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MAKALE

THE IMPACT OF ICT BASED SOCIAL CAPITAL ON ORGANIZATIONAL LEARNING

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ABSTRACT

Information and communication technologies (ICT) are not only tool for communication but also a catalyst for both social capital and organizational learning. The effect of ICT may differ from one style of workplace organization to another. It may also differ from one community to another. This study can be seen as a propositional framework which covers how online communities of practices externalize a part of tacit knowledge. The relationships between ICT and workplace organization are mapped by conducting centralization and decentralization effect of ICT. The scope also extended through the relationships between workplace organization and social capital and organizational learning. The constructs of these variables are selected and framed by making allowance for tacit knowledge. This study also captures some sort of integrated activities (e.g. dimensions and forms of social capital) occurred in a social context. Finally, this study conducts online communities of practices working for logistic sector.

Keywords: ICT, workplace organization, organizational learning, social capital
JEL Codes: D83, D85, J21, J24, O10, O14

ÖZ

Bilgi ve iletişim teknolojileri sadece iletişim aracı değil, aynı zamanda sosyal sermaye ve örgütsel öğrenme arasında bir katalizördür. Bilgi ve iletişim teknolojilerinin etkisi bir işyeri örgütlenme biçiminden diğerine değişmektedir. Bu etki ayrıca topluluktan topluluğa da fark etmektedir. Bu çalışma örtülü bilginin çevrimiçi uygulayım topluluğunda nasıl dışsallaştırıldığına ilişkin kapsam önerisi olarak görülebilir. Bilgi ve İletişim teknolojileri ve işyeri örgütlenmesi arasındaki ilişkiler bu teknolojilerin merkezileşme ve âdemimerkeziyetçilik üzerindeki etkilerine odaklanarak haritalanmıştır. Çalışmanın kapsamı bu bazda işyeri örgütlenmesi, sosyal sermaye ve örgütsel öğrenme değişkenleri ekseninde genişletilmiştir. Bu değişkenleri oluşturan yapılar ise örtülü bilginin değişimi çerçevesinde ele alınmıştır. Bu çalışma ayrıca sosyal bir yapıda var olan bir takım bağıl yapıları da (sosyal sermayenin boyutları ve formları gibi) kayda geçmektedir. Son olarak bu çalışma lojistik sektöründe

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faaliyet gösteren çevrimiçi uygulayım topluluğuna odaklanmaktadır.

Anahtar Kelimeler: Bilgi ve iletişim teknolojileri, örgütsel öğrenme, sosyal sermaye
JEL Kodları: D83, D85, J21, J24, O10, O14

1. Introduction

There is an ongoing discussion about the impact of information and communication technologies (ICT) on knowledge creation and skill diffusion in terms of sharing tacit knowledge. Knowledge is the primary asset of any organization in knowledge society and the ability to create, share and utilize knowledge is continuously upgraded by the advancement of ICT (Brynjolfsson and Hitt, 2003). Although these concepts are widely discussed in the literature, there are still many conflicting conceptualizations and typologies, together with the stylization of individuals, organizations and learning. The popular assumptions are agreeable in view of social assets and norms which also are key variables in knowledge creation and learning (Yli-Renko et al., 2001; Wasko and Faraj, 2005).

It is one of the recent developments that the more effective use of ICT in a virtual environment, including online communities, may build social norms and assets in geographically dispersed communities as well as local communities interacting via ICT. According to Quan-Haase and Wellman (2004), the nature of online tools providing low cost of communication and asynchronous interaction enhance people to participate in interest-based social networks of individuals in globally-dispersed communities. Instead of only a tool for interaction, ICT should also be assumed as an actor of exchanging, codifying, storing, retrieving and delivering.

This study can be seen as a propositional framework which covers how online communities of practices externalize a part of knowledge by capturing some of those activities that occurred in social context. Study conducts both location based communities and geographically dispersed communities. Location based community members are available to have face-to-face contact in their daily works while the members of dispersed community mostly interact via ICT applications. The first part of the study defines major issues in both communities. These issues are given as workplace organization, organizational learning and social capital. ICT are the factor for setting up all revised relations among individuals. The other types of relationships (e.g. face to face) are excluded from the study and those considerations are not gathered. ICT are also handled as an instant communication tool and a constant connectivity tool. Both forms of ICT are measured for all major issues in both communities.

2. Theoretical Framework and Hypotheses

a. Evolution of workplace organization through IT based business

The rapid development in ICT and its extensive use in organizations shaped the structures of organizations in order to adapt new conditions and acquiring, creating and diffusing knowledge within the organization and among organizations. Changes in organizations

are more likely to have a positive change in knowledge acquisition costs in a decentralized architecture. More generally, ICT based working, especially computerization effects organizational change by adding value in two ways; it increases productivity of workers and it increases knowledge acquisition within the organization and between organizations, as well as coordination and monitoring (Brynjolfsson and Hitt, 2003). Furthermore, ICT not only boost organizational performance, but also boost performance of the sector and economy, which is also named as the new economy. The advances especially facilitate easier and cheaper access to storages and processing information stored in databases. One of the advances of the ICT is to enable easier and cheaper communication through the dispersion of wired and wireless communication tools and agents.

