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The Impact of Organization's Dynamic Capabilities on Information Systems Project's Success in the Jordanian Telecommunication Sector

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Abstract

Information Systems (IS) ecosystems change rapidly which makes IS projects' success challenging. Project success eventually impacts organizational competitive advantage which is a major concern for telecommunication organizations. dynamic capabilities (DC) are needed for organizations to continually transfer, shift and reallocate their organizational capabilities according to the dynamic changes occur in the surrounding ecosystem.

This paper aims at investigating the impact of organizational dynamic capabilities (DC) on IS project success in telecommunication organizations in Jordan. A survey is used as an instrument of research in order to achieve the research's main objectives. The study is carried out by surveying (233) employees who participated in IS projects. The survey paragraphs are validated and approved by a panel of experts. Consequently, data extracted from the questionnaire is statistically analyzed using the Statistical Package for the Social Sciences (SPSS) and AMOS applications.

The findings reveal that employees in telecommunication organizations recognize and apply the concept of DC (Dynamic Capabilities) at a (High) level. Results also show that rate of IS projects success in telecommunication organizations in Jordan is (High). It also shows that DC along with its four main dimensions, contribute in all three dimensions of IS project, and that project capabilities play a major role mediating the impact of DC on IS project success. The study has several contributions on both academic and practical levels. For example, it links DC for becoming basis for software projects success.

Keywords: dynamic capabilities, project success, information systems, project capabilities, telecommunication organizations

1. Introduction

Information Systems (IS) business has lots of challenges. That's, IS environment is known to be complex, turbulent and it's changing rapidly (Kelley & Nakosteen, 2005; Zahay, Griffin, & Fredericks, 2004). Also IS work is structured in projects (Marinho, Sampaio, Lima, & Moura, 2014). Projects are known to have limited and tightly scheduled resources with predefined cost (Lee, Keil, & Kasi, 2012). Projects also tend to focus on particular customer needs, neglecting the interaction with other business dimensions and the external environment (Vainio, Tuunanen, & Abrahamsson, 2005) that affects one of the main sources of innovation (Mathiassen & Vainio, 2007). Keeping in mind that, innovation is a major dimension of the DC components. Whereas, DC has a promising future for providing sustainable competitive advantage by integrating and reconfiguring multiple changing and comprehensive knowledge resources which are critical for projects to succeed and excel (Vainio et al., 2005).

DC promises has not been empirically verified, especially for IS projects and in telecommunication contexts. Therefore, because the telecommunication industry is very dynamic and highly competitive in Jordan, the research adds value by testing DC application in telecommunication industry, and testing how much DC can really impact a sustainable competitive advantage.

Addressing the role of internal environment (PM) while dealing with the competitive and dynamic external environment (Teece, Rumelt, Dosi, & Winter, 1994) is one of the many significant factors (Zahra, Sapienza, &

Davidsson, 2006) that attracts researchers for studying this field and deepening in its knowledge.

This study applies DC on IS project that are carried out in telecommunication organizations in which, to the best knowledge of the researcher, it was never applied previously.

Previous researches proposed DC's importance as for achieving better performance, higher productivity, better organizational results and sustainable competitive advantages, but they have never applied it practically on IS project success. This study provides practical evidence for the impact of DC on project success, and it also proves that DC achieves better organizational results.

Moreover, this study measures benefits from DC quantitatively; as it is considered a challenge (Ethiraj, Kale, Krishnan, & Singh, 2005; Helfat & Winter, 2011; Zollo & Winter, 2002, Warner & Wager, 2019), due to many reasons such as the abstract nature of DC.

This study also contributes highly to DC knowledge because it studies the impact of DC's sub factors theoretically and practically. Whereas the impact of Shaping, sensing, seizing and knowledge absorbing was never studied solely on IS project success. Finally, the study explores the impact of the mediating role of PC in the DC-project success relationship.

The research is organized as follows: Section 2 examines the related work, then section 3 provides the research model and hypotheses Formulation. Section 4 describes the research methodology. Section 5 and 6 analyse and discuss the results. Section 7 introduces paper's impact, finally section 8 provides conclusion.

2. Related Work

2.1 Dynamic Capabilities

Business is full of very well-known examples of organizations that accumulate valuable technological resources which aim at strengthening their organizational capabilities (OC) such as IBM, Phillips and Microsoft (Teece & Pisano, 1994). Organizational capabilities are referred to as the combined resources, skills and knowledge that the organization owns.

On one hand, the importance of building OC and owing valuable resources is confirmed in the literature. (Keelson, 2014; Newbert, 2007), and on the other hand, it is discussed that sustaining certain organizational capabilities and building such valuable resources are not enough to sustain the competitive advantage and stay strong in business. (Arndt, Pierce, & Teece, 2017; Teece, 2014; Teece & Pisano, 1994)

DC concept is emerging rapidly(Frasquet, Dawson, Calderón, & Fayos, 2018; Teece, 1981, 2014, 2018; Teece et al., 1994). Since the concept first introduced (Teece & Pisano, 1994), the term DC was rooted to reflect some clear concepts such as the need for dynamism to convoy the shifting characteristics of the current environment which is embedded in "Dynamic" term, and "capabilities" term to point out for the need of strategic management to reconfigure the internal environment (Teece & Pisano, 1994). But the term DC left many unclear dimensions for scholars to discover. Literature recorded several trials (e.g. Barreto, 2010; Fallis et al., 2009; Jantunen, Tarkiainen, Chari, & Oghazi, 2018; Teece et al., 1994) to redefine this knowledge area. But the researcher believes that none of these trials really adds noticeable extension to the fundamental definition introduced by Teece et al. (1994) except Teece (2007) himself, Alinaghian (2012) and Yassien (2016). Teece (2007) added two new dimensions to the earlier definition. First definition focused only on competence's reconfiguration dimension, while later definition added two more dimensions which are sensing and seizing, as it is mentioned in Teece (2007) and Teece (2014).

