



Al - Bayt University

College of Business and Finance

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The Impact of E-leadership On Innovation: Collaboration as a Moderate Variable at Higher Education Sector in North Jordan Universities

تأثير القيادة الالكترونية على الابداع: التعاون كمتغير وسيط في قطاع التعليم العالي في جامعات شمال الاردن

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## التفويض

أنا أنس أحمد الرحيل أفوض جامعة آل البيت بتزويد نسخ من رسالتي ورقياً  
والكترونياً للمكتبات، أو المنظمات، أو الهيئات والمؤسسات المعنية بالأبحاث  
والدراسات العلمية عند طلبها .

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نموذج اقرار والتزام بقوانين جامعة آل البيت وانظمتها وتعليماتها لطلبة الماجستير والدكتوراه.

الرقم الجامعي:

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تخصص:

أعلنُ بأنني قد التزمت بقوانين جامعة آل البيت وانظمتها وتعليماتها وقراراتها السارية المفعول المتعلقة بإعداد رسائل الماجستير والدكتوراه عندما قمت شخصياً بإعداد رسالتي / أطروحتي بعنوان:

The Impact Of E-leadership On Innovation: Collaboration As a Moderat Variable In Higher Education Sector In north Jordan Universities

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وذلك بما ينسجم مع الأمانة العلمية المتعارف عليها في كتابة الرسائل والأطاريح العلمية. كما أنني أعلن بأن رسالتي/ اطروحتي هذه غير منقولة أو مستلة من رسائل أو أطاريح أو كتب أو أبحاث أو أي منشورات علمية تم نشرها أو تخزينها في أي وسيلة اعلامية، وتأسيساً على ما تقدم فأنتي اتحمل المسؤولية بأنواعها كافة فيما لو تبين غير ذلك بما فيه حق مجلس العمداء في جامعة آل البيت بإلغاء قرار منحي الدرجة العلمية التي حصلت عليها وسحب شهادة التخرّج مني بعد صدورها دون أن يكون لي الحق في التظلم أو الاعتراض أو الطعن بأي صورة كانت في القرار الصادر عن مجلس العمداء بهذا الصدد. التوقيع .....

التاريخ:

## Committee Decision

**This Thesis** (The Impact Of E-leadership On Innovation: Collaboration As a Moderate Variable In Higher Education Sector In north Jordan Universities

) was Successfully Defended and Approved on 1/8/2018.

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## الإهداء

إلى من زرع في نفسي حب العلم والتعلم .... أبي العزيز أطال الله في عمره .  
إلى من أرهاقها السهر وتحملت عناء التعب لتراني أتقدم في منابر العلم والدتي العزيزة أطال الله في عمرها .

إلى من كانوا عوناً لي في كل حين اخواني و أخواتي الأعزاء لكم كل الشكر والامتنان  
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خطيبتي

إلى اصدقائي الذيننا لطلما جمعتنا صعاب لتبرز اخوتنا في كل كرب مر احبكم جميعاً  
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الباحث

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# The Impact of E-leadership On Innovation: Collaboration as a Moderate Variable in Higher Education Sector In north Jordan Universities

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## ABSTRACT

This study aimed to identify the effect of electronic leadership on innovation: Collaboration as a moderate variable in the higher education sector in the universities of Northern Jordan. The researcher used descriptive method to clarify the general information and to transfer the non-quantitative information to a measurable quantity. The sample consisted of 300 staff academics from Al-Bayt University, Yarmouk University, the University of Science and Technology, and the questionnaire was divided equally among three universities. The researcher analyzed using Structural Equation Modeling (SEM) software because of the existence of a moderate variable . The result was that there is a direct relationship between the electronic leadership and innovation, and that Collaboration does not play a role as a moderator between the electronic leadership and innovation, where the researcher is proud of the absence of supportive culture or trust or both of them.

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إعداد

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### Arabic of summary

هدفت هذه الدراسة الى معرفة تأثير القيادة الالكترونية على الابتكار: التعاون كمتغير وسيط في قطاع تعليم العالي في جامعات شمال الاردن, حيث قام الباحث باستخدام الاسلوب الوصفي لتوضيح المعلومات العامة وتحويل المعلومات غير الكمية الى كمية قابلة للقياس. وكانت العينة 300 من اعضاء هيئة التدريس في جامعة ال البيت وجامعة اليرموك وجامعة العلوم وتكنولوجيا وكان عدد الاستبانات موزعا بالتساوي على الجامعات الثلاث. وقام الباحث في تحليل باستخدام برمجية نمذجة المعادلات الهيكلية وذلك لوجود متغير وسيط , واعربت النتائج عن وجود علاقة مباشرة ما بين القيادة الكترونية والابتكار, وان التعاون لا يلعب دور كمتغير وسيط بين القيادة الالكترونية و الابتكار حيث يعزو الباحث ذلك لغياب الثقافة الداعمة او الثقة او الاثنان معا.

# The Impact of E-leadership On Innovation: Collaboration as a Moderate Variable in Higher Education Sector in Jordan University

## Chapter one

### 1.1.Introduction

The unexpected changes in the world dimension from the perspective of information and communication technology (ICT) could be seen as a dramatic change. The revolution of ICT in the past decades seen unbelievable (Yuen, Law, & Wong, 2003). These changes seen as encouragement of economic growth in worldwide (Jorgenson & Vu, 2016) and extend market share ( Rao, 2001). furthermore, ICT is the most factor effect products development and communication among organization segments (Oulton, 2012) and other sectors like education and other business (Nakasone, Torero, & Minten, 2014). Advance information technology as source based of any organization give it a competitive advantage over other firms in the same sector (Powell & dent-Micallef, 1997).

The interest in leadership and its development is an essential for any organization (Day, 2000). Recently the phenomena of leadership in terms of theories, practices and research gain the attention from academic and practitioner (Avolio, Walumbwa, & Weber, 2009). Moreover, The number of leadership types as reported by (Goleman, 2000) is six types that have direct and indirect effect on the organization depending on the work climate. Leaders can benefit from the advancement of ICT in many aspect's (Bennis, 2013). The vision of leadership specially leaders affect the use and acceptance of these technologies (Kaushal, 2011). The leader who embrace

the ICT enhance his organizational position among their competitors (Bassellier, Reich, & Benbasat, 2001). Most scholars argue that the main aim for Electronic Leadership not changed towards organizational goals, but the procedure should be done in electronically way (Dasgupta, 2011). In other words, the leader may not meet their follower face to face, out could be made over an electronic medium like a computer (Gibson, 2001).

Electronic leadership or e-Leadership defined as “social influence process mediated by Advanced Information Technology (AIT) to produce a change in attitudes, feelings, thinking, behavior, and/or performance with individuals, groups, and/or organizations”(Avolio, Kahai, & Dodge, 2001,P617). Furthermore, Avolio et al.,( 2001,P617) add that “we chose the term e-leadership to incorporate the new emerging context for examining leadership”. E-Leadership gain attention since the complexity and globalization of organization (Samartinho, Faria, & Silva, 2015). In addition, the e-Leader didn't eliminate the characteristics of traditional leader perception, its takes it on consideration (Samartinho et al., 2015). Leaders to face the changes for the “Technological generation” (i.e. Y generation) which searching quality in everything should adapt the term of eleader's skills and practices (Sahay & Baul, 2014).The definition of Advanced Information Technology (AIT) or information and communication technologies(ICT) as tools that enable the organization to exchange information quickly and rapidly in the collection and transfer of information and access to knowledge(DeSanctis & Poole, 1994).Where they include Advanced Information Technology (AIT) or information and communication technologies (ICT) such as E-mail systems, message boards, group

programs, GSS, knowledge management systems, operational information systems, collaborative CRM and supply chain management systems. These techniques can assist leaders in surveying, planning, deciding, disseminating and controlling information(Avolio et al., 2001)

Leadership styles has huge impact on innovation (Al-Husseini & Elbeltagi, 2016; Erkutlu, 2008). Several researchers agree that we can't know the effect of leadership on innovation, since we have various types of leadership styles (Eisenbeiss, van Knippenberg, & Boerner, 2008; Gumusluoglu & Ilsev, 2009; Rosing, Frese, & Bausch, 2011). In addition to that, ignoring the role of collaboration for enhancing innovation is unacceptable. A number of researchers agree that collaboration is one of the fundamentals of innovation (Antikainen, Mäkipää, & Ahonen, 2010; Faems, Van Looy, & Debackere, 2005; Lee, Olson, & Trimi, 2012; Wang, Rodan, Fruin, & Xu, 2014)

A numerous studies revealed that collaboration depending on the type leadership applied inside the organization and intention to stay (Cowden, Cummings, & Profetto-Mcgrath, 2011). "Collaboration is critical to success" as mentioned by (Rao, 2016, P28). The collaboration relying on many factors like workplace, culture, team awareness and leadership (Shah, 2016). In leadership we have many styles applied and used to motivate the employees (Bass & Steidlmeier, 1999). Some styles of leadership it can enhance the collaboration for instance Authentic leadership increases the efficiency of collaboration, but on the other hand Transformational leadership un effective for amelioration of collaboration (Blake, Leach, Robbins, Pike, & Needleman, 2013).

Innovation defined as "The successful implementation of creative ideas within the organization" (Amabile, Conti, Coon, Lazenby, & Herron, 1996, P1163). Leadership styles has huge impact on innovation (Al-Husseini & Elbeltagi, 2016; Erkutlu, 2008). Several researchers agree that we can't know the effect of leadership on innovation, since we have various types of leadership styles (Eisenbeiss, van Knippenberg, & Boerner, 2008; Gumusluoglu & Ilsev, 2009; Rosing, Frese, & Bausch, 2011). In addition to that, ignoring the role of collaboration for enhancing innovation is unacceptable. A number of researchers agree that collaboration is one of the fundamentals of innovation (Antikainen, Mäkipää, & Ahonen, 2010; Faems, Van Looy, & Debackere, 2005; Lee, Olson, & Trimi, 2012; Wang, Rodan, Fruin, & Xu, 2014).