In the literature, there are various strands and a great amount of research conducted on the relationships between organizational structures and ICT. These studies posit the role of ICT and complementarities with workplace organization (Brynjolfsson and Hitt, 2003). One strand of research stresses that increases in use of ICT cause increases in the relative profitability of the decentralized decision making (Bresnahan et al.,2002; Brynjolfsson and Mendelson, 1993), while the other strand posits increases in the relative profitability of centralized decision making (Bolton and Dewatripont, 1994). Basically, while the use of ICT enables decentralization by decreasing agency costs, it lowers decision information costs, which favors centralization. The former strands mainly conceive that delegated formal authority should deal with the problem of limited information acquisition by enabling delegated agents with incentives to acquire information.

Acemoğlu, et al. (2007) argues that organizations are more likely to have a decentralized structure if they work in heterogeneous industries and if they have less information acquisition than other organizations. By the way of decentralized workplace structure they can gather well informed local agents. Additionally, the importance of external market conditions force organizations to allocate more authority to create better information acquisition, (Marino et al., 2010). In this sense delegation can utilize the agent's informational advantage within an uncertain environment in order to avoid uninformed decisions.

This relationship between ICT and delegated management systems can be characterized as decentralization effect of ICT on organizational architecture by considering an increase in the use of teamwork versus a decrease in levels of managerial activities with the help of direct participation in decision making processes (Arvantis, 2005). Within the notion of a decentralization effect, individuals in organizations, both workers and managers, can access to information which is stored within the organization, so as to have some independent decisions and more initiatives. Additionally, within the existence of flexible rules, individuals who are using initiatives can act in an informal environment. These conditions

provided by decentralized structure trigger creativity and innovative efforts by enabling trial and error options for individuals and teams. The positive results of allocating decision-making authority may depend on the role of local knowledge. When local knowledge is highly important, delegated decision making is more beneficial than efficiency in communication, as long as the incentive problem is small (Brynjolfsson and Hitt, 2003; Hart and Moore, 2005). As a result, ICT provide more convenient environment for running decentralized management system. However, not only for decentralized systems, ICT also provide some opportunities for central management system.

The optimal method can be seen as the degree of delegation which is stated where the sum of agency (information or decision cost) is minimized. When ICT improve the opportunity of supervising individuals and reduce agency costs, organizations become more decentralized structures. In contrast, when ICT improve the quality and speed of top management decisions, organizations become more centralized in structure. Within the existence of well defined strict rules, the centralization effect of ICT occurs more easily than the decentralization effect. The intense reduction of information and communication costs leads to a transformation of specific knowledge into general knowledge. As a result, it is possible to monitor managers and to coordinate activities performed by peripheral teams (Colombo and Delmastro, 2004). Less inefficiency in the communication process and lower information costs leads to a more centralized allocation of tasks and decision making. Here is point to state a hypothesis as;

H1: ICT is positively influenced by both decentralization and centralization.
- H1.1: Instant communication tools are positively influenced by decentralization.
- H1.2: Constant connectivity tools are positively influenced by decentralization.
- H1.3: Instant communication tools are positively influenced by centralization.
- H1.4: Constant connectivity tools are positively influenced by centralization.

To sum up, ICT applications improves central management's ability to monitor agents and results and increase the relative profitability of decentralization. On the other hand, ICT applications decrease communication and information processing costs and increase organizational performance by enabling central decision making. Decentralization associated with some sort of informal communication and more initiatives which make transfer of implicit knowledge easier and effective. On the other hand, centralization associated with some sort of formalization and specialization which make transfer of explicit and procedural knowledge easier and cost effective. Even though the net effect of ICT used on the value of decentralization versus centralization is therefore ambiguous, it seems to be related with social capital in such dimensions as structural, relational and cognitive or in such forms as bonding, bridging and linking.

b. Organizational structures, social capital and learning

In line with these managerial practices aimed to improve organizational performance, changes in the structure effects the organizational stock of social capital. In particular, decentralized organizations are likely to be informal and specialized organizations which support the emergence of social capital by the providing more individual autonomy (Tsai and Ghoshal, 1998). On the contrary, centralized organizations are likely to be less specialized organizations which prevent the emergence of social capital by constricting its free development (Inkpen and Tsang, 2005).

Based on the empirical studies, there seems to be a positive relationship between organizational performance and dimensions of social capital. In sense of organizational learning; (1) learning takes place in organization with the dialogues and interactions among individuals (Beer et al., 2005), (2) learning takes place in an effective way resulting in a shared understanding (Bell et al., 2010), (3) learning takes place in an individual's mind or within the organizational structure (Beer et al., 2005).

While the first and second aspects refer to interpersonal interactions in a social environment, providing shared cognition and understanding, the last aspect refers to interpretation of messages by individuals who are part of the organization's cognition. According to some seminal works (Nahapiet and Ghoshal, 1998; Adler and Kwon, 2002), these three specified aspects are also linked with embedded assets in organizations, such as structural embeddedness, relational embeddedness and cognitive embeddedness. These works also exclaim some dimensions of social capital by increasing the opportunities of knowledge and information exchange, intensifying the motivation of social interaction between members and contributing to the acquisition of both critical knowledge (tacit knowledge, core knowledge, experiences etc.) and information for members embedded in the inter-organizational relationships.

These dimensions are known as the three dimensions of social capital playing critical role in organizational learning. They are structural, relational, and cognitive dimensions of social capital. Andrews (2010) indicates that relational[(2)] and cognitive[(3)] social capital are positively related to organizational performance. According to the author, while decentralization strengthens the positive impact of relational social capital on organizational performance, it weakens the impact of cognitive social capital. It might be resulting

2 The relational dimension focuses on the character of the connection between individuals. This is best characterized through trust of others and their cooperation and the identification an individual has within a network. Communication is needed to access and use social capital through exchanging information, identifying problems and solutions, and managing conflict.

