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# Absorptive Capacity and its Potential Role in Supporting Organisational knowledge Creation: A Qualitative Approach

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## **Abstract**

*Absorptive Capacity (ACAP) is the ability of a firm to integrate, transform, and apply valuable knowledge required for business success. ACAP is proposed to play a significant role in enriching the process of knowledge creation embraced inside contemporary organizational Information Systems (IS) environments. Many misperceptions surround how ACAP can be measured and understood as an organizational construct. The aim of this research is to decrease such misperception by providing qualitative measures for ACAP dimensions extracted using data from (22) semi-structured interviews conducted with senior managers working in two telecommunication companies, and analysed following Grounded Theory Methodology (GTM) coding techniques. Drawing on our analysis, we propose a relational model that includes measures that can be commonly used in the literature, and treated as guides to IS researchers and senior managers in exploring the rich facets of ACAP. The extracted measures are proposed to offer foundations for shaping where and how further potential organizational assets can be leveraged.*

**Keywords:** Absorptive Capacity, Information Systems, Research and Development, Grounded Theory Methodology.

## **1.0 Introduction**

This section sets the scene of the presented research paper by introducing the key features of its contents. The current research motivation is to uncover measures of ACAP from organizational knowledge foundations. A significant amount of empirical research has used the concept of ACAP (Popovič, Puklavec, and Oliveira, 2019). However, very few qualitative valid measures that are able to integrate its various dimensions have been established (Wang & Ahmed, 2007). Conversely, the determination of the study is to direct the attention of organizations to the importance of enhancing their ability to assimilate, transform, and apply valuable knowledge

required for their business success prior to investing in a large amount of expenditure such as buying state of the art IS for instance (Flor, Cooper and Oltra, 2018). The research is oriented towards efficiently acquiring and processing data, information, and knowledge in technology-based industries. Accordingly, the aim is to answer the bellow research question:

*“What are the measures that determine organizational ACAP dimension, and that can support potential creation of knowledge? “.*

The current research attempts to decrease the misperception in understanding organizational ACAP by providing qualitative measures that determine its potential existence within firms. Aligned with this study these measures can be defined as categories within different areas of an organization that can be improved (Robert et al, 2012). The focus of the paper is directed towards how these dimensions work in a systematized sequence to present ACAP as a logical dynamic competency that promotes organizational enhancement (Elbashir et al, 2011). To do so, we suggest measures empirically extracted using data collected from semi-structured interviews and conducted with 22 senior managers working with two companies in the telecommunication sector. Later, analysed following rigours set of systematic grounded theory coding techniques. The contents in section 2. Delivers a review of ACAP and its dimensions adapted from the (Zahra and George, 2002) model. Following, in section 3. We outline the research methods including data collection, data analysis, and results. All comprehensively by discussing the detailed process of the main GTM coding phases incorporating open and axial coding, and how they were generated. Later, The final segments in section 4. Presents the discussion, managerial implications, and direction for future work.

## **2.0 Research Background and Review**

### **2.1 The Concept of Absorptive Capacity: An Overview**

Researching ACAP has been one of the most frequently stated and explored subjects in organization management throughout the last two decades (Flor, Cooper and Oltra,

2018). The concept is defined as: *'the ability of a company to identify, assimilates, and exploits knowledge coming from external sources* (Cohen and Leviathan, 1990). Historically, the concept of ACAP was mentioned since the seventies. Nevertheless, the latest application of its practice has been related to Cohen and Leventhal (1990). Their definition of ACAP mentioned before it became dominate in almost all research associated with knowledge creation. A proposition by Lane et al. (2006) indicated that ACAP is required to be one of the foremost significant elements needed in organizations to develop research due to its correlation with other widespread organizational fields. ACAP developed rapidly within literature in line with the unique standpoint that the concept is able to offer (Lane et al, 2006). To make the concept more familiar Roberts et al. (2012) presented a real-world analogy by building a similarity between the mechanisms of ACAP inside organizations and a sponge, they correlated the ACAP to a sponge given its material, number of holes, and its nature of water resistance when amount of water enter inside it. All are all strong indicators of its ability to absorb water. Now, the water is able to flow within the holes in the material as the sponge absorbs the water, and as we squeeze the sponge we are facilitating the flow of water. Likewise, any organization is able to absorb knowledge from external sources; nevertheless, it will only do so if the capabilities of its employees are responsive and open to any new knowledge source that can be integrated with their current knowledge base. Importantly, such knowledge streams or flows are enabled using suitable fitting processes, structures, and supporting technologies. ACAP as a construct is seen to be located amongst various fields of organizational learning (Popovič, Puklavec, and Oliveira, 2019), more pragmatic research and individual-driven theory have been studied in various areas of interest such as banking, technology licensing, strategic alliance and organizational learning (Cohen and Leviathan, 1990). Furthermore, studies have examined ACAP as an organizational capability of both individuals and organization (e.g., Cohen and Leventhal, 1990; Minbaeva et al. 2003), or countries as proposed by Mowery and Oxley (1995) and Buzzacchi, Colombo, & Mariotti. (1995).

## **2.2 Dimensions Of Absorptive Capacity**

This section provides a detailed illustration of the previously mentioned ACAP dimensions clarified by Zahra and George (2002). Dimensions of ACAP are defined

as a ‘distinct but complementary capabilities that compose a firm's ACAP. By looking into the dimensions it is understood that they basically represent a set of capabilities or potentials that a certain organization may acquire and exploit to serve its knowledge creation process. ACAP Dimensions are exemplified in figure 1.

