Study of IT Management Strategy Direction Dealing with IT Consumerization

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Abstract: As IT has advanced, the subject of IT innovation moved to the consumer from organizations. It also has changed personal lives as well as organization environment. Traditionally, employees did their business with organization-owned IT resources. But grown IT expectation more and more, it caused a gap between organizations and employees. Therefore it made a phenomenon that employees use their own IT resources in work place. This is called "Consumerization of IT". Consumerization of IT that started from usage of employee-owned IT resources makes limits of traditional IT management. Business should much understand about this trend and adopt the new IT management. In this study, I identify the charactoristics and impacts of consumerization of IT then find limits of conventional IT management. In addition, I present the considerations that reflect the organization characteristics for establishing new IT management.

Key words: IT consumerization, IT management and IT risk management, considerations, expectation, impacts

INTRODUCTION

IT technology innovation that started in big organizations such as nation or enterprise in the past repeated its steady development so that the individuals became to use IT technology in daily lives (Hietikko, 2014). As such as the individual's IT usage experiences increase, the consumers are becoming from passive members who previously used IT provided by manufacturers or service providers to active members who lead IT technology innovation in the direction they desire.

With IT innovation that started from the consumer market, individuals experienced more abundant IT devices, applications and services than the past. Thus, the desire to establish familiar IT environment at the place they belong increased and the trend to use individual IT resource in the working environment stood out and this is 'IT consumerization'. IT consumerization is already in progress in various shapes in organizations.

As such, IT consumerization is settled as a trend but in reality, the effort to manage IT consumerization within organizations is insufficient. Furthermore, the existing central control type IT management is not enough to manage the consumerization that is mainly composed of individual IT resource. The lack of IT management inside organizations causes problems that may damage the enterprise such as leakage of important information, so the focus shall be on new suitable IT management.

Therefore, this study will study the influence of IT consumerization on organizations and which limits the existing IT management has. Through these, the management strategy direction of IT consumerization according to the characteristics of organization is proposed.

It consumerization's characteristics and influence on enterprises

Definition of IT consumerization: The term IT consumerization is first used in 2004 in Computer Science Corporation (CSC) research. Here, IT consumerization means the overlapped usage of IT devices, network infrastructure and services by individuals.

Afterwards, due to the expansion of SMAC (Social, Mobile, Analysis, Cloud) technology as the consumers became the main agents of IT innovation, individual's technology requirements are influencing up to the organization's IT resource demand. When it is not satisfied, individuals use their own IT resource in the business and it is called IT consumerization (May, 2012).

In the early stage of IT consumerization expansion, most of the climates were to block them or making them issues due to the concern for difficulty of management and security risk but as the positive side of business efficiency and no limit of time and space stands out now it is the trend that organizations also acknowledge IT consumerization.

However, as they focused on only the positive side that organization can gain, the discussion on the remaining security problems and management is insufficient. Therefore, the organizations shall study the influence of IT consumerization and shall be concerned about which IT management strategy they shall have.

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MATERIALS AND METHODS

IT consumerization's characteristics and influence: IT consumerization has the characteristics of self motivation that individuals themselves introduced IT resource to the organization, the fragmentation of responsibility that the management responsibility is not concentrated in the center but distributed to individuals, sharing of information and IT usage experience, virtuality that data storage and business are carried out in virtual space. The phenomenon appearing in organizations due to IT consumerization brings positive change to the organizations but also has the double-sidedness of causing problems.

Regardless of whether organizations accept IT consumerization, IT consumerization evolved organization's IT from tools for efficient business processing to one of the resources that creates value. (D'Arcy and Marketing, 2011). Already, IT consumerization is a flow that cannot be resisted, so organizations shall establish the strategy to respond to this. To take the advantages of IT consumerization and to minimize the problems, management change in the organization level will be essential.

Self motivation-change of decision making right: IT consumerization started as individuals themselves brought their own IT resources to the organizations to use them for the business. The individuals who used to use IT resources distributed en bloc by the organization are gradually expanding the boundary of individual IT resource introduction starting from mobile devices to software and services.

