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Human Performance Factors in the Evaluation of Virtual Organizations

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Abstract

Performance evaluation is one of the most important issues that have been considered due to the transition from industrial age to knowledge era. Virtual organizations, as one of the challenges of third millennium, which came to existence for enhancing organization's performance through outsourcing, are not excluding. The main objective of this paper is to investigate the main factors that affect the virtual organization performance and to show how these factors can be used in virtual organization evaluation.

Based on review of literature, this study provides a conceptual model of important performance factors of virtual organization. This conceptual framework gives a valuable insight into the performance in virtual organization and can give a useful help to practitioners to evaluate the performance of these organizations. Then, we use expert opinion to validate proposed model and to rank the importance of the factors.

Keywords: Virtual organization, Performance measurement factors, Evaluation, Knowledge management

1. Introduction

Both developments in communication technology that facilitates the fast access, process, transferring of information, and innovation in reorganization due to conformity with fast changes in environment and preparing customer needs, have leaded to the emersion of virtual organization (Ulrich, 1999) which is consistent with post-industrial age. As Lipnack and Stamps (1997) argued, the four major ages has brought some benefits to social groups and organizations in their time: the benefits of first age were the formation of small social groups; in the second age, hierarchy had established in organizations; industry development in third age had resulted in the formation of bureaucracy. Finally the fourth age, information century, leads to the extension of organization boundary, the creation of widespread work networks, and the formation of virtual organizations. Hence, the benefits which information century brings, in general, are in the development of information and communication technology (computer science) and especially is in the formation of virtual organizations. The world "virtual" originates from computer science, in where, virtual memory means operating the programs more extensively than actual memory (Kavan et.al., 1999). Even in the organization level this concept is utilized, because external sources are used such that does not really belong to organization. "Outsourcing" that means buying product or service from outside instead of procuring them internally, has become

prevalent phenomenon in business. Indeed, virtual organizations supply many of their activities from external sources and create a structure that jobs operated by external units instead of operating them by each internal units. In virtual organizations small and self reliant units are related with each other by the help of information and communication systems and as a result of joining such small organizations, a huge network of organizations are produced which are able to do massive missions (Kavan, 1999). Therefore in virtual organizations traditional boundaries obscured, different cultures would be merged and many redesigned jobs would be emerged.

Intelligent organizations use the following three virtual dimensions, to reach their strategic goals and to restructure their activities: location, time, and structure (Kurtakko and Kurtakko, 1998). From locational dimension, information and communication technology, especially internet, economize separation between operation and workforce which have been together. In timing dimension, organizations can change their activities according to the zone time. Another application of time dimension is flexibility in workforce work time that work via telecommunication, because they can adjust their commercial needs with their family life. Finally, organizations can utilize more flexible structures like networks, which integrate different people and expertise for operating special activities. People can be a member in temporary teams and the virtual organization till the time they are needed.

Virtual organization has some benefits and constraints as follows:

- *From organizational perspective:* It reduces costs and constraints that associated with work location (Lepak and Snell, 1998), it provides access to an extensive set of capable workforce, and leads to flexibility, gaining from environment opportunities, the reliance of organizations to the source of each other, and better responsibility to customers.
- *From employee perspective:* It provides more independence, freedom, flexibility, life control, and it reduces the conflict between work and life that emerges from work in traditional location.
- *From society perspective:* It reduces traffic problem and environment pollution, are created for physical movement.
- *From structural and inter-organizational relationships perspective:* small, independent and self reliant units operate more easily and their ability to respond to fast changes in market and the use of their potential ability in design, produce, marketing and supporting the product is more than before. But when virtual organization's workforces are independent and there is no control on them, it is possible that the noncooperative actions of a supplier organization in the long term are considered as a threat and therefore making the coordination between them is difficult (Chesbrough and Teece, 1996). Here the structural characteristics of virtual organization are not underscoring but the characteristics of human resource management in such organizations are underlined.
- *Human resource:* one of the challenges in virtual organizations is reaching to some patterns for collective interaction and communication between work groups and workforces that are separated in distant places. Kurland and Egan (1999) have separated the problems of managers and employees in this circumstance. Because employees are not with managers, they think they can't have complete control on them. It is possible that employees be isolated socially and professionally due to loss of face to face relationships. From social side, less informal interaction is formed between workforces and friends. However if work is done in home, isolation will be more than before. From professional side, workforces worry that as going from sight, they go from thought and with respect to organization rewards and promotion they are not treated correctly. In such conditions their perception of justice would be an important issue that organization should have sensitivity facing it and do essential departure.

