

The Role of ICT in Smart-work Continuance

Sang Soo Kim^{a,*}, Eun Jung Ko^b, Sang Yeoul Kim^c

^a Assistant Professor, Department of Business Administration at Yong In University, Korea

^b Ph.D. Candidate, Graduate School of Business at Sogang University, Korea

^c Senior Industry Specialist in Deloitte Consulting, Korea

ABSTRACT

Despite the increasing interest in the positive effects of smart-work, the introduction rate of domestic firms in Korea is lower than that of other developed countries. A gap also exists between the introduction of smart-work program and the actual use by workers. Thus, even if the smart-work program was introduced to firms, the actual usage rate of the program would still be lower than the introduction rate. Moreover, even if the program was initially used, evidence suggests that the usage rate tends to decrease rather than being used continuously. In this study, we intend to find out the mechanism by which the continuance intention of smart-work is formed. To achieve this objective, we established a research model based on literature on Information System (IS) continuance model and Information & Communication Technology (ICT) support. We also hypothesize that concerns about career disadvantage in the mechanism plays a negative role in the satisfaction of smart-work. To analyze the hypothesis empirically, we surveyed domestic workers who used smart-work. Our data analysis was based on 333 responses. We found that all paths were statistically significant, except for the direct effect of ICT support on perceived usefulness and the direct effect of perceived usefulness on smart-work continuance intention. The results of this study extend existing IS continuance model and suggest implications for practical smart-work implementation and improvement.

Keywords: Smart-Work Continuance, ICT Support, Confirmation, Satisfaction, Perceived Usefulness, Concern about Career Disadvantage

1. Introduction

With the development of information technologies such as intranet, groupware, and cloud computing, information access methods have been improved, creating an environment in which workers can flex-

ibly handle tasks without restriction of time or space (Chang, 2011). As a result, public and private companies are pursuing more sophisticated and high level organizational innovation in the way they work, perform (fulfill) tasks and manage their performances through the innovation of time and space manage-

*Corresponding Author. E-mail: sgssk@yongin.ac.kr Tel: 823180202726

ment (Samsung Economic Research Institute, 2011).

The concept of smart-work breaks away from the conventional designated working hours and spatial concepts. It means a work environment in which a worker can positively accommodate the latest information technology environment without being constrained by time and place, and can perform work by connecting people, information, and knowledge through a network (Lee and Lee, 2011). The core of smart-work is the autonomy of workers' time, place, and method of doing their jobs in the way they want to work at the time they want to, and ICT provides a very important role in securing this autonomy (Lee and Kim, 2010). In the past industrial society, the workplace office had all the facilities, equipment, and fixtures necessary for carrying out work. But now the environment is changing, and even if they are not in the office, they can use IT or social media related apps to do the work. With smartphones, we can work anywhere, anytime, and there are a lot of related software being created. Working smart is not just about increasing efficiency or productivity. Rather, it's about creativity, creating innovative changes, working in a better way, and, as a result, innovating efficiency and productivity (No et al., 2011). In this respect, ICT maximizes creativity by maximizing the autonomy of employees and balancing work and life on the assumption that they achieve a given work performance. Today, the biggest issue of increasing work capacity is to secure the competitiveness as well as productivity and efficiency by carrying out the traditional business functions more creatively and innovatively, and at the same time securing the leisure of individual life (Ko and Kim, 2017).

In the era of Smart Work, it has made a lot of changes in the old social wisdom of having to spend most of the time in a single workplace, and it has

become possible to have various types of flexible work arrangements. Flexible work arrangements introduced and used in Korea can be classified into types such as working time selection system, time-lapse commuting system, discretionary work system, remote work system (telecommuting, smart work, mobile work), however, it is currently in the midst of time-lapse commuting (12.5%) and working time selection (11.6%) (Ko and Kim, 2017).

Despite the interest in smart-work in recent years, the introduction rate of domestic companies is only 21.9%, which is lower than that of overseas advanced countries (Ministry of Employment and Labor, 2016). In the case of flexible work arrangements in developed countries and the globalization trend, the government announced 'Smart-work Activation Strategy' in 2010, which aims to increase the participation rate of smart-work participation of the entire workforce by 30% by 2015 (Ministry of Science and ICT, 2015). More importantly, even if institutions are officially in place in the organization, it is also a reality that is difficult to use practically. In Eaton's (2003) study, biotechnology-related workers were asked about the number of flexible work arrangements they recognize. Among the given seven types of flexible work arrangements, the average of 3.2 were said to exist. However, the average of the actual utilization was only 1.5. This shows that even if there is an institution, there can be a gap between existence itself and actual utilization (Choi et al., 2011; Kossek et al., 2006).

