

# **THE ROLE OF KNOWLEDGE MANAGEMENT IN ENHANCING INNOVATION CAPABILITIES “AN EMPIRICAL STUDY”**

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## **ABSTRACT**

Companies strive to be innovative, and maintain their leadership and market share. Therefore, they started to understand the value of employee knowledge as a valuable asset to construct new knowledge for new innovative products. Accordingly, the importance of knowledge management started to increase recently.

This research aimed to assess the effect of knowledge management on the innovation capabilities in Egyptian telecommunication sector. For this purpose, a conceptual model was developed from literature and data collected using a structured questionnaire and distributed to a sample of the staff at the Egyptian telecommunication sector, and then analyzed using spss 26. The statistical analysis showed that the dimensions of knowledge management process positively affect the innovation capabilities' dimensions.

**Keywords: Knowledge Management, Innovation Capabilities, Telecommunication Sector.**

## **1. INTRODUCTION**

Today, knowledge is considered as one of the main skills in any organization (Yaghoubi et al. 2017). With the economy's unstable circumstances, such as technological advancements, market changes, and the arrival of new competitors, knowledge has become a source of competitive advantage.

Combining elements of knowledge in an organization has become one of the most important challenges of the management team, neglecting which may result in reduced creativity of organizations, and thus also in their innovation capability. It is worth mentioning that knowledge management is treated by some authors as one of the most important issues within the organization (Tekin and Akyol 2019).

The orientation towards innovation is one of the most important keys to the solution to entrepreneurial thinking, especially in an unstable environment. Innovation can be seen through entrepreneurial orientation activities. Firms that create new resources through innovation can maintain their competitive edge (Xing, et al., 2019).

The research was conducted in the telecommunication sector companies in Egypt represented by the four companies (WE -

Orange – Vodafone - Etisalat) to discover how knowledge management process could affect innovation Capabilities.

## **2. LITERATURE REVIEW**

### **2.1 Knowledge Management**

There are many definitions to the term knowledge but among the most appealing are: “Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents but also in organizational routines, processes, practices, and norms.” (Davenport, & Prusak,1998).

Also, according to (Nguyen, 2009) “Knowledge consists of truth and beliefs, perspectives, concepts, judgements, expectations, methodologies, and Know-how”.

### **2.2 The Nature of Knowledge**

To understand the nature of knowledge, we have to explore first the difference between data, information, and knowledge.

#### **2.2.1 Data**

According to (Uriarte, 2008) “Data is a number or word or letter without any context” showing no relationship between

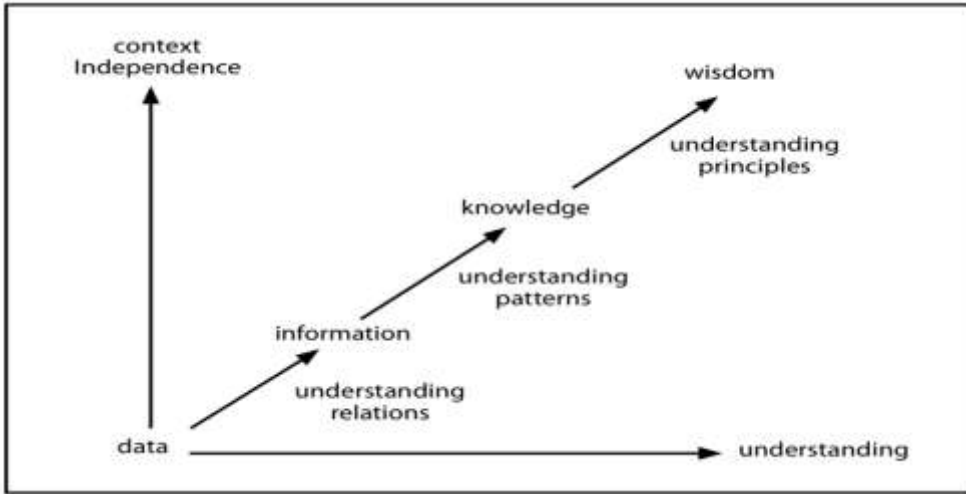
pieces of data. Also, according to (Davenport, & Prusak, 1998) “Data is a set of discrete, objective facts about events” described through a structured record of transactions stored in some sort of technology systems like Databases.

### **2.2.2 Information**

Data transform into Information by understanding the relationship between pieces of Data (Uriarte, 2008). However (Davenport, & Prusak, 1998) describe information as some sort of a message between source and receiver which is meant to change the judgement and perception of the receiver about something, where data transform into information by adding a meaning and value to data pieces.

### **2.2.3 Knowledge**

“Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents, but also in organizational routines, processes, practices, and norms.” (Davenport, & Prusak,1998). Uriarte (2008) showed the conceptual progression from data to knowledge in the following figure.



**Figure 1:** Conceptual Progression from Data to Knowledge.

source: Uriarte (2008)

### 2.3 Tacit and Explicit Knowledge

Knowledge is an essential asset in the organization to create a sustainable competitive advantage over existing competitors (Uriarte, 2008). Companies started to value the experience which is developed over time more than intelligence or education because of the value of knowledge to support managers to make critical decisions (Davenport, & Prusak, 1998).

