

The Role of Virtual Teams in Increasing the Number of Innovations and Developing Competitive Advantage - Exploratory Data Analysis Study -

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Abstract: This paper attempts to discover the role that virtual teams play in increasing the number of innovations in the research and development (R&D) department in global companies, and the extent to which this affects achieving a competitive advantage for the organizations under study (SAMSUNG, LG, IBM, and Toyota). The research was based on the method of exploratory analysis of data as the method of the study, and to achieve this goal, the researcher collected data on the number of hypothetical employees assigned to the research and development department in those companies compared to investments and sales and related to the number of innovations during the period between 2009- 2016. The research was based on the method of exploratory data analysis as a method for the study and analysis of the data used. The results of the research concluded that there is a positive direct relationship between the previous variables. Virtual teams are also one of the most important modern methods used in modern business enterprises and their necessity as a result of increasing response and shifting from serial work to simultaneous and parallel work to increase innovation, which leads to an increase in the competitive advantage of these organizations. The study recommends the need to pay attention to building effective virtual teams within organizations because of their essential advantages and to overcome the most important challenges that hinder the effectiveness and success of these teams. By increasing collaboration, interaction and efficiency leadership

Keywords: Virtual Teams (VTs), Innovation, Competitive Advantage, Research and Development (R&D) department.

دور الفرق الافتراضية في تحسين الابتكار وزيادة الميزة التنافسية - دراسة تحليلية -

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المستخلص: يهدف هذا البحث إلى دراسة دور الفرق الافتراضية في تحسين وزيادة عملية الابتكار واكتساب مدخلات قيمة من قسم البحث والتطوير للشركات العالمية قيد الدراسة (سامسونج و LG و IBM و تويوتا). وللإجابة على التساؤل الرئيسي للدراسة، وهو كيف يمكن لفريق البحث والتطوير الافتراضي أن يلعب دورًا بارزًا في تطوير الابتكار بالشكل الذي ينعكس على تحقيق ميزة تنافسية أكبر لتلك المنظمات.

ومن أجل ذلك قامت الباحثة بتجميع البيانات الخاصة بعدد الموظفين الافتراضيين المعينين في قسم البحوث والتطوير في الشركات موضوع الدراسة ومقارنة هذا العدد مع حجم الاستثمارات المنفقة في هذا القسم مع حجم المبيعات المحققة وعدد الابتكارات المسجلة خلال الفترة بين 2009 إلى 2016. كما اعتمد البحث على أسلوب التحليل الاستكشافي للبيانات كمنهج للدراسة وتحليل البيانات المستخدمة.

توصلت نتائج البحث إلى وجود علاقة طردية ايجابية بين المتغيرات السابقة، وأن الفرق الافتراضية داخل الشركات تعتبر من الوسائل الحديثة الضرورية في منظمات الأعمال اليوم بسبب زيادة الاستجابة والتحول من العمل التسلسلي إلى العمل المتزامن والمتوازي لزيادة الابتكار، مما يؤدي إلى زيادة القدرة التنافسية لهذه المنظمات. وتوصي الدراسة بضرورة الاهتمام ببناء الفرق الافتراضية الفعالة داخل المنظمات لما لها من مميزات تنافسية جوهرية تساعد في تحقيق غايات منظمات الأعمال الحديثة مع ضرورة التغلب على التحديات التي تعوق من فعالية ونجاح هذه الفرق من خلال زيادة التعاون والتفاعل والقيادة الفعالة.

الكلمات المفتاحية: الفرق الافتراضية (VTs)، الابتكار، الميزة التنافسية، قسم البحوث والتطوير.

Introduction

Modern organizations are exposed to many competitive pressures and rapid technological development. In response to these challenges and these accelerating pressures, virtual teams emerged as advanced teams that eliminate all temporal and spatial boundaries and take advantage of cultural diversity, skills, experiences and knowledge existing in the world.

Objectives of the study

This study aims to achieve a set of primary objectives, such as:

- 1- Knowing the extent of the impact of the performance of virtual teams on the general performance of organizations and their role in achieving a distinct competitive advantage for the organizations that apply them.
- 2- Communicating the most critical factors that affect the practical construction of virtual teams and the most critical challenges facing these teams.
- 3- Ensure the validity of the measurement used for the study variables.
- 4- Reaching out to a set of results and recommendations that benefit those interested in human resources management about the role of virtual teams in achieving a competitive advantage for organizations.
- 5- Clarify the role that virtual team members play in increasing the number of innovations registered for the organizations in which they work.

The study Problem

Today, Business organizations strive hard to survive and continue in a highly competitive environment. These organizations are trying to explore modern administrative practices and methods that they apply in order to increase their competitive advantage and their continuity in global markets and their growth. From here comes the problem and questions of research that it tries to find an answer to. The research questions are as follows:

Question 1: Are virtual teams considered one of the tools used to achieve a competitive advantage for organizations?

Question 2: Are virtual teams considered a modern administrative practice that cannot be overlooked with technological development and modern means of communication?

Question 3: Does apply this practice within business organizations lead to an increase in innovations?

Question 4: Does cultural difference and multiple skills and knowledge within virtual teams positively affect the increase in innovation?

Question 5: What are the difficulties that face business organizations to rely on virtual teams?

Question 6: How can one address these difficulties and reach the best solutions?

Research Hypotheses

From the previous presentation of the research problem and objectives, the hypotheses can be formulated as follows:

H1: The performance of virtual teams affects achieving a competitive advantage within organizations.

H2: The performance of virtual teams affects the increase in the number of innovations recorded within organizations.

H3: Global organizations rely on virtual teams more than other work teams to increase their competitive advantage.

H4: cultural diversity, multiple experiences, skills, and knowledge within virtual teams have positively impact increasing innovation within organizations.

Research Importance

The importance of research appears in many ways, including:

- 1- This research is characterized by relative newness, as the primary variable, which is the hypothetical difference, is one of the current administrative topics that have not received much attention from scholars and researchers in human resource management.
- 2- The research attempts to develop a conceptual conception of virtual teams' concept and identify its strengths and weaknesses, advantages, challenges, and how to face them.
- 3- The difference in the research method used from the rest of the methods used in many of the research published in this field, which relied heavily on a statistical analysis of survey lists or reliance on interviews. However, this research was based on exploratory data extracted from the financial statements and periodic annual reports of the organizations under study

Literature Reviews

(Horwitz, Bravington and Silvis, 2006). This paper aims to explore the enablers and constraints in developing and operating virtual teams. To assess the importance of factors such as team development, cross-cultural variables, leadership, communication, and social cohesion as contributors to the effectiveness of the virtual team. To this end, 115 employees were selected in virtual teams using an online survey with a response rate of 55 percent. The results were to improve intercultural communication and management communication. Leadership, clarification of goals and roles, and relationship building are most important to hypothetical team performance.