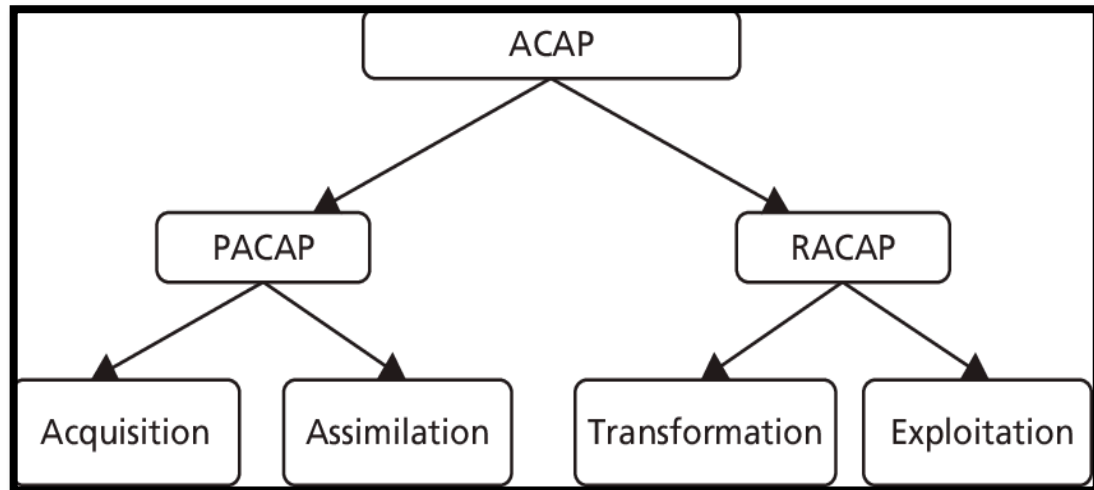


Figure 1. ACAP dimensions model (adapted from Zahra and George, 2002).

Our standpoint in this research is that these dimensions can be better attained, facilitated and applied as an input to organizational knowledge creation success. The model of Zahra and George (2002) added more to their conceptualization of ACAP by classifying two synchronized groups called; potential absorptive capacity (PACAP) and realized absorptive capacity (RACAP). They suggested that PACAP in a firm offers capabilities for acquiring and assimilating knowledge, where prior knowledge plays a major role inside the organization. RACAP is the ability of a firm to combine the prior owned knowledge with newly attained knowledge by having set of procedures that are able to support this combination and refinement of knowledge, or in other words knowledge transformation. RACAP refers to knowledge exploitation indicating the capacity of the firm to exploit newly gained knowledge, and efficiently apply it in services and product, which can lead to better performance and financial profit.

- **Acquisition**

The acquisition is the ability to recognize, obtain, and grasp external knowledge required for organizational processes and growth (Popovič, Puklavec, and Oliveira, 2019). Many scholars considered the dimension acquisition as an effective generator

of knowledge that seems to appear through proper investments in R&D (Zahra & George, 2002). These authors suggested three important aspects that describes effort used in knowledge acquisition and which can eventually influence ACAP, the aspects are (intensity, speed, and direction). Intensity coupled with the speed of effort are vital aspects to recognize and collect knowledge in firms, moreover, they are able to define the quality and degree of a firm's acquisition competencies. In other words, and according to (Kim, 1997) the extra the effort that the firm provides in acquiring knowledge, the more quickly the firm will shape necessary capabilities.

- **Assimilation**

The definition of Assimilation by Kim (1997), and Szulanski (1996) was cited in Zahra & George (2002) refers to the firm's routines and processes that allow it to analyse, process, interpret, and understand the information obtained from external sources. Zahra & George (2002) explained that philosophies and findings that lies outside an organization's search zone are somehow disregarded, since the firm cannot easily understand them externally, moreover external knowledge coming from outside either outside a department or outside the organization may involve heuristics that are totally inconsistent with the current heuristics used by that firm or organization. Consequently, this may cause a delay in understanding knowledge and processing (Leonard-Barton, 1995). External knowledge is required to be specific in terms of context and contents. The difficulty of grasping knowledge lies in the value of knowledge when the value of knowledge is dependable on its complementary asset; the more difficulty appears in grasping and relating it with external knowledge (Teece, 1981). Eventually, the comprehension of knowledge and being able to understand is a key role successfully assimilating the external knowledge (Zahra & George, 2002).

- **Transformation**

Transformation describes the ability of the organization to do series of refinement on its current routines so that it can be combined with newly acquired knowledge. Zahra & George (2002) acknowledged that the process of refinement can be done by the addition or deletion of knowledge, or may also be accomplished by augmenting the same acquired knowledge in different directions. Zahra & George (2002) suggested using what is called Bi-Sociation; in their description of the transformation

dimension. Bi-association is a process that leads to transformation. Bi- association arises when an idea appears in two dependable but incompatible settings of resources. Subsequently, the capability of the organization to absorb information formulated in a shape of two inconsistent forms coming from different resources and then associate these pieces of information to produce knowledge is required to be a successful practice of transformation (McGrath & MacMillan, 2000). The transformation has been linked to a strategic change in many positions within literature. Strategic change or strategic organizational transformation is described when a constructive change appears within the firm's routines and knowledge. According to Zahra & George (2002) strategic change presents new knowledge for reframing organizational description of the industry and competitive strategy.