At the early stage of individual IT resource introduction, the organizations prohibited it for the management reasons. But they started to permit it due to the advantages of IT resource saving and business efficiency increase and that it is very difficult to control individuals using IT resource in the business and thanks to this, individuals became able to use more IT resources in the business (Accenture, 2014).

IT consumerization has influence on information management, managerial business, IT governance and IT security. As organization members voluntarily introduce individual IT resource into the business, the individuals have the ownership of IT resources and the change of the direction of decision making right occurred. The previous downward decision making is gradually changed to upward decision making as the power of individual who has the ownership of IT grows stronger (Accenture, 2014) and there was the phenomenon that the main agent of the

management also became the individuals. That is, unlike the previous central control and management of all IT, the rights and duties for IT resources are distributed between organizations and individuals due to IT consumerization. Accordingly, organizations now need, instead of previous IT management method that managed only resources, the management centered on the users who directly use IT resources (Intel IT Center, 2012).

Management responsibility fragmentation-increased external resource usages: Previously, IT management responsibility and authority were concentrated in IT department in an organization but IT consumerization has the form that management responsibility and authority are shared by the individuals that are the organization members, who own IT resources and IT department. Before IT consumerization, organization purchased and distributed IT resource en bloc, so naturally organization had the control and management authority but since IT consumerization, individuals have the ownership of IT resources used in the business, so centralized management authority had be weakened. Furthermore, IT consumerization shows the trend of expanding from devices to entire IT resources such as IT service, etc. The cases of individuals using cloud service, etc., to store the information of the organization outside and to carry out the business through virtual platform are increasing.

The biggest advantage of external storage is the cost saving. When the information with low importance is stored in external storage, the internal storage management cost decreases and business platform is for free or individual pays the cost, so IT expenditure decreases. However, compared to the usage ratio of cloud service, ratio of organization complying with the usage policy is very low and as we see the survey result that the usage of using high risk service is high as 85% (PWC, 2015), we can see that the risk of security by using external storage is continuously getting higher.

Sharing-information enrichment: Increase of mobile devices, wireless network expansion and invigoration of social network service usage brought expansion and sharing of a lot of information and this has influence on the organization's information sharing. From previous internal network and limited information sharing through internet, now the expanded information sharing is made through the use of mobile devices and social network services that are not restricted by location. Also, individuals show the characteristics of naturally sharing the experience within the organization going out of individual life as they have abundant IT experiences in

their lives. Such sharing of IT usage experience increases the IT utilization capacity of the entire organization and has the role of bringing in more and new IT resources into the organization.

IT consumerization has influence on the organization's information supply and usage. Information enrichment occurred along with the increase of information supply and demand of individual usage. With the advancement of web 2.0 technology, information channels became diverse and with the invigoration of mobile devices, the restriction of time and space for information collection disappeared and this affected the increase of organization information as individual IT resources are used inside the organization. This can be seen as that information of individual usage can also become information of organization as necessary (Hietikko, 2014).

The explosive increase of information leads to the information management problem. Due to organization's limit of information storage server and the difficulty of classifying necessary information and unnecessary information and business data and individual data, not only the problem of not being able to use the necessary information in the right place but also the disadvantage that more caution is required for the information security management occurred (Fig. 1).

Virtuality-uncertain boundary: As the business carried out in the business desk top moved to the individual mobile devices, virtual space for business cooperation became necessary and due to the mixing of individual data and organization data, it became difficult to store all information in the organization server. Due to this, it shows the characteristics of active use of virtual space and virtual storage for business. Virtual space can be represented by cloud service and since it is easy to subscribe and easy to use in the business, organizations also have very high interest in the cloud.

As individuals start to use their own mobile devices in the business, the boundary between business and individual life started be become uncertain. In the past, IT resources were used by classifying business usage and individual usage, so a clear boundary existed but with the start of BYOD (Bring Your Own Device) that is represented by IT device usage among IT consumerization as individual mobile devices are rapidly expanded, the boundary of the organization is crumbling down.

