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## Innovation and Knowledge Management Practice in Turkish SMEs

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*Innovation management has recently received much attention from research, industry and state support. However, much of the research has focused on large enterprises with much available financial wealth and required planning infrastructure, in order to be effective at managing innovation. This paper aims to understand the factors that affect the innovation management process within Turkish SMEs. A number of interviews are conducted with 25 SMEs using three different innovation auditing models to capture and validate best practice techniques. The goals of the analysis are (a) to understand the Turkish SMEs current capabilities and innovation management practices in each organization and (b) to identify a set of recommendations that may facilitate and enhance innovation management in all participated SMEs. Results showed that the majority of the SMEs have apparent lacking of innovation strategic plan, culture, formal process and assessment approach to measure impact of innovation project. These factors impact to the overall success of the organization.*

**Keywords:** Innovation Management, Small and Medium Size Enterprises (SME), Innovation Auditing, Innovation Capability, Innovation Strategy

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## Introduction

In Turkey Small and Medium Enterprises (SME) have proved to be one of the main sources for employment and economic growth where it represents over 85% of the country GDP and two third of labor market in Turkey.[1] Currently SMEs provide 99.8% of business activities within Europe and account for 68% of employment while business revenue accounts for 63%. The mainstream of these SMEs employ less than 10 employees and small businesses have become a key provider to private-sector employment and output. Together with start-ups SMEs are reported to create between one and two third of all new jobs. There is a large consensus among the research community that SMEs are a major employment and economic boosters in the European economy ([2], [3], [4]).

While various researchers have developed and implemented specialist Innovation management frameworks (IMFs) for large organization, many SMEs organizations still face the challenge of selecting affordable frameworks including strategies, tools, and methods, which fit their objectives and needs as SMEs and then successfully implementing such frameworks [5].

This paper presents the findings of ongoing research into the innovation capability of SMEs in Turkey to innovate in seven dimensions: Innovation Strategy, Innovation Process, Leadership and Culture, Collaboration and Partnering, Business and Technology, Innovative organization, and learning. This research will also present the finding of a number of empirical studies of SMEs in the Turkish context.

## Literature Review

### Innovation Capability Overview

Gaynor (2002) has defined the innovation capacity as a systematic way of management. This focuses on the organization's efforts and directions to look for extraordinary potential opportunities, analyses whether they are suitable to utilize for organization's strategic

management, defines the indicators for success, and determine the value of opportunities in a sustainable way. Gaynor also stated that innovation does not need genius, but it does need a system-wide dedication to have substantial opportunities [6].

Lawson and Samson (2001) suggested that innovation capability refers to the ability to continuously transform knowledge and ideas into new products, processes and systems for the benefit of the firm and its stakeholders. Thus, innovation capability refers to the ability to integrate limited resources to implement manage innovation [7]. Analyzing how firms actually practice innovation may display the effectiveness of their innovation management approach and help translate it from a common concept into actions and competitiveness [8].

### **A Comparison between SMEs and Large Organizations**

The topic of innovation has received much attention from research and industry in the past few years. However, much of the researches have focused on large enterprises with much available financial wealth and required planning infrastructure, in order to be effective at managing innovation [5]. This section aims to provide a brief comparison between SMEs and large organizations. The comparison will primarily focus on management, structure, culture and human resources as follows:

*Management:* Senior management in larger organizations in contrast have the power to delegate some of their responsibilities to lower management, thus freeing their time to focus on knowledge management strategies [5]. In SMEs, the managers are in most cases the owners, which imply that decision making is centralized, and fewer layers of management. This means that decision-making is shorter than in large organizations [9]. The advantage for the owners in SMEs is that they become the key drivers for knowledge management implementations, assuming of course that they appreciate the importance of knowledge management. Another distinction to be made is that management of SMEs has to look after every aspect of the business which gives them limited time to focus on the strategic issues relating to knowledge management.

*Structure:* SMEs have an advantage over large enterprises in respect to their structure, in implementing knowledge management. They have a

simple, flatter and less complex structure, which will facilitate a change initiative across the organization since functional integration both horizontally and vertically, is easier to achieve and fewer complications will be encountered [9]. Whereas larger organizations have a bureaucratic structure; making them slower and less flexible in creating new schemes.