(Drouin, Bourgault & Gervais, 2009). This study aims to identify the structural factors and processes associated with hypothetical teams affected by organizational support systems. This study is based on the methodology of exploratory case studies of two international high-tech companies based in Canada, through face-to-face interviews with managers in the management of the virtual project team.

The study found that the top management of virtual project teams through human resources (HR), resource allocation, coordination, and communication support systems. Support systems help with quality control, share information, and build trust and cohesion among team members.

(Pazos, 2012). The research seeks to know the role of goal-oriented attitudes and behaviors as precedents for conflict management and the subsequent impact of conflict management on team results in virtual teams. The research is based on a quasi-experimental study to examine the relationships between commitment and conflict management and the results achieved in virtual teams. The study was applied to 141 students grouped into 39 teams from four groups within the Engineering Management course.

The research found that conflict management mediates the relationships between goal commitment and team outcomes. Adherence to team goals is an important indicator of conflict management. That the teams participate most actively in preventing and resolving conflicts.

(Ziek and Smulowitz, 2014). The aim of this paper is to examine the emerging leadership competencies most influencing virtual team effectiveness. The study is based on a mixed study where both participant survey and content analysis are used for actual participants' messages to determine the competencies of emerging virtual team leaders. The results of the research reached the preparation of a descriptive model for the best effectiveness of team leadership. Virtual teams are more effective at completing tasks and projects than regular teams.

(Zuofa and Ochieng, 2017). The research seeks to know the most important challenges facing the virtual project team in organizations in Nigeria. The interview method was adopted, where 20 registered answers were interviewed. The results also suggested that challenges in virtual project teams could be linked to the organization, project team, virtual environment, or even a combination of everything. Among the most important challenges facing virtual teams are ineffective communication, lack of confidence and

technological adaptation as the main challenges affecting the virtual project teams in Nigeria. In addition to the lack of coordination across geographical boundaries and time zones, the inability to build trust and effective working relationships among project team members, as well as the deficiencies arising from the technological systems.

(Tan, Ramayah, Teoh and Cheah, 2019). The research aims to explore the factors that affect the performance of the hypothetical team, and the extent of the influence of these factors on its performance within Malaysia. The impact of six factors (coordination, communication, relationship building, cohesion, trust and reward) on team performance was tested. To achieve this purpose, quantitative methodology and the use of the survey checklist as a study tool. 205 questionnaires were collected and relied on structural equation modeling to assess relationships between variables in the hypothetical team. The study found that there is a positive statistically significant relationship between communication, building relationships, cohesion and confidence towards the performance of the team.

After reviewing the previous studies that were written and dealt with the hypothetical difference, it is possible to clarify the gap between the current study and the rest of the other studies. The current research linked the performance of virtual teams with both innovation management and competitive advantage, as there is no previous research linking these three variables to the best of the researcher's knowledge. Most of the previous studies analyzed data through statistical analysis or literature review, but this research used the method of exploratory analysis of data. Finally, the research included four international organizations of different fields, which gives greater comprehensiveness to the results of the research.

Theoretical framework

If organizations do not adapt quickly to competitive and technological changes in the modernistic business environment, they will emerge from the competitive race, regardless of their previous history. Therefore, these organizations must search for new methods that increase opportunities and reduce threats (Duarte & Snyder, 2001). VTs are considered a new organizational practice that can revolutionize the development in the workplace and make organizations more flexible and responsive (Ibrahim, Shams El- Din & Zahari, 2009). VTs achieve many benefits, such as increased job satisfaction and commitment, high levels of knowledge exchange, and improved organizational performance (Pauline, 2003).

Concept of Virtual Teams

Scientists have worked hard in developing a specific definition for the term virtual team (VT), and the most important of these definitions will be listed. Kayworth & Leidner (2002) knows that virtual teams represent a number of coworkers in different geographical locations but are linked organizationally through communication and information technologies that strive to achieve specific organizational tasks.

Ibrahim et al. (2009) defined VTs as small or large temporary workgroups of knowledge and time that are geographically and organizationally distributed and who often coordinate their work using information and electronic communication technologies to accomplish one or more organizational tasks.. Kimble, (2011) finds that virtual teams categorized into different types of groups. Team membership may be relatively stable; Team members may work in a location near or geographically far away, and team members may be selected from the same or several different organizations, and finally, team members may work at the same time or at different times. Hanisch (2001) believes that virtual team members are physically isolated members who interact with each other primarily through communication and electronic communication technologies, and in most cases do not meet face to face over the course of their work. According to (Morley, Cormican & Folan., 2015), virtual teams are functional units within the organizational entity characterized by flexibility in addition to speed and high professionalism in implementing large advanced projects, taking advantage of spatial and temporal diversity.. On the other hand, (Hertel et al., 2005) asserts that VTs are two or more persons who cooperate and work cooperatively in an interactive manner to achieve common organizational goals, depending on electronic means of communication (e- mail, fax, telephone and V- conferencing, etc.).

Dulebohn & Hoch, (2017) explain the concept of virtual teams based on the systems approach, and Figure 1 illustrates this concept.