Alinaghian (2012) shares similar DC dimensions of (Teece, 2014) and adds the shaping dimension.

Yassien (2015) gathers all four components in one model and introduced a complete framework. Yassien (2015) definition for DC is the organizational capabilities to absorb knowledge, sense the surrounding opportunities and threats, shape rapidly changing business environments in order to seize opportunities and avoid/ mitigate threats to create and sustain competitive advantages through tangible and intangible resource management

The researchers considers Yassien (2015) definition as the most comprehensive one for this paper. Thus, DC is regarded to consist of four main processes as follows:

- Absorbing Knowledge

Absorbing knowledge was discusses extensively in literature. Operationalize absorbing knowledge is widely studied and clearly defined in literature. (Cohen & Levinthal, 1990; Schweisfurth & Raasch, 2018; van den Bosch, van Wijk, & Volberda, 2003)

Cohen & Levinthal (1990) defines absorbing knowledge as the ability to recognize the value of new information,

adapt and apply it.

Zahra & George (2002) propose a more comprehensive concept of absorbing knowledge involving: Acquisition, Assimilation, Transformation/internalization and Exploitation/application. For this paper purpose, Absorbing Knowledge is defined as the ability to identify external knowledge, assimilate it with the internal knowledge, transform/internalize and apply/exploit external knowledge. (Cohen & Levinthal, 1990)

Keep in mind that learning is embedded in the absorbing process, where transformation/ internalization includes combining the acquired knowledge with the existing knowledge to come up with new knowledge.

Thus, within this step, innovation happens (Cohen & Levinthal, 1990; van den Bosch et al., 2003; Zahra, S. A., Larraneta, 2015) Transformation and reconfiguration, which were earlier mentioned by Teece (2014), Alinaghian (2012) as the ability to perform continuous alignment and realignment of tangible and intangible assets to constantly implement the seized opportunities and implementing opportunities, also happens within the absorbing process. Transforming exactly occurs during in internalization process (Within absorbing knowledge stage) with the use of the absorbed knowledge from sensing, seizing and shaping.

- Sensing

Teece (2014), identifies sensing as gaining knowledge about the external and internal environment and making decisions about the strategic direction, the researcher believes that it is not sensing, but rather gaining knowledge which refers to the first dimension.

Yassien (2015) defines sensing as the faculty/capability by which the organization perceives an external or internal stimulus and translates it to opportunities or to face a threat.

Higher abilities to sensing means higher abilities to perceive and recognize stimulus as opportunities or threats.

- Shaping

This paper agrees with Alinaghian (2012) that shaping follows sensing whereas shaping is the ability to constantly formulate reasonable responses to the sensed opportunities through modifying existing contexts, developing and exploring new contexts for existing businesses.

Shaping to respond to the sensed opportunities and threat is a relative action which depends on organizational strength and weaknesses.

Thus, identifying how to respond to the sensed opportunities can be done using SWOT analysis, which is used to generate business strategies and responses that use strengths and overcome weaknesses to take advantage of opportunities, and avoid threats.

- Seizing

Teece (2014) sees seizing as mobilization of resources to address the needs and the opportunities, and to capture value.

Alinaghian (2012) defines seizing as the ability to constantly priorities and select shaped opportunities or threats to manage, and allocate resources to capture opportunities developed or to avoid/mitigate threats.

While Oxford definition of seize is to take opportunities eagerly and decisively, so this study agrees with Alinaghian (2012) definition for seizing.

2.2 IS Projects Success Measures

Many authors introduced several definitions for IS project success (Barclay, 2008; Radujković & Sjekavica, 2017; Sanchez, Terlizzi, & de Oliveira Cesar de Moraes, 2017; Thomas & Fernández, 2008; Yassien, 2017,Cen & Busch, 2019). And some others used empirical studies (Mitchell, 2006).

Objective view is the most dominant perspective in literature since the 1960s (Ika, 2009; McLeod, Doolin, & MacDonell, 2012), and the most used in practical life (Ika, 2009; Yassien, 2017).

But, project management process success represents an internal and only short term perspective of a project, and not overall project success (Davis, 2014). In order to be accurate in reflecting the real picture of what goes on inside these projects (operational entities), and what their effect might be on the long run). Project success must include both internal and external perspectives, short and long term perspectives as well (Joosten, Basten, & Mellis, 2011).

The mentioned objective definition is widely used due to the ease of its measurement (McLeod et al., 2012), and because it had been said that objective definition measures projects operational efficiency success (Mitchell, 2006; Sanchez et al., 2017; Yassien, 2017). It is also easily used for evaluating project manager's performance.

(Jugdev & Moller, 2006)

On the other hand, it had been criticized by several writers that it is too narrow and limited in scope (Baccarini, 1999; Ika, 2009; Yassien, 2017) to capture the complex, multi-stakeholders and multifaceted nature of IS projects (Nelson, 2005) as it had been described in the previous section.

Moreover, operational success does not always mean strategic success, especially when operational success is not aligned with organizational strategy, it is considered a failure instead.

Accordingly, the importance of different measures were realized (Ika, 2009) and caused a great shift in literature to consider different criteria such as client satisfaction, strategic objective and business success. (Ika, 2009; McLeod et al., 2012; Yassien, 2017)However, most of the authors agree upon considering project management process as one important dimension of the measure, but not sufficient when handled alone. Thus several authors provided more comprehensive definitions for project success. (Baccarini, 1999; Nethathe, Van Waveren, & Chan, 2011).