*Culture:* SMEs tend to have a more organic and fluid culture, than larger organizations [8]. Smaller number of people usually united under common beliefs and values, which implies that it easier for smaller organizations to change and implement knowledge management. It is easier to create a knowledge sharing culture in smaller organization than in larger ones [10]. In smaller organizations the cultural values and beliefs of the employees can be influenced by the owners. This can be a problem if the owner does not trust his employees or does not encourage the culture of sharing and transferring knowledge. In this case, the owner can obstruct the development of knowledge rather than develop it [5].

*Human resource:* SMEs have a problem in attracting high caliber, experienced employees. These experienced people, tend to go to larger organizations, where they will be paid higher salaries and bonuses. Furthermore it also a problem for SMEs to retain, specialized employees, because of limited opportunities for career progression, and the constant appeal of larger organizations, who can provide better prospects. SMEs are mostly seen by some employee as a stepping-stone to move to larger organization. The departure of highly knowledgeable employees is a major threat to SMEs, unless that knowledge is captured, codified, and transferred throughout the organization [11].

Regardless of the research approach there is an underlying consensus that SMEs by and large are of great importance to economy. It is also largely been conceded that SMEs will not evolve or develop unless they innovate [12]. The key competitive lead of SMEs lies in the human resources. The research to date has also found that internal planning and communications occurs on a rather ad hock basis unless designed from the outset.

Many of the SMEs may not have the technical capacities or expertise to innovate or work in partnership with manufacturers on innovation and product development projects [13]. However according to a FORFAS study (an Irish state body) many SMEs have the information

technology infrastructure required to innovate. Expertise in these SMEs may be deficient in terms of skill and may be low in terms of resources available to innovate [12].

All of the projects and the development effort in the SME should align with an effective strategic development process of the SME. However SME strategy differs greatly from that of the large enterprise [12]. Pearce in his studies on SMEs, between 1983 and 1984, were unable to show that formal planning had any positive impact on superior performance in the SME sector. The strategic advantage of an SME is that they are small and versatile and can change quickly to emerging industrial needs. Secondly the key resource of an SME is the human resources [14]. Thus as a development strategy SMEs should focus on more human resources elements such as training and collaboration as opposed to infrastructure and technology [12].

### **SMEs Innovation Success Factors**

Hence it is of great importance to the European economy that the SME sector improves and develops. According to Keizer [3], innovation is among the most important resources through which SMEs can sustain and improve their level of competitiveness in the market. Keizer further indicated the key factors that impact the capability of SMEs to innovate such as innovation subsidies, having links with knowledge centres' and the percentage of revenue invested in R&D [12].

The studies analyzed by Storey [4] identified that technological sophistication, market positioning and new product developments are among the most important factors for SMEs strategic importance.

Many models and frameworks have been put together by various authors in order to try and understand the affects that these environmental factors have on the small firm sector ([15], [16]) Each of these models aims to assess the various impacts of varying environmental factors on the development of SMEs.

There are a number of key factors that affect the innovation process within SMEs such as research and development investments, state funding, links to knowledge centres', links to customers, collaboration and systems and structures to manage the process [3].

Among the many causes of failure of innovation, there are five that constantly appear in literature: (1) poor goal definition, (2) poor action alignment, (3) poor allocation of teams and resources, (4) poor feedback of results, (5) poor performance monitoring [15]. Mulligan et al. [12] further extends this from the literature review on supplier SMEs to include poor collaboration between customers and suppliers and accurate interpretation of requests from customers.

## Research Approach

Our research has drawn on these many different fields of literature, combining the elements to improve the development of SMEs innovation capability and maturity. A review of the significant literature points out that innovation studies can be divided into four research directions or streams: (1) innovation typology, (2) linkage of innovations (3) applying innovation processes and frameworks (4) the assessment of innovation capacity and performance. In this paper, we will focus on the last three streams and finding the inter-relationship among them through the usage of several innovation auditing models.

The approach to this research has been designed around six phases: literature review (background), research hypothesis (induction), research instrument design (survey development), implementation (data collection), data analysis, conclusion and recommendations. A number of interviews were conducted with 25 SMEs using 3 different innovation auditing models to capture and validate best practice techniques. The goal of the analysis was (a) to understand the Turkish SMEs current capabilities and innovation management practices in each organization and (b) to identify a set of recommendation that may facilitate and enhance innovation management in all participated SMEs.