3 The cognitive dimension focuses on the shared meaning and understanding that individuals or groups have with one another.

from the less hierarchical structures and offering greater opportunities for free transfer of knowledge, and for handling collective action problems without recourse to formal control mechanisms. On the other hand, these benefits of decentralization for the organization might be gained at the expense of a strong sense of mission, since senior managers may have less direct control over the goal orientation of their subordinates.

While social capital can be defined as formation of these issues allowing and facilitating interactions in organizational level, it is also a resource for accessing some other embedded assets at individual level. Social capital can be described as the norms and networks facilitating interaction among members (Woolcock, 2001), resulting in trustworthiness and mutuality (Putnam, 2000) and the precious asset of organizations caring the concept to the interactions among groups of individuals (Ostrom, 2000). From this viewpoint social capital can also be conceptualized as a kind of investment (Lin, 1999) in social relations at the individual level and an investment in networks (or sub-networks) at group level. Within both levels, social capital generates positive externalities for the each member of the group, by the way of shared values, trust and norms. These externalities can be especially derived from informal communication within organizations or communities (Durlauf and Fafchamps, 2004). Based on these claims, most of these approaches of structural perspective recognize networks as the group of individuals working, getting together and etc. It results in improvements in member's capacity of learning and provides better outcomes of collaboration. Sabatini (2006) considers social capital as a social network and defines it as an informal network of strong family ties (bonding social capital), informal network of weak ties connecting friends and acquaintances (bridging social capital), formal networks connecting members of voluntary organizations (linking social capital) and formal networks of activists in political parties.

Another important critic of the network perspective is the style of membership which is categorized as networks and associations (Knowles, 2005). While the networks are about the people knowing each other and interacting informally, the associations are about the people who belong to a community or group, such as membership in a sport team. Knowles (2005) divides associations into two groups as vertical structures and horizontal structures. Whereas members in vertical structures are in hierarchical relationship, members in horizontal structures are in equal basis. This critique posits some other characterizations of social capital in a hierarchy which holds an extraordinarily large set of obligations (Coleman, 1988). However, horizontal associations supply more homogeneity in members, (as opposed to heterogeneity,) in the sense of having common characteristics (Cassar, et al., 2007), as well as common interests and values among members. As a result of having shared values instead of having obligations and homogeneity may raise social capital accumulation by reducing information asymmetries (Grootaert, 1999) and making

interactions and accumulation easier. To finalize the network characteristics which is enhancing or reducing social capital, there is a need to look at another characteristic of the group. Frequency of contacts is one of the characteristics (Narayan and Pritchett, 1999) which plays a critical role in both structures. Frequency may raise social capital and may also raise the rate of accumulation of social capital because the repetition of interactions is the supporting element of reciprocity among individuals. These three network characters help to identify social capital because they also characterize the set of expectations and obligations linked to individual membership to groups. On the other hand, there is need to know the combinations of these characteristics and resulted compositions with the form of social capital accumulated in groups.

Table 1:
Bonding, Bridging and Linking Social Capital

Bonding Social Capital	refers to	ties between people in homogenous groups and similar contexts.
Bridging Social Capital		ties among distant friends and, associates, as well as between institutions.
Linking Social Capital		ties among people in dissimilar situations, such as those who are entirely outside the community and in different social strata.

Source: Sabatini (2006)

With regard to these characteristics, social capital can be presented in three different forms as bonding, bridging and linking. Putnam's (2000) distinction of social capital as bonding social capital referring in homogeneous social groups and bridging social capital referring to heterogeneous social groups. While the former one emerges in homogenous or relation based groups, such as family members, close friends and/or some ethnic closeness, the latter emerges in homogeneous groups which have relations among distant friends, associates and colleagues. One other form, linking social capital indicates relationships among individuals and groups in different social levels via vertical connections to formal institutions in a hierarchy (Healy and Cote, 2001). It extends the social capital beyond the community by leveraging resources and information from formal institutions (Woolcook, 2001). Because of the selected sample representing individual practitioners who are working in same community, linking social capital are not measured in this study. Here is the hypothesis about the relationships between organizational structure and social capital.

H2: Organizational Structure influence social capital

H2.1: Decentralization positively influences bridging form of social capital.

H2.2: Centralization positively influences bonding form of social capital.

In the literature, these two dimensions are also measured by overlapping with structural dimensions of social capital which is also based on the structure of ties among entities. Robert, Dennis, and Ahuja (2008) find that all dimensions of social capital (structural, relational, and Cognitive) facilitate knowledge integration. They argue that the structural social capital is particularly helpful when there is a lack of face-to-face communication channels. Some researchers can also be found in the literature investigating how the structure of relationships and cognitive/relational mechanisms trigger those relationships. For instance, Inkpen and Tsang (2005) research direct ties among individuals in order to realize the effect of interaction by focusing on relational dimensions. According to these authors relational/cognitive dimensions are a mediator between information exchange and relationships between individuals. Thus, it can be stated that weak ties provide more search for, and better access to the new information and resources (Granovetter, 1973). Whereas, strong ties lead to more search for, and better access to, redundant or familiar information and resources (Hansen, 1999). This characterization leads to setup a link between forms and dimensions of social capital, as well as dimensions and organizational learning activities. Figure 1 helps to summarize the conception of this casual framework.