Particularly, due to Korea's traditional organizational culture emphasizing face-to-face contact, there is a negative view on systems such as teleworking, which is one of smart-work types (Chung, 2011). In addition, there is a limit to activation due to the perception that non-regular workers are mainly employed. These negative views will appear as concerns about career disadvantages and will prevent

the use of actual smart work programs (Perlow, 1995; Thompson et al., 1999). In fact, a global survey of 1,320 executives from 71 countries found that 61% of respondents said that those using smart-work programs (in this study, we use the smart-work program in the meaning of the flexible work arrangement that enables working smart based on ICT) were relatively unfavorable in terms of career development, including promotion (Lee and Kim, 2012). According to the 'Basic statistics survey for establishment of IT based teleworking policy' conducted in Korea, the expectation effect of teleworking was positive in all individuals, organizations and countries. However, 44.7% of the respondents said that they intend to use teleworking (Kim et al., 2009). In a recent study of workers at the Korea Road Traffic Authority, it was mostly for the purpose of giving birth or for raising children to use flexible work arrangements. In addition to the fact that the actual use rate for other types is low, the number of users has also dropped by about 40% from 136 in 2012 to 83 in 2013 (Kim et al., 2015).

In view of the attitudes of these workers, it can be seen that the introduction of smart-work alone cannot bring positive results. Therefore, it is necessary to review the perspectives of workers' acceptance of smart-work and their continuous utilization intention. However, most of the previous studies have focused on the effects of smart-work introduction (Park et al., 2013). This study focuses on the continuity of the introduced smart-work program and approaches from the viewpoint of the smart-work continuance intention after the acceptance. We will look at how mechanisms of smart-work continuance intention are formed, based on the IS continuance model (Bhattacharjee, 2001), and to examine the ICT support (Lee and Choi, 2003; Stonehouse and Pemberton, 1999) and con-

cerns about career disadvantage for enabling such mechanisms.

II. Literature Review

2.1. IS Continuance Model

Understanding the persistent intent of the individual to use the information technology has been of great interest in IS research (Bagayogo et al., 2014). Bhattacharjee's IS continuance model demonstrates empirically the phenomenon associated with IS persistent use (Bhattacharjee, 2001; Bhattacharjee and Barfar, 2011; Carillo et al., 2017). According to the IS continuance model, the agreement (confirmation) between initial expectation and actual performance affects both perceived usefulness and user satisfaction. Perceived usefulness also affects satisfaction and ultimately determines the intent to use continuously. The term "smart-work" used in this study is not a technology itself but a work policy. However, since smart work is indispensable to ICT, this study intends to use the IS continuance model of Bhattacharjee (2001) as the theoretical background.

The IS continuance model is based on the Expectation Confirmation Theory (ECT). ECT is an extension of the Cognitive Dissonance Theory (CDT) in social psychology and is based on marketing and consumer behavior research (Oliver, 1977; Oliver, 1980; Oliver and Desarbo, 1988). It has been applied in many fields such as service quality, psychology, leisure behavior, medicine, and human resources. The Expectation Confirmation Theory is also called the Expectation Disconfirmation Theory. In this case, the concept of disconfirmation is used instead of confirmation (Bhattacharjee, 2001; Oliver, 1980; Oliver, 1993). The main difference is that the concept of

confirmation is positively related to satisfaction because it represents the realization of the benefits of using, while disconfirmation focuses on failure to meet expectation satisfaction (Bhattacharjee, 2001).

Carillo et al. (2017) categorized studies using IS continuance model into three categories. The first is the studies that focus on the 'continuance intention' itself as a dependent variable and extend the whole or part of the model. The second is a study of the phenomenon that is different from the IS continuous use by taking several constructs used in Bhattacharjee's model. In these studies, other variables were used as dependent variables rather than continuance intention. Finally, the third is the research using some results and implications of the IS continuance model for developing other specific theories. This study belongs to the first category. We set the continuance intention of smart-work as a dependent variable and expand the factors affecting it based on Bhattacharjee's IS continuance model.

2.2. ICT Support as an Enabler for Smart-work

Information and communication technology (ICT) refers to any electronic device or technology capable of collecting, storing and transmitting information (Steinmueller, 2000). By increasing access to information, ICT can improve employee problem solving (Morgan et al., 2000) and improve employee performance by increasing their communication ability with other organizational members (Dewett and Jones, 2001). ICT can also increase the level required by employees by increasing access to the workplace and increasing expectations for productivity (O'Driscoll et al., 2010).