In general, there are two types of knowledge: tacit knowledge and explicit knowledge. Tacit knowledge is the knowledge stored in the brain of the person which is difficult to articulate or put into words and drawing, while explicit knowledge is the knowledge that exists in documents, tangible

forms like words and images, or storage systems rather than existing in human brains (Uriarte, 2008; Dalkir, 2005).

Nonaka, Konno, and Toyama (2001) describe the SECI model as a continuous process of knowledge creation, whereas according to Nonaka's thought the SECI Model is a frame or picture of a repeatedly created process of knowledge creation, which allows analysis and evaluation of existing workflows in the real world. SECI itself is a framework in the creation of knowledge that can be actualized. The components contained in the SECI model are:

### **2.3.1 Tacit Knowledge**

Tacit knowledge is stored in the heads of people and results from accumulation of knowledge, study, and experience. It is personal and developed through the interaction with people over time, and experience of trial and error, success, and failures (Uriarte, 2008).

Tacit knowledge is not formalized in a tangible format, where sharing and communication of such tacit knowledge between people represents a great challenge for many organizations. Tacit knowledge sharing can be achieved through activities such as conversations, and workshops (Nonaka, 1991; Dalkir, 2005).

Tacit knowledge is a unique asset for the organization to create a unique value for this organization that is difficult for

competitors to replicate, it is considered also as an essential prerequisite for making good and right decisions (Uriarte, 2008).

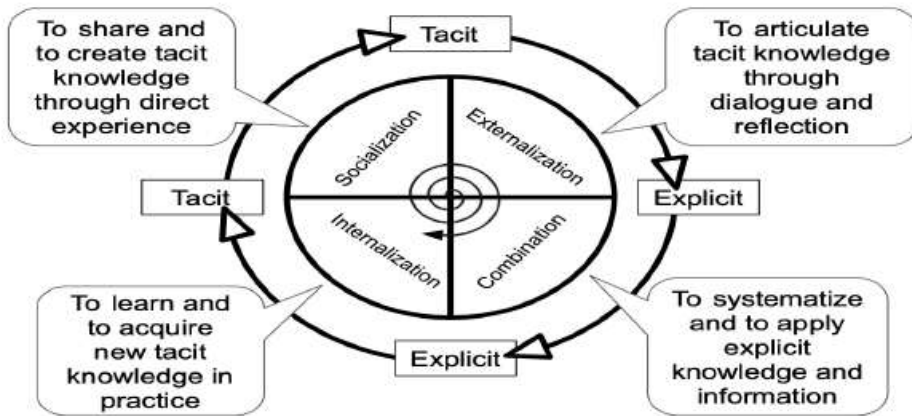
### **2.3.2 Explicit Knowledge**

Explicit knowledge is codified, documented, and stored in tangible forms like documents, databases, emails, reports, business plans, drawings, and patents. Therefore, it is much easier for communication and transmission between people (Uriarte, 2008; Dalkir, 2005).

Explicit and tacit knowledge are complementary to each other, where tacit knowledge is considered necessary to understand the explicit knowledge. Explicit knowledge tends to represent the final product, while tacit knowledge represents the know-how with the processes behind that final product. (Uriarte, 2008; Dalkir, 2005).

### **2.4 Interaction between types of knowledge**

The Figure next (figure 2) is showing the dynamic process for interaction between tacit and explicit knowledge which is considered as the basis for knowledge creation within the organization, and converting the personal knowledge into organizational knowledge (Uriarte, 2008).



**Figure 2.** Spiral of Organizational Knowledge Creation.

Source: (Uriarte, 2008)

**2.4.1 Socialization (From Tacit to Tacit Knowledge)** is the process of sharing and communicating tacit knowledge directly between two individuals to create a common tacit knowledge with shared experiences. (Nonaka, 1991; Uriarte, 2008).

**2.4.2 Externalization (From Tacit to Explicit knowledge)** is the process to converting tacit knowledge in the brains of experts into explicit knowledge in the form in diagrams or concepts that can be shared with others. (Nonaka, 1991; Uriarte, 2008).