The concept of virtual organizations that are based on the loss of location and time boundaries, is an attractive idea but it introduces a new employment paradigm. Innovation in technology makes every employee as a potential immigrant in more different work place. This condition explains an attractive challenge to change organizational structure, work organizing, increase in productivity and flexibility and human resource improvement (Kurland and Egan, 1999).

The supervision and control issues are an unseparated part of organizations; hence, virtual organizations are not strange with these facts too. But here the essential question is that how we can evaluate virtual organizations and measure the performance of employees and trust them for doing their duties and manage people that are absence physically. Therefore, the discussion of virtual organization has reached to the level that managerial needs should be considered, investigated, and essential departure is done in the whole level of this organizations. The first step in performance appraisal is the determination of some factors that the performance of teams and workforces is measured by them and it is not possible unless with a performance appraisal approach in the different level of virtual organization. Based on organization level division, first, we introduce three levels and their importance and then we offer a model, composed of organization levels and some important factors for appraisal.

2. The virtual organization's working level

Generally, people in virtual organization work in three levels: virtual organization director level, virtual teams and workforces level (Fritz et.al., 1998). We introduce them as following:

2.1 The directors of virtual organization

Ulrich and Beatty (2002) have identified five roles that must be in director's level of virtual (and other) organizations: coaching, architecting, designing, facilitating, and leading. They defined these roles as follows:

2.1.1 Coaches

They help participants to see what did and did not work and offer specific counsel and advice on what can be done to improve performance. In virtual organizations, they coach senior leaders about how they can personally build stronger organizations. Coaches read to their business leaders and learn how to provide them concrete feedbacks on their behavior. They must learn to give clear, direct, candid, and useful feedback to both the business leader and team. They must build a relationship of trust with the business leader. This relationship emerges as they express personal concern for the leader, empathizes with the leader's challenges, offers specific observations, and is willing to offer the leader feedback he or she may not receive elsewhere.

Business leaders need to have a clear sense of what they want to accomplish. Often these goals may be defined by examining each stakeholder relevant to the business leading, including: customers, boards, senior management team, suppliers, alliance partners, investors, government agencies, employees, and etc. Using this stakeholder map, a coach may help the leader identify for each stakeholder:

• What are your goals with this stakeholder?

• What are the current relationships with the stakeholder?

• What needs to be adapted to reach the goals?

• What are the actions that you can take to ensure that the goals are met?

• What are the metrics for success with each stakeholder?

Stakeholder map provides a template that the business leader can recall and readily use to focus attention.

2.1.2 Architects

They help to turn general and generic ideas into blueprints for organizational action. They shape the way work flows consistent with the ideas and ideals of the business leader. They help identify choices not evident to the business leader about how organizations might be better governed. They come to the management meeting understanding business realities and virtual organizations and ensure that dialogue focuses on the right issues. They must have a concept of organization and be able to apply that concept to the firm. They continually look for the strategic agenda of the firm and try to envision how it turns into an organizational agenda. In their management meetings, they offer ideas and alternatives about how to weld organization capabilities across alliances to deliver value to customers and employees. They perform organizational diagnoses by asking questions such as:

• Given our strategy, do we have the right organization?

• Given our strategy, what are the capabilities we must have to deliver the strategy in an effective and efficient way?

• Given our strategy, what roles must be played by management team members to ensure implementation?

In addition to assessing and understanding their firm's employees, they will need to conduct an assessment of the capabilities of their firm's web partners' workforces to meet the firm's expectations as strategic partners in their emerging business webs.

2.1.3 Designers

Architects create blueprints, but without becoming implemented, they become ideals without impact. Turning ideas into action matters because unless creative ideas are implemented, they add no value. Acting on ideas comes when employees who come to work behave in ways consistent with strategy and capability. They become not only experts at seeing what needs to be done, but at making it happen. In summary, jobs that a designer can undertake in virtual organization includes following:

- Executing and implementing virtual operational plans (long-term, medium- term and short-term);
- Human resource plans (Competence, Rewards and performance management, Communication, Governance, Change processes);
- Designing the outsourcing of human resource, activities and the type of its outcome.