In the organization's side, the usage of individual mobile devices has the advantage of reducing business time restriction and individual and organization IT cost. However with the use in the two usages, clear distinction
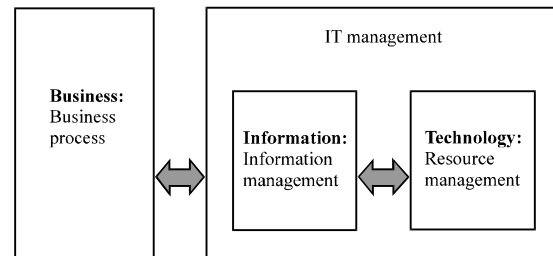

Fig. 1: Relationship between business and IT management

of individual data and business data became difficult and there is a higher risk of leakage and exposure of data. Also, the access from external network and place with potential risk may cause the problem of malignant code and information security (Intel IT Center, 2012; Yevseyevaa *et al.*, 2014).

In individual side, it gives the burden to carry out business outside the business hours and there is a concern for invasion of private life such as checking individual data to review organization data.

RESULTS AND DISCUSSION

Limits of previous it management: So far, IT in organization was recognized as a tool helping smooth operation of business process. As such organization recognizes IT as a tool, so the management system also has the centralized form to increase the efficiency. But, due to IT consumerization with the trend of expansion of individual right for IT resource selection and management, downward decision making became difficult and also, due to several reasons such as explosive increase of information and decrease of IT life cycle, the existing IT management method has its limits.

Definition of IT management: IT management has the role of supporting core business activities with independent management system managing IT resources. The objective of IT management is to manage the information which as an important role in the organization operation process method. Support safely and according to the objective of the organization (Garba *et al.*, 2015).

As you see in details, IT management is divided to information management (Information) and resource management (Technology) and information management is divided and managed according to each system in most of the cases (Blount, 2011) and information asset has the form of being managed according to the importance of the asset or by each business process.

IT management process: Generally, organization's IT management process is composed of 4~5 management systems such as IT resource management, contract, risk, change, composition and operation management, etc. And the corresponding management system is designed with the purpose of conveniently managing the business process.

The operation and management of IT management is basically overseen by IT manager (IT department) and it has the role of procurement, utilization and update of IT resources and planning of the plan and execution of the business flow (Fig. 2).

Such centralized IT management is possible when IT resources are distributed by the organization. But in IT consumerization, individuals own IT resources, so there may be weak point to manage IT consumerization with existing IT management process.

IT resource management is the system managing IT resources according to the life cycle of IT resources and it has the role of supplying IT resources required for the organization based on value assessment of IT resources and user trace process. The main objective of IT resource management system is to clearly classify IT resources and support overall IT management such as cost, technology plan management operation, etc. To pursue efficiency and cost saving. Also, how to make it easy to exchange information between human resource and process through IT service products can be also seen as an objective of IT resource management.

IT composition management focuses on relationship or composition of IT resources regardless of the owner or value to play the role of helping IT infrastructure elements to be maintained organized according to the life cycle. The study of the composing items shall precede IT composition management and the studied composing items are classified and stored.

Change management (IT change management) means the process of minimizing the lack of IT service and managing and controlling the change life cycle of all elements. Change management has the objective of studying how to change IT elements that have influence on IT environment to provide the management method and it is in charge of from the entire IT process to the management of the change of detail IT elements.

Previously studied IT resource management, composition management and change management are the management methods that can be done when IT resource study preceded. But, it became difficult to grasp the resources due to individual ownership of IT resources and usage status is also impossible to grasp in reality for the same reasons. In such a situation, if the same existing
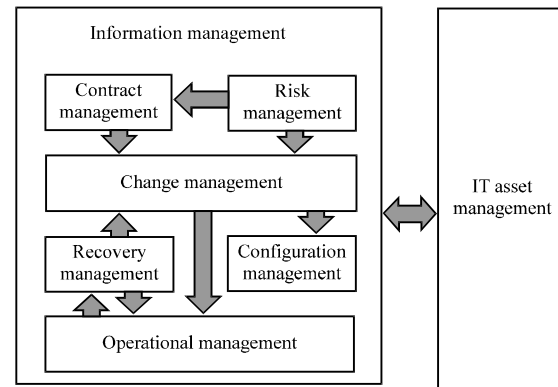