#### Research problem

Nowadays, leadership plays crucial role in the advancement of innovation, higher education sector faces a scarcity in productivity, adding to that the internal processes applied inside the university not supporting for their innovation. Add to that, technological issues, cultural and workplace atmosphere. Based on the aforementioned snags the researcher proposed the below model using three dimensions leadership, collaboration and technology for testing their effect on process and service innovation in the higher education sector in Jordan. Since no previous studies before examining this constructs in western or non-western country like Jordan. Furthermore, a few studies examine the effect of E-leadership on other variables but not innovation.

## 1.2.Research questions

- What Is the Effect of E-Leadership on Innovation?
- Do Collaboration Moderate the Relationship Between E-Leadership and Innovation?
- What is the level of E-Leadership in Higher Education sector?
- What is the level of Collaboration in Higher Education sector?
- What is the level of Innovation in Higher Education sector?

The Objectives of the study:

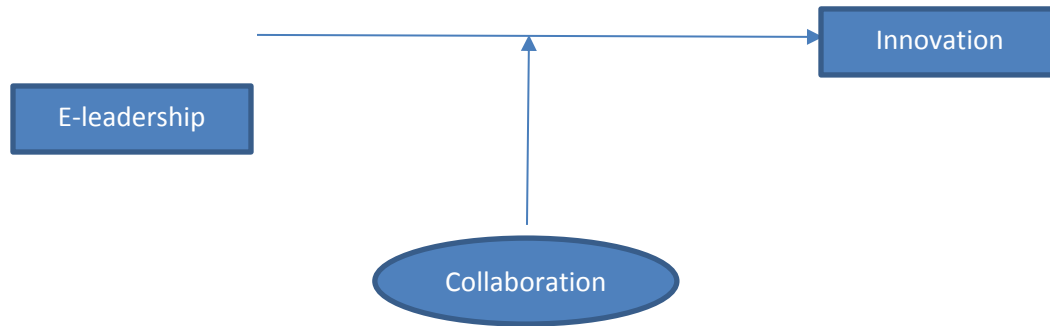
- To investigate the direct effect of E-leadership on process and service innovation.
- To investigate the moderate role of collaboration on the relation between E-Leadership and innovation.

Variables of the study

Independent variables (IV)	Moderate Variables	Dependent variables
E-Leadership	Collaboration	Process Innovation
		Service innovation



## Research model



Source: Adapted from (Avolio et al.,2001;Elrehail et al., 2017)

## Research Hypotheses

H1: E-leadership will Positively influence innovation.

H2: collaboration will positively moderate the relationship between E-leadership and innovation.

## Methodology

In methodology the data collection method was quantitative method, the primary data source from questionnaire using likart-5scal, the secondary data collected from scholars (articles, books, and journals... etc.) which will obtain form databases available to the researcher (Ebsco, Google scholar, ...,etc). The nature of study is using the positivism paradigm which deal in nature with quantitative approach and shall followed by qualitative approach. According to (Saunders et al., 2012) quantitative approach is used to test hypothesis which assert that the theories are true, on the other hand, the qualitative approach is explorative in nature which mean it useful for theories development and extension, in this proposal the researcher will apply the quantitative approach.

### 1.3.Sample of the study

The sample will be investigated randomly from higher education institutes (Universities), the universities in North Jordan,Where the researcher distributed 300 questionnaires on 3 universities in the northern region: Al-Bayt University, Yarmouk University, University of Science and Technology, and distributed equally, then interrupt the data, using SmartPLSprogram. Since the model of the study consist of mediation and moderation effect the using of Structural Equation Modeling (SEM) which has the ability to analysis such complex model.

## Chapter two

### 2.1.Introduction

Leadership has been studied for many years. Focused on the behavioral as well as personality and character traits, the earlier studies stated that a successful leader should be for example self confident, honest, able to integrate, motivated, emotionally mature and have the drive to achieve, Boyett 2006, And because of the increasing needs of organizations for effective leaders, this has been resulted in a shift of perceptions of the leadership methodologies and theories, and this is obvious in the second generation of leadership theories, which focus on what the leader achieve and behaviorally acquired.

Environment containing leadership, a complex and dynamic environment. That forces the leaders to adapt to the surrounding factors, moral issues. Those who succeed are committed to their individual and personal standards, where their personal style enables them to overcome the challenges they face.And the habits of those who are characterized by this type are turning the planting of fear in their followers. (Fulmer, 2004).

Those challenges include, for example, developing a favorable working atmosphere and Setting distinct business policies.

Most leaders in meeting key standards have failed. For not realizing the meaning of real leadership, but with a start-up time the meaning of the concept becomes clear, and the leaders become more aware and aware of it.

## 2.2 Theories of leadership

As observed bei Meuser and colleagues (2016), the number of leadership theories has significantly increased in the last decade, which reflects the maturity of the field. Other researchers on the other hand state that this increase is significant since 2000. For example, 66 separate theories of leadership has been revealed by the qualitative meta-analysis conducted by Dinh and colleagues (2014) showing that the number of leadership theories identified across 10 academic peer-reviewed journals is quite high.

### a) The Great Man Theory:

Thomas Carlyle assumed in 1840 that true leaders were not born, but leaders had the potential to make a change, and to take the appropriate decision if necessary. He was called the great man because they were in that era, because males are the only leaders (Borgatta, Bales, & Couch, 1954).

### b) Trait Theories Trait:

This theory was defended by Gordon Olport, where this theory assumes that the leader has individual abilities that distinguish him from the rest instinctively, and reveals the theory that leaders in general have common characteristics (Pervin, 1994).

### c) Contingency Theories:

This theory assumes a part of the theory of behavior, that there is no better method than the other, to lead organizations. (Fiedler and Chemers, 1967)

d) Situational Theories:

This theory is part of the theory of emergency, assuming that there is no better method of leadership alone, Where it must include four modes: first inform, second marketing, third participle and finally authorization. (Graeff, 1983).

e) Behavioral Theories:

This theory aims to focus on the behavior of the leader, not on the characteristics he possesses. This theory focuses on the behavior that can be developed in the leader to deal with things. (Lewin, Adams and Zener, 1935).

f) Participative Theories:

This theory dictates that team members should be strengthened by enhancing their participation, and appreciating their effort, where the employee feels responsible for decision-making (Wagner, 2008).

g) Relationship Theories:

This theory concern with the connections between leaders and subordinates. This leadership theory was first introduced in 1978 by Burnsand. This theory assumes that the leaders should create the motivation of their subordinates by helping them to understand the importance of their goals. Leaders in this theory must have a high ethical standards and attempt to ensure individual, group and organizational success (Poorasadi & Mohammad, 2015).

### 2.3 E-Leadership:

Electronic leadership defined as “social influence process mediated by Advanced Information Technology (AIT) to produce a change in attitudes, feelings, thinking, behavior, and/or performance with individuals, groups, and/or organizations”(Avolio, Kahai, & Dodge, 2001,P617). Furthermore, Avolio et al., (2001,P617) add that “we chose the term e-leadership to incorporate the new emerging context for examining leadership”. E-Leadership gain attention since the complexity and globalization of organization (Samartinho, Faria, & Silva, 2015). In addition, the e-Leader didn't eliminate the characteristics of traditional leader perception, its takes it on consideration (Samartinho et al., 2015). Leaders to face the changes for the “Technological generation” (i.e. Y generation) which searching quality in everything should adapt the term of e-leader's skills and practices (Sahay & Baul, 2014).The definition of Advanced Information Technology (AIT) or information and communication technologies(ICT) as tools that enable the organization to exchange information quickly and rapidly in the collection and transfer of information and access to knowledge(DeSanctis & Poole, 1994).Where they include Advanced Information Technology (AIT) or information and communication technologies (ICT) such as E-mail systems, message boards, group programs, GSS, knowledge management systems, operational information systems, collaborative CRM and supply chain management systems. These techniques can assist leaders in surveying, planning, deciding, disseminating and controlling information(Avolio et al., 2001).As mentioned by Kissler(2001, P122)“the most important actions for a successful leader to take is to introduce new information—quickly and

efficiently—into the organization”. The main idea of this paper to conceptualize the eLeadership term as a foundation of e-business strategy. Kissler(2001,P121)catogrizе his article on eight diminsion namly; “Organizational Mind Share”, “FuturePrint”, “Organizational Alignment”, “Proximity Management”, “Creative Tension”, “Sense of Urgency”, “Development of People”, “Leading by Values” and finaly “Resistance and Air-Cover”. Furthermore, Kissler, (2001)based on his eight diminiosn he set a summry for succssful leadership atrebutess by mentioning that we can’t say eleadership succses whithout their qualties and attrebutes. Leaders should take in consedration that maybe a spicifc leadership style fit for spicific business type. On the other hand, not sutable for other business, onother words, the eLeadership maybe not the most effective style in e-business strategy. Based on the arguments resulting from reviewing“e-Leadership” paper the auother can conclude these points; 1) the leaders should take in account what the type of business they conduct, 2) applying eLeadership attrebutes is usful for the business that firm established, 3) based on the queick changes happened to technolgy, the leader’s may need training courses for using new technology, Finally, eLeadership when applying it in an effective way it should produce changes on pefromance or attidues inside and outside the orgnization.(Avolio andKahai, 2003) The researchers start their work by asking a question “what is E-Leadership?” and explaining the interaction between two factors, Human factor and Information Technology(IT). According to the authors the connection entire the organization depend on its structure, on other words, how we can make decisions, to whom we should refer. As reported in this paper the authors introduce the characteristics of e-Leadership as a solution that can give