Figure 1:
Casual framework of organizational learning between social capital and innovation

Relational dimension → Bridging social capital → Exploration activity

Cognitive dimension → Bonding social capital → Exploitation activity

Mostly three dimensions of social capital overlap two components of organizational learning. Relational and cognitive dimensions can be characterized with regard to exploration and exploration activities, with the help of frequency of contacts in a structure (Structural dimension). The distinction between exploration and exploitation can be clarified here as the process of exploitation entails the deepening of a firm's core knowledge, while exploration implies a process broadening into non-core areas. Both for the exploration and exploitation process, networks and clusters offer opportunities and mechanisms by representing social capital (Burt, 1992). Based on these considerations, Noteboom (2000) introduces a cycle of discovery involving both exploration and exploitation in a process for all levels: individuals, organizations and innovation systems. However, there are two different views on the matter of balancing these activities. One bunch of researchers posits that there is a trade-off between exploration and exploitation and they cannot

be combined during the same period through innovation (Benner and Tushman, 2003). Others posit that there is cause and effect relationship among activities and they follow each other overtime (Winter and Szulanski, 2001). Hence, organizations still try to have optimization between exploration and exploitation activities in all levels. Maintaining this optimization by combining two activities in all levels is not a clear issue for sustaining organizational learning (Holmqvist, 2004; Levinthal and March, 1993). When considering organizations as a social community, because of the complexity of embedded relationships in a network (Chae et al., 2005), realization of the factors effecting exploration and exploitation activity requires knowledge about social network approaches, focusing on (1) structural properties of networks (Adler and Kwon, 2002), (2) structural holes in the network (Burt, 2000) and (3) the strength of ties (Granovetter, 1973).

While the first two characterizations of social networks as structural properties provides an opportunity to map structure of relationships facilitating learning among entities, the last one provides an opportunity to understand closeness by looking at frequency of interaction. Furthermore, considering strength of ties to map learning in a network requires measurement of cognitive and relational factors. As it is mentioned before, the cognitive dimension of social capital reflects bonding form of social capital resulting from cognitive closeness or distances among actors sharing content or vision, while relational dimensions reflect bridging form of social capital resulting motivation of actors to exchange content. More specifically, both of these forms may serve a moderate relationship between social capital and exploration/exploitation activities. At that point an hypothesis can be stated here as;

H3: Forms of social capital positively influence organizational learning
H3.1: Bridging form of social capital positively influences exploration.
H3.2: Bonding form of social capital positively influences exploitation

While bonding social capital maintains the combination of trust and social cohesion in the community (Coleman, 1988) and enables members to receive social support from other members, it may limit the access to new connections overtime by making the members too dependent to the group (Woolcock and Narayan, 2001). On the other hand, bridging social capital provides access to new connections across the organizational boundaries. With the help of weak ties, bridging social capital provides trust and cohesion among members in different communities (Granovetter, 1973). Moreover, bonding social capital provides strong ties between members, facilitating forms of intergroup interaction and collective action, while bridging social capital provides ties between groups and other actors and organizations (Woolcock and Narayan, 2001). Briefly, bonding social capital refers to a trusting relationship between members in a single community (e.g. social capital in criminal gangs), bridging social capital refers a trusting network of relationships

between members of different communities and between communities (e.g. social capital between sport clubs). At this point there is a need to revisit Granovetter (1973), who stresses that bonding and bridging social capital are correlated with strong and weak ties by maintaining existing relations (bonding) and extending networks or facilitating mobility (bridging). In this context it can be supposed that ICT may have positive effect on the creation of bridging form social capital while maintaining or reducing bonding social capital.

3. Methodology

a. Sample

This research is conducted in media and institutional development departments of the companies working in logistic sector as a specific part of communities of practice (CoP). The logistics, in its simplest definition, is the set of activities that plans and executes the delivery of goods and raw materials from suppliers to end-users (Özdemir and Darby, 2009). The increased global exchanges and competition with the improvement of logistics infrastructure and system force logistics companies to use more advanced ICT for leveraging their supply-chain networks (Özdemir and Darby, 2009). Moreover, the countries in central position in terms of global logistics expand their online networks for ensuring effective and efficient transportation across the world. In line with these structural changes in the sector, logistics companies shift their ICT infrastructures towards advanced systems in order to improve their decision-making activities, collaborative works with their partners, communication activities with suppliers, produces, wholesalers, distributors, stores and customers. On the other hand, they utilize the advances of ICT for awareness raising, strategic alliances, learning, diffusing, informing and etc. Eliiyi and Şahin (2011) underlines the situation of Turkish logistics sector as a gateway between Europe and Asia. Because of Turkey's strategic position as a hub between three continents, the effective use of advanced ICT is critically important for successful development and sustaining competitive forces. The implementation and development of ICT improves the performance of logistics companies especially by passing the information to different parties in the network and by decreasing the cost of overall system (Disney et al., 2004). The use of ICT also provide learning abilities, accessing faster and reliable services, increasing revenues and effective communication for the companies working in the sector (Feng and Yuan, 2006). Within this sector, the sample population for the study consisted of managers, vice managers, specialists, experts, officers and consultants working for logistics companies located in Istanbul which is the most populous city involving 15% of the Turkish population.