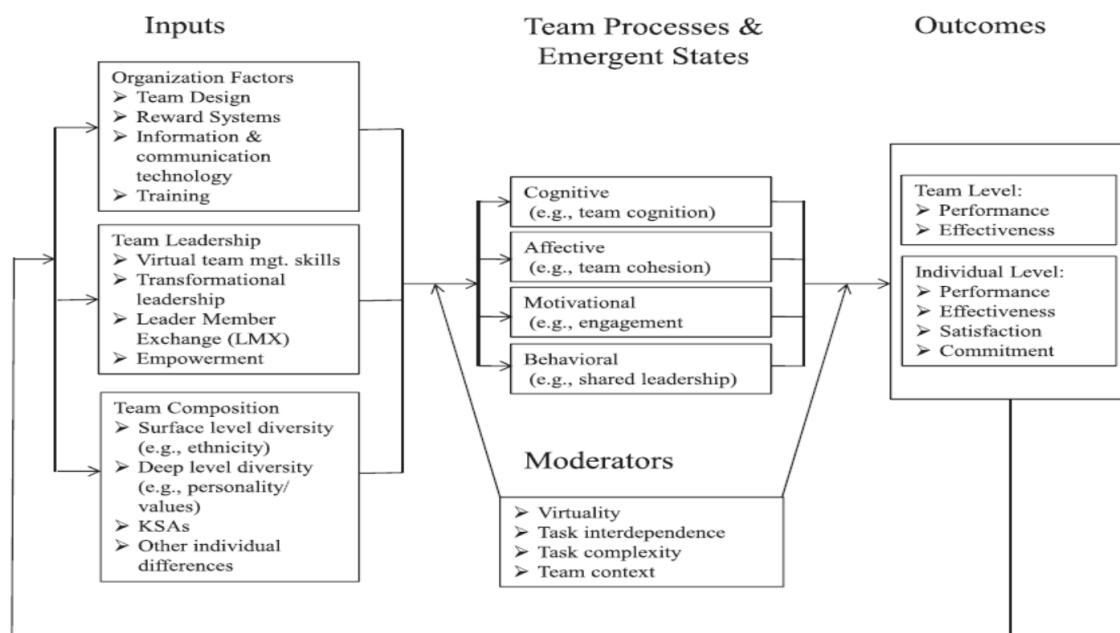


Figure (1) system approach of virtual teams.

Source: Dulebohn & Hoch, 2017

Justifications for the Importance of Virtual Teams

The increasing importance of virtual teams appears in several aspects. In this section, this importance will be illustrated in the following points:

- According to the Culture Wizard (2016) report that 1,372 people, customers, end- users and business companies operate in the field of global commercial activity in 80 countries to know the importance of virtual teams and their role in improving organizational performance, where 41% of the global number of employees are virtual employees who do not meet With each other personally, 48% of respondents confirmed that more than half of their teams are members from other countries, and the report confirmed that these numbers are greater than they were in 2014.

Virtual teams have many strategic advantages (Drouin, 2009)... such as:

- Members of virtual teams are appointed based on experience rather than being forced to hire individuals locally.
- Members of virtual teams work around the clock, as team members are in different time zones and different geographical locations, which increases speed, accuracy, flexibility, and effective response to market requirements.
- Build good relationships with customer can be achieved while reducing travel and transportation expenses. The arena in which companies compete for resources now includes the entire world.
- The strategic structure of the virtual team is characterized by its high flexibility to respond to environmental changes and developments and to implement its activities and tasks such as including design, production and logistics. For example, we find that Siemens, one of the largest manufacturers of electronic systems and devices in Germany, deals with more than 1000 projects around the world- depending on the teams spread all over the world (Lasser and Heiss 2005).
- Organizations operate in dispersed geographical contexts where organizations greatly need to conduct their commercial operations that are not limited to a region in multiple geographic locations spread rather than one place and rely on the diverse experiences distributed in different geographical locations in the world (Cascio, 2000).
- Virtual teams are a contemporary response to the need for fast market access time and low- cost and fast solutions to complex organizational problems.
- Virtual teams allow organizations to pool talent and expertise from employees and non-employees by removing barriers of time and space. Currently, companies are investing heavily in VT to enhance their performance and competitiveness (Ebrahim et al., 2009) g.
- A report from the Economic Information Unit (2009), of 407 people in the initial sample, nearly eight out of ten (78%) have worked in virtual teams or worked in virtual teams in the recent past. Of the 22% are not currently working in virtual teams (Carson et al., 2007).
- Virtual teams help global companies use the best innovative talent and capabilities around the world. The global search for talent must include ideas from other countries and cultures (Davis, 2004).
- Virtual teams develop overall performance in many ways Powell et al., 2004), including:

- Continuous training and development - Develop strategies
- Finding a common language for dialogue and interaction
- Team Building- Team link- Good coordination
- Developing the communication process- Setting goals
- Increase commitment and team commitment.

So from the above, the importance of virtual teams within organizations can be summarized as helping organizations seize opportunities and access a large number of talents around the world, improve product quality, shorten the product life cycle and deliver it to the market faster with 24- hour productivity, reduce costs by reducing travel Mobility, and knowledge sharing across geographic boundaries.

Challenges Facing Global Virtual Teams

Virtual teams face similar challenges to traditional teams, but these teams also face unique problems that are different from traditional teams (Kayworth & Leidner, 2002). Among these challenges are the following:

- Shared understanding among team members is one of the most difficult challenges facing virtual teams (Cristina, 2003).
- Building the identity of the virtual employee and keeping the employee is difficult to achieve and maintain in modern institutions.
- Members of the virtual team need to feel equality with other individuals in the organization and not to discriminate in dealing as a result of their different personalities or their work conditions.
- The feeling of lack of belonging is one of the challenges facing virtual teams, such as low morale and organizational loyalty. (Asian Development Bank).
- Virtual team members are sometimes subjected to oppression, such as difficulty getting a promotion because they have fewer opportunities for face- to- face communication, effective performance evaluation, and direct performance monitoring (Marks and Lockyer, 2005).
- Difficulty with coordination due to cultural differences between members of the virtual team, which creates obstacles to effective communication (Cristina, 2003).
- Leadership challenges within virtual teams, especially in relation to significant team results and performance. Virtual team leaders are exposed to a set of big problems, such as adapting to cultural, geographic, and temporal differences, dividing roles, dealing with work structure (Ziek, 2012; Watanabe, 2017).
- The conflict between team members. Therefore, a common context must be created among the team members by focusing on experiences, focusing on critical processes such as setting goals and clarifying the role. (Bazos, 2012).

Innovation and competitive advantage

Innovation is the magic wand to confront the accelerating competitive potential of organizations; innovation creates continuous new advantages; Many studies and research have emphasized linking innovation with the competitive advantage of organizations. This is not surprising, as innovation is an essential strategic tool characterized by flexibility, the ability to adapt and respond to all ambitious organizations that want to survive in the shadow of fierce competition. Innovation is a type of dynamic ability that contributes to achieving competitive advantage (Dorson, 2018); Innovation is a process and must be managed. The main activities in innovation management are goal formulation, process design and organization, progress monitoring and, if necessary, adjusting objectives and process organization (Boyer & Daring, 2001). (Zawawi, 2016) defines innovation as "that general innovative ability of organizations to introduce new products and services to the market, or open new markets, through the combination of strategic orientation, innovative behaviour and process. Goyal & Pitt, (2007) division innovation into several types, such as Product innovation, process innovation, production innovation, organizational innovation, marketing innovation, service innovation, and management innovation.