- **Exploitation**

Exploitation highlights the application of knowledge. Exploitation as an organizational competency is grounded on practices and routines that permit organizations to refine, outspread, and influence existing capabilities, otherwise to generate new different ones by incorporating acquired and transformed knowledge into its operations (Cohen and Leventhal's, 1990). Exploitation key role lies in reflecting a firm's capability in producing and integrating knowledge into its processes and operations (Van den Bosch et al., 1999). This integration mechanism desires to retrieve knowledge that has been previously produced and adopted for practice (Lyles & Schwenk, 1992). Consequently, the output of the exploitation capability is the formation of new services, products, systems, and knowledge. A good example of the exploitation capability can be apparent when looking at new projects that tend to collect knowledge from different essential resources such as customers, competitors, and market. And they later use this captured knowledge in creating novel proficiencies. Likewise, prosperous recognized organizations are expected to inaugurate routines that position their knowledge and target it to improve current visions or inspire new creativities inside their environment (Rumelt, 1987).

### **2.3 The Association Between Absorptive Capacity and Information Systems**

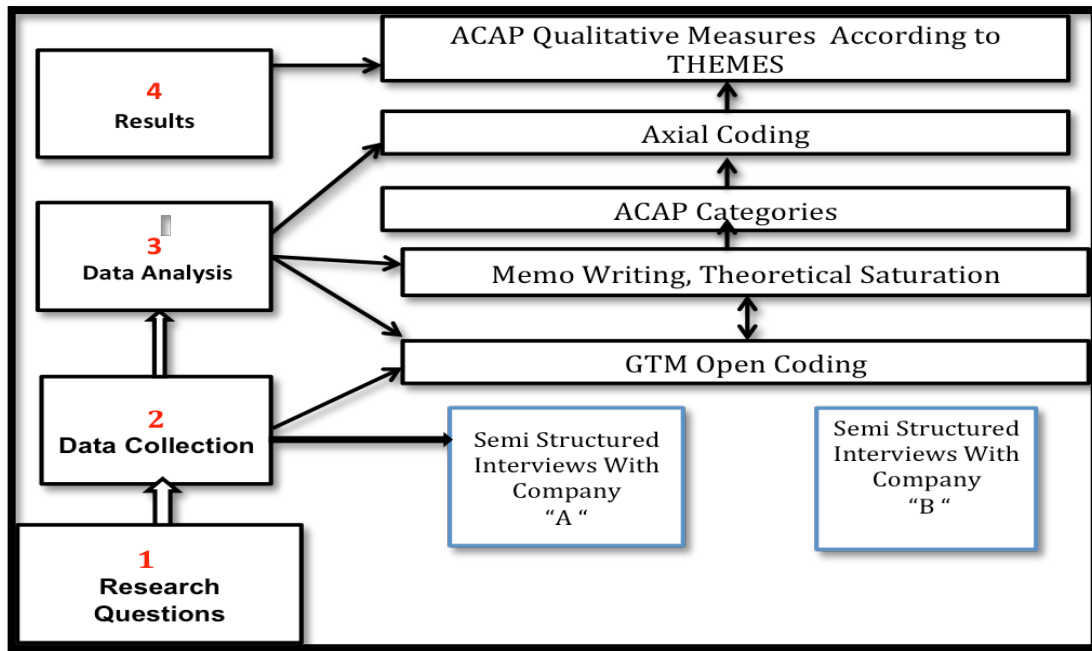
A connection between ACAP and (IS) research appeared in a revision by Robert et al (2012), the main drive of the study was to refine the current understanding of ACAP and directing its operative practice in IS studies. They reviewed this construct by

tracing the evolution of ACAP literature in organizations observing issues linked to its conceptualization effects and organizational learning. Moreover, they examined how ACAP has been measured, theorized, and then utilized in the IS research field. Consequently, they proposed a framework aimed at researches that links ACAP to IS and Information technology. Interesting work that focused on this connection includes Elbashir et al (2011) and Robert et al, (2012). They ascertained on the importance of the capability to collect, absorb and strategically control new information coming from external sources for creating a suitable technological set-up, and to integrate information systems for achieving better organizational performance. Additional outcomes of their studies demonstrated issues related to managerial hierarchy, they proposed that top management plays an indirect but critical role in effectively positioning information systems.

### **3. Research Methods**

After creating a broad-spectrum review in exploring ACAP and its dimensions in the above sections, the research intended to investigate the empirical interface in exploring ACAP. Grounded Theory Methodology (GTM) was used as the core research method due to that ACAP was treated as an imprecise type of organizational control that required further investigation. The research question was explored using prior literature review without any settings for research hypotheses. However, the phenomenon of ACAP was still unclear until explored openly using GTM. The current study was significantly influenced by Strauss & Corbin (1998) school of GTM, as the two scholars believe that researchers can use GTM for building a systematic rigorous understanding of a certain phenomenon, and not essentially to extract a theory. The empirical design is shown in figure 2. Demonstrates that there is an apparent interaction in GTM between data collection and analysis as they both initiate synchronously (Bryant, 2002).





