica de vigilancia estratégica. Pamplona: Agencia Navarra de Innovación.
- Forrest, J. F. (1991) Models of the Process of Technological Innovation. *Technology Analysis & Strategic Management*, 3(4), 439-453.
- Fundación Premio Nacional de Tecnología e Innovación (2016). *Modelo Nacional de Gestión de Tecnología*, XVIII Edición, Ciudad de México.

- Govindarajan, V., (2010) Innovation is not Creativity. Harvard Business Review, August 03, 2010.
- Ishak, W. (2017). Creating an innovation culture. McKinsey Quarterly. September 2017.
- Kline, S. and Rosenberg, N. (1986) An Overview of Innovation, in the Positive Sum Strategy: Harnessing Technology for Economic Growth. Washington, D.C., National Academy Press, pp. 275-305.
- Lane, A. (2016) Innovation in Mining, Africa 2016. Monitor Deloitte. pp 6
- Lewin, A. & Massini, S. (2003) Knowledge creation and organizational capabilities of innovating firms. En Tsoukas Haridimos, Mylonopoulos Nikolaos; Organizations as knowledge systems. Knowledge, learning and dynamic capabilities; Palgrave Macmillan; New York.
- Meissner, D. & Kotsemir, M. (2016) Conceptualizing the innovation process towards the 'active innovation paradigm' - trends and outlook, Journal of Innovation and Entrepreneurship, pp 5-14.
- Nagles, N. (2007) La gestión del conocimiento como fuente de innovación. Revista Escuela de Administración de Negocios, (61), pp 77-87.
- Navarro, J. & Zuñiga, P. (2011) La necesidad de Innovar; El camino hacia el progreso de América Latina y El Caribe. BID, Segunda Edición.
- Nonaka, I. and Takeuchi, H. (1995) The knowledge-creating company: how Japanese companies create the dynamics of innovation. Oxford University Press, New York.
- OCDE & EUROSTAT (2005) Principes directeurs pour le recueil et l'interprétation des données sur l'innovation. Manuel d'Oslo. 3ª Edición, París.
- Porter, M. (2008) Las cinco fuerzas competitivas que le dan forma a la estrategia. Harvard Business Review (Edición America Latina), 86(1), 58-77.
- Rey, A. (2016) Plataforma de innovación abierta basado en un análisis de herramientas web: propuesta del modelo y aplicación en un contexto universitario.
- Ruiz, M. & Mandado, E. (1989) La innovación tecnológica y su gestión. Colección Productiva No. 25 Marcombo Boixareu Editores, Barcelona.
- Velasco, E., Zamanillo, I., & Intxaurburu, M. (2007). Evolución de los modelos sobre el proceso de innovación: desde el modelo lineal hasta los sistemas de innovación. January 2007, at <https://www.researchgate.net/publication/28200735>.