Competitive advantage addresses some of the criticisms of comparative advantage (Porter, 1985). Competitive advantage is a company's ability to create a defensive position against its competitors to survive. Competitive advantage is a vital component of the organization that is used to measure and distinguish the company from its competitors. On- time delivery, competitive price/cost, high quality, correct quantity and flexibility are critical measures (Abeysekara, 2019). Christensen (2010) defined competitive advantage as "any value that a business provides that motivates its customers (or end- users) to purchase its products or services rather than its competitors' products or services.

Foss & Knudsen (2003) emphasized that the competitive advantage is the positive differential profits over the opportunity costs kept in equilibrium, as the relevant differences between the industry and within the industry may be. The relationship between virtual team, innovation and competitive advantage Products are done every day. Gaining the appropriate knowledge to keep pace with the rate and intensity of change has become imperative. Virtual teams provide an enabling environment to increase innovation in research and development and lead to the diffusion of knowledge within organizations that connect time and space. Therefore, the decision to create virtual teams in R&D is not a choice but a requirement. Globalization and new waves of global trends in business combined with advances in telecommunications technology have opened a path for the formation and performance of virtual teams. (Ibrahim et al., 2009). Using the best talent regardless of geographical location (Samarah, Paul, & Tadisina, 2007) leads to greater productivity, shorter development times (Mulebeke & Zheng, 2006) and better employee attraction, the most desirable competitive advantage in all organizations.

May & Carter (2001) illustrates a case study of the work of virtual teams in the European automotive industry. He has shown that communication and cooperation between geographically

dispersed engineers at car manufacturing sites and suppliers make them obtain advantages with better quality, lower costs and reduced time to market (between 20% to 50%) For a new product vehicle (Lenders et al., 2003). Also, the use of virtual teams to develop new products is increasing rapidly, and organizations can rely on them to maintain a competitive advantage (Ebrahim et al., 2009).

Research Methodology

Study Methodology

The research depends on the Exploratory Data Analysis (EDA) as the method of the study. EDA is an approach/philosophy to analysing data using a number of techniques (mostly graphical) to increase insight into the data used, uncover the underlying structure of variables, discover outliers, test underlying assumptions and develop proposed models (Abonyi, Németh, Vincze. & Árvá, 2007, P1)

Most EDA technologies are graphical in nature with some quantitative techniques, and the reason for the heavy reliance on graphics is that the main role of EDA is exploration, as graphs increase the ability of analysts to study and analyze results and stimulate data to reveal its structure. Secrets (Abboni, Nemeth, Finches & Irva, 2007, P1)

The choice of exploratory data analysis as a method for the study is due to the suitability of this analysis with the data used in the study, which includes a set of financial data for four international companies, as these data contain (the volume of investments that were spent on the research and development department from 2009 to 2016, the volume of sales achieved during Same years, number of employees assumed in the same department.

The analysis of exploratory data helps in achieving the following points related to the main aim of the research (Komorowski, Marshall, Salciccioli & Crutain, 2016, P186):

- 1- Understand the database structure / create a clear view
- 2- Visualize potential relationships (trend, size and number), which helps in drawing conclusions.
- 3- Detect outliers and anomalies
- 4- Development of a predictive or illustrative model.
- 5- Extract and create clinically relevant variants.

EDA methods can be classified as follows:

Graphic or non- graphic styles

Single variable (only one variable, exposure or result) or multivariate (many)

Exposure variables alone or with the outcome variable) Methods.

Data and sample

The research chooses four international organizations (Samsung, LG, IBM and Toyota) to be the research community in question, and the reason for choosing these organizations is that they are among

the largest companies around the world and a leader in their field, which has proven over the years its high ability to survive and excel. Under the competition. The diversity is also due in the field of each organization as both Samsung and LG are a pioneer in the field of electronics and communications, IBM is a pioneer in the field of software, and Toyota is a pioneer in the field of cars in knowing the extent of the impact of the performance of virtual teams on these organizations. Does this effect differ from one area to another? In order to analyze the data, the financial data included in the periodic financial reports of each company during the period from 2009 to 2016 were relied on, specifically data on innovations, the default number of employees, and the volume of investments.

(Note that the letter N is used to represent the number, VE stands for virtual employees, and V is the acronym for volume.

Samsung's data analysis

The following data in Figure (2) highlight the relationship between the N of virtual employees in Samsung. We can see that the N of virtual employees in 2009 is 44533, in 2016 it becomes 6453 employees.

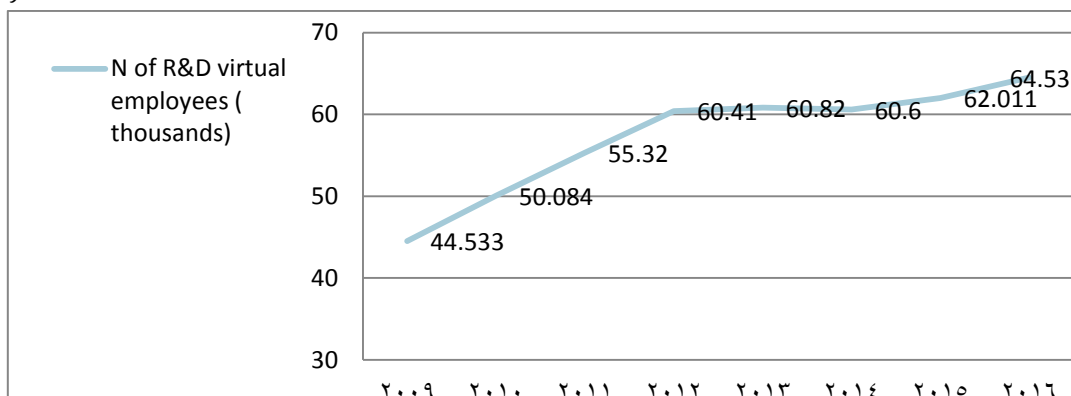


Figure (2) The N of VE within Samsung's R&D department

Source: annual report of Samsung during 2009- 2016

The indicates the expansion in the employment of Samsung in relying more on virtual employees, and this is confirmed by Figure (3), where we find that the percentage of employment of virtual employees Within the R&D department is more than the traditional employees in the same department where employees in 2016 increased from 53% to 58% that the amount of investment, and the sales volume.