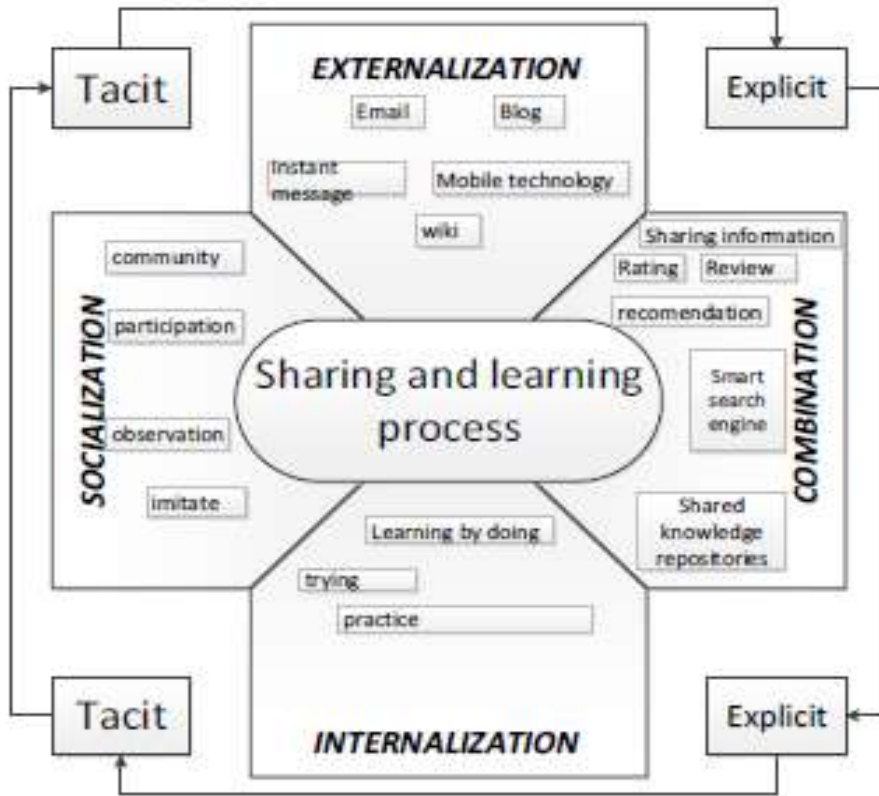
**2.4.3 Combination (From Explicit to Explicit knowledge)** is the process of assembly or combination of discrete pieces of explicit knowledge (like designs or diagrams) to create or format a new explicit knowledge represented in a new design or diagrams. (Nonaka, 1991; Uriarte, 2008).



**2.4.4. Internalization (From Explicit to Tacit knowledge)** is the process of transforming an existing explicit knowledge which is shared within the organization to reframe a new tacit knowledge within the brain of the individuals. For example, reading an operating manual of a new device to create a new know-how within the brain of the users. (Nonaka, 1991; Uriarte, 2008).

In a knowledge creating company, there is a dynamic interaction between four patterns like a spiral of knowledge. Example, starting with ‘socialization’ to learn know-how from experts, then with ‘externalization’ to convert this new know-how into a tangible format to be communicated to organization individuals, leading to ‘combination’ with combining the new know-how with existing knowledge to produce new manuals or workbooks. Finally, comes with ‘Internalization’ where the tacit knowledge and know-how of individuals are enriched. (Nonaka, 1991).

Later in (2018) Tara, Wardhani and Lusa, provide an extension of the SECI model developed by Nonaka with 4 criteria each having derivatives from the sharing and learning process, can be seen from the following figure:



**Figure 3.** Expansion of SECI Model

Source: (Tara, Wardhani and Lusa 2018)

## 2.5 Innovation

In a world of increasingly global competition, countries gain competitive advantages and achieve international leadership in certain industries through the implementation of certain strategies and innovation (Porter, 1990). Innovation refers to the commercial implementation of ideas, creative thoughts,

imaginations, work methods, and business models for the organization. (Petrariu, Bumbac, Ciobanu, 2013)

The success, growth, and sustainability of a business depend on the ability of an organization to innovate and develop. (Rothwell and Gardiner, 1985) explains that innovation doesn't only include major leaps in technology or the commercialization of thoughts it also includes the process of making small, continuous, and minor improvement in the performance of a product in its commercial launch.

(Porter, 1990) shows that innovation is the use of technology that enables organizations to achieve competitive advantages and competitiveness. Knox (2002) explains that innovation is the process of developing new products, services, tools, structures and a new way of marketing, this process adds value for customers, organization, and suppliers. While Hisrich and Kearney (2013) believes that innovation is an ongoing process that starts with the stage of idea generation and ends with the stage of market introduction.

## **2.6 Innovation Drivers:**

Four main dimensions are important and create a need for innovation which are; severe competition, technological advances, changing business environment and changing customers' needs and requirements (Goffin, Mitchell, 2010).

**2.6.1 Sever competition:** Because of severe competition, safe home markets are being threatened by intensified foreign competition. Many companies face competition from sources outside their industries.

**2.6.2 Technological advances:** Technology often opens the door to new industries. New applications of established technology are constantly emerging. Technology is important for service companies and R&D, which is increasingly affecting how service companies do their business.

**2.6.3 Changing business environment:** business environment is always subject to changes. Markets become open because of the impact of the agreement and trade grouping and different associations. There are many reasons for the occurrence of a change in the business environment, some of these reasons are: Globalization, Technological innovation, Improving efficiency, Cost reduction and Competition.

**2.6.4. Changing customers' needs and requirements:** demographics show that many markets will evolve because the aging population will affect and change markets. Some markets are made up of young and teenage customers who have various aspirations. Changing customers show that traditional markets are changing and disappearing.

## 2.7 Innovation Capabilities

Nowadays, innovation has become a key conditioning factor in the survival of an organization. The organizations should have high level of innovation capability to be able to effectively develop and implement new solutions. Their ability to respond innovatively becomes a critical factor for the survival and success. Innovation Capabilities measured in variety of dimensions. Four of the dimensions that help develop the study model are as follows.