Fig. 2: IT management process recomposition

IT management is carried out, IT resources owned by organization members is censored by organization without authority, so complaint by organization members such as problem of privacy may occur and even if it is carried out, precise IT resource demand and positioning cannot be graped. This is because due to the characteristics of IT consumerization, individual authority on IT resource selection and utilization is reinforced and the individuals do not use only the designated resources. Also, IT resource life cycle gets shorter and shorter and change of IT resource cannot be predicted easily.

Lastly, existing IT risk management is focused on the defending of risk related to internal IT operation. But, IT's risk is directly related to not only the operational risk but also all risks of the organization (ISACA, 2009) and IT's complexity is continuously increasing, so IT risk management shall grasp not only IT area but also all risks that may be caused by IT consumerization to try to reduce the risk of the organization.

Limits of previous IT management: Centralized IT management adopted by many organizations has IT resources belonged to the organization and it is effective when the resource composition is simple. But IT consumerization has abundant resource compositions and the management authority concentration is difficult for individually owned resources.

Also, resources are impossible to control unilaterally, so listing up and value assessment of IT resources became impossible. This is because that with the use of individual devices, IT system role classification became difficult and unlike existing method which is the control per system, the entire IT consumerization has the continuity in data collection, storage, etc.

Existing method with downward communication method is also not suitable for IT consumerization. Organization members continuously demand new

technology and for single IT manager to receive these, it has to go through too many processes. It causes problems such as increasing security threat by using unapproved application or service in the business.

As such even though there are limits of the existing IT management, most of the organizations are not aware of these. Even though many enterprises adopt IT consumerization, the preparation for this is little and it is very insufficient to take the advantage of IT consumerization that will expand more in the future. Therefore, the enterprises shall not see IT just as a tool but shall change the awareness to see it as a main agent creating value and establish suitable management method.

IT management strategy selection model proposal according to it consumerization: Existing IT management is centered on business process and is not suitable to consider IT consumerization. The weak point of such IT management is directly related to the organization's security problem, so new IT management strategy is required.

IT management strategy considering IT consumerization, unlike the existing unified IT management strategy, shall be designed with the consideration of characteristics and influence of each organization. It is because that the management level changes according to the degree of influence by IT consumerization. Thus, the strategy shall be selected according to the organizational characteristics through the elements considering IT management affected by IT consumerization.

IT management consideration for IT consumerization: IT consumerization has different awareness on IT, main agent owning IT and decision making method from previous, so existing business process oriented IT management has its limits (Blount, 2011).

Therefore, the considerations during IT management strategy establishment shall be looked at from new perspective. Especially, the response to IT consumerization in the organization's risk management level must be included. Unlike the existing IT management and device oriented BYOD management, IT consumerization has a wider boundary of IT resources. Also, the threat elements that can occur inside such as employees increased, so it is necessary to prepare for these.

IT considerations inside the organization such as IT business value, IT capacity, IT function, etc. (Koffer *et al.*, 2015) and risk elements considering internal and external environmental threats are the elements to
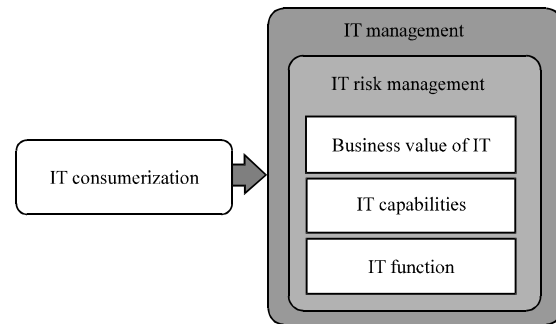

Fig. 3: The considerations that impacted consumerization of IT

establish the management strategy for IT consumerization and at the same time considering each element, the entire shall be considered as an organic form to establish the strategy. Therefore, the considerations for IT management strategy establishment for IT consumerization are proposed as Fig. 3.