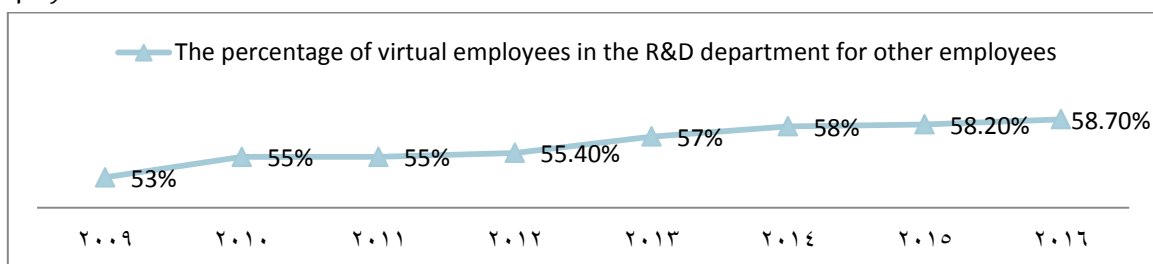


Figure (3) The percentage of the N of VE within the R&D

Source: annual report of Samsung during 2009- 2016

When following up on the sales volume of Samsung and the volume of investments spent in the research and development department, it was found that there is a direct relationship between them, as the more investment in the research and development department increased the sales volume, and Figure (4) illustrates this relationship, as shown in Figure (5) The ratio of investment in research and development to sales volume in Samsung.

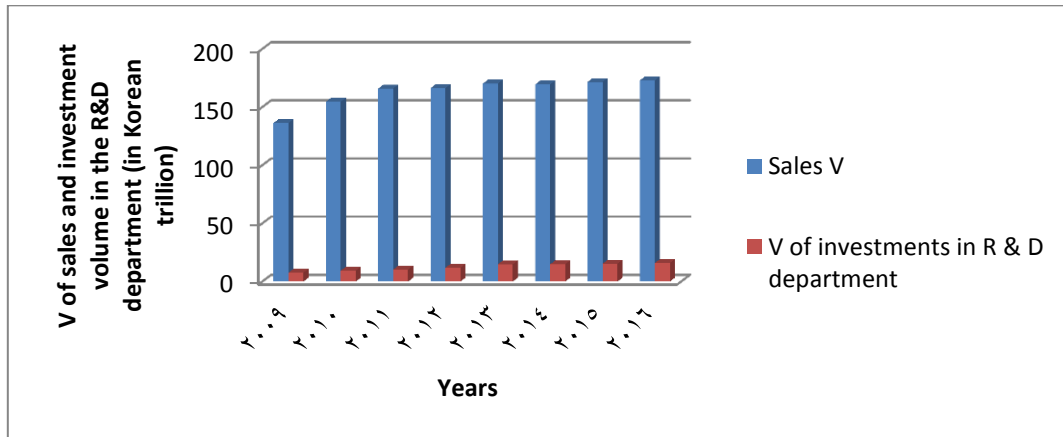


Figure (4) The V of sales in Samsung and investment at the R&D

Source: annual report of Samsung during 2009- 2016

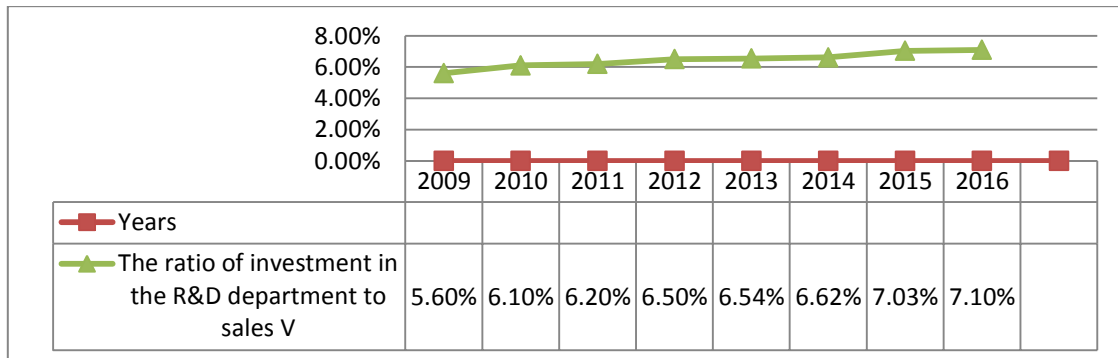


Figure (5) The ratio of investment to sales Volume

Source: annual report of Samsung during 2009- 2016

Samsung innovation's number

Samsung is one of the famous electronics organizations, especially in innovation as Samsung won 30 innovation awards in 2012, the largest consumer technology trade fair. One of its top priorities is to focus on continuous growth and become a leader in the global ICT industry. The number of future product and technology innovations increased in 2014, 952.4 patents was registered during 2014, and that was the result of an investment of approximately 15 trillion Korean yen in the R&D department in the field of innovation leadership, expansion of global research and development centres, and the recruitment of the best talent. During the year 2016, Samsung won 38 awards for innovation in the field of consumer electronics. The number of innovations reached 100 patents during the same year.

IBM Company's data analysis

When we look to The percentage of the number of virtual employees within the Research and Development department is constantly increasing from 53 % in 2009 to 55% in 2012 to 61.30% in 2016 as show in figure 6. This proves that the company is increasingly relying on virtual employees, as their number is greater than the regular employees, reaching approximately 61% of the total employees in the research department in 2016.