Westhuizen & Fitzgerald (2005) proposed to append two elements to traditional standpoint of project success: quality of project management process and satisfaction of stakeholders' needs.

(Pankratz & Basten, 2018) enhance the understanding of project success mechanisms and shed light on an area that is often treated as a black box. They identified several ladders for IS project success including Budget, schedule, functional requirements, non-functional requirements, efficiency, customer satisfaction, and system usage.

Pinto & Slevin (1988) ensure the importance of project success over time and introduce an instrument to measure project success. It consists of two main dimensions, project and client, each with several factors.

(Nelson, 2005) argues that project success must be seen through the eyes of different stakeholders and that project success must be seen as process and outcome success. He considers product as part of the process, same as Pinto & Slevin (1988), but add learning to the outcome .

Shenhar, Levy, & Dvir (1997) suggest four success dimensions, namely: project efficiency (same as golden triangle), impact on the customer (same as product), business and direct success, and preparing for the future.

Other authors provided full comprehensive models that include many of the discussed dimensions in literature. For example, El-Masri (2009) introduces IS success model that constitutes of five perspectives: process success, product success, operational dimension , strategic and financial impact, stakeholder satisfaction process-wise and the outcome-wise.

Barclay (2008) also developed Project Performance Scorecard (PPS) frameworks that can help in assessing Information System project outcomes while learning from Information System project management practices.

Howsawi, Eager, Bagia, & Niebecker (2014) proposed a systematic framework with four levels. The four levels are: Project process, Products and deliverables, Business of the project to the stakeholders, Context and externalities.

Although, the El-Masri (2009), Barclay (2008) and Howsawi et al. (2014) models are comprehensive enough to include nearly all of the thought aspects, but unfortunately, they are hard to be measured and unrealistic to use, especially with small projects that take short time to be accomplished. The mentioned assessments may need more time than the project development itself.

Besides, it had been recorded that IS projects assessment mainly varies with different and sometime contradictory stakeholders' perspectives (Barclay, 2008), which may be impossible to reconcile between them.

McLeod et al. (2012) work expanded the concept of project success to include more than the iron-triangle parameters as shown in table 1. Taking in to consideration that in practice not all criteria elements may be applicable for all projects and all the time (Bannerman, 2008; Shenhar et al., 1997).

Table 1. Project success criteria

Project Success	Product Success	Organizational Success
Focus on Project Management	Focus on Project Objectives	Focus on Organizational Objectives:
• On time	• Product Use	• Business Benefits
• Within budget	• Client Satisfaction	• Strategic BEnefits

• To specs	• Client Benefit

Source: (McLeod et al., 2012).

Basten, Joosten, and Mellis (2011) identified three models to evaluate the most influential factors on IS project success: Customer satisfaction, process efficiency and adherent to planning. Their empirical study shows that customer satisfaction is the most influential on the perceived overall success. Efficiency has only a slightly lower importance towards IS project success. Camilleri (2012) also emphasizes that there are four levels for project success start at corporate success, and ends at operational success.

The research in hand is built mainly upon the model of McLeod et al. (2012) in operationalizing project success, and used client satisfaction elements from Basten et al. (2011) work, for the following reasons. First, the models gather both objective and subjective views in a simplified way. Second, the chosen factors can be unambiguously defined in this study. Third, the nature of the independent variables of the current research is strategic (Teece et al., 1994; Zahra et al., 2006). Furthermore the mentioned criteria consider evaluation form several stakeholders' perspectives including top management, which is specifically a very important view to consider when looking at DC. (Ika, 2009; Jugdev & Moller, 2006).

Moreover, it is important to consider time-related elements of criteria when talking about DC. DC is a strategic issue that prepares the organization to build a long lasting competitive advantage, and evaluating such issue cannot be only applied on short term and operational results.

Finally, it is important to add the fact that IS domain (setting of this research) places a great emphasize on subjective issues such as user satisfaction (Jugdev & Moller, 2006).

Main model is adapted from McLeod et al. (2012) paper, but the second part of McLeod et al. (2012) - product success - is vague, broad and not clear enough for operationalization. Also client satisfaction cannot be empirically studied as McLeod et al. (2012) presented. Moreover product use is part of overall client satisfaction (Basten et al., 2011; Thomas & Fernández, 2008). And finally, Basten et al. (2011) provides more comprehensive definition for client satisfaction. Hence, the author chooses to use client satisfaction as the second part instead of Product success. Client satisfaction is to be measured by the three elements identified by Basten et al. (2011): functional requirements, operational quality and usability.

Also, the researcher chooses to replace strategic benefits from McLeod et al. (2012), with knowledge and learning from Jonkers, R. , Rossum R. V. (2015) paper. Strategic benefits have no clear definition in literature, and cannot be measured accordingly. Concluding, the following model is to be used to measure IS projects success as shown in table 2.

Table 2. Used model for project success criteria

Project Success	Client Satisfaction	Organizational Success
On time	Functional Requirements	Business Benefits
Within budget	Operational Quality	Knowledge and Learning
To specs	Usability	

Source : Prepared by the researcher.

2.3 Project Capabilities (PC)

Project Capabilities (PC) concept was first introduced by Davies & Brady (2000), where they suggested that organizational capabilities can be modified to explain how complex product organizations build their project capabilities to expand successfully into business. They introduced the term project capabilities (PC), in which they consider PC a subset of the previously defined organizational (operational) capabilities (Davies & Brady, 2016a). PC is the particular knowledge and experience required dealing with specific customers' needs and requirements, also developing bids or offers, and initiating and implementing projects (Davies & Brady, 2000).