In data collection process, the questionnaire was given to volunteer members and answers were collected by face-to-face interviews. These respondents are practitioners who

are using online tools in their communities: location-based and dispersed. These practitioners are engaged in learning effective ways of operations, managing human resources, monitoring operations and third parties, adapting procedures to global situations involving such challenges as green house gases, negative effects on human health, land use and resource consumption. These practitioners are also responsible for social and environmental issues by concerning their business practices to work towards corporate sustainable development and learning. With the help of face-to-face interviews practitioners answered directed questions correctly and carefully. In order avoid getting biased results; face-to-face interview is selected as the date collection method. Similarly, core departments, instead of ICT departments, are analyzed for accessing healthy implications about the sector.

b. Measurements

In this study, data were collected through 30 different instruments which consisted of a questionnaire. According to Jacobs and Chase (1992), an instrument's reliability deals with the consistency of measurements. The majority of the studies assessing reliability of the instruments have done so through the standard coefficient of internal consistency, Cronbach's alpha level. It was also used to verify reliability in this study. The scales used in this study are ICT, organizational structures, organizational learning, and social capital scales, which are primarily adapted from the literature and based on the character of the research object. The questions for measuring the use of ICT are mostly adapted from the work of Partnership on Measuring ICT for Development introduced by International Telecommunication Union (ITU)[4], European Union Surveys on ICT usage and e-Commerce in enterprises (2011)[5]. The other questions for measuring the workplace organization and social capital are based on the approaches which are given at Section 2.

After the first-run of the analysis, a necessity to have some additional data is required because of the deficient explanations on the latent constructs. New questions in 120

4 The Partnership on Measuring ICT for Development was launched in June 2004, following the first phase of the World Summit on the Information Society (WSIS). Its current members are Eurostat, the International Telecommunication Union (ITU), the Organization for Economic Co-operation and Development (OECD), the United Nations Conference on Trade and Development UNCTAD, the United Nations Department of Economic and Social Affairs (UNDESA), the United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics (UIS), the World Bank, and four United Nations Regional Commissions (the UN Economic Commission for Africa, the UN Economic Commission for Latin America and the Caribbean, the UN Economic and Social Commission for Asia and the Pacific, and the UN Economic and Social Commission for Western Asia). For further information on the objectives and activities of the Partnership, see http://measuring-ict.unctad.org

5 Access to database: European Union Survey on ICT usage and e-Commerce in enterprises (2011)
http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/comprehensive_databases
http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/documents/Tab/what%20is%20where%20on%20Eurobase_upd2012.pdf

interviews are repeated with same practitioners. In this process the number sample is increased to 150 interviews which also provide an opportunity to eliminate missing data and out layers. Each of variables is measured by a five-point Likert-type scale, ranging from 1 (low) to 5 (high).

i) Information and communication technologies

Given the vastness of the literature resulted by popularity of relationships between social capital and ICT, highly limited criteria representing the use of ICT in CoP are adopted from the ICT literature and measurement indexes as well as open ended question in test-runs. Because of the strategy of the study, ICT are handled in two different parts as instant communication tools and constant connectivity tools. The former refers instant and synchronous communication applications while the latter refers constant repositories and platforms for asynchronous communication tools. Here is the set of criteria's and results of EFA. The results shows two parts of ICT explain 63% of total variance of other criteria used in gathering data. The result and scores of EFA can be seen at Appendices 1.1.

- Synchronous communication applications – (Instant Communication Tools)
  - Receiving/Sending from/to LMS platforms
  - Receiving/Sending from/to instant message
  - Receiving/Sending from/to web based chat
- Asynchronous communication tools – (Constant Connectivity Tools)
  - Receiving/Sending from/to forums
  - Receiving/Sending from/to wikis
  - Receiving/Sending from/to social networking sites (SNS)

ii) Organizational structures

The organizational structures scale is adapted from a revision of Acemoglu, et al. (2007), Beer ,et al. (2005). These adapted criteria are;

- Decentralized workplace organization
  - Tolerance of mistake is high in location based/dispersed community
  - Ability to act individually in location based/dispersed community
  - Having informal relationships in location based/dispersed community
  - Having flexible rules in location based/dispersed community
  - Trial/error option is available in location based/dispersed community
- Centralized workplace organization
  - Rules are exactly defined in location based/dispersed community
  - Having strict rules in location based/dispersed community

The results and scores of EFA can be seen at Appendices 1.2.

iii) Social capital

The scale of social capital is primarily based on the work of Narayan and Pritchett, (1999), Putnam (2000), Cassar, Crowley and Wydick, (2007) who described social capital using the three dimensions of structure, relation and cognition as well as referring two forms of bridging and bonding. In line with the strategy, social capital is adapted by setting two forms as bridging and bonding with the selected measurable items listed here;

- Bridging form of Social Capital
  - Short-term newcomers to location-based community
  - Volatility in location-based community
- Bonding form of social capital
  - Long-term newcomers to location-based community
  - Members are known each other directly in location-based community

The results and scores of EFA can be seen at Appendices 1.3.

iv) Learning

The organizational learning scale is a revision of the measurements in Noteboom (2000), Holmqvist (2004) and Levinthal and March (1993). The sub-dimensions of organizational learning include exploration and exploitation and involve 12 measurable items. Here is the list for these items. The results and scores of EFA can be seen at Appendices 1.4.

- Exploration
  - Creativity is supported in location-based/dispersed community
  - New Educational activities in location-based/dispersed community
  - Sharing of information in location-based/dispersed community
  - There is new information from outside to location-based/dispersed community
  - There are newcomers from outside to location-based/dispersed community
  - There is uncertainty in location-based/dispersed community
- Exploitation
  - Cooperation in implementation in location-based/dispersed community
  - Existence of determined procedure and action plan in location-based/dispersed community
  - Implementation of information in location-based/dispersed community
  - Sharing of knowledge in location-based/dispersed community
  - Newcomers are capable for processes in location-based/dispersed community

Members know what they will do in location-based/dispersed community

c. Reliability and validity

To test the validity and reliability of scales, besides obtaining full content validity through literature analysis and this study utilizes Cronbach's Alpha to test each scale's reliability and the results show that all exceed 0.65, demonstrating that each scale in this study has good reliability. Because of the adapted criteria and added new measurable items Confirmatory Factor Analysis is not needed in this study. EFA factor regression scores are used for dependent and independent variables and statistics are given in acceptable significance levels.