**Figure 2. The empirical qualitative research design for the current study.**

The above design in figure 2. Presents an illustration of the inductive empirical data collection and analysis methods that are qualitative in their nature. The research question offered a broad perspective of the research concern. Consequently, once a specific site for collecting data has been originated the process of the data collection was initiated accordingly (Bryant, 2011). GTM open and axial coding processes were employed in the analysis phase resulting in extracting ACAP categories and assigned to themes as a result of the axial coding process. Memo writing and theoretical saturation mentioned in the design made this approach dissimilar from other approaches. Memo writing is a process where the researcher writes notes throughout the research; memos might include events, categories, or relationships observed and written while initiating the collections and analysis phase (Gibbs, 2018).

### **3.1 Data Collection**

Empirical data collection in GTM is the process of focusing on collecting novel data rather than permitting theoretically collected data to direct the researcher perspective (Charmaz, 2001). According to Gibbs (2018), GTM researchers always demonstrates openness while collecting the data, openness refers to being open-minded in receiving answers from participants and not being biased to any previous knowledge owned (Gibbs, 2018). Semi-structured interviews were chosen as the core data collection

channel. The interviews enclosed open questions given the fact that the research is mainly following GTM. Interview questions probed into how each participant can explain the existence of potential scopes treated as knowledge creation elements in their organization according to the given interview questions, and how they went about exploiting such realization. In each interview, a set of (10) questions was asked for each person participating in the study.

Perspective Category	Number of Interviewed Participants	Length of Work Experience	Managerial Level	Industry
Head of data analytics	2	10	Top Manager	Telecom
Chief information officer	1	9	Top Manager	Telecom
Marketing head	2	15	Top Manager	Telecom
Risk manager	2	8	Top Manager	Telecom
Product development manager	2	9	Top Manager	Telecom
Senior cost analyst	2	5	Top Manager	Telecom
Data Platform Engineer	2	10	Middle	Telecom
Technology leader global analytics	2	12	Top Manager	Telecom
Business intelligence analysis head	2	4	Middle Manager	Telecom
BI and data analytics Senior Consultant	3	5	Senior	Telecom
Director Of human resources reporting And analytics	2	14	Top Manager	Telecom

**Table 1. Specification for interviewed participants.**

Table 1. Presented detailed specification for interviewed participants from two organizations based in Jordan. Both companies are currently using BI solutions; and both required as strong competitors, with similar employee's number and size, the target was to find two similar companies with least differences. The study will not concentrate on the telecom industry business value chain, the goal was to find companies in the IS environment that deal with data challenges and already have BI solution assimilated within. The positions were altered to match the companies' different position categorization. Consequently, to accumulate the greatest number of seniors engaged as participant in the study. Participants in table 1 are specified according to their industry, managerial level, and length of work experience. A total of (22) practitioners were chosen from the telecommunication industry, different senior levels (Heads, leaders, senior consultants, and top level and middle managers),

different languages mainly Arabic and English, and different level of experience ranging from (4) to (14) years as described in table 1.

### 3.2 Data Analysis

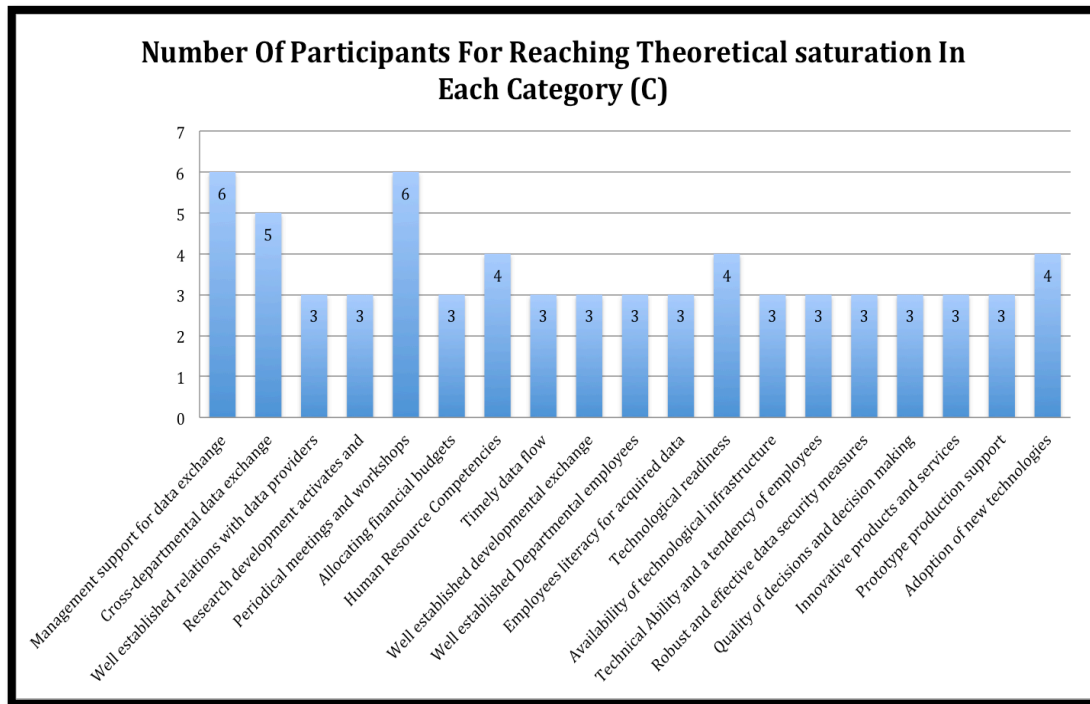
Data analysis in the current study relied primarily on two data coding techniques guided by GTM: open, axial, coding. A code in GTM is a specific indication of the main issue or phenomenon that is going on in the text or collected data (Gibbs, 2018). Additionally, coding references a process of reducing the data without changing the meaning of the data starting with a large amount of data and ending with a grounded abstract view of the data. NVivo software was used to code the data by first uploading all interviews as one whole transcript and conducting a line by line coding to all answers of the participant's transcripts. In this phase, coding was required as a systematic automated technique for segmenting data into smaller units called sub-nodes, and categories in GTM. The configurations of categories enabled the researcher to gain a deeper rationale of the knowledge creation potentials that were extracted from the interview answers. Mixed Methods were encapsulated within GTM such as theoretical saturation, memo writing, and finally mapping results with previous literature review for validation issues.