flexibility for working procedures regardless the structure applied and used in any organization. The paper also adds that not only communication between leader and followers take a place over IT, the information receiving and sharing also can be done over IT using chat or establishing the term of virtual teams, also support decision making process. After defining the advantage of e-Leadership Avolio and Kahai started a new stage “why you should care about E-Leadership by introducing “access to information and media has changed” which mean that all employees inside the organization can access information which was in the past exclusive just for the managers, so for that the managers in the era of e-Leadership lost their control on the information which mean the managers should care about employee’s satisfaction. Secondly, the authors stated the “Greater Workforce interconnectedness” which make the connection between the workforce and the managerial level more easily and the response from superintendent come faster as mentioned by the Singapore example. Furthermore, e-Leadership is a supporter argument for globalization and virtual teams, each team member has the opportunity to be a leader and a follower at the same time. Moreover, the authors considered the e-Leadership as an easier way to reach and keep on touch with others. According to the Avolio and Kahai the leaders and managers can’t ignore the connection with followers as everything is documented and stored over email or the communication media supported by information technology. So, for facing the afore mentioned arguments what leader should do? Leaders should take in account that leadership focusing on achieving organization vision and mission to obtain firm goals. Leaders should not forget to balance



the traditional ways of leading with new era of information technology, the changes in technology adopted by any organization to be more responsive and make it as the best solution for communicating with others (i.e. employees, workforce and other partners). Finally, we can conclude from this paper; 1) managers should take care about their followers because the information technology makes them loss their authority. 2) the information technology enhances the communication among managerial level, staff and virtual teams. 3) the adoption of information technology makes the organization more global and extend their market share. 4) technology as source of storing, documenting, acquisition of information and sharing. The article of (Avolio, Kahai, and Dodge, 2001) start with defining e-Leadership as “social influence process mediated by AIT to produce a change in attitudes, feelings, thinking, behavior, and/or performance with individuals, groups, and/or organizations”(Avolio, Kahai, & Dodge, 2001,P617). After that authors start giving points about the relation between advanced information technology (AIT) and e-Leadership. Furthermore, the three authors of this paper define the (AIT) as “Advanced Information Technology includes, but is not restricted to, e-mail systems, message boards, groupware, GSS, knowledge management systems, executive information systems, and collaborative customer relationship management and supply-chain management systems. These technologies can help leaders scan, plan, decide, disseminate, and control information” (Avolio et al., 2001,P616). The authors built their assumption based on Adaptive Structuration Theory (AST) which demonstrated as an influencer of AIT. Furthermore, the author’s used and modified AST as a platform for testing and explaining the phenomena of

e-Leadership. Finally, Avolio and his colleagues extracted some propositions based on the afore mentioned arguments AIT and AST, the first proposition; deals with leadership and the usability of AIT for continuous development and enhancing performance. Second proposition; discuss the relationship between leadership and Group-Support System (GSS), how each term influences the other. The third proposition; which describe the relationship among GSS and leadership, how leadership affected by GSS features. The fourth and final proposition; how dose GSS affect “group process and outcomes”. Based on the above established discussion the researcher can conclude that the status of the relationship between leadership specially e Leadership need more investigation, by testing the relationships mediated by AIT in western and non-western countries and among multiple sectors.

#### 2.4 innovation.

The first parson spoke about innovation was Joseph Schumpeter in (1934) and he mentioned five kinds of innovation: the preface of new product quality or a new goods, the preface of a new output process, finding of a new market, finding of a new Suppliers of raw materials, and make the organizational structure flexible and integrity in an industrial sector. By Schumpeter Can measured innovation by economic gain accomplished through improved products or new products, changes in economic output systems or broaden distribution networks. featured between three types of innovation: basic, radical, or break by innovations that develop industries or inspire whole new industries; systems innovations make important on develop in existing industries; and “nuts and bolts” or incremental innovations, that are little but paramount to make better to find products, services and processes, Marquis

(1969). featured between primary innovations, that build new sections of industry; radical make better innovations, that regenerate existing sections of industry; and pseudo-innovations, that are the large numbers of small improvements and difference of existing products and services, and that are combined in older sections of sectors of enterprise, Mensch (1979). featured between four types of innovation based by their impact by the economy and society, by Freeman and Perez (1988):

1-incremental innovations – innovations that build on existing technologies and that occur more or less continuously.

2-radical innovations-- “discontinuous events unattainable through incremental adjustments of the pre-existing state of affairs” Lundgren (1995).

3-new technological systems – effect by technology used on an industry of the economy that impact upon these industry.

4-new techno-economic paradigms – fundamental technological revolutions that have far-reaching effects on the entire economy and that transform society.

The top level in organization at all want to enhancing their organization performance to increase productivity to achieve this object they necessary encourage employees to motivate them, increase their performance, and encourage innovation and creativity. On the other hand, Organizations are moved to focus on innovation as a key success factor (KSF) and competitive advantage. (OECD1981) define innovation: “Innovation consists of all those scientific, technical, commercial and financial steps necessary for the

successful development and marketing of new or improved manufactured products, the commercial use of new or improved processes or equipment or the introduction of a new approach to a social service. R&D is only one of these steps.”.by West & Farr (1990), innovation defined as an “intentional introduction and application of new products, processes, procedures, or ideas that are designed to significantly benefit the individual, the group, the organization or wider society”. By Amabile(1988)defined innovation as “the successful implementation of creative ideas within the organization”. by Edquist (1997) agree with Schumpeterinnovation defined. by(Amabile, Conti, Coon, Lazenby, & Herron, 1996, P1163)Innovation defined as "The successful implementation of creative ideas within the organization". Damanpour (2009) assume that innovation is serious to helps organizations to respond and adjust to technological and environmental changes, and other author assume that innovation is the Process to find new ideas, processes ,and products , it's have impact on performance( De Jong and Hartog (2007)).by Nusair, Abaneh,and Bae (2012) assume to obtain the aim of organization efficiently you will be innovativeby developing and implementing new methods, procedures, and ideas. Innovation defined as "The successful implementation of creative ideas within the organization" (Amabile, Conti, Coon, Lazenby, & Herron, 1996, P1163). Leadership styles has huge impact on innovation (Al-Husseini & Elbeltagi, 2016; Erkutlu, 2008). Several researchers agree that we can't know the effect of leadership on innovation, since we have various types of leadership styles (Eisenbeiss, van Knippenberg, & Boerner, 2008; Gumusluoglu & Ilsev, 2009; Rosing, Frese,

& Bausch, 2011). In addition to that, ignoring the role of collaboration for enhancing innovation is unacceptable. A number of researchers agree that collaboration is one of the fundamentals of innovation (Antikainen, Mäkipää, & Ahonen, 2010; Faems, Van Looy, & Debackere, 2005; Lee, Olson, & Trimi, 2012; Wang, Rodan, Fruin, & Xu, 2014).

## 2.5 Collaboration

the broad concept of collaboration as “Is the process in which two or more people do something together,” and In particular solving problems together (Dillenbourg, 1999, p. 1). By Roschelle and Teasley collaboration was defined in particular as a joint effort to solve the problem. (as cited in Dillenbourg et al., 1996, p. 2). It was noted that it is difficult to define collaboration even among experts by (Dillenbourg1996). Collaboration defined as a continuous, synchronous and coordinated activity of a group of individuals to solve a problem ( Roschelle and Teasley (1995) (p. 70)). The limits of the problem are defined as the common knowledge structure through which the problem is solved by reaching the goals, describing the exact problem and the awareness of the strategies adopted and understanding the links between them. According to Roschelle and Teasley, Collaboration provides space for people to solve the problem, so a suitable environment should be provided to allow for a good communication between individuals An organization, where individuals must have ways to provide knowledge, and control changes to connect to an optimal solution. Dillenbourg et al. (1996) note that Some automatic partition occurs during collaboration. For that, distinguish between the two is not necessary to be clearly defined A numerous studies revealed that collaboration depending on

the type leadership applied inside the organization and intention to stay (Cowden, Cummings, & Profetto-Mcgrath, 2011). “Collaboration is critical to success” as mentioned by (Rao, 2016, P28). The collaboration relying on many factors like workplace, culture, team awareness and leadership (Shah, 2016). In leadership we have many styles applied and used to motivate the employees (Bass & Steidlmeier, 1999). Some styles of leadership it can enhance the collaboration for instance Authentic leadership increases the efficiency of collaboration, but on the other hand Transformational leadership un effective for amelioration of collaboration (Blake, Leach, Robbins, Pike, & Needleman, 2013). In addition to that, ignoring the role of collaboration for enhancing innovation is unacceptable. A number of researchers agree that collaboration is one of the fundamentals of innovation (Antikainen, Mäkipää, & Ahonen, 2010; Faems, Van Looy, & Debackere, 2005; Lee, Olson, & Trimi, 2012; Wang, Rodan, Fruin, & Xu, 2014).

## 2.6 Previous studies

### 2.6.1 The relationship between e-leadership and innovation.

There is many study spoke about the relationship and impact of leadership or leadership stayle on innovation. In this section we will address some studies that present this relationship.

Elrehail, Emeagwali, Alsaad, & Alzghoul ,(2018) the goal the study of identifying the role of knowledge sharing as an intermediate variable between leadership and innovation . Where the researcher in this study developed a questionnaire self-based on the members of the teaching staff in the universities were selected by the researcher, and Structural equation

modeling (SEM) was used for analysis by using IBM SPSS AMOS. the results obtained from this study showed that leadership is one of the most important factors affect the innovation especially in the higher education institution (i.e. universities).