### 2.7.1 Learning Capabilities:

(Ashkenas et al., 1995) defined Learning as “the ability of an organization to learn the lesson of its experience and to pass those across boundaries and time”. Organizational learning, innovation reflect novelty, different activities, and contributions developed by organizations. The organization that is concerned with innovation is skilled at creating, acquiring, and transforming knowledge and modifying its behavior to reflect new knowledge and insights. Learning is one of the most valuable assets that give the organization sustainable competitive advantages.

Learning is one of the most valuable assets that provides sustainable competitive advantage and a key element for access, acquisition, and development of new knowledge from external boundaries (Caloghirou et al., 2004).

### **2.7.2 Resource Allocation Capabilities:**

It refers to the sufficient allocation of human, material, and financial resources for the efficient utilization of different resources. (Sabherwal & Fernandez 2003). It can be defined as the ability of an organization to use its different resources” human, financial, material in different processes of the organization. It was found that resource allocation capability enables firm to sustain global competitiveness (Yam et al., 2004).

### **2.7.3 Strategic Planning Capabilities:**

Strategic planning is a set of activities and processes that organizations use to coordinate their activities to apply the vision, mission, and strategies of an organization. Strategy is “the direction and scope of an organization over the long term; which achieves advantage for the organization through its configuration of resources within a challenging environment to meet the needs of markets and to fulfill stakeholder expectations” (Maleka, 2014)

Tarifi, 2021 stated that strategic planning is critical in the management of an organization due to the essential role it plays in leading the organization into the identification of strategic plan through focusing the issues, evaluating their effects while considering the organizational operations and developing alternative measures and tactics so as to ensure that the organization earns competitive advantage. Souitaris (2002)

includes this strategic planning capability in his model of innovation.

#### **2.7.4 Organizing Capabilities:**

Organizing capability is defined as a firm's ability in securing organizational culture and adopting good management practices. Wan et al. (2003) indicated that innovation is positively correlated with organizational structure and culture. Rothwell (1992), has identified a positive association between internal communication and technological innovation. Every company should have a roadmap for innovation. Innovations rely on many factors as Reward system, Organization culture and leadership (Fardin, 2012).

### **2.8 Organizational Innovation Capability as A Result of Knowledge Management**

Hussein et al. (2016) stated that the readiness of members of the organization to collect, as well as donate knowledge, can affect the innovation capacity of teams. Ullah et al. (2017) showed that the process of knowledge sharing in general has a great impact on innovation capability, what is why knowledge sharing is the basic activity that an employee can undertake to increase the innovation capacity of an organization and enable it to achieve goals and achievements. Employees who feel motivated, additionally undergo appropriate training are

delighted with activities that are aimed at increasing the innovation capability of the organization.

One of the major roles knowledge management plays in innovation is enabling the sharing and codification of tacit knowledge. Tacit knowledge sharing is critical for organizations' innovation capability (Cavusgil et al., 2003). Knowledge management contributes in creating tools and platforms for tacit knowledge creation and sharing in the organization, which plays an important role in the innovation process. Knowledge management also assists in converting tacit knowledge to explicit knowledge. It can provide both the platforms as well as the processes to ensure that tacit knowledge becomes explicit. (Rodan 2002)

Tekin and Akyol (2019) came to an interesting conclusion in their study, they concluded that sharing knowledge is insufficient to build innovation capacity when employees are not completely convinced that the management have provided them with full information, or when information has not been provided in a timely manner.

Liao et al. (2015) in their research illustrated that not only the knowledge sharing process but also knowledge transfer is of great importance for building corporate innovation capability. Mazzucchelli et al. (2021), in turn, pointed out that understanding how research and development units distributed all over the world share knowledge with each other, that will allow



for a better understanding of the development process of innovation capabilities.

As mentioned by Lopez-Nicolas and Merono-Cerdan (2011), knowledge management is one of the factors that affects the ability to innovate. Knowledge management is a cycle, process, and discipline of knowledge acquisition, knowledge creation, knowledge sharing, and knowledge application. This can be used to make effective decisions at any level. These effective decisions provide a competitive edge for the organization. Knowledge management is less proactive than competitive intelligence and focuses mainly on internal knowledge (Momeni et al., 2012). This could mean that knowledge management can be used to assess the current and potential internal environment of an organization.

### **3. Telecommunication Sector in Egypt**

The telecommunications sector is one of the sectors that witnesses intense competition between companies to attract and acquire the largest segment of customers. The attraction of customers depends on the degree to which customers realize confidence and trust in the service and the realism of the declared services. The dissatisfaction of customers leads to the continuous shift of customers to other companies to get extra benefits from the offers made by them. Thus, it became necessary for companies in the telecommunications sector to focus on innovation when setting their strategy and serving their customers.

This can be accomplished through the implementation of knowledge management practices that help better serve customers and introduce the best level of quality to be able to compete in such changing conditions. During the recent period, great attention is given to the knowledge management processes and how to be used by the company's employees, which will be reflected in a way or another on the level of innovation within the company in general.

#### **4. RESEARCH OBJECTIVES**

The research aims to achieve the following objectives:

- Recognizing the different aspects of knowledge management and innovation capabilities.
- Disclosing the challenges facing knowledge management and innovation at Telecommunication sector in Egypt.
- Determining the effect of knowledge management practices on the innovation capabilities in Egyptian telecommunication sector
- Presenting several recommendations to telecommunication sector based on the findings of the research.