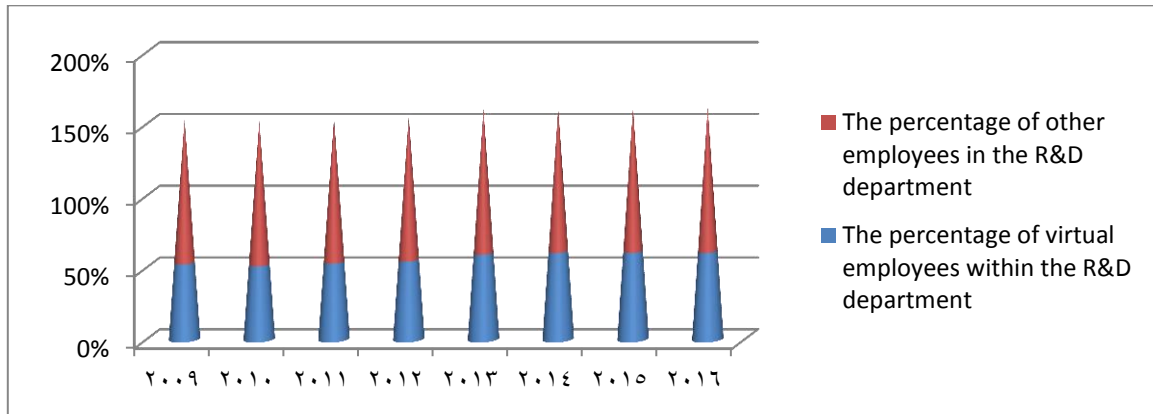


Figure (6) The percentage of virtual employees within the Research and Development compared to other employees in the same department at IBM.

Source: annual report of IBM during 2009- 2016

While verifying the data in figure 7, which confirms that there is a direct relationship between the volume of sales and investment in the company's research and development department, this relationship, is positive because when the investments in research and development in 2009 were 5.82, it increased to \$ 7.051 billion in 2016. Likewise, the volume of sales in research and development increased from 95.76 billion dollars to 110.921 billion dollars in the same years.

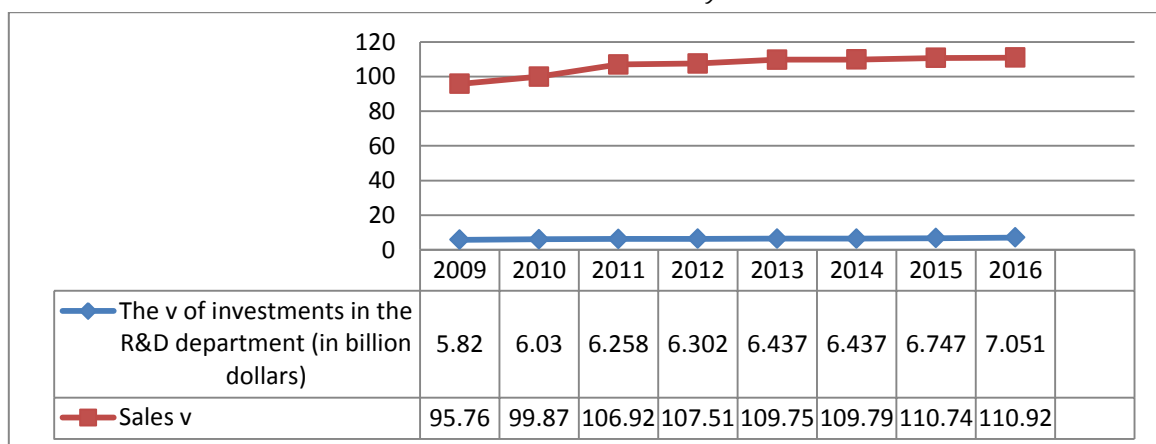


Figure (7) The volume of sales at IBM and the investment

Source: annual report of IBM during 2009- 2016

Toyota Company's data analysis

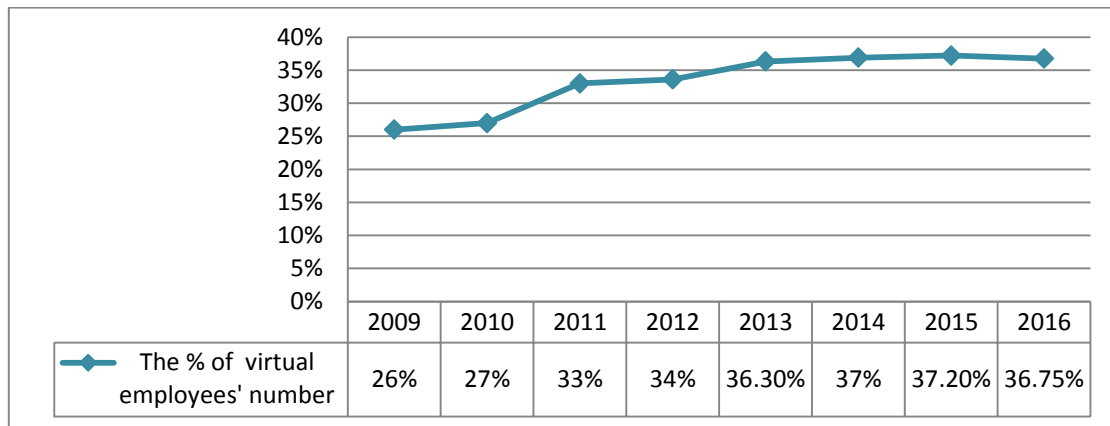


Figure (8) virtual employees' number at R&D VS traditional employees in the same department in