Brady & Davies continued their work (2004) to propose a complete model of how PC can be built. The model consists of two levels of building PC: the project level and the business level. Project level, where exploratory learning initiated, transferred to other projects, and eventually saved into organizational knowledge base for managing projects.

Second Level, the business level, when organization uses (exploit) the knowledge gained from the first level to

create capabilities that influence organizational resources and perform routinized project activities. Davies and Brady, in their final work (2015), clarified theoretically that DC and strategic management control and mobilize PC.

Davis and Brady (2000, 2015) confirmed the importance of research stream in this area to study how DC and PC may work together to benefit high-tech and complex projects, they also found that it may be helpful to provide a lens to improve "our understanding of how firms implement strategies and learn through projects".

Davies & Brady (2015) also suggests that PC is developed to face the changing conditions in dynamic environment as the case in this study. They also contribute by differentiating PC from DC by considering PC as operational and a type of organizational capabilities while DC is strategic, arguing that organizations depend on certain DC to manage PC to achieve better results, which coincide with the definition of both the DC and the organizational capabilities and also with the presented model for this study. It coincides with Söderlund & Tell (2009) that project-based organizations rely on DC to find new opportunities and exploit their potentials.

The researcher agrees with Davies & Brady (2000; 2015) that DC impacts organizational (operational) capabilities to manage projects and also agrees that PC is operational and thus DC impacts the operational PC.

Ghapanchi & Aurum (2012) also support the same concept and performed first of kind study regarding the impact of DC on Open source software projects performance which is similar to the subject of this study. Ghapanchi & Aurum (2012) consider PC part of DC. Their paper results in confirming the positive impact of DC (represented by PC) on Open source software projects gathering data from 607 Open source software projects over time.

Main issue of Ghapanchi & Aurum (2012) study is the confused concept of PC with DC. Ghapanchi & Aurum (2012) consider PC part of DC justifying that Open source software projects development is carried out iteratively in increments. Whereas PC cannot be considered as DC because the defined PC (defect - removal and functionality enhancement) in their study is not strategic, instead, they are operational in definition as the organizational capabilities are defined, where organizational capabilities are about doing things in the right way and achieve high level of performance and efficiency (Easterby-Smith & Prieto, 2008; Schilke, 2014), while DC are about doing the right thing at the right time and about effectiveness, (Barreto, 2010; Helfat & Peteraf, 2009; Teece, 2014). Meanwhile, the defined PC factors: defect removal and functionality enhancement aim for performance and efficiency not effectiveness. That is why the researcher rejects Ghapanchi & Aurum (2012)'s results, though they support the model of this study.

It is true that Davis & Brady (2015) contributes by setting the foundation of the topic, but the topic still blur and unclear and it also needs a lot of research, especially that this topic has a poor number of research that study it, and the theoretical foundation was rarely tested empirically. However, the subject is very important to be tackled as it is shown in section 3.4.

3. Research Model and Hypotheses Formulation

The main purpose of this paper is to investigate the possible impact of DC on IS project success while considering the mediating role of Projects Capabilities (PC) in telecommunication industry.

Figure 1 presents the research's model. The model shows DC as independent variable, while IS project success as dependent variable, whereas PC is considered as the mediator. The proposed model suggests studying the impact of DC on IS project success, considering the mediating role of PC.

Figure 1. Research model

Source: Prepared by the researcher based upon the following studies : **Independent** (Alinaghian, 2012; Augier & Teece, 2009; Barreto, 2010; Teece, 2014; Yassien, 2015) **Dependent Variables**: ((Basten et al., 2011; Jonkers, R. , Rossum R. V., 2015; McLeod et al., 2012) **Mediating Variable**: (Davies & Brady, 2016a).

The direct impact of DC on organizational performance and sustainable competitive advantage regardless of the type of the organization had been discussed by many authors (Eisenhardt & Martin, 2000; Teece et al., 1994; Yassien, 2015; Zahra et al., 2006). Some studies look at the impact of DC as a whole independent factor, others studies looked at the impact of DC sub-factors without referring to DC as a whole independent factor (Expósito-Langa, Molina-Morales, & Tomás-Miquel, 2015; Winkelbach & Walter, 2015). Overall, researches emphasized the positive high impact of DC in dynamic environment such as IS project based organizations, but they ignored studying DC in such environment (Davies & Brady, 2016a).

In Conclusion, the researcher in this paper argues that while IS project success is defined in terms of efficiency and effectiveness, and it is also considered to be part of organizational performance (Henri, 2004), DC positively impacts IS project success, which is represented by first hypothesis. ($H_0 1$)

$H_0 1$: There is no significant impact at level ($P \leq 0.05$) *of Dynamic Capabilities on IS Project Success.*

Some of the previously discussed DC literature shows theoretically that DC does not directly impact organizational performance, instead they act on organizational capabilities to achieve sustainable competitive advantage. (Helfat & Winter, 2011; Yassien, 2015; Zahra et al., 2006)

The researcher suggests that the same concept is applicable to project-based organizations only with different context and conditions, and project-based organizations rely on their PC to manage their work and achieve desired business results (Hobday, 2000; Whitley, 2006), then the author proposes that DC act on PC to achieve IS project success, which represents the second and third hypotheses:

$H_0 2$: There is no significant impact at level ($P \leq .05$) *of Dynamic Capabilities on Project Capabilities.*

$H_0 3$: There is no significant impact at level ($P \leq .05$) *of Project Capabilities on IS Project Success.*

In conclusion, the relation between DC and IS project success is mediated by PC. Thus, the researcher argues that

DC acts on PC to keep sustainable competitive advantage through improving IS project success, which constitutes the fourth hupothesis of the current paper.

H_04: There is no significant impact of Project Capabilities to explain the impact of Dynamic Capabilities on IS Project Success.