On another study for Elrehail,(2018) The goal of this study is to illustrate the impact of two types of leadership on innovation, first transformational leadership and second Authentic leadership, where the impact of process innovation and product innovation was illustrated in the higher education sector in Jordan. Where the sample was private universities in Jordan and was used Structural equation modeling (SEM) to analysis data. Where he found that there is a positive effect between transformational leadership on innovation in the higher education institution (i.e. universities), As an Authentic leadership does not support innovation in non-Western countries such as Jordan. The researcher attributes this to the absence of a culture and awareness of the concept of leadership, while on the other hand confers uncertainty among the members of the organization.

(jasimuddin, & naqshandi, 2018)The study aims at linking, leadership with innovation, with the knowledge management as intermediary factor, Where the sample was 172 branches of multinational companies in France, Use structural equation modeling in analyzing relationships, The relationship illustrates that knowledge-oriented leadership has a positive effect on knowledge management, capacity and open innovation. (medcof, 2017) The researcher speaks of the lack of research, which deals with technological leadership, especially at higher levels of management, As the senior

management concerned with the formation of strategies that help a company

in achieving its objectives, in my opinion as a researcher supporting this idea. The study shows the appropriate leadership for each level and the shortcomings in its implementation.

(HUI LIU, YI YANG, MINGMING DU and TINGTING LIU,2017)the study aim to show impact humble leadership on the innovation. The study showed that the humble leadership affects the employee innovation behavior positively. ( Al-Husseini , & Elbeltagi 2016)The purpose of this research is to explore the effect of Transformational leadership on product and process innovation, and its influence in public and private higher education institutions (HEIs) in Iraq. 439 teaching staff and 10 leaders from private and public HEIs were interviewed and questionnaires were used with multi-group structural equation modelling (SEM) with AMOS 20, the research exhibit that Transformational leadership has a key role in increasing product and process innovation.

(Chen, & Tang, & Jin, & Xie, & Li, 2014) In this study, the researcher aims to explain the effect of transformational leadership, chief executive officers (CEOs) on product innovation, Where the sample was 151 people, divided by senior managers, questions about transformational leadership And another part was the questions, about the technology used and company policy. Where the results showed that the role of the mediator for entrepreneurship, it supports the relationship between transformational



leadership, executive managers, product innovation, positive direction, The study added that, there is a technological trend, showing that it supports the variables, prior to the achievement, innovation in the product.

(Ali, & Ibrahim, 2014) this study explores the effect of leadership styles on corporate innovation in telecommunication industry in Somalia. purposive sampling used in this study, 142 top and supervisory level managers from telecommunication industry in Somalia took part in the study. The results demonstrate that Transformational leadership, transactional leadership style and Laizes Faire leadership styles were have statistically significant and positive effect on firm innovation.

( Agbim, 2013) This study aims at highlighting the necessity of informal social relations. In this study, the researcher studied the structure and the type of leadership, and its impact on innovation in the process, Use the questionnaire to collect data and analyze it. They found Where it turns out that the vital system and transformational leadership is specialized in the generation of ideas On the other hand, the study explained that, mechanical structure and transactional leadership, is specialized in applications.

( L Gumusluoğlu, 2009 )the study explored the effect of transformational leadership on organizational innovation, and the role of internal and external support for innovation . Questionnaires were given to 163 R&D employees and managers of 43 small companies in Turkey. The results showed positive effect of transformational leadership on organizational Innovation in small

companies. Furthermore, innovation is significantly Affected by external support .

(Erkutlu , 2008) The goal of this paper is to study the effect of leadership behaviors on both organizational and leader effectiveness at boutique hotels. 60 managers and 662 employees were given Questionnaires. The author find that organizational and leadership effectiveness are significantly affected by leadership behaviors.

( Geijssel, & Slegers, & van den Berg, 1999) The purpose of this study is to measure the impact of the transformational leadership on teachers. Where he studied three dimensions of transformational leadership: stimulating intellectual, visual, individual view. The study found that the three dimensions were responsible for a change in teacher performance.

(Zhang , & Sims, 2005) The study aims to clarify the role of collaboration between leadership and innovation, empowered teams strengthen collaboration with decentralized team decision-making. Thus, the gathering of successful empowered team members represent the collaborative capital. Variable attitudes and behaviors of the team members under transformational leadership and empowered leadership could make innovation easier and could enable the leadership to have maximal influence on it. Farther more the study mentioned that empowerment could work as moderator or partial mediator or both between innovation and transformational leadership.

Previous studies show that there is a strong relationship between leadership and innovation. Studies indicate that there is a positive relationship between leadership styles, Taking into account the existence of trust, and a culture that supports this approach. And in a study of the same theme in 2005 by Zhang , & Sims, Take into account the impact of leadership on innovation with an moderator variable which is collaboration The result was a positive relationship.

### 2.6.2 The relationship between collaboration and innovation.

There is many study spoke about the relationship and impact of collaboration on innovation. In this section we will address some studies that present this relationship.

(Najafi-Tavani et al., 2018)The study illustrates the relationship of innovation with collaboration, and how they affect the product Where a study of 258 industrial companies in Iran, Where the results showed that the relationship is not large, Only in the presence of a culture that accommodates the idea of innovative cooperation.

(Rao (2016) The goal of this paper is to gather efficient teams to attain organizational excellence and effectiveness. The paper outlines a plan to make an effective team which includes, Different personality types enhancing their capabilities and competencies. Result knowing your team personalities and strengths, and how to lead them is the key to make an effective team .

(Jea Yu, & Yoon Rhee, 2015) The study was to give a better understanding of corporate environmental performance. data from 597 Korean firms was collected study showed that firm's environmental performance is positively influenced by firms collaboration, which positively affects its innovation.

Gressgård, (2011) This study aims at how to use information and communication technology in creating collaborative teams to be able to create knowledge within the teams to develop themselves, and how these variables contribute to creating innovation. His methodology in this study was based on previous literature in analyzing the relationship of information technology, communication, cooperation and innovation. The study found a positive relationship between information technology and communication, virtual cooperation teams, and innovation, But culture must be taken into account in the organization and work to create trust among staff .

(Barczak , & Barczak ,& Mulki, 2010) The study aims at detecting influential factors in team innovation and creativity. Such as team confidence, and emotional intelligence. The aim was to study the relationship between variables. The sample included 82 students at a university in the United States, the questionnaire was distributed to them. The study found that emotional intelligence fosters trust, confidence fosters a collaborative culture, and a positive reflection of a positive relationship with creativity.

(Svihla , 2010)The study aims to understand the role of collaborative interaction, and influence the design of innovation, The study concluded that

it is a cooperative interaction that supports the creative design in a positive way.

(Antikainen, & Ma"kipa"a" , & Ahonen, 2010) this paper aimed to investigate collaboration in open innovation (OI) communities. The paper focuses on the following two research problems: how can users be motivated to collaborate in OI communities and what kind of tools and methods can support collaboration in OI communities? The case study involved three innovation intermediaries in three countries: Finland, France, and The Netherlands. The study used open-ended questions sent by e-mail as a first source of data. The second source is the review of internet documents. Results showed motivation of contributing users with financial rewards is not the best option. contributors like community cooperation, exploring new things and to be entertained.

(Faems, & Van Looy, & Debackere, 2005) This article analyzes data from a biannual survey on Belgian firms, which showed that the relation between innovative performance and interorganizational collaboration is a positive one. on the other hand, the type of the partners affect the innovative performance differently.

### 2.6.3 The relationship between leadership and collaboration.

There is many study spoke about the relationship leadership and collaboration. In this section we will address some studies that present this relationship.

(Chirag Shah, 2016) Investigating the aspect of online collaboration to learn how different are leadership modes. The discussion here is about a user study including 84 participants in 42 pairs, working in one of the three conditions across two sessions. These conditions are:

1-awareness of personal progress

2-awareness of both personal and team progress

3-the log and chat data from the sessions where these teams work

Quantitative and qualitative analyses showed the difference through the three conditions in relation to these two leadership styles. It is found that those with the team awareness, with the third condition provided, exhibited the least amounts of leadership. The democracy provided to such teams lead to more diverse searching behaviors and to less needs for communication.

(Kayworth , & Leidner,2015) Studying the trend toward physically dispersed work groups who required fresh needs into the role and nature of virtual team leadership. Thirteen culturally different global teams from Europe, Mexico, and the United States, assigning each team a project leader and a certain task to achieve. The findings indicated that effective team leaders showed the capability to handle, with the contradiction, by doing multiple leadership roles at the same time. Specifically, they have figured out that effective virtual team leaders work in a mentoring way and showed a high level of understanding empathy towards other team members. At the same time, they have their authority without being described as exaggerated or

inflexible, and they are found to be extremely effective at providing regular, detailed, and prompt communication.

(E. Hoch , & . Kozlowski, 2014) This paper aimed primarily at studying the effects of hierarchical leadership and other factors such as structural supports and shared team leadership on team performance. This study has resulted in noticing that structural supports and shared team leadership are more associated with team performance than hierarchical leadership, and that was as predicted based on Bell and Kozlowski's (2002).

(Dr Blake, 2013) Examining the effects of an healthy work environment (for example: leadership, communication, collaboration) on turnover rate of RN from the collected data from a research study. Methods Descriptive, cross-sectional, correlational design. About 415 RNs from 10 pediatric intensive care units (PICU) have completed both the Practice Environment Scale of the revised Nursing Work Index as well as a subscale of the Intensive Care Unit Nurse-Physician Communication Questionnaire. They were asked if they have the intention to leave their current job within the next 6 months. Results There was a statistically significant relationship between leadership and the intention to leave. An inverse relationship was found to be between years of experience and the intention to leave. Effectiveness of leadership in the PICU is important factor to PICU registered nurses and significantly affects their decisions about leaving their current job or not.