Innovation audits can help managers and decision makers improve their innovation process. They help to assess the degree of best practice in place. The SME respondents must agree or disagree with each of the statements that reflect best practice for innovation management.

In order to audit the innovation capability and maturity level at any company, Braden Kelley developed a 50 question matrix for measuring five innovation dimensions. The statements were categorized around five

dimensions for effective innovation management process as follows: Strategy, Idea generation, Idea evaluation and Idea selection, Idea implementation and Collaboration and Infrastructure. This allows managers to have an overview of their strengths and weaknesses with regard to managing innovation.

The matrix is a simple tool for auditing current status of Innovation management and recommending further procedures to reach the next maturity level. Based on the Kelley's survey instrument there are 5 maturity levels: L1: chaotic (reactive), L2: organized (structured), L3: standardized (controlled), L4: Predictable (managed), L5: Kaizen (optimized).

The second survey instrument is based on the insights of the IBM Global CEO Study 2006; the tool analyzes the responses to key questions about organization's innovation practice and compares the results to those of the 765 CEO Study participants. The Innovation Assessment tool is designed to help SMEs better understand and expand their "innovation horizon" by providing insights into how SMEs can drive innovation across organization. The innovation audit tool helps to find out how organization rates along critical four dimensions of innovation with a set of recommendations for how to move company forward. These four dimensions are: (1) Innovation Strategy, (2) Leadership and Culture, (3) Collaboration and Partnering and (4) Business and Technology – the tool identified these four key areas as the strongest indicators for shaping an organization's innovation profile and helping in identifying opportunities for improvement.

The tool assessment is designed to provide insights into how SMEs can drive innovation within organization and focus on which innovations matter the most to helping SMEs achieve faster growth in achieving their business objectives.

The third survey instrument model is developed by Dolley [15] focuses attention on some of the important areas of innovation management. The Dolley's innovation audit model can provide the pattern of behaviour which describes how the organization handles the question of innovation in five areas: Strategy, Process, Innovative organization, Linkage and networking, and Learning and Knowledge management.

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## Results and Recommendations

Results of project and results of strategies were considered to be one of the most important aspects of SME development from the owner managers that were interviewed. Deployment of strategy was found to be the most important approach for applying and managing innovation however this rated as one of the weakest as well as the lack of formal innovation process and internal use of knowledge and the management of it. From the analysis of the results section the SMEs did not appear to have any formal evaluation of impact of project results to the overall success of the organization.

Key findings from the three auditing models are discussed below.

## Goals and Strategic Agenda

The Innovation Agenda looks at the "innovation mix" among business model; operations; and products, services and markets innovation. All SME owner managers agree that clear strategic goal formulation and monitoring indicators are important for effective innovation management. However in a number of the interviews awareness of the customer requirements outranked the relevance of strategy formulation. Goal formulation while important ranked as being one of the poorest in terms of capability with little time and resources allocated to the level of detail required for an effective business plan. There is currently little emphasis and capability on measuring performance and thus many of the projects are not measured in terms of their impact on the overall goals of the organization.

SMEs should start the process of defining their innovation agenda and deciding their target position compared with the innovation leaders in their industry. To establish a strong foundation for innovation, SMEs needs to establish an innovation vision and identify gaps between vision and current go-to-market strategy. They should assess their current capabilities, identify target maturity levels and decide where to focus initial efforts to build out a balanced innovation agenda. SMEs are also required to establish and formalize change management practices, assess their business components to understand areas of differentiation and opportunities.

## Leadership and Culture

The leadership and culture of the participated SMEs helps create a "climate for creativity." Critical characteristics include the processes for generating ideas, incubation structures and innovation metrics and incentives. Most of SMEs are still in the basic level of building the foundation for a more innovative climate, while some SMEs counteracted a cultural tendency toward the status quo.

To build a strong foundation for an innovative culture SMEs should acknowledge innovation as an executive level priority and consider programs and measure to specifically address: ideation management, processes, metrics/measurement, and incentives. SMEs should understand and leverage practices that have been successfully adopted by leading competitors, partners or organizations in other industries.