4. Research Methodology

This research is applied and carried out for descriptive and explanatory purposes. The quantitative approach is used; thus, a survey is a typical strategy for collecting information from the respondents.

The paper is applied on IS projects in Jordanian telecommunication organizations which consists of three main organizations: Zain, Orange and Umnia.

A questionnaire was designed and developed based on an extensive literature review. The definitions of constructs, variables and references are discussed in Table 3, and all the measures items used for individual constructs are shown in Appendix. The draft questionnaire was tested by scholars and experts, which led to minor modifications in the wording of some survey items. All multiple-item variables were measured on a 5-point Likert-type scale from "strongly disagree" to "strongly agree".

Table 3. The definitions of constructs, variables and references

Construct	Variables	References
Dynamic Capabilities	**Absorbing Capacity**	Daspit & D'Souza (2013)
	Sensing	Ambrosins & Bowman, 2009) (Chang , 2012) Wang & Ahmed, 2007) Hunger & Wheelen, 2011) (Teece, 2014)
	Shaping	Hunger & Wheelen, 2011)
	Seizing	Sadler-Smith, Hampson, Chaston & Badger, 2003)
IS Project Success	Operational	Jonkers et al., 2015
	Customer Satisfaction	Basten et al. , 2011
	Organizational benefit	Camilleri, 2012) Jonkers et al., 2015
PC		(Davies & Brady, 2015)

4.1 Sample and Data Collection

The research is applied on IS projects in Jordanian telecommunication organizations which consists of 3 main organizations: Zain, Orange and Umnia. This research uses probability sample (proportional stratified random sample) to collect data, 260 questionnaires were distributed and Only 233 of them were fully completed by 310 Employees who are working in IS projects in the three Jordanian telecommunication organizations as shown in table (4), thus the recommended number of the distributed questionnaire is 175 (AL-Najjar, F., AL-Najjar, N., & AL Zuabi, 2013)

Table 4. Estimated population

Organization	Population Estimated	Sample Size (AL-Najjar et al., 2013)	Number of questionnaire distributed
Zain	65	56	65
Orange	200	132	150
Umnia	45	40	45
Total	310	228	260

This research uses probability sample (proportional stratified random sample) to collect data. The researcher distributed 260 questionnaires. Only 233 of them were completed fully. Table 5 describes sample size of the current study. Response rate is suitable (91%) (Gorard, 2001, 41)

Table 5. Summary of a sample size

Organization	**Number of questionnaire distributed**	**Number of completed questionnaires returned**	**Number of uncompleted questionnaires returned**	**Number of questionnaire unreturned**
Zain	65	57	3	5
Orange	150	135	3	12
Umnia	45	41	4	0
Total	260	233	10	17

Table 6 shows the demographics of respondents that included genders, age, education level, type of occupation, job position, years of experience and average monthly income.

Table 6. Demographics of respondents

Variable	Type	Percentage
Gender	**Male**	77.7
	Female	22.3
Age	Less than 6 months	46.8
	6 - Less than 12 months	45.9
	40-Less than 50	7.3
Years of work experience	Less than 5 years	11.6
	5 - Less than 10 years	39.5
	10-Less than 15 Years	41.6
	15 years and more	7.3
Education	Bsc	86.3
	Master	12.0
	PhD	1.7

4.2 Research Quality and Standards:

1. Validity

Validity refers to the certainty level in which a result really measures the assumed concept (Sekaran & Bougie, 2013). It can be obtained through arbitration, whereas a number of professionals screen the questionnaire to provide their opinions (AL-Najjar, F., AL-Najjar, N., & AL Zuabi, 2013, 147). The researchers referred to a number arbitrators who arbitrated the questionnaire in earlier stages.

Also, the researcher accomplished a pilot test of (10) respondents to refine the questionnaire, to uncover problems in answering the questions, and to identify clarity and validity of the questionnaire. Consequently, The researcher updated the questionnaire according to their notes, and finally it was translated into Arabic in order to make it clearer to respondents.

2. Reliability

"Reliability is an indicator of a measure's internal consistency." (Zikmond, W., & Babin, 2012, 257). A measure is reliable when the measurement has the same result even when it's repeated.

Cronbacht Coefficient alpha is the most popular test for reliability (Sekaran & Bougie, 2013, 229). The measurement varies between 0 (No consistency) to 1 (Complete consistency). Usually coefficient between 0.80 and 0.95 reflects a very good reliability (Sekaran & Bougie, 2013, 229), which is the case for this study as shown in table 7.

Table 7. Reliability analysis results using the approach of alpha cronbach for the questionnaire dimensions

No.	Dimension	No. of items	Reliability
1	Absorbing Knowledge	**8**	**.857**
2	**Sensing**	**8**	**.865**
3	Shaping	**7**	**.851**
4	**Seizing**	**7**	**.855**
Dynamic Capabilities		**30**	**.850**
5	Operational / Project Management Process Success	**8**	**.888**
6	**Client Satisfaction**	**8**	**.895**
7	**Organizational Success**	**8**	**.872**
IS Project Success		**24**	**.866**
Project Capabilities		**11**	**.873**
9	**Questionnaire**	**65**	**.879**

Table 7 suggests the values of reliability concerning each construct in the questionnaire. The values range is between (0.850) for **DC** and (0.895) for client satisfaction. The overall (questionnaire) reliability value is (0.879). It is noted that the reliability value for the dependent variable is (0.850). All these values are considered to be high and appropriate for the study purposes (AL-Najjar, F., AL-Najjar, N., & AL Zuabi, 2013).

5. Analysis and results

5.1 Testing the First Hypothesis

$H_0$1: There is no significant impact at level ($P \leq 0.05$) for Dynamic Capabilities on IS Project Success.