#### **5. RESEARCH PROBLEM**

There is intense competition among the telecommunication sector companies in Egypt. All of them seek to provide high-

quality telecommunications services to customers. Traditional methods are no longer appropriate now in light of contemporary environmental conditions and changes. These challenges make it imperative for the company to search for tool that help achieve the highest levels of excellence in its performance.

By reviewing the previous studies, it was found that there is a research gap represented by the deficiency in the studies that link between knowledge management and innovation in the telecommunication sector.

**So, research problem can be summarized as follows**

- The presence of shortcomings in the companies' adaptation to knowledge management practices.
- It was found that there are some shortcomings in providing the opportunity for the employees to share knowledge and participate in decision-making
- Lack of the company's management ability to change its strategies to respond to the circumstances imposed by the external environment.
- Deficiency in the study of innovation in telecommunications companies, and how knowledge management could enhance such issue.
- There are some deficiencies in the company's adoption of the views and suggestions of customers and sharing knowledge with them to help providing better services.

- A deficiency in focusing on the knowledge, skills, and experiences of the company's employees to make the maximum utilization out of it.
- There's also a lack of interest in the employees to provide a new methods and a creative ways of working.

## **6. METHODOLOGY**

### **6.1 Pilot Study**

The researcher limited the study population to the different managerial levels and employees in telecommunication sector companies in Egypt.

The researcher conducted in-depth interviews with 20 managers in different levels in the telecommunication sector companies represented by the four companies (WE- Orange- Vodafone- Etisalat) to formulate the research problem and develop the hypotheses and to discover the extent of the research variables are implementation. Also, to check the extent to which the company adopts strategies that support knowledge sharing and innovation.

### **6.2 Study Population, Sample and Data Collection**

The Research Conducted in telecommunication sector companies in Egypt represented by the four companies (WE- Orange- Vodafone- Etisalat) through different managerial levels and employees.

The sample size for the population proportion

$$n = p (1 - p) (Z / E)^2$$

Three items need to be specified:

- The desired level of confidence.
- The margin of error in the population proportion.
- An estimate of the population proportion. (Lind; Marchal & Wathen, 2012)

1- The used level of confidence is 95% which it's  $Z = 1.96$ .

2- The margin of error in the population is 0.05.

3- The estimation of the population proportion assumed (P) 50%.

**Table 1.** Companies' employees' number & market share

Company	Market Share (Mobile Subscribers)	Number of Employees
Telecom Egypt (WE)	7.7 million subscribers	31000
Vodafone	43 million subscribers	10000
Orange	26 million subscribers	7470
Etisalat	27 million subscribers	6900

Developed by the researcher according to the

Companies' data Q4 End of 2021

**The Formula will be:**

$$0.5 (1 - 0.5) (1.96 / 0.05)^2 = 384$$

So, 384 questionnaires were distributed and the response rate was 80% (307 questionnaires)

**Table 2.** Knowledge Management Questionnaire Items and Reference

N	Dimension	Source	Statement
1	<b>Internalization</b>	Study Antonio, Richard, and Esther, (2010)	This dimension was measured by 4 questions that are from 1 to 4
2	<b>Externalization</b>		This dimension was measured by 4 questions that are from 5 to 8
3	<b>Combination</b>		This dimension was measured by 3 questions that are from 9 to 11
4	<b>Socialization</b>		This dimension was measured by 6 questions that are from 12 to 17

**Table 3.** Innovation Capabilities Questionnaire Items and Reference

N	Dimension	Source	Statement
1	<b>Learning</b>	Sabherwal & Fernandez (2003)	This dimension was measured by 4 questions that are from 1 to 4
2	<b>Resource allocation</b>		This dimension was measured by 4 questions that are from 5 to 8
3	<b>Organizing</b>		This dimension was measured by 4 questions that are from 9 to 12
4	<b>Strategic planning</b>		This dimension was measured by 6 questions that are from 13 to 18

The researcher developed the innovation capabilities model according to the study of Antonio, Richard, and Esther, (2010). While the Knowledge Management part was developed depending to the study of Sabherwal & Fernandez (2003). The research employs quantitative methods it was divided into two sections. The first section included information about knowledge management dimensions (internalization, externalization, combination, and socialization) and the second section about the measure of innovation capability (learning, resource allocation. Strategic planning and organizing).

A Likert scale was used as a five scale. (5) referred to strongly agree (4) agree (3) neutral (2) disagree and (1) strongly disagree. This indicated that (5) strongly agree referred to a very high degree of acceptance, while (1) strongly disagree refers to a very low degree of acceptance.

### **6.3 Hypotheses Development**

A major trend that has the implications for knowledge management today is globalization. The world became an interconnected global market. Most of the companies now compete in international markets where barriers to capital movement and tariff have reduced (Yuen Yee Yen 2021).

knowledge management in the organization is effective in creating a common culture for maximizing innovation performance and creating competitive advantage (Andreeva and

Kianto 2012). Sofiyabadi, Valmohammadi & Ghadam (2020) suggested that the strategic knowledge management practices should be considered in the organization to help the organization focus on the most value-added activities. Given the results of this article and the significant relationship between knowledge-based and the innovation performance in the organization. Thus, the main hypothesis could be developed as follows.