2.1.4 Facilitators

Even with good intent, most change efforts fall short. Facilitators understand the process of getting things done in the long term, not short term. They have the ability to make changes happen and to sustain those changes at three levels. *First*, they help teams operate effectively and efficiently. *Second*, facilitators ensure that organization's changes happen. As organization facilitators, they bring together resources, focus attention, and make sure that decisions are made

quickly and accurately. *Third*, facilitators ensure that alliances operate. Facilitators ensure that action occurs within teams, organizations, and alliances. The guideposts for action come from considering who is involved, what information is used, and how decisions are made. They ensure that the right people are on the team to accomplish the team goals, that the right information is generated to make good decisions, and that the team operates well. Facilitators using a checkup team can take a team through a periodic (e.g. quarterly) team diagnosis about purposes, decisions, relationships and learning. Facilitators help organizations make changes happen fast when they build discipline into decision making:

- Clarity of the decisions
- Who makes the decisions?
- When must decisions be made?
- What processes are needed to make good decisions?
- How will a decision be returned and reported?

Facilitators must create cross-alliance actions and commitment. To do so, they must ensure that information moves across alliance boundaries, that knowledge in one firm is shared with another, and that information systems connect people in different organizations.

They must learn skills of process observation. Facilitators know how to amass resources to accomplish goals. These processes include the ability to do team processing, organizational decision making, and alliance management.

In some ways facilitators are like coaches only instead of focusing on a person, they focus on collectives of people in teams, organizations, or alliances. Like coaches, they shape points of view and offer feedback on progress. Only facilitators have the more complicated task of doing so for collective groups of individuals, not just individuals.

2.1.5 Leaders

In order to lead, leaders need to apply a leadership model to themselves. The leadership model we advocate follows a simple equation: effective leadership = attributes × results. Attributes means that leaders know and do things that ensure they do things the right way. Results mean that leaders ensure outcomes from their knowledge and actions. Leaders need to define clearly the behaviors they should demonstrate as leaders (e.g. setting clear goals, being decisive, communicating inside and out, and managing change), and they also must define clearly the results they must deliver.

Greiner and Metes (1995) discuss the new leadership skills required to lead in the virtual environment, including the ability to manage a network of interdependent firms, to design virtual operations, to create and sustain virtual relationships with internal as well as external constituents, to support virtual teams, and to keep virtual teams focused. The leader of a virtual organization demands a new set of skills unlike the skills required in a traditional hierarchy.

2.2 Virtual teams

According to Katzenbach and Smith (1993), "A team is a small number of people with complementary skills who are committed to a common purpose, set of performance goals, and approach for which they hold themselves mutually accountable." Similarly, Sweezy, Meltzer, and Salas (1994) suggest a team is "a distinguishable set of two or more people who interact dynamically, interdependently, and adaptively toward a common and valued goal, objective, or mission; each of whom has been assigned specific roles or functions to perform, and who have a limited life-span membership."

Nowadays, the structure of teams has changed considerably due to change in organizations and the nature of their works. The ordinary boundaries of organizations which are, between the horizontal units of organization, between inside and outside of organization and between geographical and cultural market areas, have been changed. The relationship between people from inside and those that conceived outside of organization (customers, suppliers, shareholders etc.) up to now, has been more important than before and the *organizations without boundary* is forming and organizations has found the value of collective work and group corporation (Ashkenazi et.al., 1995).

The most essential activities of business like supply chain management, sale, quality improvement, change management and etc, require people collaboration beyond the boundary of the organization. In order to do such activities, the organizational and geographical boundaries could prevent employees work. In virtual teams, team members work beyond the geographical and organizational boundaries together in separated place, one time and with the same organizational rules (Cantu, 1997). Virtual team, like any other teams, includes groups of people that interact with each other due to doing dependent activities and the conductor of team is the same goal. Really, virtual teams have the basic characteristics of ordinary teams but team members may separated in different geographical locations and don't use face to face relationships. The factors that join virtual team members, are technologies associated with web and trusting each other (Eggert, 2004).