A stepwise multiple regression test is conducted to investigate the impact of DC dimensions on IS project success. Therefore, DC dimensions are analyzed according to their statistical contribution in explaining the variances of IS project success.

Table (8) presents the stepwise results. Results show the availability of two models. The first model contains the shaping dimension with fair statistical contribution of IS project success explanation with R^2 (0.114). Also the shaping dimension has a fair correlation factor R (0.338). Value of t is (5.461) with a significant value less than .05 (Sig=.000) and Beta value is (0.338).

The second model contains shaping and knowledge absorbing dimensions with fair statistical contribution of IS project success explanation with R^2 (0.131). Also the model has a fair correlation factor R (0.362). Values of t are (2.71) for shaping and (2.102) for knowledge absorbing with significant values less than .05 (Sig. for shaping=.031 & Sig. for knowledge absorbing =037). Finally Beta values are (0.197) for shaping & (0.191) for knowledge absorbing.

Table 8. Stepwise regression test results for $H_0$1

Model	*Predictor*	*Model Summary*		*ANO VA*			*Coefficient*		
		R	*R^2*	*F*	*df*	*Sig.*	*βeta*	*T*	*Sig. t.*
1	Shaping	.338	.114	29.822	1	0.000	.338	5.461	.000
2	Shaping	.362	.131	17.340	2	0.000	.197	2.71	0.031
	Knowledge Absorbing						.191	2.102	0.037

5. 2 Second Main Hypothesis

$H_0$2: There is no significant impact at level ($P \leq .05$) for Dynamic Capabilities on Project Capabilities.

A Simple linear regression test is conducted to investigate $H_0$2 hypothesis. Results of the test are shown in table (9). F value is (49.564) with significant (.000) which means that the null hypothesis is not accepted, and the alternative hypothesis is accepted. This implies that there is a significant impact at level ($P \leq 0.05$) for DC on Project Capabilities. Change of one standardized unit of DC changes project capabilities by 42 % standardized units, as Beta value is (.420) (t =7.040), also R^2 value (.177) implies that DC explains 17.7 % of project capabilities.

Table 9. Simple linear regression test results for $H_0 2$

Independent Variable	*Mediator Variable*	*Model Summary*		*ANO VA*			*Coefficient*		
		R	*R^2*	*F*	*Df*	*Sig. F*	*βeta*	*t*	*Sig. t.*
DC	Project Capabilities	.420	.177	49.564	1	.000	. 420	7.040	.000

5. 3 Third Main Hypothesis

$H_0 3$: There is no significant impact at level $(P \leq .05)$ for Project Capabilities on IS Project Success.

A Simple linear regression test is conducted to investigate $H_0 3$ hypothesis. Results of the test are shown in table (10). F value is (77.440) with significant (.000) which means that the null hypothesis is not accepted, and the alternative hypothesis is accepted. This implies that there is a significant impact at level $(P \leq 0.05)$ for Project Capabilities on IS Project Success. Change of one standardized unit of project capabilities changes IS project success by 42.8 % standardized units, as Beta value is (.428) (t =8.800), also R^2 value (.183) implies that project capabilities explains 18.3 % of IS project success.

Table 10. Simple linear regression test results for $H_0 3$

Mediator Variable	*Dependent Variable*	*Model Summary*		*ANO VA*			*Coefficient*		
		R	*R^2*	*F*	*df*	*Sig. F*	*βeta*	*t*	*Sig. t.*
Project Capabilities	Project Success	.428	.183	77.440	1	.000	.428	8.800	.000

5. 4 Fourth Main Hypothesis

$H_0 4$: There is no significant impact for Project Capabilities to explain the impact of Dynamic Capabilities on IS Project Success.

Direct and Indirect impact was tested using AMOS 22.0. Results are shown in table (11) where Chi^2 value is (7.885) with significant impact at level $(P \leq 0.05)$ (α = ***) for Project Capabilities to explain the impact for dynamic capabilities on IS Project Success, which means that the null hypothesis is not accepted, and the alternative hypothesis is accepted.

Also the table shows several indicators which prove a good model fit; The results show (close to one) values for both indices Goodness of Fit index (GFI=0.958) and Comparative Fit Index (CFI=0.943). Also Root Mean Square Error of Approximation value is (RMSEA = 0.117).

Results show that the direct impact for project capabilities on IS project success is (.428) with (CR=6.949) and (α =***). The direct impact for DC on IS project success is (0.174) with (CR= 2.832) and (α =0.005). The indirect impact for DC on IS project success is (0.18) with α =***. Concluding that PC explains 18% of the impact of DC on IS project success in telecommunication industry.

Table 11. AMOS results for $H_0 4$

Mediator Variable	*Chi^2*	*Probability Level*	*df*	*GFI*	*CFI*	*RMSEA*	*Sig*	*Values of Indirect Standardized Coefficients*		*C.R.*	*Sig*	*Indirect Standardized Coefficient*	*Sig*
Project Capabilities	7.885	.005	1	0.958	0.943	0.117	***	DC → Project Capabilities	0.420	7.055	***	***	***
								Project Capabilities → Project Success	0.428	6.949	***	***	***
								DC → Project Success	0.174	2.832	.005	0.18	***
GFI	Goodness of fit index												
CFI	Comparative Fit Index												
RMSEA	Root Mean Square Error of Approximation												
α = ***	Indicates that α is less than .001												

6. Discussion

A comparison between the current research findings with previous studies is presented below:

$H_0$1: There is no significant impact at level (P≤ 0 . 05) for Dynamic Capabilities on IS Project Success.