4. Findings

Structures of workplace organization positively and significantly has an influence on the use of ICT in both meaning as instant communication tools and constant communication tools. As it s seen at Table 2, the effect of decentralized workplace organization has bigger influence on Instant communication tools than constant connectivity tools. In order to utilize this effect of decentralization, criteria of Instant communication and criteria of decentralization can be considered as behaviors of individuals in rigid/flexible working environment for location based communities. Individuals have more tendencies to use instant communication tools for being interactive with their colleges or other members of the community. The effect of workplace organization is different from location based communities in geographically dispersed communities. The centralized workplace organization has significant and positive impact on the use of ICT for both meaning as instant and constant tools. This result mostly emerges from the specific group of individuals working as practitioners. In dispersed community, online members mostly use their own ICT tools such as their extranet, wikis, instant messaging application to interact with other members. This tendency makes the effect of centralization is positive. Finally, as its expected, bridging form of social capital has positive effect on instant communication tools in location based communities while bonding form of social capital has a positive effect in dispersed communities. These results are parallel with the results of workplace organization. Even members interact with other member in dispersed community; they mostly use ICT tools served by central management. Table 3 shows related regression results. Decentralized workplace organization has positive impact on bridging form of social capital while centralized workplace organization has positive impact on bonding form of social capital. It is because of the effect of decentralization on individuals who are interacting informally with other members mostly in short term periods. Table 4 gives regression scores of effect of workplace organization on social capital. This impact in location based communities is no change in dispersed communities. However, centralization has

a positive impact on bridging form of social capital in location base communities because of the availability of face-to-face communication making individuals to develop social capital in other ways. These impacts of workplace organization on the forms social capital are parallel with the impact of workplace organization on the organizational learning. As it is seen at Table 5, the only difference can be found in exploration in location based communities for bridging social capital that is insignificant. Even centralization provides bridging social capital in location based communities; it is not utilized for exploration in location based communities. This result emerges from the possible similarities and cognitive closeness of the members in location based communities. Bridging social capital can only be utilized if the workplace organization is decentralized in location based communities. Table 6 presents regression scores stating bridging form of social capital is found in location based communities for exploration. On the other hand bonding form of social capital is found just for exploitation activity. Table 2 shows hypothesis in this study and all of them is accepted for location based and dispersed communities.

Table 2:
List of Hypothesis and Acceptances

	Loc. B.	**Disp.**
H1: ICT positively influenced by both decentralization and centralization.	**√**	
H1.1: Instant communication tools are positively influenced by decentralization.	**√**	**-**
H1.2: Constant connectivity tools are positively influenced by decentralization.	**√**	**-**
H1.3: Instant communication tools are positively influenced by centralization.	**√**	**√**
H1.4: Constant connectivity tools are positively influenced by centralization.	**√**	**√**
H2: Organizational Structure influence social capital	**√**	
H2.1: Decentralization positively influences bridging form of social capital.	**√**	**√**
H2.2: Centralization positively influences bonding form of social capital.	**√**	**√**
H3: Forms of social capital positively influence organizational learning	**√**	
H3.1: Bridging form of social capital positively influences exploration.	**√**	**√**
H3.2: Bonding form of social capital positively influences exploitation	**√**	**√**

Table 3:
The Effect of Workplace Organization on the Use of ICT

	Dependent Variables of ICT			
	Instant Communication Tools		Constant Connectivity Tools	
Location Based Community				
Decentralized Workplace Organization	0.562	***	0.343	***
Centralized Workplace Organization	0.273	***	0.301	***
R^2	***0.39***		***0.2***	
Adj. R^2	***0.38***		***0.19***	
F	***37.504***	*****	***10.086***	*****
Dispersed Community				
Decentralized Workplace Organization	0.021		0.14	
Centralized Workplace Organization	0.363	***	0.258	**
R^2	***0.13***		***0.08***	
Adj. R^2	***0.12***		***0.07***	
F	***8.885***	*****	***5.528***	******
Location Based Community				
Bridging Social Capital	0.799	***	0.145	
Bonding social Capital	0.078		0.075	
R^2	***0.64***		***0.026***	
Adj. R^2	***0.63***		***0.009***	
F	***105.713***	***	***1.561***	
Dispersed Community				
Bridging Social Capital	***0.04***		***0.236***	
Bonding social Capital	***0.248***	*	***0.138***	*
R^2	0.063		***0.075***	
Adj. R^2	0.047		***0.059***	
F	3.954	*	***4.731***	*

*** p < 0.01 ** p<0.05 * p<0.1

Table 4:

The Effect of Workplace Organization on the Forms of Social Capital

		Location Based Communities				Dispersed Communities			
		Bridging Social Capital		Bonding Social Capital		Bridging Social Capital		Bonding Social Capital	
Location Based	Decentralized Workplace	0.556	***	-0.162		0.008		0.066	
	Centralized Workplace	0.292		0.395	***	0.065		-0.021	
Dispersed	Decentralized Workplace	0.003		0.126		0.777	***	-0.041	
	Centralized Workplace	0.272		0.17		0.074		0.883	***
	R^2	0.57		0.18		0.63		0.76	
	Adj. R^2	0.55		0.16		0.61		0.75	
	F	38.273	***	6.632	***	48.889	***	88.698	***