IT business value: IT business value focuses on how the organization members utilize the organization's IT resources and what are the benefits from it (Bloch and Gomez, 2009). For example, it means the result of the organization members using IT resources acting as the advantage of the organization such as strategic information or exchange benefit, etc. This has an outstanding role not only in IT efficiency but also in terms of business core capacity and economic and strategic terms.

IT business value has close relationship with the characteristics of IT consumerization. Especially, it is influenced by the self motivation and sharing. The degree of influence of IT business value can be decided centered on the detail elements of self motivation and sharing and the detail elements of each characteristic are as follows.

Self motivation: Initiative for consumer IT resource inflow.

Sharing: Sharing of internal and external information, sharing of IT usage experience within the organization. When you see these, you can see that the business value of individual IT resources changes according to the role of human resource (Nevo and Wade, 2010). Therefore, IT consumerization's characteristics can be divided to detail questions to study the degree of inflow and influence of IT consumerization and decide IT business value level by IT consumerization. The details are as in Table 1.

In the self motivation questions, if overall questions correspond to the organization such as that the organization's characteristics are sensitive to the

Table 1: Decision factor of the IT business value for new IT management strategy

Category	Questions
Self motivation	Will you permit free inflow of external individual IT resource
	Is the level of IT usage by organization members in normal time high
	Is the organization's characteristics sensitive to environmental changes
Sharing	Is the proportion of business using individual mobile device high
	Is the sharing of IT usage experience within the organization active

Table 2: Decision factor of the IT capability for new IT management strategy

Category	Questions
IT resource life cycle reduction	Up to which level is IT resource's technological support possible
	What are the ratio of beginner, middle and high level technicians
	Is fast security application possible for new IT resource
Information enrichment	In the individual mobile usage, do you have the technology to separate business/individual usage (ex: mobile virtual technology)
	How much data can be stored in the server
	how much consumer's individual information in possession
	How much sensitive information that shall not be open to outside in possession
	Do you have security technology that can safely protect individual information and important information
External storage	Is the external storage usage ratio high
	Is the external storage's security policy thorough
	Are important information or sensitive information stored in external storage

environmental changes and the IT usage level and IT usage experience sharing is active, etc., it is suitable to manage IT consumerization with open strategy that restriction on individual IT resource usage is not big.

IT capacity: IT capacity means the managerial and relational capacity of the technology to reinforce IT competitiveness with mutual supplementing relationship with IT business value (Khani *et al.*, 2011). While IT business value is the result that can be obtained through business value creation and operation, IT capacity plays the role helping to achieve the result, so one shall try to maintain similar levels. Also, high level IT capacity also corresponds to the meaning that high technology level shall be maintained according to the organization's characteristics, so which technology level is required by the organization shall be also considered.

IT capacity means the technological capacity, so it is highly related to technological and managerial problem solving capability that showed as the phenomenon of IT consumerization. The following is the list of the problems by the phenomenon of IT consumerization.

IT resource life cycle reduction: IT resource's technological support capability, IT support department's technological understanding, organization data and individual information security.

Information enrichment: Mixed existence of individual information/organization information, information adoption capability, data security.

External storage of information: Whether external storage is used, cloud service's security. Through the capability of solving problems that can occur from each phenomenon, management strategy shall be selected. The following is the management strategy decision categories through IT capacity level (Table 2).

IT capacity management strategy decision category has the most significance in the grasping of the technological preparation of the organization. Therefore, if IT technology usage is high in the organization, IT capacity also must maintain similar level (Kleiner and Disterer, 2015). In the organization, if IT consumerization's

influence degree is big, IT capacity is also required for the effort to support it. The organization with many categories corresponding to information enrichment shall also maintain high level IT capacity. These are usually the organizations sensitive to information leakage and data confidentiality, so closed strategy for IT consumerization shall be considered.