( Chutnik , & Grzesik, 2009) The expression, Virtual Team Leader, came in modern times to the surface. It means that the modern companies hire increasingly teams who are geographically separated and culturally differ but

have the access to the same digital network and communicate through modern technological systems and even are located in different time zones and have never met each other face to face. Virtual leadership in intercultural teams requires special skills. Many of these reflect leadership skills in standard teams. In addition to that, a number of challenges appear, among which communication and cultural diversity have an important part. Aim Studying the challenges related to leading a virtual team. Conclusion Cultural diversity requires special communication skills. For example, the leader have to be able to develop and adapt standard team processes, appropriately use the available technology to support their teams, career development and support building networks. The paper presents areas of special interest and indicates competences of a leader in a virtual intercultural team.

(Hambley , & A. O'Neill, & Kline, 2007) This paper has studied the effects of communication media and two of leadership modules. Transformational and transactional modules on team interaction styles and outcomes .Results Giving that transformational and transactional modules have no effect on team interaction or outcome styles; the mean constructive interaction score was significantly higher with face to face communication than videoconference or text chatting, but not significantly higher in videoconference than chat teams; and that teams working in an environment richer with communication media did not accomplish better task performance than those who works in an environment less rich with communication media. Finally, mean scores of team cohesion were found to be higher with face-to-face and videoconference than those with text chatting method, but not significantly higher in face-to-face than videoconference teams.



## Chapter three Methodology

### 3.1. Introduction

This chapter aim to show the research approach, design, procedures and methods, there were used in this research to determine the perceived level of E-leadership, Innovation, Collaborationat Higher Education Sector In north Jordan Universities.

In this chapter researcher describe theresearch participants, research design and variables, researchinstrument, its validity and reliability, theresearch procedures, and statistical analysis.

### 3.2. Research Design:

This study adopted the quantitative approach to test the study hypothesis and answering the study objectives and hypothesis. the data collection method is a quantitative method, the primary data source from questionnaire using likart-5scal, the secondary data collected from scholars (articles, books, and journals... etc.) which was obtained form databases available to the researcher (Ebsco, Google scholar, ...,etc). The nature of study is using the positivism paradigm which deal in nature with quantitative approach and shall followed by qualitative approach. According to Saunders et al., (2012) quantitative approach is used to test hypotheses which assert that the theories are true, on the other hand, the qualitative approach is explorative in nature which mean it useful for theories development and extension, the primary goal of this study is to investigatethe Impact Of E-leadership On Innovation: Collaboration As a

Moderate Variable, and to achieve this objective the descriptive analytical design was used and this design depends on survey and sample to collect data.

### 3.3. Population and sample of the study

Population of this current study consisted of all academic staff working at higher education institute (Universities) and number of them (2272), the universities in North Jordan.

### 3.4. Study sample:

A convenient sample was selected from academic staff from the population, the study of the universities in North Jordan for the goal of the current study, two a appropriate sample is one of the easiest sampling procedures used in the literature. Three hundred (300) questionnaires were distributed to selected sample of which 300 questionnaire were with the response rate of %100.

### 3.5. The study instrument

A questionnaire was developed to collect data from the study participants the questionnaire after reviewing relevant previous literature. The questionnaire consists of two parts the first one was developed to collect demographic data of participants and the second part was developed to collect about the main study variables. Table (3.2) shows these variables.

A questionnaire as the study instrument consisted of the following elements:

1. Demographic data: gender, marital status, age, experience, academic qualifications, academic position, and their university name.
2. Three main domains, and two sub consisted of 31 items namely:

The domains	
E-leadership	
Innovation	
Innovation service	
Innovation process	
collaboration	

Scale of the study:

To elect the participants responses a five point Likert scale was used . we asked the participants to express their level of aggregates by choosing the appropriate level on the scale ranged from (1) strongly disagree to (5) strongly agree.

The Likert Scale Items				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
5	4	3	2	1

### 3.6. Instruments validity:

The questionnaire validity was gotten by 9 academic staff specialized in management from management departments in Jordanian universities.

### 3.7. Reliability and validity:

The aim of this part is to examine the reliability and validity of the measurements employed in this study. Since all variables in this study are operationalized as reflective latent variables, the researcher applied only the evaluation procedures that are related to reflective measures. These procedures include an examination of items reliability, internal consistency reliability, convergent validity, and discriminant validity (Garson, 2016; Hair et al., 2014).

In line with Hair et al. (2014), the researcher estimated items loading, Cronbach's alpha and Composite Reliability which are the most popular test for items and constructs reliability. According to the rule of thumb, items are reliable if they load above 0.7 on their postulated construct (variable). Hair et al. (2014) also suggest that items with a loading of 0.6 and above should be kept in the model if the Average Variance Extracted is above 0.5.

### 3.8. Statistical Analysis:

The research framework in this study is complex as it contains both mediation and moderation variables. Formworks containing moderation and mediation need a powerful analytical tool to handle such complexities. Indeed, traditional or first generation analysis techniques (MANOVA, LOGIT, ANOVA, and Linear Regression) work inefficiently with mediation and

moderation as they can perform only one layer of linkages between variables (Garson, 2016; Hair et al., 2014). Alternatively, the second generation methods including Structural Equation Modeling (SEM) provide a powerful solution to analysis both mediation and moderation. SEM enables researchers to perform multiple layers of linkage between variables and enables high-quality statistical analysis. Accordingly, the researcher decides to use SEM for data analysis purpose instead of first generation methods (Garson, 2016; Hair et al., 2014).

This study employs Partial Least Square SEM (PLS-SEM) approach to SEM in preference of other approaches to SEM. PLS-SEM has several advantages over others. First, PLS-SEM is a good choice when the objective of the study is to explore new relationships (as the case of this study) wherein the theoretical foundation is less pronounced. Second, PLS-SEM is more appropriate when the proposed framework contains a moderating variable and mediation. This study uses SmartPLS 3, which is a software package designed based on a PLS-SEM algorithm, to examine the research hypotheses.

## CHAPTER FOUR Results

### 4.1.Introduction

This chapter is designed to achieve the research objectives and to test the suggested hypotheses presented in Chapter one by performing several tests on the collected data. This chapter is divided into four sections. The first section describes the demographic characteristic of the respondents and it describes their assessment for the research variables. The second section shows the data screening processes to ensure that the data is appropriate for regression analysis. The third section describes the data analysis technique used in this study that is PLS-SEM. Finally, the last section describes the procedures used by researcher to test the proposed hypotheses and summarized the findings of the study.

### 4.2.Descriptive Analysis

This section describes the demographic characteristic of the respondents and their evaluation of the research variables. These pieces of information provide the required information about the research settings and enable readers and researchers to make comparisons with other research in similar contexts (Gefen et al., 2011). The section begins by reporting the demographic characteristic of the respondents, and then followed by descriptive statistics regarding the research variables.

#### 4.2.1.The Demographics Characteristics

The respondents participated in this study are academic staffs from universities located in the north side of Jordan. The respondents were

distributed in three universities. The researcher collected 300 valid responses. The questionnaire was designed to collect data regarding the respondents' demographic characteristics, including their gender, marital status, age, experience, academic qualifications, academic position, and their university name. Table 4.1 shows the descriptive statistics of these characteristics. As indicated in the table, most of the respondents are male accounting for 77.3% of the sample. Responses from female are only 22.7% of the sample. The table also shows that approximately 80.3% of the responses are from married respondents. Responses from singles account for only 18% of the sample. With regard to the age of respondent, the table shows that most responses are distributed in the age between 30 and 59 years old. More precisely, responses from age category 30- 39 and 40-49 years old account for roughly 29% and 32% respectively. Responses from respondents with age category 50-59 account for 19.2% of the sample. With regards to the respondents' experiences, about 37% of the responses are from respondents with 10 or less years of experience. Responses from respondents with experience 30- 39 and 40-49 years are roughly 21% and 20% of the sample respectively. However, the majority of the respondents are Ph.D holders which account for roughly 84% of the respondents. The responses came from several academic ranks. Responses from assistant and associated professors account for 26% and 31% of the sample respectively. Meanwhile, responses from lecturers and professors account for 16% and 25% of the sample respectively. Finally, the respondents are distributed equally on the three universities. However, this descriptive information suggests that most of the respondents had sufficient experience and knowledge to participate in the survey and to offer a reliable data.

However, this descriptive information suggests that most of the respondents had sufficient experience and knowledge to participate in the survey and to offer a reliable data.

Table 4. 1: The demographics information of the respondents

Demographics		Frequency	Percent
Gender	Male	232	77.3
	Female	68	22.7
	Total	300	100.0
Marital status	Single	54	18.0
	Married	241	80.3
	2	3	1.0
	3	2	.7
	Total	300	100.0
Age	<=29	30	10.0
	30-39	88	29.3
	40-49	97	32.3



	50-59	58	19.3
	>=60	27	9.0
	Total	300	100.0
Experience	<=10	111	37.0
	11-15	65	21.7
	16-20	60	20.0
	21-25	31	10.3
	>=26	33	11.0
	Total	300	100.0
Academic Qualification	Master	47	15.7
	Phd	253	84.3
	Total	300	100.0
Academic Position	Assistant professor	78	26.0
	Lecturer	50	16.7
	Associate Professor	95	31.7
	Professor	77	25.7

	Total	300	100.0
University Name	0	100	33.3
	1	101	33.7
	2	99	33.0
	Total	300	100.0

#### 4.2.2. The descriptive statistics of the research variables

This section describes the respondents' assessment of the research variables. This section is designed to evaluate the level of E-leadership, Collaboration, and Innovation according to the respondents' answers. The researcher did so by describing the mean and standard deviation of each variable incorporated in the research framework. The mean is judged as low if mean is  $< 2$ , moderate if mean  $\geq 2$  and  $\leq 3$ , and high if mean  $> 3$ .

As shown in Table 4.2, the overall mean of e-leadership practices is 2.92. Items' means are at range between 2.86 and 3.00. This suggests that the respondents generally assess the E-leadership practices as moderate in their organization. Thus, the researcher can conclude that level of E-leadership in north Jordan universities is moderate.