*** p < 0.01 ** p<0.05

Table 5:

The Effect of Workplace Organization on Organizational Learning

		Location Based Communities				Dispersed Communities			
		Exploration		Exploration		Exploration		Exploration	
Location Based	Decentralized Workplace	0.94	***	-0.087		0.019		0.08	
	Centralized Workplace	0.002		0.86	***	0.066		-0.019	
Dispersed	Decentralized Workplace	0.031		0.049		0.919	***	-0.024	
	Centralized Workplace	-0.058		-0.085		0.052		0.915	***
	R^2	0.91		0.72		0.87		0.81	
	Adj. R^2	0.9		0.71		0.87		0.8	
	F	278.853	***	73.094	***	194.692	***	121.635	***

*** p < 0.01 ** p<0.05

Table 6:
The Effect of Social Capital on Organizational Learning

	Location Based Communities				Dispersed Communities			
	Exploration		Exploration		Exploration		Exploration	
Bridging form of social capital	0.67	***	0.324	***	0.78	***	0.025	
Bonding form of social capital	0.077		0.483		0.21		0.94	***
R^2	0.45		0.34		0.61		0.88	
Adj. R^2	0.44		0.33		0.6		0.88	
F	48.546	***	29.91	***	91.613	***	443.59	***

*** p < 0.01 ** p<0.05 * p<0.1

5. Conclusion

Previous research about the relationship between ICT and social capital mostly conducts to investigate one particular technology, such as the Internet, e-mail or phone. Recent findings about the impact of ICT on social capital tend to support positive relationships between the constructs by underlining the sense of community in virtual spaces and enhancing its offline relations (Hampton and Wellman, 2003). Along with these findings, it can be derived that the impact of ICT on social capital depends on the type of technology selected by individuals and tools for interaction. Together with the various communication and social media tools, electronic networks has extended the way of interaction among people to the era of interaction among users in such communities. With the rapid development in technologies and tools, first it became a mediator of real world relations but later it defined these relations with its own dynamics.

For instance, Web 2.0 enabled social media tools for communicating, sharing, learning as well as socializing. With the advance of Web 2.0, new tools provide huge variety of ways to interact. Each of these tools has a different impact on societal activities in an organizational context (Altheide, 1994). Within the frame of this statement, it can be supposed as users transform these tools by customizing them, modifying them and experimenting with them towards the purpose of the action.

Conducting ICT as the instant communication and constant connectivity provided an insight to comprehend the multi-faceted nature of interactions including text, voice, video, picture and so on. Moreover, these shared materials may be synchronous or asynchronous. Combined use of these tools may offer some opportunities for creating and maintaining social capital among users. Communication tools refer to the acts of transmitting information or knowledge by using the various media such as instant messaging, chat rooms

and LMS platforms. The conversation via these media can be from one to many or from one to one. These tools are generally considered to supplement face-to-face communication in location based communities while it is a substitute for dispersed ones. Findings of the study show that decentralized workplace organization has no significant impact on the use of ICT. It is most probably because of the empowered and delegated workforce in those communities. Both form of ICT is an important tool when decentralized teams want to get together around an entity. On the other hand, constant connectivity tools offer new connections from the virtual spaces by participating online communities. Having an account in social networking sites, wikis, and forums may bring the user to a central position to access new information via new contacts (Deitering and Bridgewater 2005). Results shows that dispersed teams can utilize ICT when they have centralized workplace organization. It means that when rules are exactly defined in procedures and when they are strict, centralized workplace organizations work well in online environment. There is differences between location based communities and dispersed communities working in an online environment. However, differences between EFA results present the constructs enabling significant results.

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APPENDICES

1. EFA results for the use of ICT in CoP

Rotated Component Matrix

	Component	
	1	2
Sending comment to LMS platforms	.879	.156
Reading/Following LMS platforms	.869	.112
Receiving to instant message	.723	.335
Receiving to web based chat	.687	.273
Sending to web based chat	.620	.306
Sending to instant message	.600	.514
Sending comment to forums	.086	.816
Sending comment to wikis	.119	.754
Reading/Following SNS	.290	.745
Sending comment to SNS	.423	.719
Reading/Following forums	.347	.710
Reading/Following wikis	.385	.646

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

Cronbach's Alpha	0.875	0.872	0.909
Cronbach's Alpha Based on Standardized Items	0.878	0.876	0.913

Total Variance Explained %	31.814	31.742	63.556
Total Variance Explained % (Cumulative)	31.814	63.556	63.556

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.891
Bartlett's Test of Sphericity		
	Approx. Chi-Square	794.821
	df	66
	Sig.	0.000

Component 1
ICT_INSTANT_COMMUNICATION_TOOLS
Component 2
ICT_CONSTANT_CONNECTIVITY_TOOLS

2. EFA results for the use of organizational structures.

Component Matrix[a]

	Component	
	1	2
Tolerance of mistake is high in location based community	.865	.269
Ability to act individually in location based community	.855	.036
Having informal relationships in location based community	.840	.229
Having flexible rules in location based community	.736	-.026
Trial/error option is available in location based community	.700	.488
Rules are exactly defined in location based community	-.430	.879
Having strict rules in location based community	-.461	.868

Extraction Method: Principal Component Analysis.