TOYOTA Source: annual report of Toyota during 2009- 2016

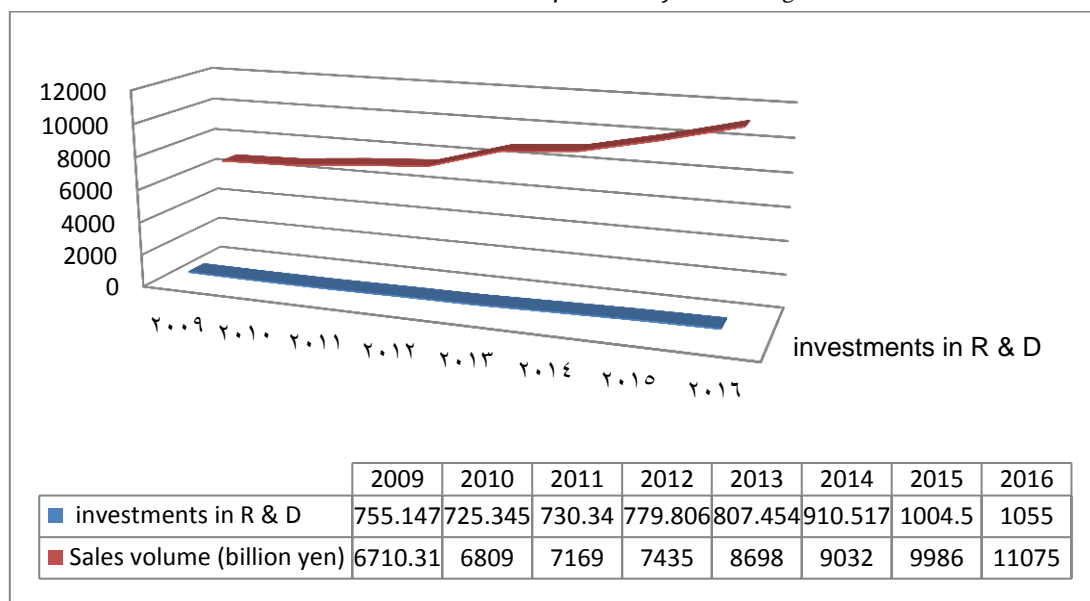


Figure (9) The volume of sales in Toyota and the amount of investments spent within the R&D department Source: annual report of Toyota during 2009- 2016

The data of LG company

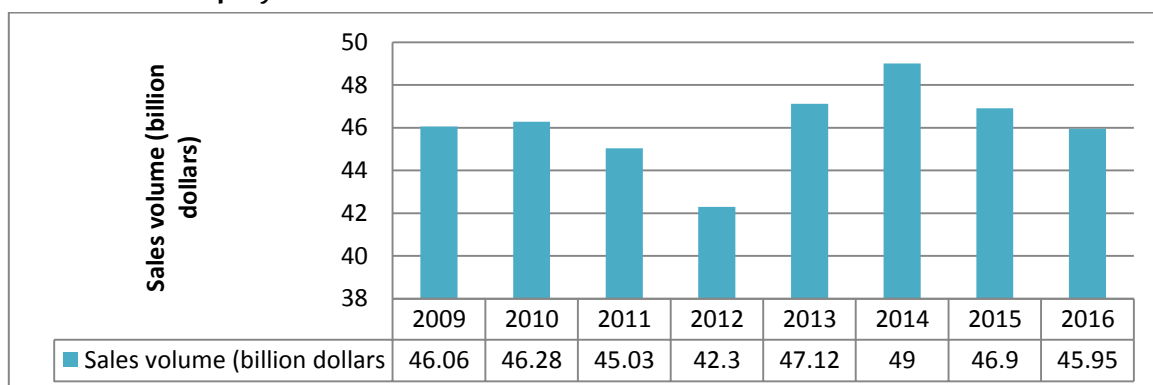


Figure (10) The volume of sales in LG Source: annual report of LG during 2009- 2016

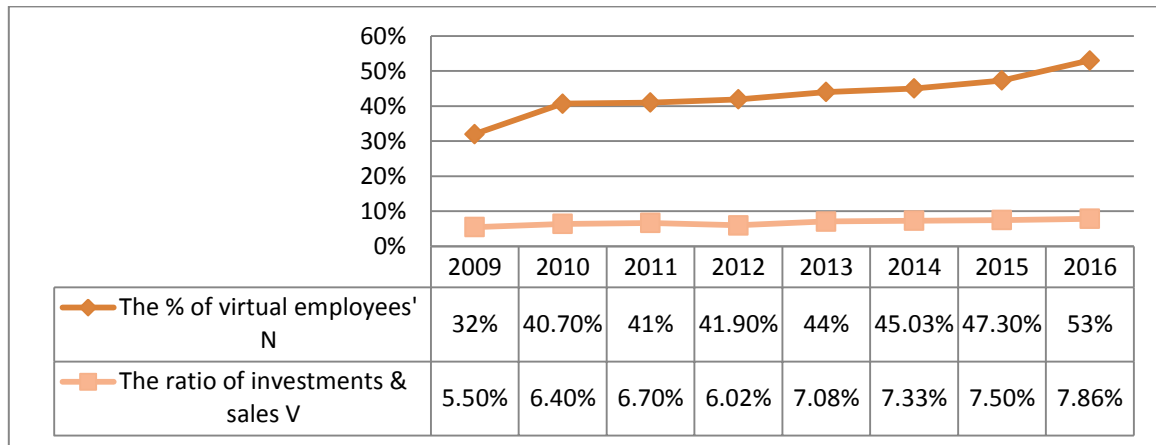


Figure (11) The VE's number at R&D and investment Source: annual report of LG during 2009- 2016

General analysis of companies data

the data of four well- known and famous international companies are Samsung, LG, IBM and Toyota. Note from the data analysis that the number of hypothetical employees correlates with the number of investments spent in the R&D department with the increase in sales, which means that there is a good positive relationship between the number of innovation, the size of investments, the number of hypothetical employees and the volume of sales. The R&D department and the volume of sales achieved by these companies. The reason for this is due to the virtual competence of the employees, whose numbers increase every year, and what they have, innovations and paths, and what they have from various experiences and not be limited to local expertise. Where there is a marked increase in virtual employees versus traditional employees. This increase is matched by increased innovations, sales volumes, and a high competitive advantage.

Discussion of the results and recommendations

This study reached several significant results, which can be summarized in the following points:

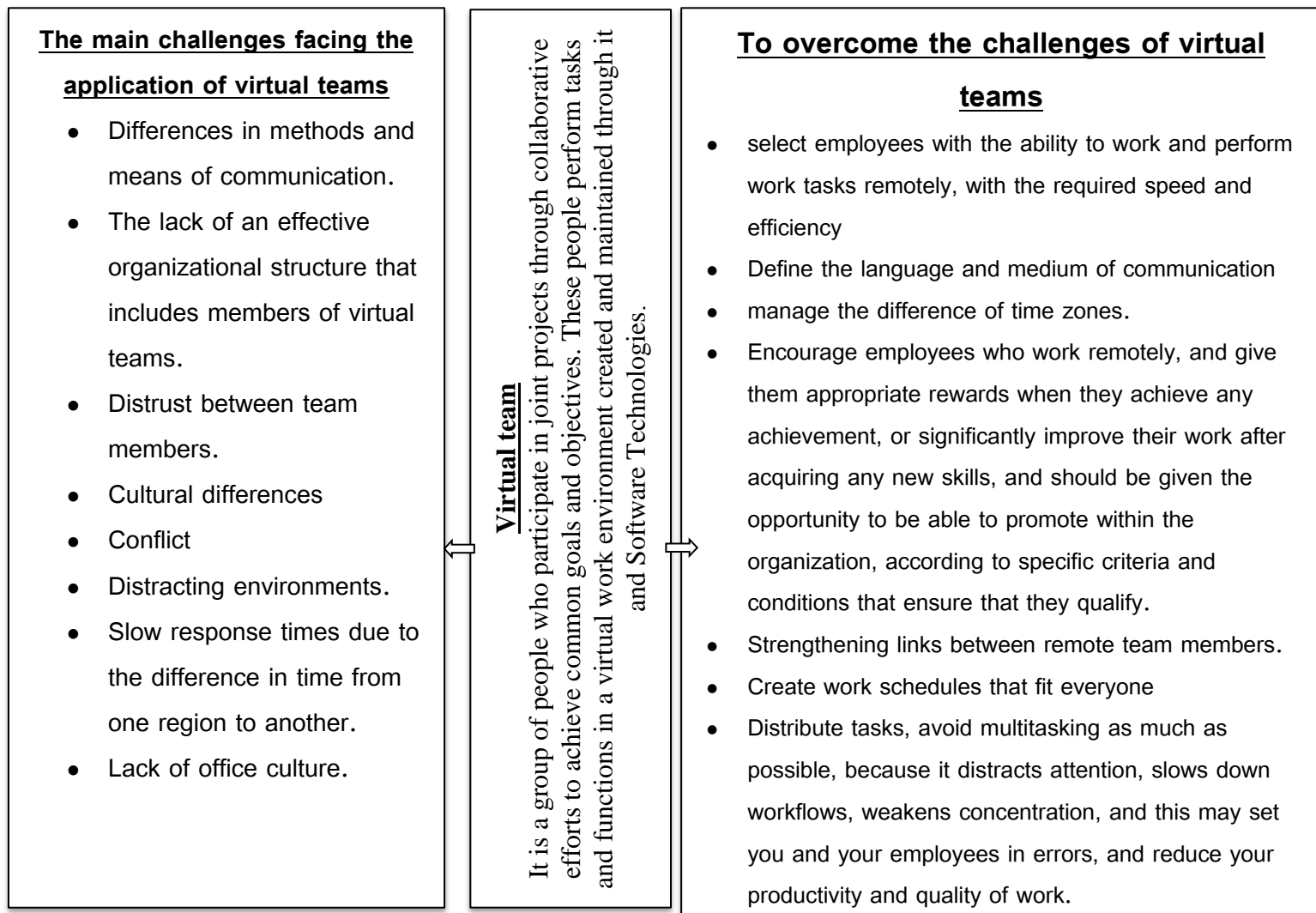
There is a strong and positive relationship between the performance of virtual teams and the development of general performance within organizations, which is an essential competitive advantage that current business organizations need in light of favorable and changing conditions and a robust competitive environment.

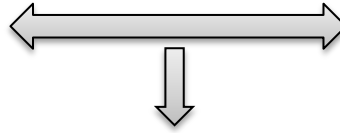
The study found a correlation between the number of innovations registered by organizations and the increase in the number of virtual employees, especially within the research and development department. It was found that all four organizations under study increased their dependence on hypothetical employees year after year in line with the increase in the number of innovations registered.

It is noticeable that many companies have begun to increasingly rely on remote employees (virtual teams) to accomplish work tasks. Furthermore, this trend has started to spread; it saves many expenses, as the cost of recruit employees to work remotely is much less than the cost of hiring employees

to work in the company's headquarters. This is what the current study confirmed, in line with previous studies. The performance of the virtual teams is the most effective because of their diverse experiences, multiple skills, reducing costs, and benefiting from 24- hour work due to the different times of each place. According to a study published last year, 70% of workers worldwide work at least once a week. According to the Gallup 2016 report, 24% of employees in the USA spend 80% of their time working remotely.

After reviewing the previous studies and the analyzed data on the companies studied, the researcher tried to summarize all this by preparing a general conceptual form that explains all the parts that include the concept of virtual teams, features, challenges, and how these challenges can be faced





The advantages of virtual teams

- Ability to share information and knowledge among team members
- Complete business and make decisions through various means of communication.
- Reach more experienced people- The possibility of solving work problems faster
- This type of interaction and communication between team members goes beyond the limits of time and space.
- Saving office costs and Reduce travel and transportation costs,
- Improving the planning process, participation and decision- making.
- Flexibility in choosing working time,
- Increased productivity, sales volume, increased innovations

Recommendations

The current study recommends the importance of building effective virtual teams by focusing on the following points:

- 1- Awareness of leadership, as leadership is an essential factor in the success of virtual teams. To be effective, team leadership must have the ability to deal specifically with personal, communication, and cultural factors; To overcome distance restrictions. Organizations must select team leaders who are comfortable with technology and have the interpersonal skills required to lead effectively in a virtual environment. To be effective, team leadership must have the ability to deal specifically with personal, communication, and cultural factors; To overcome distance restrictions. Organizations must select team leaders who are comfortable with technology and have the interpersonal skills required to lead effectively in a virtual environment.
- 2- Successful virtual business teams hold many face- to- face meetings during the first 90 days of their establishment; emphasize priorities, goals, and responsibilities, and strengthen interconnectedness among its members; during these meetings, how the team will work is defined. Then the team leader can virtually hold meetings over the Internet with any application designated for this purpose.
- 3- It is significant for the members of the virtual work teams to know their roles, and successful teams always have their members' clear work roles defined in advance. They are evaluated and emphasized on their clarity every period, as this ensures the smooth implementation of tasks and not exceeding the specified timelines for their completion and informing them of what is happening in different parts and levels of the organization.
- 4- Collaboration by building a solid communication system between team members and defining a clear path for the flow of work tasks. It is easy for team members to communicate with each other,

seek advice or assistance, share data and files quickly. Share information widely and openly between team members.

- 5- Interaction between members. Interaction between team members during the meeting by taking care of knowing which members are most involved in conversations and attending meetings. They know the degree to which team members interact with them. Do they feel pressure at work, mutual understanding, poor communication, lack of participation, and lack of attention during virtual meetings indicate that the environment for participation and interaction is ineffective, so this should be avoided whenever possible.

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