First hypothesis according to this research is not accepted and the alternative hypothesis has been accepted with a fair significant impact for DC on IS project success in telecommunication industry in Jordan. This finding goes in line with the proposed foundations of DC in theoretical studies, whereas the direct impact of DC on organizational performance and sustainable competitive advantage had been discussed earlier theoretically by many authors (Augier & Teece, 2009; Eisenhardt & Martin, 2000; Teece et al., 1994; Yassien, 2015), but practically slightly discussed (Chang, 2012; Leonidou, Leonidou, Fotiadis, & Aykol, 2015; Lin, Su, & Higgins, 2016) Moreover, a direct impact for DC on IS project success, upon to the researcher knowledge, has never been discussed neither practically nor theoretically, which considered a major contribution.

This paragraph discusses the four sub-hypotheses related to $H_0$1. The alternative sub-hypothesis of $H_0$1-1 has been confirmed in this research with a fair significant impact of knowledge absorbing on IS project success in telecommunication industry in Jordan. This finding is consistent with the proposed foundations of DC in theoretical studies considering Knowledge Absorbing as part of DC (Augier & Teece, 2009; Davies & Brady, 2016a; Eisenhardt & Martin, 2000; Teece et al., 1994; Yassien, 2015). It's also consistent with the findings of theoretical and practical studies of D'Souza & Kulkarni (2015) and Biedenbach & Müller (2012) that prove using interviews and online survey which Absorb knowledge contributes to performance outcome in general.

Regarding the other three sub hypotheses, upon the best knowledge of the author, there was no research studies found on the impact for sensing, shaping and seizing as main factors on IS project success. But, there were several theoretical studies which ensure their impact as sub-factors of DC on organizational performance, productivity, and competitive advantage.

$H_0$2: There is no significant impact at level (P ≤. 05) for Dynamic Capabilities on Project Capabilities.

$H_0$2, according to this research is not accepted and the alternative hypotheses have been accepted with a fair significant impact for DC on project capabilities in telecommunication industry in Jordan. This finding goes in line with the concept that Davies & Brady proposed theoretically, in their final work (2015), that DC and strategic management control and mobilize PC and that organizations depend on certain DC to manage their PC to achieve better results. The results also coincide with Söderlund & Tell (2009)'s results that project-based organizations rely on DC to find new opportunities and exploit their potentials. Practical studies were not found, so this study provides a major contribution in this regard.

$H_0$3: There is no significant impact at level (P≤. 05) for Project Capabilities on IS Project Success.

$H_0$3, hypothesis according to this research is not accepted and the alternative hypothesis have been accepted with a fair significant impact for project capabilities on IS project success in telecommunication industry in Jordan. This finding goes in line with the concept that running projects efficiently and effectively (Achieving organizational strategy) as pointed by researchers (Andersen, Birchall, Arne Jessen, & Money, 2006; Turner & Zolin, 2012) would lead to higher rates of project success and better organizational impact.

This result also goes in line with the studies of (Davies & Brady, 2000, 2016a) who confirmed the importance of research stream in this area to study how DC and PC may work together to benefit high-tech and complex projects.

$H_0$4: There is no significant impact for Project Capabilities to explain the impact of Dynamic Capabilities on IS Project Success.

$H_0$4, hypothesis according to this research is not accepted and alternative hypothesis have been accepted with a significant impact for project capabilities to explain the impact of DC on IS project success in telecommunication industry in Jordan, which is considered another major contribution for this study.

7. Theoretical and Practical Impact

Bredin (2008) points out that the biggest dilemma of projects implementation occurs when temporariness of projects meets the permanence of the organization, which causes tension between project's autonomy and the desire of management to implement stable and routinized systems to keep the operations under control (Davies & Brady, 2016b). PC tries to solve the well-known aspect of organizational theory differentiation vs. integration tension (Lawrence & Lorsch, 1967). In project implementation, there is a strong need for differentiation because projects are temporary endeavor designed for unique and customer-related tasks (DeFillippi & Arthur, 1998). However, the need for the balance between the two perspectives is important; organizations must keep long term

and strategic perspectives to create long lasting performance and projects must keep highly efficient customer-focused.

Focusing on differentiation limits organization's perception of project implementation to low-level and operational rather than being strategic (Kawamura & Takano, 2014) which does not reflect the whole picture and purpose of project implementation, and skip the main purpose of implementing these projects in the first place, which is mainly to meet the organizational strategy (Melkonian & Picq, 2011).

Integrating the strategic dynamic capabilities with operational project management activities can have a great impact on organizational and project success. Running projects efficiently and effectively (Achieving organizational strategy) as pointed by researchers (Andersen et al., 2006; Turner & Zolin, 2012) would lead to higher rates of project success and better organizational impact.

Moreover, linking DC to project's outcomes enables project based organizations to measure benefits of DC quantitvely (Davies & Brady, 2016a), which is considered a challenge (Helfat & Winter, 2011; Zollo & Winter, 2002).

Although DC was researched in relation with many fields including its original field (Strategic Management) (Barreto, 2010), it was rarely studied in relation with project management knowledge field within IS industry.

This scientific and critical gap motivated the researcher to focus on this particular knowledge area whereas the author seeks to study it through the model presented in the next section.

8. Conclusion

A main problem arises here because of the lack of coordination between strategic activities such as DC and operational activities such as project management activities, due to the well-known dilemma of Organizational Theory: differentiation vs. integration tension. The dilemma appears clearly in this research, as the paper shows a noticeable impact of DC on IS project success with small numbers, which implies that telecommunication organizations lack integration and coordination between DC and project management activities.

Statistical analysis of the data mainly highlights the following conclusions. First DC along with its four main dimensions, contribute to all three dimensions of IS project success (Operational success, client satisfaction and organizational success). Most influencing capabilities of DC are the shaping and knowledge absorbing. Project success is mostly achieved on operational level. Telecommunication organizations lack integration and coordination between DC and project management activities. Project capabilities play a major role mediating the impact of DC on IS project success.