Interview Question	Answer	Memo	Memo Date /Time
<i>Do you have specific practices inside your organization that reflects any degree of data sharing between departments or outside the organization scope? Please provide examples?</i>	In our company there is a quick <u>information flow</u> , e.g., if a business unit obtains important information it communicates this information promptly to all <u>other business units or departments</u> . And Our management demands periodical <u>cross- departmental meetings</u> to interchange new developments, problems, and achievements.	<u>Relate this when coding to " **Assimilation Node in Nvivo. SUGGESTED CODES in interview: Information flow, 2. Other business units or 3. Departments, 4. Interchange new developments. **"</u> <u>Saturation reached after this answer.</u>	March 20/2018, Tuesday, 11 :00 Am. Zain Head office

**Figure 3. Memo /open coding analysis for the current study.**

Figure 3. Presented a sample of a memo extracted from the analysis process of the current research. Generating effective memos helped in assisting the process of coding the data, extracting categories, and extracting relation. Moreover, the use of

memos was undertaken to document any similarities and differences that had appeared while collecting data, and coding the data.



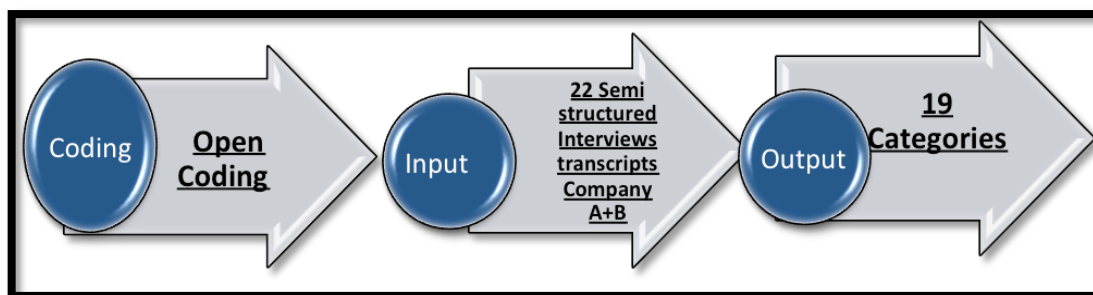
**Figure 4. Number of participants reaching theatrical saturation.**

A minimum number of (3) participants were used to reach the theoretical saturation, with no maximum limit as presented fig 4. Theoretical saturation in the current research demonstrated the process of knowing when exactly to stop with collected data, and also when to stop with coding the data needed for extracting new categories, seeking for variation or similarities. In GTM there is no standardized way to reach saturation participant number calculation, it is according to the transcripts contents (Gibbs, 2018) .The main intention of this technique was to promote a final refinement of certain categories and properties, also allowing maintaining the balance between learning from empirical data and existing theories without diminishing the value of an inductive approach (Charmaz, 2012).

### 3.3 Results

#### Open Coding Results

We obtained a total of (19) extracted categories using open coding technique obtained from the 22 interviews transcripts as illustrated in figure 5.

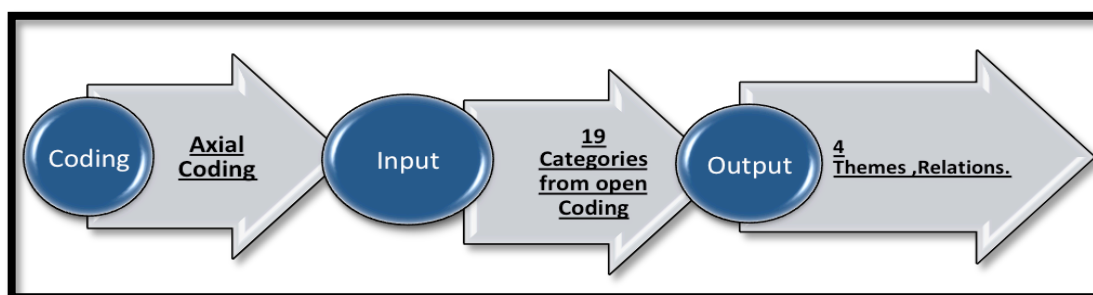


**Figure 5. Open coding input and output for the current study.**

Each category was coded as a sub-node in Nvivo, later was rationalized into the suitable main node that is referenced as a theme in the axial coding process. In open coding, the main input was the participant's transcripts, and the final output was the developed categories. Open codes were extracted by assigning a phrase to represent a certain chunk of a data performed open coding and then labelling this data according to respondents answering patterns, the essence was to reduce the amount of data (Glaser, 1978). Table 2 below illustrates the total of (19) categories extracted through the open coding process. Appendix A provides a wider sample of the categories, their brief explanations, and an example from the participant answers provided for each extracted category.