H1: Knowledge management process affects positively and significantly innovation Capabilities.

Based on the review of the knowledge management literature discussed above and the research objectives, the main hypothesis could be classified into four sub-hypotheses as follows.

H1.1: Knowledge management process affects positively and significantly learning capabilities.

H1.2: Knowledge management process affects positively and significantly resource allocation capabilities.

H1.3: Knowledge management process affects positively and significantly strategic planning capabilities.

H1.4: Knowledge management process affects positively and significantly organizing capabilities.



### 6.4 Study Model

According to the previous studies and the pilot study, the researcher developed the following model:

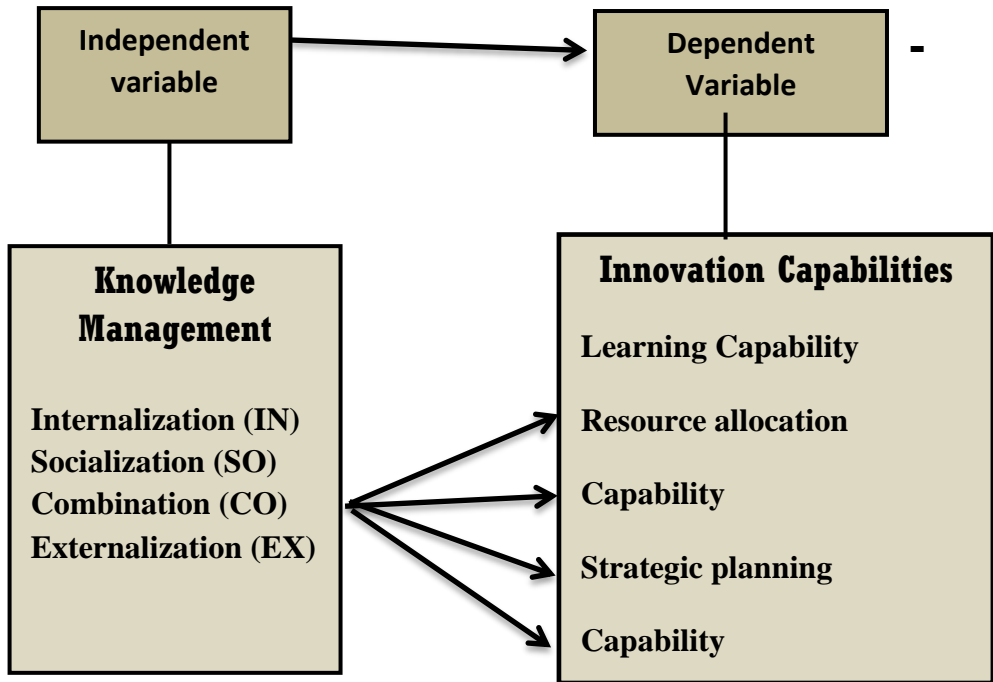


Figure 4. Research Model “Developed by the Researcher”

### 6.5 Statistical Analysis of Survey Methods

Data were unloaded by known Statistical Package for Social Sciences Statistical Program was the statistical analysis using the computer through a statistical package software SPSS V. 26. The following statistical methods were used to derive the results from

the collected questionnaire data:

1. Testing reliability through Cronbach's alpha coefficient to test the stability of the questionnaire.
2. Test the validity through the Pearson correlation coefficient between dimensions.
3. Pearson correlation coefficient to study the relationship strength and correlation direction between study variables.
4. Simple and multiple regression to test the effect of independent variables on the dependent variable to prove the validity of the study hypotheses.
5. T-test indicates that there is a significant effect of the independent variable on the dependent variable and that this effect is significant.

**Table 4.** Results of Validity and Reliability to Variable of Knowledge Management.

N	Dimension	Items	Alpha Cronbach
1	Internalization	4 questions that are from 1 to 4	0.739
2	Externalization	4 questions that are from 5 to 8	0.716
3	Combination	3 questions that are from 9 to 11	0.802
4	Socialization	6 questions that are from 12 to 17	0.817
	Total	17 questions	0.797

**Table 5.** Results of Validity and Reliability to Variable of Innovation.

N	Dimension	Items	Alpha Cronbach
1	Learning	4 questions that are from 1 to 4	0.824
2	Resource allocation	4 questions that are from 5 to 8	0.816
3	Organizing	4 questions that are from 9 to 12	0.772
4	Strategic planning	6 questions that are from 13 to 18	0.783
	Total	18 questions	0.803

The previous tables show the results of Alpha (Cronbach): This is a model of internal consistency, based on the average inter-item correlation. The results of the reliability tests are presented in the previous Table. All the items have a Cronbach alpha's value ranges are greater than 0.7 thus the measurement of the variables is valid and reliable (Nunnally and Bernstein, 1994).