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Appendix A.

Questions	Agreement Level				
	Very Little	Little	Medium	Strong	Very Strong
Dynamic Capabilities: are the organizational capabilities to absorb knowledge, sense the surrounding opportunities and threats, shape rapidly changing business environments in order to seize opportunities and avoid/ mitigate threats to create and sustain competitive advantages through tangible and intangible resource management.					
Absorbing Knowledge (AK): is the organizational ability to identify external knowledge, assimilate it with the internal knowledge, transform/internalize and apply/exploit external knowledge.					
1. Our organization manages special technologies to absorb new knowledge.					
2. Our organization periodically meets with customers to acquire new knowledge.					
3. Our organization is quick to recognize shifts in our market (e.g., competition, regulation, demography).					
4. Our project managers periodically meets to discuss changes					
5. Our organization records and stores newly acquired knowledge for future reference.					
6. Our organization periodically provides employees with trainings to transfer knowledge.					
7. Our employees know how activities within our organization should be performed.					
8. Our organization seeks to exploit new knowledge acquired by the organization to new services.					
9. Sensing: is the faculty/capability by which the organization perceives an external or internal stimulus and translates it to opportunities or to face a threat.					
10. Our organization has the ability to confirm the opportunities or threats in external market.					
11. Our organization has the ability to tackle the changing environment by implementing proper managerial practices in the company					
12. Our organization has the ability to identify market needs, especially when an unexpected emergency occurs in the market					
13. Our organization has the ability to track Soci-etal advances.					
14. Our organization has the ability to identify and recognize the changing industry					
15. Our organization has the ability to track internal advance.					
16. Our organization has the ability to have the vision that identify opportunities					
17. Our organization has the ability to scan and understand the ecosystem changes					
18. Shaping: is the ability to constantly formulate reasonable responses to the sensed opportunities through modifying existing contexts, developing and exploring new contexts for existing businesses.					
19. Our organization has the ability to identify organization strength.					
20. Our organization has the ability to use organization strength.					
21. Our organization has the ability to create new strengths to respond for sensing.					
22. Our organization has the ability to identify organization weakness.					
23. Our organization has the ability to enhance its weaknesses					
24. Our organization has the ability to shape strategies to take advantage of opportunities.					
25. Our organization has the ability to shape strategies to avoid threat.					
26. Seizing: is the ability to constantly priorities and select shaped opportunities or threats to manage, and allocate resources to capture opportunities developed or to avoid/mitigate threats.					
27. Our organization has the ability to prioritize opportunities.					
28. Our organization has the ability to select appropriate opportunities for implementation.					
29. Our organization has the ability to allocate human resources efficiently and effectively to manage opportunities and threats.					
30. Our organization has the ability to allocate technological resources efficiently and effectively to manage opportunities and threats.					
31. Our organization has the ability to allocate physical resources efficiently and effectively to manage opportunities and threats.					
32. Our organization has the ability to allocate financial resources efficiently and effectively to manage opportunities and threats.					
33. Our organization has the ability to allocate reputation resources efficiently and effectively to manage opportunities and threats.					
34. IS Project Success: is the sum of project management process success, client satisfaction and organizational success.					
35. Operational / Project Management Process Success					
36. The project was completed on baseline schedule with no variances					
37. The project was completed on baseline Budget with no variances					
38. The project was completed on baseline requirements with no variances					
39. The project was completed on baseline specification with no variances					
40. The project was completed with updates according to updated schedule					
41. The project was completed with updates according to updated budget					
42. The project's processes were successfully controlled					
43. The project was completed with the same number that was specified at the beginning of project initiation.					

	Questions	Agreement Level				
		Very Little	Little	Medium	Strong	Very Strong
44.	Client Satisfaction					
45.	There is great customer satisfaction regarding the delivered software					
46.	From the customer's perspective, the delivered software matches the essential functionality.					
47.	From the customer's perspective, the service features every essential non-functional quality.					
48.	The customer didn't report on serious problems concerning the service.					
49.	From the customer's perspective, the delivered service works reliably.					
50.	From the customer's perspective, the delivered service is easy to use.					
51.	From the customer's perspective, the service's handling is easy to learn.					
52.	Customer use the service with no problems					
53.	Organizational Success					
54.	The project directly resulted in improved effectiveness for the client organization(s).					
55.	The project directly resulted in improved efficiency for the client organization(s).					
56.	The project directly resulted in improved effectiveness for our organization(s).					
57.	The project directly resulted in improved efficiency for our organization(s).					
58.	The project increased stakeholder knowledge					
59.	The project helped prepare the organization for future challenges					
60.	The project is aligned with organization strategy					
61.	The project's outcome fits its planned impact on business strategy					
62.	IS Project Capabilities (PC): is the particular knowledge and experience required dealing with specific customers' needs and requirements, develop bids or offers, and initiate and implement IS projects.					
63.	Our organization has the needed knowledge to deal with special customer needs.					
64.	Our organization has the needed knowledge to deal with special bids.					
65.	Our organization has the needed ability to gather special customer requirements.					
66.	Our organization has the needed ability to create projects plans .					
67.	Our organization has the needed ability to control and follow up projects plans .					
68.	Our organization has the needed knowledge to deal with special projects that have special requirements.					
69.	Our organization has the needed ability to learn from previous projects.					
70.	Our organization has the ability to transform acquired knowledge from previous projects to routines and procedures					
71.	Our organization has the ability to circulate its human resources between different projects					
72.	Our organization has the ability to circulate its physical resources between different projects					
73.	Our organization has the ability to circulate its financial resources between different projects					

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