Total Variance Explained %	48.333	30.279
Total Variance Explained % (Cumulative)	30.279	78.612

Cronbach's Alpha (for all Variables)	48.333	30.279
Cronbach's Alpha Based on Standardized Items (for all Variables)	30.279	78.612

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.741
Bartlett's Test of Sphericity		
	Approx. Chi-Square	697.905
	df	66
	Sig.	0.000

Component 1

DECENTRALIZED WORKPLACE_in Location-based Communities

Component 2

CENTRALIZED WORKPLACE_in Location-based Communities

Component Matrix[a]

	Component	
	1	2
Trial/Error option is available in dispersed community	.947	-.117
Tolerance of mistake is high in dispersed community	.826	.075
Ability to act individually in dispersed community	.813	-.134
Having flexible rules in dispersed community	.813	-.156
Rules are exactly defined in dispersed community	.136	.871
Having formal relationships in dispersed community	.137	.862
Obligation is the factor getting members together in dispersed community	.093	.515
Having strict rules in location based community	-.461	.868

Extraction Method: Principal Component Analysis.

Total Variance Explained %	41.805	26.381
Total Variance Explained % (Cumulative)	26.381	68.186

Cronbach's Alpha	0.683
Cronbach's Alpha Based on Standardized Items (for all Variables)	0.712

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.677
Bartlett's Test of Sphericity		
	Approx. Chi-Square	375.745
	df	21
	Sig.	0.000

Component 1

DECENTRALIZED WORKPLACE_in Dispersed Community

Component 2

CENTRALIZED WORKPLACE_in Dispersed Community

3. EFA results for the use of social capital

Rotated Component Matrix

	Component	
	1	2
Short-term newcomers to location-based community	.909	-.040
Volatility in location-based community	.906	.088
Long-term newcomers to location-based community	.048	.903
Members are known each other directly in location-based community	.000	.901

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Total Variance Explained %	41.24	40.918
Total Variance Explained % (Cumulative)	40.918	82.159

Cronbach's Alpha (for all Variables)	0.655
Cronbach's Alpha Based on Standardized Items (for all Variables)	0.661

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.487
Bartlett's Test of Sphericity		
	Approx. Chi-Square	127.139
	df	6
	Sig.	0.000

Component 1

BRIDGING_Social Capital in Location-based Communities

Component 2

BONDING_Social Capital in Location-based Communities

Rotated Component Matrix

	Component	
	1	2
Long-term newcomers to dispersed community (1-5)	.957	.032
Members are familiar to each other in dispersed community (1-5)	.903	-.024
Intimacy in dispersed community (1-5)	.875	.104
Short-term newcomers to dispersed community (1-5)	-.076	.855
Different back-grounded newcomers to dispersed community (1-5)	.149	.830

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Total Variance Explained %	50.493	28.642
Total Variance Explained % (Cumulative)	28.642	79.135

Cronbach's Alpha (for all Variables)	0.697
Cronbach's Alpha Based on Standardized Items (for all Variables)	0.691

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.655
Bartlett's Test of Sphericity		
	Approx. Chi-Square	278.371
	df	10
	Sig.	0.000

Component 1

BONDING_Social Capital in Dispersed Community

Component 2

BRIDGING_SC_ in Dispersed Community

4. EFA results for organizational learning

Rotated Component Matrix

	Component	
	1	2
Cooperation in implementation in location-based community	.885	-.221
Existence of determined procedure and action plan in location-based community	.842	-.105
Implementation of information in location-based community	.838	-.177
Sharing of knowledge in location-based community	.818	-.179
Newcomers are capable for processes in location-based community	.753	-.137
Members know what they will do in location-based community	.731	-.001
Creativity is supported in location-based community	-.239	.811
New Educational activities in location-based community	-.281	.783
Sharing of information in location-based community	.304	-.644
There is new information from outside to location-based community	-.071	.599
There are newcomer from outside to location-based community	.229	-.596
There is uncertainty in location-based community	.067	.272

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Total Variance Explained %	32.898	27.819
Total Variance Explained % (Cumulative)	27.819	60.717

Cronbach's Alpha (for all Variables)	0.609
Cronbach's Alpha Based on Standardized Items (for all Variables)	0.688

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.821
Bartlett's Test of Sphericity		
	Approx. Chi-Square	1781.104
	df	136
	Sig.	0.000

Component 1

EXPLOITATION_in Location-based Communities

Component 2

EXPLORATION_in Location-based Communities

Rotated Component Matrix

	Component	
	1	2
There is uncertainty in dispersed community	.850	.015
Sharing of information in dispersed community	.785	.154
There is new information from outside to dispersed community	.751	.172
Creativity is supported in dispersed community	.733	.023
There are newcomer from outside to dispersed community	.730	.007
Sharing of knowledge in dispersed community	.052	.918
Members know what they will do in dispersed community	.024	.877
Cooperation in implementation in dispersed community	.047	.850
Newcomers are capable for processes in dispersed community	-.024	.804
Implementation of information in dispersed community	.126	.703

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Total Variance Explained %	36.664	30.314
Total Variance Explained % (Cumulative)	30.314	66.978

Cronbach's Alpha (for all Variables)	0.868
Cronbach's Alpha Based on Standardized Items (for all Variables)	0.872

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.845
Bartlett's Test of Sphericity		
	Approx. Chi-Square	1371.152
	df	91
	Sig.	0.000

Component 1

EXPLORATION_in Dispersed Communities

Component 2

EXPLOITATION_in Dispersed Communities