## 6.6 Hypotheses Testing

**Table 6.** Matrix correlation coefficients between Knowledge Management and Innovation Capabilities.

Matrix correlation between variables		Innovation Capabilities				Total
		Learning	Resource Allocation	Organizing	Strategic Planning	
Knowledge Management	Internalization	0.706	0.716	0.701	0.844	0.708
	Externalization	0.775	0.702	0.792	0.807	0.757
	Combination	0.804	0.816	0.725	0.812	0.782
	Socialization	0.837	0.825	0.771	0.798	0.811
Total		0.782	0.765	0.748	0.826	0.764

From the previous table we find that there is correlation relationship between all dimensions of the variable Knowledge Management and the dimensions of Innovation at significance level 0.01. The value of the Pearson coefficient indicates a positive correlation in all dimensions.

Multiple linear regression was used to find out the effect of the independent variable (Knowledge Management) on the dimensions of the dependent variable (Innovation Capabilities), and then use the relationship to predict the value of one of the two variables in terms of the other variable. The regression analysis was used by (F) testing as follows:

**Table 7.** Results of a regression analysis of variance to confirm the validity of the model for testing.

N	Dimension	df	(R <sup>2</sup> )	(F)	Sig.
1-	Internalization	207	0.607	56.114	0.000
2-	Externalization	207	0.586	84.007	0.000
3-	Combination	207	0.558	65.025	0.000
4-	Socialization	207	0.683	74.549	0.000
Total		207	0.583	65.227	0.000

Based on the previous table, we find that at the level of significance (0.01) and degrees of freedom (207). The value of the (F) test indicates the quality of the relationship model and the validity of the dependence without errors, where the value of (F) was equal to (65.227), which is statistically significant at a significant level (0.01).

The value of the determination coefficient ( $R^2$ ), which equals (0.583). This indicates that the (Knowledge Management) variable explains the change in (Innovation Capabilities) by approximately (58.3%), and the percentage of random errors represented in the accuracy of the units of measurement remains for the variables. This indicates the role and effect of the dimensions of the independent variable (Knowledge Management) in the interpretation of the dimensions of Innovation Capabilities.

### 6.6.1 Test the first Sub-hypothesis:

**Table 8. The results of multiple regression analysis to test the effect of Knowledge Management on Learning Capabilities.**

N	Dimensions	(B)	Std error	Beta	(R <sup>2</sup> )	(T)	Sig.
1-	Internalization	0.448	0.038	1.048	0.498	11.789	0.000
2-	Externalization	0.542	0.034	1.027	0.600	15.941	0.000
3-	Combination	0.601	0.027	1.012	0.646	22.259	0.000
4-	Socialization	0.658	0.024	1.207	0.700	27.458	0.000
Total		0.556	0.030	1.072	0.609	18.566	0.000

By reviewing the results in the previous table and following up on the values of the (T) test, it was found that the statistical significance is less than the level of significance (0.01). This indicates that there is an effect of these dimensions on the dependent variable innovation capabilities in Telecommunication sector in Egypt.

Based on the above results to test the validity of the main hypothesis of the study, the hypothesis can be accepted, as it: **Knowledge management process affects positively and significantly learning capabilities.**

### 6.6.2 Test the second Sub-hypothesis:

**Table 9.** The results of multiple regression analysis to test the impact of Knowledge Management on Resource Allocation Capabilities.

N	Dimensions	(B)	Std error	Beta	(R <sup>2</sup> )	(T)	Sig.
1-	Internalization	0.494	0.030	1.157	0.514	16.466	0.000
2-	Externalization	0.477	0.031	1.227	0.492	15.387	0.000
3-	Combination	0.621	0.022	1.121	0.665	28.227	0.000
4-	Socialization	0.662	0.034	1.007	0.680	19.470	0.000
Total		0.561	0.029	1.128	0.585	19.344	0.000

By reviewing the results in the previous table at significance level (0.01) and following up on the values of the (T) test, it was found that the statistical significance is less than the level of significance (0.01). This indicates that there is an effect of these dimensions on Resource allocation as one of the dimensions of innovation Capabilities in Telecommunication sector in Egypt. Based on the above results to test the validity of the second sub-hypothesis of the study, so it will be accepted: **Knowledge management process affects positively and significantly resource allocation capabilities.**

### 6.6.3 Test the third Sub-hypothesis:

**Table 10.** The results of multiple regression analysis to test the impact of Knowledge Management on Strategic Planning Capabilities.

N	Dimensions	(B)	Std error	Beta	(R <sup>2</sup> )	(T)	Sig.
1-	<b>Internalization</b>	<b>0.462</b>	<b>0.034</b>	<b>1.147</b>	<b>0.492</b>	<b>13.588</b>	<b>0.000</b>
2-	<b>Externalization</b>	<b>0.601</b>	<b>0.030</b>	<b>1.209</b>	<b>0.627</b>	<b>20.033</b>	<b>0.000</b>
3-	<b>Combination</b>	<b>0.503</b>	<b>0.024</b>	<b>1.317</b>	<b>0.527</b>	<b>12.551</b>	<b>0.000</b>
4-	<b>Socialization</b>	<b>0.542</b>	<b>0.022</b>	<b>1.249</b>	<b>0.593</b>	<b>24.681</b>	<b>0.000</b>
<b>Total</b>		<b>0.521</b>	<b>0.028</b>	<b>1.221</b>	<b>0.558</b>	<b>18.607</b>	<b>0.000</b>

By reviewing the results in the previous table and following up on the values of the (T) test at significance level (0.01). It was found that the statistical significance is less than the level of significance (0.01). This indicates that there is an effect of these dimensions on Strategic planning as one of the dimensions of innovation Capabilities in Telecommunication sector in Egypt. Based on the above results to test the validity of the third sub-hypothesis of the study, so it will be accepted: **Knowledge management process affects positively and significantly strategic planning capabilities.**

### 6.6.4 Test the fourth Sub-hypothesis:

**Table 11.** The results of multiple regression analysis to test the impact of Knowledge Management on Organizing Capabilities.