2.3 The workforces in virtual organization

In the virtual organization progress toward goals is done by employees. Due to outsourcing, workforces in these organizations, in addition to do their tasks, they have improver role and can be the strength or the weakness of a virtual

organization. In virtual organizations workforces have following characteristics (Lipnack and Stamps, 1997):

- They do not have the same physical location
- They do basic mutual relationships by the use of computer communication technologies
- They rarely visit each other and sometimes they might not see each other for a long time
- Occasionally, they have different languages and cultural histories
- They have some personally constraints and troubles, it is possible, even others not be aware of it

3. Performance evaluation of organizations and the importance of it

The use of evaluation methods in formal manner comes from nineteen century. It can be said that performance evaluation is developed at the same time with the development of management thoughts under the management schools trends. Change and development in evaluation factors from the form of general and comprehensive principles of the evaluation of organizations to total quality management indicate the trend of evaluations development.

There are two viewpoints that how performance evaluation came into existence. The first one is traditional evaluation theory that has two important goals for evaluation: judgment and performance reminding. The second one is modern theory that considers development and improvement of performance where the dynamic side of evaluation is an essential side of it. The investigation of different approaches to performance evaluation explains that evaluation methods should be proportionate with the growth and development of organizations and it responds to different dimension of them. Nowadays, some factors that should be considered in performance evaluation are: technology development, the role of critical success factors in performance, the structure of internal and global competition, quality benefits, the place of organization and its products and services to market and customers and etc. Another point that considered in the literature of performance management nowadays is the statement that there is an important and considerable relation between outcomes evaluation (output) and input and process evaluation (input). Nowadays the dominant thought is the statement that, the refining of inputs and operation process rationally, leads to the offering of proper products and services. The final control of operation cannot explain the state of organization's total performance. Output is the result of the activities of organization's different units in resource forming and output control can not help to the correction plans of processes and their supporting operations.

Specialists in management believe that performance evaluation systems should be reviewed periodically. This work can be a result of changes in essential values which direct performance evaluation systems. Recently, some attempts have been done to find either a standard or a framework to help organizations to use it for performance evaluation. In other words, it helps them to gap analysis. For many organizations, the ability of judgment about the development with some set of acceptable criteria is valued, useful and informing.

Many authorities on the subject have provided answers to this question that "why measure performance?". National Performance Review (1997) notes that performance measurement yields many benefits for an organization. One benefit is that it provides a structured approach to focusing on a program's strategic plan, goals, and performance. Another benefit is that measurement provides a mechanism of reporting about program performance to upper management. In the General Service Administrations (GSA's) performance-based management sated that measurement focuses attention on what is meant to be accomplished and compels organization to concentrate time, resource, and energy on achievement of objectives. Measurement provides feedback on progress toward objectives. If results differ from objectives, organizations can analyze gaps in performance and make adjustments (Cited by Artley and Stroh, 2001).

Recalling the above discussion and the importance of performance evaluation in virtual organization, in the next section, we will argue about the necessity of the existence of some factors and consequently evaluation of different levels of virtual organization.

4. The evaluation factors of different level of virtual organization

4.1 Virtual organization director

Regarding to section 2.1 about Virtual organization's directors, we have found that these factors are important to have a high performance directing in virtual organization:

Coach: They should build the *relationship of trust*, have *stakeholder map*, learn it to the leaders, and give effective and real time *feedbacks* to the teams and the leaders.

Architect: Regarding *strategic plan*, they should help business leader to identify choices that is not evident and to turn general and generic ideas into blueprints for organizational action. To do this they should assess and understand *workforces and their capabilities*.

Designer: They should *know and bring current theory and research* to action in order to shape employees behavior consistent with strategy and capability to turning ideas into action.

Facilitator: They should help teams to operate effectively, ensuring that changes happen and alliance operates properly. To do this they should consider *who* is involved, *what information* is used, and how decisions are made. They should have some abilities to do *team processing*, *organizational decision making*, and *alliance management*.

Leader: An effective leadership is a function of *attributes* and *results*.

4.2 Virtual teams

Hacker and Lang (2000) found objectives of virtual teams and then critical indicators of these objectives. The three objectives are *performance against schedule*, *internal customer service*, and *overall virtual team health*. By focusing resources on the critical indicators and regularly evaluating status, virtual teams will be in a better position to meet their mission.