## Collaboration and Linkage

Our literature review emphasized the importance of collaboration as very important means of competitive advantage for the SMEs. Companies that work effectively across geographic, organizational and functional boundaries, both inside and outside their organizations, are able to take advantage of greater expertise and scale.

The results of the study have shown that it is important for the continual operation of the SMEs however none of the interviews have shown this to be a problem. All companies interviewed acknowledge that collaboration with governmental organizations (external knowledge bases) was important and that there was no apparent problem. However collaboration with universities and customers while ranked extremely important for SMEs was ineffective and not adequate. SMEs still using unstructured forms of collaboration mechanisms. Much of the collaboration that takes place within the SMEs appears to be face to face and on an ad-hoc informal basis that is why much of the gained knowledge may be lost.

To establish a foundation for collaborative innovation SMEs need to educate management and their employees on the value of collaboration and partnering. SMEs should begin to research and experiment with

collaboration tools such as open forums, electronic sharing mechanisms, and group support systems and start looking outside to identify opportunities to collaborate with external sources of innovative ideas.

### **Business and Technology**

There is a continual debate among the academic world in relation to the use of information systems and their benefit among the SME organization. SMEs agree there is great value in combining business insight with technology know-how to develop – and enable changing innovation strategies. The study has revealed that many of the SMEs have IT infrastructure and use them during their daily business operations however they probably largely use technology to enable implementation rather than as a shaper of strategy; SMEs are aware of potential benefits of integrating business and technology more comprehensively.

In order to build a foundation for stronger business and technology integration, SMEs need to understand how business and technology are currently aligned. SMEs also odd to identify gaps and opportunities to support current business environment more effectively and formally incorporate technological know-how in their innovation efforts, both as a source of ideas and opportunities, as well as a means to enable innovation.

### **Innovation Process**

Within SMEs Innovation could be represented by the concept of the “process of innovation” as stated by Tidd et al [17]. Mole [18] state, “innovation is the process of generating new ideas and using it effectively and profitably through to satisfied customers”. It is a comprehensive process including the whole company and is a crucial part of business strategy and daily practice.

In a manner of above literature, the process of effectively developing and implementing innovation within an organization will be stated as “the using of creative ability within customers, suppliers and the workforce by doing things alternatively or better beyond products, processes or procedures”.

Most of the interviewed SMEs lack of having formal innovation process, so it is highly recommended that they should develop a set of structured processes and policies to guide innovative activity from generating or picking up ideas through to implementation. Importantly they allow for parallel routes through their system so that innovations can come from close market interactions or from deep technology research in their enterprise or from various forms of collaboration, or from serendipitous discovery by their staff. Their staff should be given the opportunity to be trained and equipped with enough technical knowledge and skills so they could be aware of real and or latent market need opportunities supported by a well defined formal innovation process, tools and techniques.

### **Creating the Innovative Organization**

SMEs should deliberately attempt to get away from vertical structures which typified the past and towards flat/knowledge-mixing structures. They should work on establishing the knowledge culture as the new organizing model rather than efficient use of resources as the key structuring principle. Their structure should be shifted from region focus to one which has a strong customer sector focus. Empowerment and autonomy are need through giving people 'slack' time to explore new ideas. The existence of idea generation/suggestion processes will be like 'Impulse' coupled with recognition and reward for innovation that are based on participating not on the value of final ideas. However, for those ideas that are taken forward, there should be some incentive to playing a major role in the subsequent development, which engages commitment and 'championship' of ideas.

SMEs are in need for reinforcement of core values where innovation is respected and allowing for sustaining 'circulation' and movement and combination of people from different perspectives to allow for creative combinations. Additionally, patience is needed for 'stumbling in motion' as innovative ideas evolve and take shape combined with the acceptance of mistakes and encouragement of risk-taking.

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## Learning and Knowledge Management

For SMEs it is important to understand the benefits but also the risks of knowledge management. Since knowledge management is instable structures, it is expected that failure rates remain high. SMEs that don't have much experience with technological collaborations should get information before jumping on the bandwagon.