Table 4.2 : The descriptive statics of E-leadership

No	E-leadership items	Mean	Std. Deviation
1	The leader communicates electronically with team members in a frequent, ongoing manner, and constantly sends feedbacks to us.	3.00	.998
2	When having created a vision, the leader shares the vision to all team members electronically and ensure everyone understand and believe to be achievable.	2.95	.937
3	Through electronical communication, the leader knows our capabilities, and has a great understanding of team members.	2.86	.863
4	The leader electronically perceives and communicates group thinking patterns back to the members, for the best decision to be made.	2.92	.933

5	Individuals are encouraged to take initiative and participate in important decisions electronically.	2.91	.949
6	The leader is competent with and serves as positive role models in the use of communication technologies.	2.90	.934
7	The team is equipped with adequate tools and technologies to perform our tasks.	2.87	.994
8	The electronic methods we use to communicate with one another are effective.	2.92	1.042
	The overall mean	2.92	

Table 4.3 shows the descriptive statistics of Team Collaboration as assessed by the respondents. The table shows that items' means vary between 2.87 and 2.92. And the overall mean is 2.92, indicating that the respondents generally assessed the Team Collaboration practices as high in their organization. Therefore, the researcher concludes that the level of Team Collaboration in north Jordan universities is high.

Table 4. 3: The descriptive statics of Team collaboration

No	Team collaboration items	Mean	Std. Deviation
1	If it's necessary to adjust the team's goal, our team leader makes sure we understand why electronically.(leadership: focus on the goal).	3.42	.920
2	Our team leader creates a safe climate for team members to openly and supportively discuss any issue related to the team's success electronically. (leadership: ensure a collaborative climate).	3.37	.809
3	Our team leader looks for and acknowledges contributions by team members electronically. (leadership: build confidence).	3.35	.881
4	Our team leader understands the technical issues we must face in achieving our goal electronically. (leadership: demonstrate sufficient technical know-how)	3.34	.821
5	Our team leader does not dilute our team's effort with too many priorities electronically. (leadership: set priorities)	3.32	.841

6	Our team leader is willing to confront and resolve issues associated with inadequate performance by team members electronically. (leadership: manage performance)	3.30	.934
	The overall mean	3.35	

Finally, table 4.4 shows the respondent assessment of the dependent variable that is “Innovation”. As shown in the table, the respondents view their universities as being as highly innovative in term of creating new products and processes. This is indicated by the overall mean 3.10. The mean of all items is about 3.00 and above. Accordingly, the researcher concludes that the level of “Innovation” in north jordan universities is high.

*Table 4. 4: The descriptive statics of Innovation*

No	Innovation items	Mean	Std. Deviation
1	Our university constantly emphasizes development and doing research projects.	3.38	2.061
2	Our university often develops new programs/ services for members of staff and students.	3.20	.941

3	Our university often develops new teaching materials and methodologies.	3.13	.905
4	Our university is delivering new courses for members of staff.	3.12	1.001
5	Our university is implementing an incentive system (i.e. higher salaries, bonuses ...etc) to encourage members of staff to come up with innovative ideas.	3.02	.990
6	Our university often develops new technology (internet, databases ...etc) to improve the educational process.	3.08	.915
7	Our university encourages teamwork and good working relationships between staff members.	2.99	.955
8	Our university is developing new training programs for staff members.	3.00	.980
9	This university is implementing a reward system (i.e. promotions, thanks ...etc) to encourage members of staff to come up with innovative ideas.	3.06	.971
10	New multimedia software is used by this university for educational purposes and administrative operations	3.02	.921

11	Our university is trying to bring in new equipment (i.e. computers) to facilitate educational operations and work procedures.	3.09	1.055
	The overall mean	3.10	

Based on the results above, the research can answer several research questions. First, the level of E- leadership is highly moderate in north Jordan universities. Second, the levels of Team Collaboration, and Innovation are high in north Jordan universities. In summary, this section offered important information to get more understanding of the demographic characteristics of the samples. It also provided descriptive statistics for all research variables and its items as assessed by the respondents.

#### 4.3..Data screening

Prior the regression analyses the researcher engaged in data screening processes including the assessment of Missing data, Normality, Multicollinearity, and Outliers. This is to ensure that the regression assumptions are achieved, and the data is appropriate for regression analysis. Fortunately, the data does not suffer from missing data. All responses are completed and thus no further action has been taking with this regard. With regard to the normal distribution of the data, the researcher estimated the degree of data's Skewness and Kurtosis. As shown in table 4.5, the values of Skewness and Kurtosis for each variable are less than the



threshold of absolute value of 2. This suggests that the data is normally distributed (Joseph F Hair et al., 2010).

Table 4. 5: the Skewness , Kurtosis, and VIF of all variables

Variable name	Skewness		Kurtosis		Multicollinearity Statistics	
	Statistic	Std. Error	Statistic	Std. Error	Tolerance	VIF
E-leadership	-.199	.141	-.302	.281	.596	1.679
Team Collaboration	-.840	.141	1.492	.281	.815	1.227
Innovation	.055	.141	1.490	.281		

For Multicollinearity assessment, Variance Inflation Factor (VIF) is a frequently used to inspect Multicollinearity. According to the rule of thumb, a VIF value of 5 and higher indicates a potential problem of Multicollinearity (Joseph F Hair et al., 2010). The results presented in table 4.6 shows that the VIF values vary between 1.22 and 1.67 which are less than the cut-off value of 5. Therefore, the researcher concluded that the proposed model has no Multicollinearity issue.

Finally, the researcher tries to check if there are outlier observations that may bias the regression results. Typically, outliers are examined based on the degree to which a particular observation far-off from the normal distribution of the samples (J.F. Hair et al., 2010). For this purpose, the researcher utilize Z standard scores which have mean value one and standard deviation zero.

According to the rule of thumb, Z score is considered as outlier if it is above the threshold of 4 (J.F. Hair et al., 2010). Having this in mind, none of the observations in the dataset were identified as an outlier as the Z scores are below 4. Therefore, outliers are not an issue for this study.

In summary, this section was designed to examine whether or not the data meet the regression assumptions. Missing data, Normality, Multicollinearity, and Outliers have been examined. Results above confirm that the data can be used in regression analyses safely.

#### 4.4.The Selection of the Analysis Method

The research framework in this study is complex as it contains both mediation and moderation variables. Formworks containing moderation and mediation need a powerful analytical tool to handle such complexities. Indeed, traditional or first generation analysis techniques (MANOVA, LOGIT, ANOVA, and Linear Regression) work inefficiently with mediation and moderation as they can perform only one layer of linkages between variables (Garson, 2016; Hair et al., 2014). Alternatively, the second generation methods including Structural Equation Modeling (SEM) provide a powerful solution to analysis both mediation and moderation. SEM enables researchers to perform multiple layers of linkage between variables and enables high quality statistical analysis. Accordingly, the researcher decides to use SME for data analysis purpose instead of first generation methods (Garson, 2016; Hair et al., 2014).

This study employs Partial Least Square SEM (PLS-SEM) approach to SEM in preference of other approaches to SEM. PLS-SEM has several advantages over others. First, PLS-SEM is a good choice when the objective of the study is to explore new relationships (as the case of this study) wherein the theoretical foundation is less pronounced. Second, PLS-SEM is more appropriate when the proposed framework contains a moderating variable and mediation. This study uses SmartPLS 3, which is a software package designed based on PLS-SEM algorithm, to examine the research hypotheses.

#### 4.5.Data analysis

This section describes the procedures performed by the researcher to examine the suggested hypotheses. As this study utilizes PLS-SEM, the researcher first evaluates the measurement model and then examines the structure model. At measurement model evaluation the researcher examines the reliability and the validity of the measurements. Meanwhile, the researcher tests the relationships between underlying variables and the predictive power of the model at the structure model evaluation. Next sections describe in details all procedures performed to examine the measurement and structure model.

##### 4.5.1.Measurement model evaluation

The aim of this section is to examine the reliability and validity of the measurements employed in this study. Since all variables in this study are operationalized as reflective latent variables, the researcher applied only the evaluation procedures that are related to reflective measures. These

procedures include an examination of items reliability, internal consistency reliability, convergent validity, and discriminant validity (Garson, 2016; Hair et al., 2014).

In line with Hair et al. (2014), the researcher estimated items loading, Cronbach's alpha and Composite Reliability which are the most popular test for items and constructs reliability. According to rule of thumb items are reliable if they load above 0.7 on their postulated construct (variable). Hair et al. (2014) also suggest that items with loading 0.6 and above should be kept in the model if the Average Variance Extracted is above 0.5. The results shown in table 4.7 indicate that the loading of all items is above the threshold value 0.6 except one item which loads 0.46. According to recommendation from Hair et al. (2014) this item should be deleted and thus the researcher removes this item from the model. Accordingly, all items are considered reliable as they meet all convention rules. The researcher also examined the construct reliability by estimating the Cronbach's Alpha and Composite Reliability. According to the rule of thumb, constructs are said to be reliable if Cronbach's Alpha and Composite Reliability are above the threshold value of 0.7. As shown in table 4.6, the values of Cronbach's Alpha and Composite Reliability are above the threshold value of 0.7. Thus, the researcher can safely conclude that all constructs are reliable.