### **Axial Coding Results**

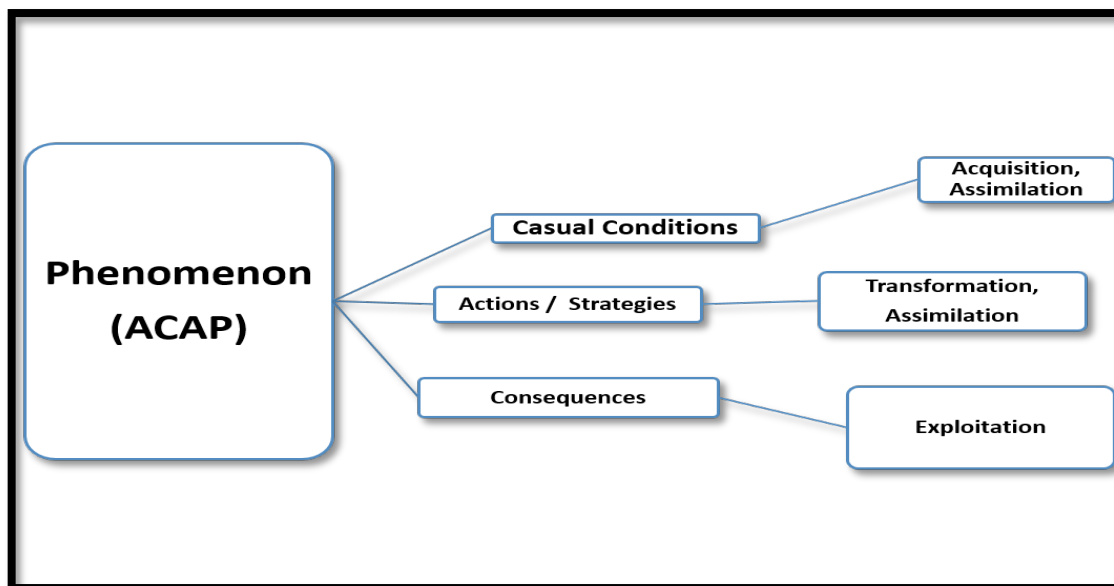
The result from axial coding is (19) categories classified into (4) pre-defined themes: Acquisition, Assimilation, Transformation, and Acquisition. Classification process was based first on evaluating the categories logically into four main classes according to (Strauss and Corbin, 2001) ACAP model. The input to the axial coding was the extracted categories; the output is building a relational model that relates each theme of ACAP into its corresponding category as illustrated in figure 6.



**Figure 6. Axial coding input and output for the current study.**

Thematically and as recommended in GTM research, the current research applied Strauss and Corbin (2001) paradigm model components that guided the axial coding model creation to generate themes in axial coding. Each component of the model allowed the reflection of certain theme of axial coding. Paradigm model theoretical component are as follows;

- **Casual conditions:** selecting any categories that may have a cause that influenced the central phenomenon of the research - knowledge acquisition, knowledge assimilation were chosen as causal condition of the central phenomenon of the research.
- **Phenomenon:** a Central phenomenon in the study by itself – (Absorptive Capacity effect on knowledge creation.)
- **Actions /Strategies:** researcher asked questions about people in the organizations
- **Consequences:** Outcomes of results of actions, and results from the strategies.



**Fig 7. Paradigm model resulted from initial Axial Coding**

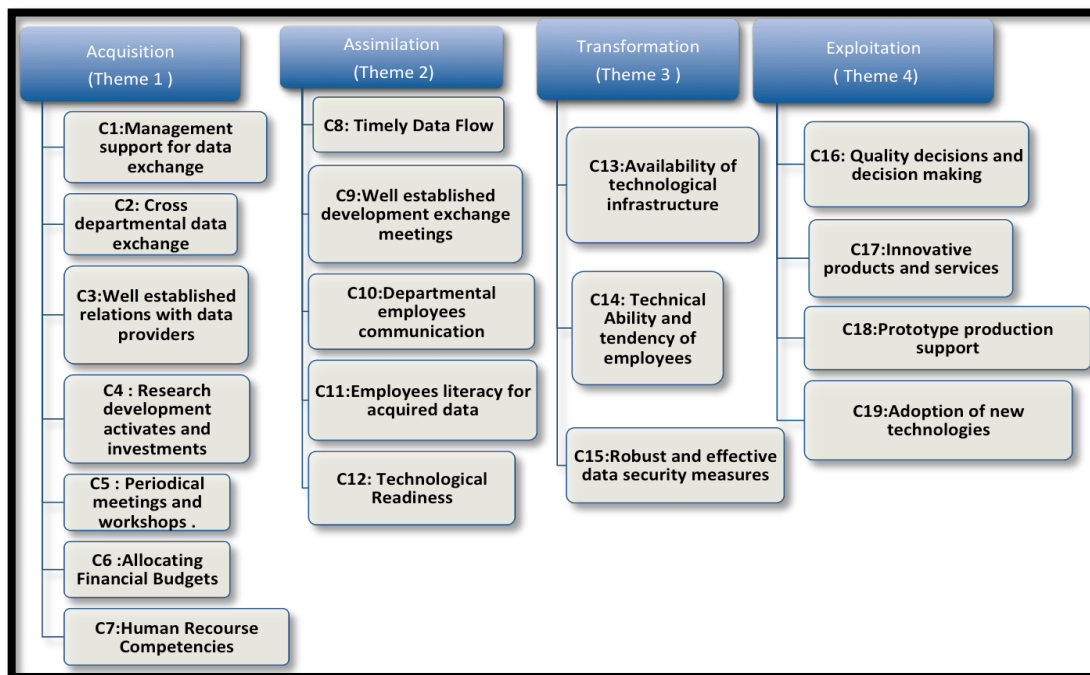
Fig 7. Illustrates how each dimension of ACAP relates to a specific component within the GTM paradigm model. In axial coding, it was looked at the conceptual categories extracted from the open coding phase. Their interdependencies were examined for outlines that might explain the relation between ACAP different dimensions. In line with the current research the process of linking categories to fit each of the ACAP dimensions is referred to axial coding (Strauss and Corbin, 2001). The results