Further, it is important for SMEs that typically these complementary resources are interesting for knowledge management, but this does not only mean technological disciplines. Of course a partner in a different but complementary technological field can be fruitful, but so can partners having more social skills or commercial skills. For example, a high tech start up may benefit from a traditional manufacturing company to further exploit the opportunities of an innovation. These traditional firms are often more specialized in mass production and less in innovation. Combining strengths might result in gaining full benefits from innovation, since successful innovation is more than just product development.

### Summary of results

The organizations which participated in this study were SMEs in the Turkish manufacturing industry. The results of the three innovation auditing models are aggregated and plotted in radar diagram figure 1 and figure 2.

The study identified that effective innovation capability depends on seven dimensions: (1) Innovation Strategy, (2) Innovation Process (3) Leadership and Culture, (4) Collaboration and Partnering and (5) Business and Technology, (6) Innovative organization, and (7) learning.

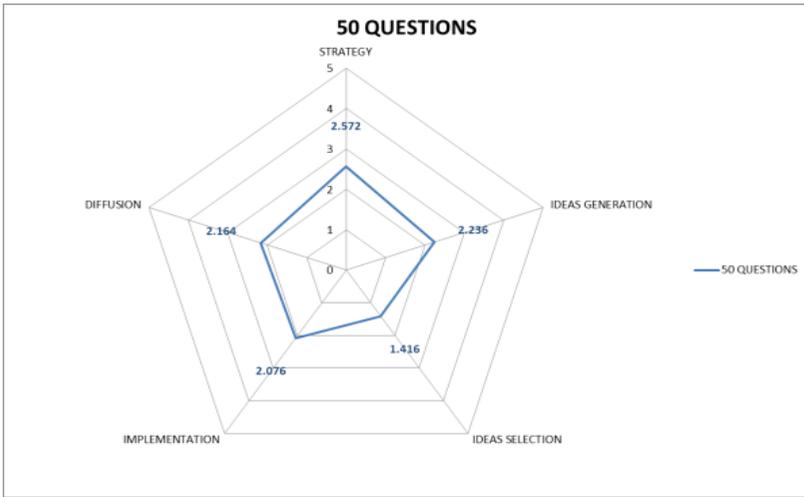


Figure 1: Kelly's Model Spider Diagram

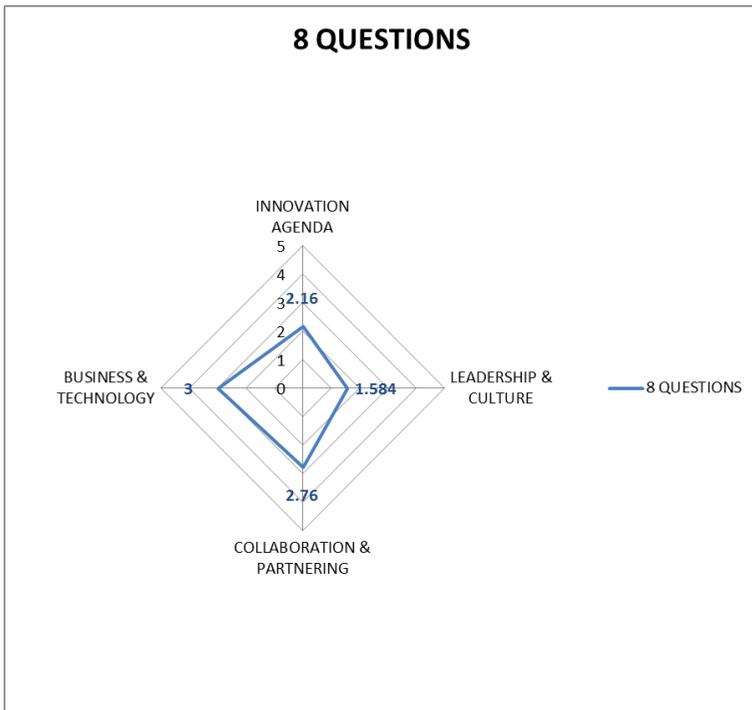


Figure 2: IBM Model Spider Diagram

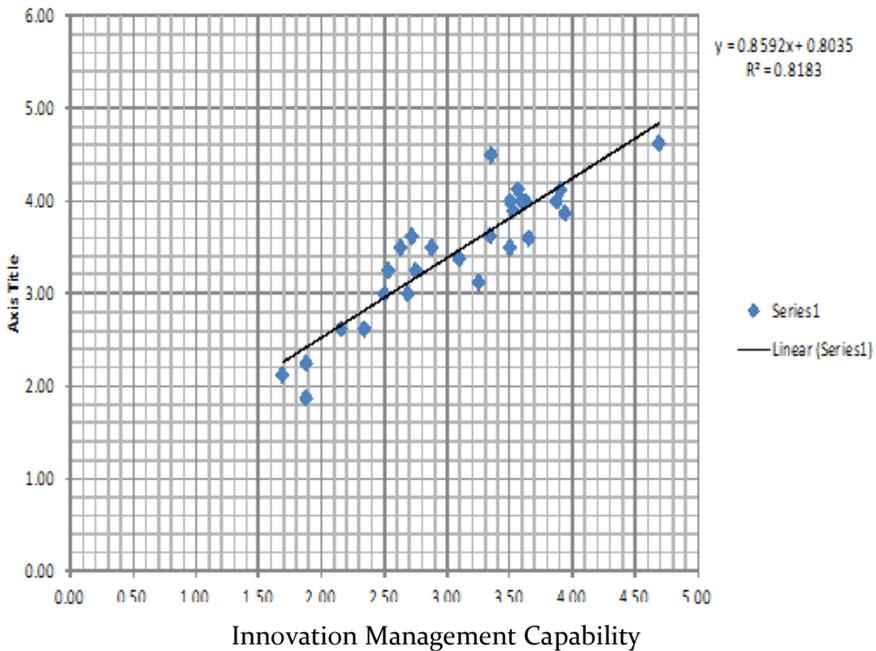
According to the Dolley’s and Kelley’s models survey analysis, 63% of the participated SMEs are in Maturity Level-1 and Level-2, 37% of SMEs are in Maturity Level-3, and only 2% in Level-4. Depicted in Figure 1 and Figure 2.

However there is an apparent lacking in innovation strategic plan, culture, formal process and assessment approach to measure impact of innovation project results to the overall success of the organization. Customer collaboration is met with some inefficiency despite its importance and the harnessing of knowledge within the management process is clearly missing.

Our research survey data analysis (figure 3) shows empirically that there a high correlation (0.9) between Innovation capability and knowledge management capacity in SMEs and the results support our research hypothesis that a firm with a knowledge management capacity will use resources more efficiently and so will be more innovative and perform better. The sample slightly over-represented smaller firms. Since data were also collected in Turkey. As with most studies, it is important to replicate this study in different contexts.