N	Dimensions	(B)	Std error	Beta	(R <sup>2</sup> )	(T)	Sig.
1-	<b>Internalization</b>	<b>0.681</b>	<b>0.037</b>	<b>1.046</b>	<b>0.712</b>	<b>18.405</b>	<b>0.000</b>
2-	<b>Externalization</b>	<b>0.632</b>	<b>0.031</b>	<b>1.021</b>	<b>0.651</b>	<b>20.387</b>	<b>0.000</b>
3-	<b>Combination</b>	<b>0.622</b>	<b>0.028</b>	<b>1.031</b>	<b>0.659</b>	<b>22.215</b>	<b>0.000</b>
4-	<b>Socialization</b>	<b>0.607</b>	<b>0.027</b>	<b>1.247</b>	<b>0.636</b>	<b>22.481</b>	<b>0.000</b>
<b>Total</b>		<b>0.651</b>	<b>0.031</b>	<b>1.174</b>	<b>0.682</b>	<b>21.001</b>	<b>0.000</b>

By reviewing the results in the previous table at significance level (0.01) and following up on the values of the (T) test, it was found that the statistical significance is less than the level of significance (0.01). This indicates that there is an effect of these dimensions on organizing as one of the dimensions of innovation Capabilities in Telecommunication sector in Egypt.

Based on the above results to test the validity of the fourth sub-hypothesis of the study, so it will be accepted: **Knowledge management process affects positively and significantly organizing capabilities.**

## 6. RESULTS

The researcher measured the dimensions that make up the variables of the study. The validity of the study hypotheses was tested to determine the effect of the dimensions of the independent variable (Knowledge management) on each



dimension of the dependent variable (Innovation capabilities). The study concluded that there is a positive and statistically significant effect of the Knowledge management process on the innovation capabilities dimensions.

Thus, the results conclude the following

H1: Knowledge management process affects positively and significantly innovation Capabilities.

H1.1: Knowledge management process affects positively and significantly learning capabilities.

H1.2: Knowledge management process affects positively and significantly resource allocation capabilities.

H1.3: Knowledge management process affects positively and significantly strategic planning capabilities.

H1.4: Knowledge management process affects positively and significantly organizing capabilities.

## 7. CONCLUSION

Knowledge management fulfils numerous functions in the innovation monarchy. All knowledge management processes affect organizational learning and are treated as organizational ability. Thus, paying attention to organizational learning and creating learning organizations helps promote a culture of innovation and creativity in the workplace and among employees. Based on the research finding, the study could conclude that knowledge is an important source of innovation. Thus, to be knowledge creating company, organization should

have a dynamic interaction between four patterns like a spiral of knowledge.

This study initiated to determine the effect of knowledge management via its SECI based dimensions on organizational innovation. It focuses on the four processes in SECI model which are Socialization, Externalization, Combination and Internalization. Among all four processes, Socialization shows high level of effect compared to other dimensions, While the least effect level is Combination.

The high effect of Socialization could be as a result that measures the sharing of tacit knowledge by employees with others who do not have the knowledge through joint activities, physical proximity and/or face-to-face communication for example, in meetings and discussions.

Among the main reasons identified for having the least significant effect are the fundamental managerial understanding on the importance of knowledge, retaining knowledge and formal and informal mode of information sharing. It can be noticed that many organizations which operate in developing countries focus mainly on skills needed to meet the volume and profit target, instead of the quality and knowledge management.

Overall knowledge management has significant effect on innovation capabilities. It indicates that knowledge creation, sharing and retaining should be given priority in order to optimize the organizational innovation.

## 8. RECOMMENDATIONS AND FURTHER RESEARCH

Management in the telecommunication sector should take into account that enhancing knowledge management can improve their innovation capabilities, furthermore, strongly influence firms' creative abilities. Thus, the study recommends the following:

- Telecommunication sector managers need to concentrate on improving the employee's capabilities and innovation through improving the Knowledge management process.
- Telecommunication companies should reinforce Knowledge management to improve its innovation capabilities and the level of services provided.
- The management needs to take in to consideration the knowledge sharing and allowing the employees for creative thinking.
- Management should formulate the strategic objectives that fosters the implementation of knowledge management process using different practices.
- It is important to increase the employees' interest to share their knowledge and experience through meetings and brainstorming sessions.

The application of this study is limited to telecommunication sector, so it is suggested to study the current topic in other sectors like manufacturing, hospitals, and service sectors, and to study the effect of Knowledge management on other variables like competitive advantage, performance and organizational resilience.

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