IT function: IT function with the role of structurally arranging IT oversees the entire IT organization and management. The complexity of IT management and the increased role of IT organization increase the importance of strategic mission establishment and IT management model, so the importance of IT function that can well connect these also increased (Rockart *et al.*, 1996).

IT function has the overall role of establishing strategy and management model and influenced by IT business value and IT capacity. The two elements shall be sufficiently considered for the strategy to be able to correspond to the needs of the organization members. Also, in IT consumerization, it influenced IT management where information management and resource management were separated previously and unlike the existing IT management where IT resource itself is important, it is because that the management system to connect each element became necessary due to invisible IT needs of individuals, individual IT resource-organization system compatibility problem, etc.

Therefore, IT business value and IT capacity shall be considered and decide on which standard to establish IT management system to maintain organic relationship. For example, if the management system is set with IT's business value oriented, innovative and flexible strategy shall be established (Agarwal and Sambamurthy, 2002) and if strategy with emphasis on IT unction such as data security is established, open strategy or authoritative strategy according to the role shall be selected.
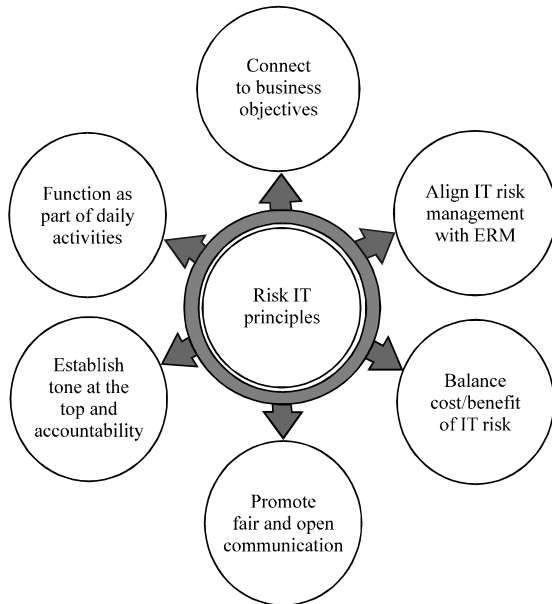
Fig. 4: Principle of risk management (ISACA, 2009)

Risk management: The boundary between internal and external environment disappeared with IT consumerization's influence and potential threats increased and the importance of the risk management is becoming higher (Accenture, 2014). Therefore, the focus of the risk management inside the organization shall be expanded and it is necessary to grasp up to the external elements according to the IT environment changes (Fig. 4).

The risk management shall not be carried out independently limited to IT but shall be related to the entire organization. From daily business to the considerations of the decision maker, the risk management shall be introduced to overall environment of the organization and it shall be carried out centered not on IT resources but on individuals or individual activities (Intel IT Center, 2012).

Also, the decision making shall not be done independently downward but shall active communication method shall be established to sensitively react to the management and technology problems of the all organization members (Fig. 5).

This means that IT business value, IT capacity and IT function shall be eventually included in IT risk management. The system combining individual activity study, threat elements classification and risk management corresponds to the internal element that must be included in the risk management and the external environment shall be also considered through the risk management, so the interface among the elements is essential.
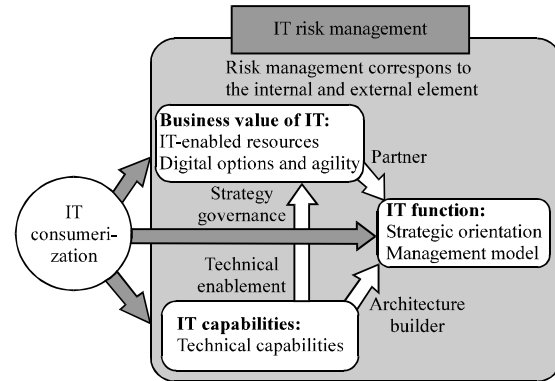