Performance against schedule: The *performance against schedule* indicator summarizes the overall percentage of projects that is finished as scheduled. How the team defines projects in terms of priority can play a part in the overall score, as a miss on a critical project affects the score more than a slip on a lesser one. Therefore, the overall *performance against schedule* score is both an indicator of the performance of the team as well as accurate planning within the team. They identified two areas to focus on in the short term to improve *performance against schedule*-balancing work load and work hours and actions required completed on-time.

Internal customer satisfaction: The nature of the virtual team's work requires team members to work with other groups and develop processes that will benefit the efficiency of these groups. Therefore, the image of the team within the larger organization is important to the success of the team. Therefore the effectiveness of the team's interaction between groups should be evaluated. They identified four critical indicators: On-time delivery, quality, communication, overall satisfaction. These indicators can be measured by the result of a survey that given to groups within the larger organization.

Overall virtual team health: Team health is a measure of how well the team members function together and how important it is to team effectiveness. Team health survey evaluates seven areas: goals and results, membership, team processes, team linkages, team development, coach checklist, and core team structure. Similar to the customer satisfaction survey, the target is to eliminate all “needs improvement” responses. The specific areas that causing problems are: meeting attendance, individual performance reviews, division of labor, commitment letters.

4.3 Virtual workforces

Dibben (2002) showed that how following factors can affect the performance of a workforce in virtual organization:

- The understanding of work and its process.
- Self-motivation.
- The high ability of verbal and written communication.
- Being criticizable and compatible.
- Having positive insight.
- The good understanding of organization and its strategy.
- Technical capability.
- Self-confidence.
- Being result-oriented.

5. The necessity of knowledge evaluation

Nonaka said: ‘When markets shift, technologies proliferate, competitors multiply, and/or products become obsolete almost overnight, successful companies are those that constantly create new knowledge, disseminate it widely throughout the organization, and quickly embody it in new technologies and products’. (Nonaka, 1991). Davenport and Prusak (2000) defined knowledge as ‘‘a fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information’’. Knowledge is originated and is applied in the mind of individuals, whereas in organizations it can be embedded in routines, processes, practices, and norms (Davenport and Prusak, 2000). It actively enables performance, problem solving, decision making, learning and teaching by integrating ideas, experience, intuition, and skills, to create value for employees, the organization, its customers, and shareholders (Liebowitz, 2000).

Knowledge management is the process of discovering, acquiring, developing, sharing, reserving, evaluating, and utilizing the knowledge in organization via the creation of useful link between technology, human resource and process in order to achieving organization’s goals. Regarding the possibility of access to more information and increase in overall human knowledge, in virtual organization this process has faster speed and the control and management of it

needs more skills in scope of knowledge management (Jones, 2000). Knowledge management is the management of people intellectual power and collective memory. Nowadays, knowledge is power and it is truly power when everyone has access to it. What that is necessary in virtual organization is supporting the culture of knowledge partake and sharing. In virtual organization, the degree of collaboration should be high enough so get them the ability to respond quickly and to solve work problems. The cultural that everyone takes apart easily in information sharing is one of the most important necessities. When more people introduce their viewpoint about the solving process of major problems, there are more possibilities for true decision making and as a result work projects implemented with higher quality.

The key to the success of virtual organization is providing some facilities for transferring of knowledge and finding special channels and unions for this purpose. Some of success factors in this point are: having clear organizational goals, clear viewpoint, jointing work culture, relationship of trust and etc. Firstly, awards and motivation factors can facilitate transfer process, but in subsequent points sharing culture, rather than awards, plays a substantial role in determining behavior and people role in knowledge transfer. Hence for success and the creation of culture infrastructure, these issues should be considered in the strategic planning of virtual organizations.

Knowledge evaluation identifies the access level to the determined goals and with the use of this feedback can help to design corrective action. In the knowledge evaluation the factors that should be considered is *knowledge acquiring, knowledge sharing, knowledge usage,* and *knowledge creation*.

We showed the complete framework in Figure 1. Finally, reliability tests were carried out and the value of Cronbach's Alpha for the three levels and the factors in each level is given in Table1. The results suggest that the instrument used in the study was reliable as the reliability statistics of the items that are above 0.7 (Hair et al, 1998).