presented a total of (7) categories were found relevant to the dimension Acquisition, (5) categories for Assimilation, (3) categories for Transformation, and (4) categories for Exploitation. Explained in bellow table 2. Number of categories related to each theme as a process of axial coding.

Number Of Classified Categories to each Theme	Theme Name/ACAP Dimension
7	Acquisition
5	Assimilation
3	Transformation
4	Exploitation

**Table 2.** Number of categories /themes of the current study.

It is imperative to mention here that axial coding was not grounded in extracting the selective themes, however, the purpose was to relate our grounded categories from open codes to the main dimensions of ACAP that references the model of (George & Zahra, 2012). A relational model was built subsequently to illustrate these relationships between each theme and its corresponding categories, as in figure (8).



**Figure 8.** Final relational model for ACAP dimentionions measures.

Drawing on the extracted model, proposed categories where coded according to the answering patterns established within the number of participants through an open

coding process. Later, these categories were assigned to the dimensions of ACAP referenced as themes within the GTM reflection.

## **4.0 Discussion**

### **4.1 Theoretical Implications**

The current study addressed an analysis of the literature on the general understanding of ACAP and its dimensions. Later, exploring ACAP dimensions by developing (19) qualitative items, and classifying them into (4) dimensions that are able to measure the dimensions of ACAP suggested in Zahra & George model (2002). The extracted measures are anticipated to function as a foundation from which to compare findings across ACAP studies such as a significant consideration of (Flatten et al., 2011) which offered a scale development approach of measuring ACAP. However, this study proposed an alternative qualitative scale for measuring the concept of ACAP, making it possible to apprehend the value added of ACAP as an organizational construct in technology based industries.

### **4.2 Managerial Implications**

The study offers senior managers in technological industries with a reasonable set of assessed measures that are proposed to evaluate their organizational weakness and strengths concerning ACAP perspective. The extracted measures are proposed to offer foundations for shaping where and how further potential organizational assets can be leveraged. While viewing the extracted measures managers can consider what they already have from these sets, and what is missing or needs to be further discovered.

The current study main contribution lies in proposing measures that found to be linked to one or more of areas summarized by : (1) organizational human recourse abilities, (2) organizational financial abilities, (3) organizational relational and interpersonal abilities, (4) organizational technical and technological capabilities, and (5) decision making outcomes and innovation outcomes. All extracted measures are linked to one or more of the given areas. By settling these concentrations, the presented managerial implication reinforced the fact that the four dimensions of ACAP were strongly



supported empirically within our study resulting from consistent managerial implications for each ACAP dimension as the following;

- **Acquisition:** the developed measures that signified the acquisition dimension are harmonized with the definition proposed by Lane & Lubatkin (1998) as the ability to recognize, obtain, and grasp external knowledge required for organizational processes and growth. Measures such as management support for data exchange, research development activates and investments, periodical meetings and workshops found to be supported in terms of acquisition capabilities within the organization. To be more specific in describing acquisition measures and basis for extracting them; a good number of managers stressed the idea of having in their department's external resources the can assist in obtaining information (e.g., personal networks, consultants, seminars, internet, database, professional journals, academic publications, market research) However, others stressed that they require these components and it is misplaced in their company. Consequently, we considered this as an essential measure to be coded as a category in the open coding phase. While other managers stressed that as managers they do assign financial budgets, or at least they are aware of organizational pre-setting for budgets that support any data obtainability initiatives, such as paying for external data providers, which revealed the category (well-established relations with data providers). Also, allocating budgets for workshops, and seminars that can provide better data accessibility and knowledge controls for employees within their departments (Abdelrahman et al., 2016).
- **Assimilation** was measured in regards to categorization that emphasized the importance of achieving timely data flows within departments, employee's literacy for acquired data, and departmental employees communication, and technological readiness. All these categories found to be in line with the cited understanding of assimilation proposed by Zahra & George (2002), which refers to the firm's routines, and processes that allow it to interpret and understand the information obtained from external sources. The extracted categories were treated as routines for encouraging understanding the acquired information.
- **Transformation:** resulted in measures that stressed the importance of contemporary information technologies that can play a very important role in the development and growth of a firm's ACAP (Popovič, Puklavec, and Oliveira,

2019). By recognizing the importance of information technologies and treating information technologies as a strategic source that can provide ACAP transformation (Wade and Hulland, 2004), managers are encouraged to identify and invest in technical requirements such as robust and effective data security measures, open architectures, infrastructural technologies and data repositories. Consequently, building and investing modern digital technologies facilitates what so-called 'learning-by-doing' which by itself is considered a transformations attribute that helps in recognizing new data and responding to any type of novel information technologies that support ACAP (Sambamurthy et al. 2003).