Table 4. 6: Items loadings, Cronbach's Alpha, and Composite Reliability (CR)

Variable name	Item Code	Items loadings				Cronbach's Alpha	Composite Reliability (CR)
E-Leadership	EL1		0.691			0.881	0.906
	EL2		0.749				
	EL3		0.777				
	EL4		0.769				
	EL5		0.706				
	EL6		0.767				
	EL7		0.746				
	EL8		0.698				
Innovation	PrdIno1		0.469			0.9	0.917
	PrdIno2		0.746				

	PrdIno3			0.7 31			
	PrdIno4			0.7 1			
	PrdIno1			0.7 57			
	PrdIno2			0.7 37			
	PrdIno3			0.7 77			
	PrdIno4			0.6 96			
	PrdIno5			0.7 04			
	PrdIno6			0.7 45			
	PrdIno7			0.6 96			
Team Collabora tion	TC1				0.6 6	0.822	0.871
	TC2				0.7 66		
	TC3				0.7 84		

	TC4				0.7 41		
	TC5				0.7 33		
	TC6				0.6 77		

With regard to convergent validity, the researcher estimates the Average Variance Extracted (AVE). Convergent validity verifies the extent to which a latent variable is well measured by its items. Constructs meet convergent validity when AVE is at least 0.5 (Hair et al., 2014). As shown in table 4.7. The AVEs of all variables are above the threshold value 0.5. This suggests that each construct (variable) explains more than half of their own items' variance which demonstrates a sufficient convergent validity.

*Table 4. 7: The Average Variance Extracted (AVE)*

Name of variable	Average Variance Extracted (AVE)
E-leadership	0.546
Innovation	0.505
Team Collaboration	0.53

The researcher also examined for discriminant validity. Discriminant validity examines the extent to which constructs that are not believed to be

related are, in fact, unrelated. The researcher used square root of AVE technique to inspect the discriminant validity (Fornell and Larcker, 1981). In the square root of AVE technique, discriminant validity is achieved when the AVE of an individual construct is greater than the squared multiple correlation of that construct with other constructs. Table 4.8 shows the AVE square root of the all constructs. The values indicate that the square root of the AVE for each latent variable was greater than its correlation with the other latent variables demonstrating a great deal of discriminant validity. Accordingly, the researcher can conclude that all items loaded distinctly on their assumed latent variable signifying a discriminant validity of the measurement model.

*Table 4. 8: the AVE square root of the all latent variables*

Construct Name	E-leadership	Innovation	Team Collaboration
E-leadership	0.739		
Innovation	0.606	0.711	
Team Collaboration	0.408	0.507	0.728

In summary, this section was designed to examine the validity and reliability of the measurement model. The results presented above provide a



robust sign that the measurements in the proposed model meet the conventional criteria of reliability and validity. However, the next section describes the structure model which is designed to test the suggested hypotheses.

#### 4.5.2. The evaluation of structure model (Hypotheses testing)

This section is designed to evaluate the structure model where the hypothesized relationships are specified. Since the hypothesized model contains a moderating variable, the research estimates two models: the main effect model and the interaction model. In the main effect model, the researcher estimates the direct effects between E-leadership and Innovation. In the interaction model, the researcher examines the moderating effect of Team Collaboration on the relationship between E-leadership and Innovation. The researcher did so in line with recommendation from Hair et al (2014). The two models are examined using PLS bootstrapping procedures with 1000 resamples.

In the main effect model the researcher evaluated the direct relationships based on path coefficients, T statistics, and P value as suggested by Hair et al (2014). The results of the main effect model are presented in the table 4.9

and depicted in figure 1. As shown in the table, the relationship between

E-

leadership and innovation is positive and significant (Path Coefficient = 0.606, P value  $\leq 0.00$ ). This suggests that as the E-leadership increases the innovation in higher education institutions will increase too. This provides a strong support for H1. The main effect model explains 36% suggesting that the predictive power for the model is high.

*Table 4. 9: the results of the main effect model*

Effect	Original coefficient	Standard bootstrap results				
		Mean value	Standard error	t-value	p-value (2-sided)	p-value (1-sided)
E-Leadership -> Innovation	0.6065	0.6092	0.0436	13.8984	0.00	0.00

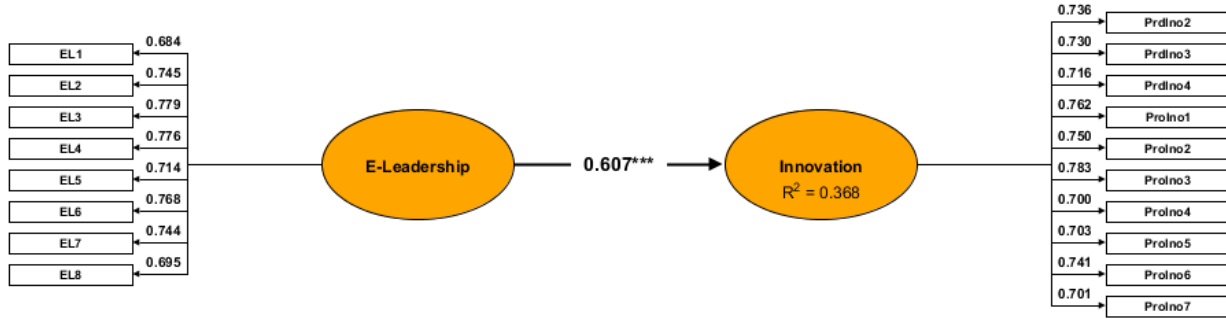


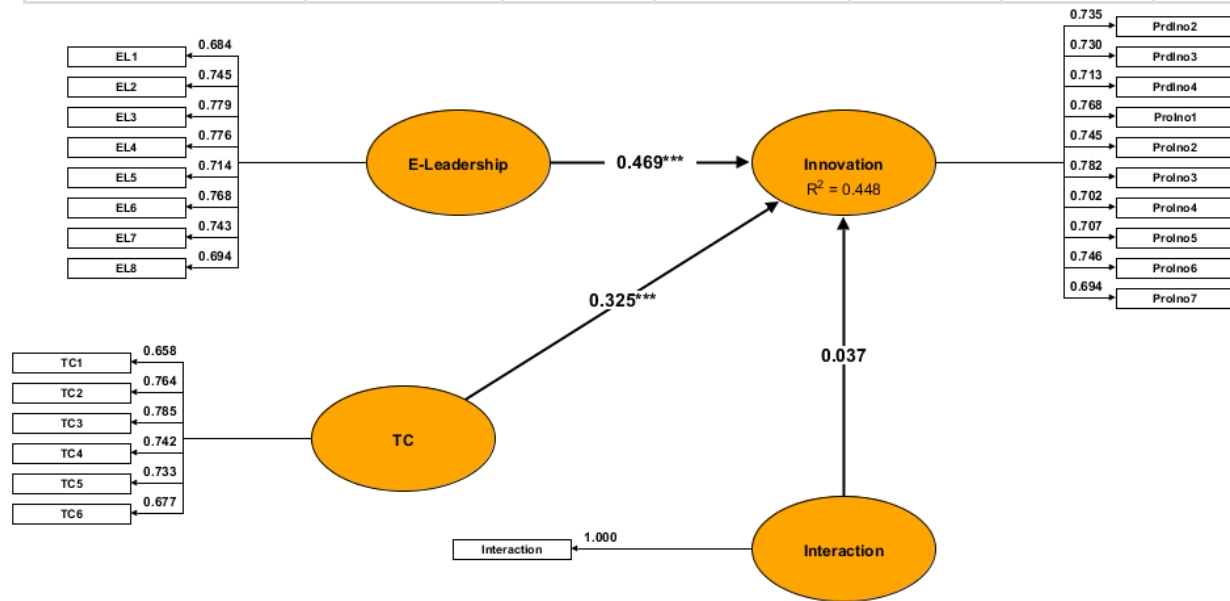
Figure 1: the result of main effect model

Finally, the moderation effect in PLS can be detected by creating an interaction latent variable. However, this study proposed that Team Collaboration has a moderation effect on the relationship between E-leadership and Innovation. To examine the proposed effect, the researcher initiates the interaction model which contains an interaction latent variable. The interaction latent variable is identified as E-leadership × Team Collaboration. This procedure is recommended by Hair et al. (2014). Afterward, the researcher run the PLS algorithm and the bootstrapping procedures with 1000 resample to estimate the standardized path coefficients, t values, and P-values of the interaction latent variable. The result is presented in the Table 4.10 and Figure 4.2. As shown in the table, the path coefficient of the interaction latent variable is neither positive nor

significant (Path Coefficient = 0.036, P value = 0.375) and thus H2 is totally rejected.

Table 4. 10: the results of interaction model

Effect	Original coefficient	Standard bootstrap results				
		Mean value	Standard error	t-value	p-value (2-sided)	p-value (1-sided)
E-Leadership -> Innovation	-	-	-	-	-	-
Team Collaboration -> Innovation	-	-	-	-	-	-
E-leadership × Team Collaboration	0.0367	0.0384	0.0414	0.8871	0.3752	0.1876



## Summary

The main purpose of this chapter was to examine the proposed hypotheses. The researcher followed the conventional procedure to estimate the needed result. The researcher first performed the data screening processes, including, missing data, normality, outliers, and Multicollinearity. This action was in order to confirm the readiness of the data. Afterward, the researcher performed the confirmatory factor analysis to confirm the reliability and validity of the measurement model. The result of the confirmatory factor analysis shows a great deal of reliability and validity of the measurement model. Then, the researcher established two models to examine the proposed hypotheses namely, the main effect model and the interaction model. The first one was designed to test the hypothesis 1. The results show that E-leadership has a direct effect on innovation which provides support for H1. On the other hand, the interaction model was designed to examine the moderating effect of Team Collaboration on the relationship between E-leadership and Innovation. Contrary to expectations, Team collaboration does not play a moderating role and thus H2 is totally rejected.

## Chapter Five Discussion and Review of Findings

### 5.1.Introduction

This chapter designed to discuss the main findings of this thesis, after doing the required analysis in chapter 4. The main aim of this study to investigate the role of electronic leadership and its role in shaping innovation in higher education sector, practically in Jordan. This study sought to answer the main research question how the electronic leadership affect innovation through the mediating role of advance information technology and the moderating role of team collaboration? By collecting data from academic staff in public universities were located in Northern Jordan.