A questionnaire designed which in one hand included some questions about the adequacy and comprehensiveness of the three levels and factors in each level for the evaluation of virtual organization and on the other hand included questions about the priority and importance of these factors.

Based on expert opinion obtained from these questionnaires, the importance level of items were measured in a 5-point Likert scale, ranging from 1 = very low, 2 = low, 3 = average, 4 = high, and 5 = very high. The results, which shown the importance and priority of the factors, are represented in Table 2.

6. Conclusion

In this paper the necessity of performance evaluation and most effective factors are discussed in increasing organizations, virtual organization. The necessity of performance evaluation, the levels of organization that should be evaluated, the factors that should be evaluated and measured, and finally the knowledge evaluation is the most important issue that investigated in this paper.

At the end, it should be noted that the information and communication technologies are changing and developing continuously and these changes are the natural characteristics of new work environment. Organizations are seeing changes in the tools, methods, and technologies of communication and therefore they should choose the best and useful techniques to evaluate performance factors. Finally, the experimental and the practical applications are needed to provide full support for this conceptual paper.

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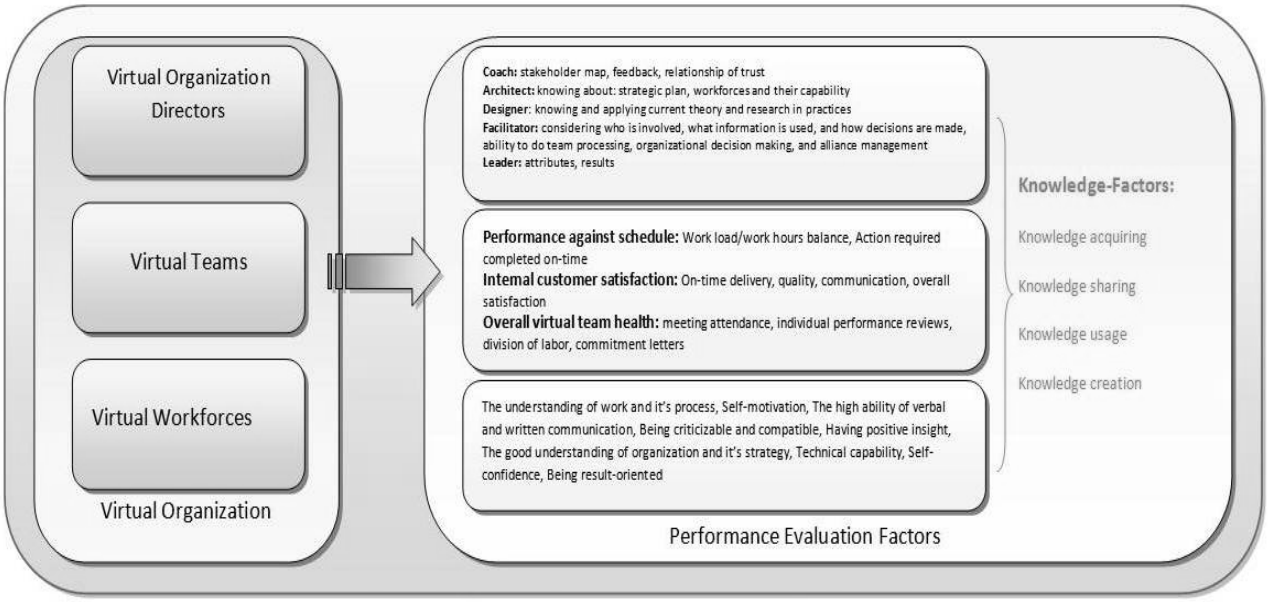

Figure1. Performance Factors in the Evaluation of Virtual Organization

Table 1. Reliability tests

Evaluated items	**Cronbach's Alpha**
Three level for performance evaluation	0.84
Factors in Virtual Organization Directors level	0.78
Factors in Virtual Teams level	0.89
Factors in Virtual Workforces level	0.73
Knowledge-factors	0.81

Table 2. The importance level of the factors

Factors	**Mean ratings**
Factors in Virtual Organization Directors level	Form 3.6 to 4.8
Factors in Virtual Teams level	Form 3.9 to 4.9
Factors in Virtual Workforces level	Form 3.7 to 4.5
Knowledge-factors	Form 3.2 to 4.4