- **Exploitation:** the resulted measures reflected the dimension exploitation as an integral output and realized dimensions of ACAP, conflicting with the proposal of Torodova and Durisin (2007) that suggested that both transformational and exfoliation are not required to be substantial aspects of ACAP comparing to assimilation and acquisition dimensions. Acknowledging exploitation when measuring ACAP facilitated in highlighting the potential outcomes resulting from implementing the potential ACAP dimensions mentioned above (Flatten et al., 2011). Exploitation dimensions in line of the current research measures proposed significant constructions such as that quality decision-making initiatives, innovative products and services, and the ability to adopt new technologies are required to be realized sets of outputs attained from employing the previous potential ACAP dimensions.

## **5.0 Limitations and Recommendations for Further Research**

A limitation of this study is the focus of the research on only one country and one sector. Organization in the telecommunication industry in Jordan deal with high volumes of data daily, these sectors are found to face challenges in acquiring and processing data and knowledge from a mass number of daily users to maintain their ACAP current. Thus, we cannot generalize that our extracted measures apply in other industries, or other countries given the fact that certain industries are characterized with certain organizational and domestic cultures that direct their organizational process, and managerial development (Hofstede, 2001). Consequently, future research will be directed towards a different scale of improvements for the ACAP constructs

Future research will also incorporate evaluating the extracted measures in terms of how they can affect specific Business Intelligence Systems and decision-making systems in different managerial levels, seeking an overall organizational efficiency and competitive advantage.

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## Appendix A

### Examples Of Extracted Codes, and Categories

Axial Coding /Theme /ACAP Dimension	Open coding /Category (C)	Abstract Definition/ Description	Sample from Participants answers
Acquisition	(C1) Management support For data exchange	This category was built upon codes from participants that described any managerial initiatives for encouraging data exchange or within the interviewed teams, departments, and individuals. (Flatten et al., 2011).	<i>“Yes, as a telecom company, we have formal managerial policies, procedures for allowing data exchange amongst different departments. “ I feel that It is appreciated when employees in my department procure information from other industries as well” example: we do collaborate with the finance department and marketing for asking for certain data sets needed.</i>
Acquisition	(C3) Well-established relations with data providers	Referencing all codes that ascertained the obtainability of ‘data sets ‘ from different providers, suppliers, or even competitors. Can be either commercial providers or others that can add value to the department’s research and knowledge creation Zahra and George (2002).	<i>“ I am aware that our strategic management established strategies for good relations with data commercial providers such as data providers “x” and international company ‘y’, potential data providers, suppliers for our hardware equipment also sometimes provide us with specific data analytics if required”.</i>
Acquisition	(C4) Research development activates and investments	This category is directly designated an indication for the researcher to relate to the acquisition dimension in absorptive capacity, as most participants who indicated research and development presence for a department who supports this category, research and development initiatives were coded	<i>“Our department has allocated specialized personnel to deal with research and potential research but no formal department”. However, we do have a special R&amp;D department with 6 formal staff “. “Our organizations have publications registered under its name”.</i>

		in this category (McGrath & MacMillan, 2000).	
Acquisition	(C5) Periodical meetings and workshops	This category referenced all codes from participants that indicated that their organization supports any kind of timely meetings either with external experts that can add more acquired knowledge to employees, or could be only periodical meetings between staff and management on regular basis. (Flatten et al., 2011)	<i>“Actually, we do develop <b>annual or semi-annual workshop</b> inviting experts to discuss potential technological issues, we even encourage latest trends in the field of telecommunications by allowing engagement with workshops that allows employees and managers to meet international speakers that can be both academic or professional from the industry”.</i>
Acquisition	(C6) Allocating financial budgets	This category referenced any financial support form management to support any data acquisition activities (Elbashir, Collier and Sutton, 2011).	<i>“As far as I am concerned, We have special <b>annual budgets for specialized telecommunication specific Projects. Supporting financially any potential courses for employees that can lead to skills enchantment and enhancing the learning process”.</b></i>
Acquisition	(C7) Human resource competencies	This category is defined as a combination of any determinate, considerable knowledge, skills or personal elements that were required as enhancers to the employee performance in acquiring knowledge and contribution for organizational success in assimilating potential systems. (Robert et al, 2012)	<i>“A consideration as a department Support financially any potential courses for <b>employees that can lead to skills enhancement and enhancing</b> the learning process.</i>
Assimilation	(C10) Departmental employees communication.	This category is different from the previous category that indicated cross-departmental data	<i>“<b>Informal/formal communication amongst employees is encouraged</b> in our organization to support data exchange</i>

		exchange. The departmental employee's communication was found to be mentioned by most participants engaged in the subsequent data acquirement phase in both companies. (Elbashir, Collier and Sutton, 2011).	<i>following a formal hierarchy of positions and levelling for whom to report to".</i>
Exploitation	(C16) Innovative products and services	This category was extracted with its high relevance to the telecom industry, referencing the number of new products, services they produce with the aid of all provided data acquisition, assimilation, and exploitation categories mentioned above (Flatten et al., 2011).	<i>"However, we launched last year innovative products/services promptly with regard to our outcome of research, process, and analysis. Such as latest mobile devices in the telecom and bids for offered lines." " Our company has a number of patents in regards to its announced products "</i>