To achieve this study goals a conceptual model was developed from existing literature, reliable and valid questionnaire was used. For analysis purpose, PLS-SEM technique was applied to test the inner and outer model of the study. Based on the results obtained from analysis chapter (i.e. chapter 4) this chapter well discuss the main findings of this study, theoretical and practical implication of the study outcome, limitation and future direction.

This chapter is structured as following; introduction, discussion, theoretical and practical implication and limitation and future direction.

## 5.2 Discussion and the main findings

In this thesis the researcher introduced a conceptualized model of electronic leadership, team collaboration and innovation in higher education institution at Northern Jordan. Further, this study integrates theory and research practices on academic staff of the selected universities to achieve and extract their perception about electronic leadership and innovation with introducing the contingent role of team collaboration.

First, the researcher proposed that electronic leadership will positively influence innovation in higher education context. The dataset shew that electronic leadership increases innovation in the universities. The current results are consistent with prior studies conducted in the Arabian context and near our region in the area of leadership and innovation such as (i.e. Elrehail et al. 2018; Elrehail 2018; Al-Husseini & Elbeltagi 2016), the results obtained from their studies showed that leadership is one of the most important factors affect the innovation especially in the higher education institution (i.e. universities). In addition, this study in line with previous outcome of studies

conducted in western countries in the field of leadership and innovation such

as (i.e. Agbim 2013; Sattayaraksa & Boon-itt 2016; Gumusluoglu & Ilsev 2009; Geijsel et al. 1999), these studies confirm the role of leadership and top management for the sake of improving the innovation inside the universities. The aforementioned findings conclude that when the organizations have a positive supportive level from the leadership of the universities the level of innovation will be high.

Second, the researcher proposed that team collaboration playing a contingent (i.e. moderating) role in the relation between electronic leadership and innovation in higher education context. Contrary to researcher expectation the dataset shews insignificant empirical support to hypothesis number two. The outcome of this hypothesis is inconsistent with prior results obtained from prior researches about team collaboration and innovation such as (i.e. Eisenbeiss, van Knippenberg, & Boerner, 2008; Jarle Gressgård, 2011; Najafi-Tavani et al., 2018; Sacramento, Chang, & West, 2006; Svihla, 2010; Zhang & Sims, 2005). The norms of team collaboration depend on the leadership of the organization as confirmed by earlier studies in the field such



as (Cha et al., 2015; Hill & Bartol, 2016; Kock, 2009). The negative result of this study (i.e. team collaboration) may be attributed to the collaborative culture (Barczak, Lassk, & Mulki, 2010) or trust as one of the important antecedents of team collaboration (Peters & Manz, 2007). We can conclude that our view about team collaboration in this study did not meet the expectation, we recommend more research's to be done to investigate the moderate role of team collaboration especially in Arabian context.

### 5.3 Theoretical and practical implication

A number of theoretical and practical implication reveals from this thesis. For the theoretical part some novel insights raised from this study. First, this study contributes to the existing leadership theory, especially electronic leadership theory literature by investigating the role of E-Leadership in shaping innovation among the academic staff of the higher education institution in Northern Jordan. This study needed as complement for western work life studies since the majority of novel studies came from western countries. In addition, innovation is playing a dominant role in giving the organization a competitive advantage among competitors and advance our knowledge for the state of innovation in the Arabian context. Second, this

study contributes to team collaboration literature, the result of our study need a careful generalization in comparison to the existing literature, since our study shows remarkable results in comparison to the other studies. Third, this study contributes to the role information technology in the organization practically the higher education institution as source of innovation.

For the practical part, the leaders should invest more in the adoption of abreast of the technologies. Moreover, the leaders of universities should take into consideration the role of collaboration in the innovation process inside the organization by establishing a proper work climate alongside with trust norms to emphasize that the universities and the academic staff are the sources of innovation. In addition, establishing a reward system inside the universities also a quite beneficial for innovation. Training and development for the academic staff with the new technology implemented by the university will reflect the importance of information technology in shaping innovation inside the higher education institutions.

#### 5.4 Limitation and future research direction

Several key limitations and recommendation could be highlighted in this study; one, the cross-sectional design of this study limits our findings, to have

more reliable results a longitudinal study over the time will be more reliable and give this study more solid bases. Two, this study observed the perception of electronic leadership among the academic staff only, maybe other staff inside the universities have different perception to their leaders. Three, our examination addresses the electronic leadership as perceived by the academic staff; as such, we are not aware about the actual existence, outcomes and shortcoming of such leadership style.

Four, this study limited to one country and one sector, it will be more beneficial to replicate this study in different sectors and countries (i.e. non-Arabic countries). Five, our study findings are limited to the methodology and data collection as theory-driven empirical approach, this leave the door open for future research opportunities, more qualitative and quantitative studies can be conducted to fill the drawbacks of methods applied in this study and management studies in general.

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## Name of experts and validation

جامعة الهاشمية

جامعة اليرموك

جامعة ال البيت

ا.د. خضير  
الفريحات

ا.د. احمد الشيباب

ا.د. وليد عواودة

د. فايز  
الشرفات

ا.د. جمال ابو دوله

ا.د. بهجت الجوازنة

د.هديل  
المعاينة

ا.د. رائد عباينة

د. هاييل عباينة

Dear participant,

This survey is aimed to test the effect of leadership style and approaches on Innovation in this organization. Your responses are highly valuable and please note that there are no wrong or right answers. The information you provide will be kept strictly confidential. Kindly answer the questions below according to the given scale.

- Note that the questioner consists of 5 parts

Strongly disagree = 1

Disagree = 2

Neither agree or disagree = 3

Agree = 4

Strongly agree = 5

E-Leadership questionnaire has 8 items adapted from (He, 2008)

E-Leadership

No.	Statement	Scale				
		1	2	3	4	5
	E-Leadership					
1	The leader communicates electronically with team members in a frequent, ongoing manner, and constantly sends feedbacks to us.					
2	When having created a vision, the leader shares the vision to all team members electronically and ensure everyone understand and believe to be achievable.					
3	Through electronically communication, the leader knows our capabilities, and has a great understanding of team members.					
4	The leader perceives and communicates group thinking patterns back to the members, for the best decision making to be made.					
5	Individuals are encouraged to take initiative and participate in important decisions making.					
6	The leader is competent with and serves as positive role models in the use of communication technologies.					

7	The team is equipped with adequate tools and technologies to perform our tasks					
8	The electronic methods we use to communicate with one another are effective					

Team collaboration leadership measured with 6 items adopted from (Lafasto & Larson, 2001)

Team collaboration

No.	Statement	Scale				
		1	2	3	4	5
	Team collaboration					
1	If it's necessary to adjust the team's goal, our team leader makes sure we understand why, electronically .(e-leadership: focus on the goal).					
2	Our team leader creates a safe climate for team members to openly and supportively discuss any issue related to the team's success , electronically . ( e-leadership: ensure a collaborative climate).					
3	Our team leader looks for and acknowledges contributions by team members, electronically . (e-leadership: build confidence).					
4	Our team leader understands the technical issues we must face in achieving our goal, electronically .(e-leadership: demonstrate sufficient technical know-how)					



5	Our team leader does not dilute our team's effort with too many priorities, electronically . (e-leadership: set priorities)					
6	Our team leader is willing to confront and resolve issues associated with inadequate performance by team members, electronically . (e-leadership: manage performance)					

Innovation measured via 11 items adopted from (Elrehail, Emeagwali, Alsaad, & Alzghoul, 2018)

#### Innovation

No.	Statement	Scale				
		1	2	3	4	5
	Product innovation.					
1	Our university constantly emphasizes development and doing research projects.					
2	Our university often develops new electronic programs/ services for members of staff and students.					
3	Our university often develops new electronic teaching materials and methodologies.					
4	Our university is delivering online courses for members of staff.					
	Process innovation.					

5	Our university is implementing an incentive system (i.e. higher salaries, bonuses ...etc) to encourage members of staff to come up with innovative ideas.					
6	Our university often develops new technology (internet, databases ...etc) to improve the educational process.					
7	Our university encourages teamwork and good electronic working relationships between staff members.					
8	Our university is developing new online training programs for staff members.					
9	This university is implementing a reward system (i.e. promotions, thanks ...etc) to encourage members of staff to come up with innovative ideas.					
10	New multimedia software is used by this university for educational purposes and administrative operations					
11	Our university is trying to bring in new equipment (i.e. computers) to facilitate educational operations and work procedures.					

Advanced information technology (AIT) has 6 items adopted from (Mitić, Nikolić, Jankov, Vukonjanski, & Terek, 2017)

advanced information technology

No.	Statement	Scale				
		1	2	3	4	5
	advanced information technology					
1	My university has the most advanced information technology					
2	In my university, modern information technologies are used to a great extent					
3	In my university, advanced information technologies significantly improve the quality, efficiency and effectiveness of all performance.					
4	The employees in my university are well trained to work with modern information technologies.					
5	The employees in my university are highly motivated to work with modern information technologies.					
6	In my university, the top management attaches great importance to modern information technologies.					

## Personal Information

Please Tick the appropriate (√)

1 – Gender: a) Male  b) Female

2- Marital Status:

a) Single  c) Divorced

b) Married  d) Widowed

3- Age:

a) Less than 30  c) 40 less than 49  e) above 60

b) 30 less than 39  d) 50 less than 59

4- Experience:

a) Less than 10  c) 16 less than 20  e) above 26

b) 11 less than 15  d) 21 less than 25

5- Academic Qualifications:

a) Master's  b) PhD

6- Academic position:

a) Assistant prof  or c) Associate  professor

b) Lecturer  d) Professor

7- University Name: \_\_\_\_\_