	Column 1	Column 2
Column 1	1	
Column 2	0.90458	1

Knowledge Management Capacity



**Figure 3:** Knowledge Management Capacity versus Innovation Management Capability

### Conclusions

In today’s changing world innovation management is becoming one of the key drivers for change and competitive advantage within industry. SMEs need to respond rapidly to these emerging changes so as to fulfill their customer needs more rapidly. It is increasingly clear that in order to achieve the goals of an organization SMEs must establish an innovation strategy and monitor the innovation process. SMEs must also comply with this as well as managing the collaboration with their customers. SMEs can also make substantial improvement by managing the knowledge assets of their organization. This can only be done by putting more effective structures and systems in place to capture the knowledge of the organization rather than adopting the current ad- hoc approach to technology and information transfer. It is interesting to note that three innovation auditing models has identified the need for cultural change and well defined innovation strategic

plan and goals within SMEs in order to support innovation management, an element that is missing from the majority of participated SMEs enterprises.

This paper presents the current Turkish SMEs best practice model that aims to facilitate SME innovation management and knowledge in a dynamic environment. Analysis of the study revealed a number of common traits that inhibit the innovation management capabilities of SMEs. The lack of innovation strategy, well defined and structured innovation process, and performance indicators are very rarely assessed due to lack of structures and systems in place and poor goal definition. Human resources, one of the greatest assets of an SME are not properly managed and utilized in order to execute innovation project plans. Communications with all enterprise stakeholders are also essential throughout SMEs however significant efforts are needed to improve the communications between all stakeholders and SMEs. Harnessing and using knowledge internal in the organization is important for innovation but SMEs are unable to take advantage of their knowledge assets largely due to lack of experience in Knowledge Management and the absence of the required of structures and systems to build up and support the Innovation culture.

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