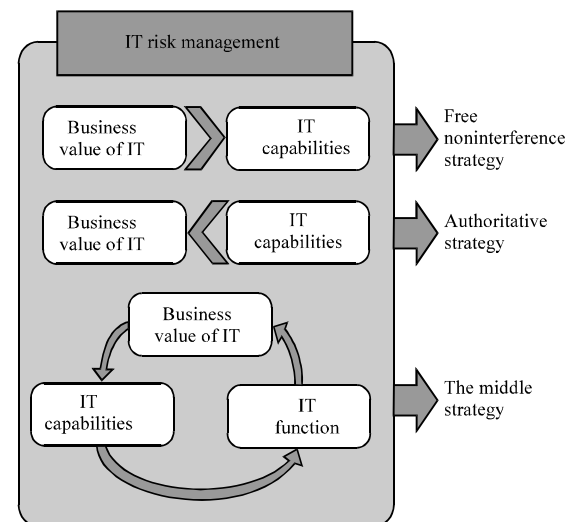Fig. 5: A structure of new IT management considerations (Koffer *et al.*, 2015)

Fig. 6: IT management and strategy choice

IT consumerization management strategy types: Previously, we looked at the considerations required in the organization for IT consumerization management. Through the composing elements of the considerations, IT business value, IT capacity, IT function and IT risk management element, the current IT management influence degree within the organization shall be studied and the strategy corresponding to the organization shall be selected accordingly (Fig. 6).

Free non-interference strategy is the strategy that opens IT consumerization completely and the organization members having the entire responsibility of IT management and it shall be used in the organization with high emphasis on IT business value and also equipped with high level IT capacity. The openness of IT resource is very high, so the environment and situation of the organization shall be clearly decided and respond to the potential threat elements.

Authoritative strategy is the strategy not approving IT consumerization and maintaining the existing centralized control method. It is the strategy used by government institutions, financial service enterprise, etc. with high emphasis on data security related capacity among IT capacities and it is suitable to use in the organization with focus on IT capacity rather than IT business value.

The middle strategy is the medium level strategy between free noninterference strategy and authoritative strategy and can be applied to most of the organizations. It is the strategy that basic IT management is carried out by the organization but ceratin parts of the IT decision making and management authority are given to the individuals and it is the strategy suitable for organizations with IT business value and IT capacity level arrived at certain level or organizations trying to introduce IT consumerization management. The middle strategy can be classified to wide boundary strategy, budget providing strategy, role classification strategy and device utilization strategy but each strategy can be mixed and used according to the characteristics or situation of the organization rather than used as an independent strategy and the big frame is the same with just different development method (Harris *et al.*, 2012).

Each strategy can be different according to on which IT consideration the emphasis is on and in addition to the previously stated considerations, external environment changes and organizational characteristics shall be also considered. Therefore, in case of the risk management, it must be carried out regardless of the type of the strategy.

CONCLUSION

The expansion of IT consumerization brought many changes in not only IT market but also to the organizations. As the consumers not the large organizations such as enterprises became the main agent of IT innovation and started to decide the development direction of IT technology, the increased IT usage experience and utilization capability did not satisfy with IT resources distributed by the organization and made the result of utilizing individual IT resources in the business. Such flow of the changes caused weak points in the existing business process oriented IT management. The problems that may occur in IT management is highly related to the industrial security such as leakage of the information of the enterprise, etc. So, new IT management strategy considering IT consumerization shall be designed to prevent these. For this, the three standards influenced by IT consumerization, IT business value, IT

capacity and IT function and IT risk management to reduce the internal and external threat shall be considered. It is suitable for the enterprise giving high assessment to IT business value related to the result of the activities of the organization members to take open strategy such as free noninterference strategy and the enterprise giving high assessment to IT capacity highly related to technological capacity of IT shall have authority oriented strategy emphasizing on the closed environment. Lastly, the medium strategy considering IT business capacity, IT function and IT capacity evenly will be suitable for most of the enterprises.

Even though IT consumerization is the trend that the organizations must be aware of, there are cases of unconditionally adopting by emphasizing only the advantages or just sitting and watch. In the situation that individual IT resources usage inside organizations increase more and more such attitude of the organization can be a big threat. Therefore, IT consumerization must be aware of and the preparation for this must be considered.

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