As mentioned above, ICT can improve information accessibility both inside and outside the workplace, improving the frequency and ease of com-

munication among employees. Due to the development of ICT, the practice of workers coming to workplace is now changing into a work centered on workers (Coates, 1997). Smart work means a flexible work type that allows information to be carried out without restriction of time and place by utilizing information and communication technology (ICT). It is generally classified into telecommuting, mobile office (mobile work), and smart work center (Lee and Kim, 2010). Smart-work is not just about replacing basic business with mobile or wireless environment, but it can improve processes and create new value by utilizing characteristics of mobile or wireless environment. There are three stages of smart work development (Lee et al., 2011). In the first stage, communication between employees goes beyond the boundary of time and place. In the second stage, transparent information sharing is realized through real-time interworking with the in-house business system. Finally, the third stage is the stage in which the way of working itself is changed.

III. Hypotheses Development

3.1. Smart-work Continuance Intention

The logic of the conceptual model derived from the IS continuous model is based on the claim that it leads to a cognitive evaluation that the difference (confirmation) between the pre-acceptance stage of the smart-work environment characterized by the initial expectation at time t_1 and the perceived performance at time t_2 . This study also assumed that confirmation affects usage-related behavior.

As with the Bhattacharjee study, acceptance predisposing factors are implicit in confirmation and satisfaction constructs. In addition, the IS continuance

model is based on the assumption that perceived usefulness (Davis et al., 1989) is the only belief that affects a user's intention at various stages of IS use (Bhattacharjee, 2001), and captures the expectation through it (Carillo et al., 2017). Applying this to the viewpoint of smart work in this study, expectation of smart-work will affect the intention of continuous use through perceived usefulness and satisfaction. Thus, hypotheses about the relationship between the constructive concepts and the concepts presented in the IS continuance model are applied to the viewpoint of smart-work program use in this study.

H1: Confirmation of smart-work will have a positive impact on perceived usefulness.

H2: Confirmation of smart-work will have a positive impact on satisfaction with smart-work.

H3: The perceived usefulness of smart-work will have a positive impact on satisfaction with smart-work.

H4: The perceived usefulness of smart-work will have a positive impact on smart-work continuance intention.

H5: Satisfaction with smart-work will have a positive impact on smart-work continuance intention.

3.2. ICT Support and Smart-work

ICT support represents the degree to which an organization provides essential ICT-based services for communication, collaboration and information processing. ICT provides a digitized platform for data and employee communication and knowledge sharing within the enterprise (Alavi and Leidner, 2001). In this regard, it has been seen that organizational ICT support is useful not only in efficiency and productivity of work, but also in promoting employee interaction and creating social relations (Palvalin et al., 2013). ICT is widely used to catalog

and reorganize the knowledge that people have and plays an important role in creating knowledge by promoting the creation of new knowledge through communication (Davenport and Prusak, 1998; Gottschalk, 2000; Gupta and Govindarajan, 2000).

Existing IS research has emphasized the importance of perceived usefulness and ease of use as the two fundamental beliefs of technology use based on the Technology Acceptance Model (TAM) (Benbasat and Zmud, 1999, 2003; Davis et al., 1989). Various types of components have been studied since then, including personal characteristics such as system characteristics, task-technology fit, emotional state, cognitive factors such as trust, and individual differences such as user commitment, anxiety, and self-efficacy (Carillo et al., 2017).

On the other hand, smart-work can be defined as a work method that can work anytime and anywhere flexibly regardless of time and place. The meaning of ICT support for smart-work is the degree to which smart-work is realized by utilizing ICT. Because ICT enables the creation, sharing, storage, and use of knowledge within an organization (Leonard-Barton, 1995), ICT support is an essential element in providing an environment for smart-work. ICT can impact smart-work in many ways, supporting the knowledge creation process by facilitating timely collection, storage, and exchange of information on a scale unimaginable in the past (Roberts, 2000). In addition, well-developed technology allows for the elimination of intra-organizational communication barriers by integrating fragmented flows of individual information (Gold et al., 2001).

ICT support in smart-work affects the relationship between expectations and values formed by individuals and acts as a magnifying glass to expand the positive attributes (perceived usefulness) of the

system. In addition, users who use smart-work programs can have more positive perception on productivity and autonomy. This study looks at goal-oriented aspects of ICT support in smart-work. The intent to use flexible work arrangements is not only for childbirth or parenting, but also for individual life or productivity (Ko and Kim, 2017). In other words, the support of ICT in smart-work can increase the personal perception of smart-work by making it possible to achieve the purpose of workers using smart-work program. Based on this logic, we set the following hypotheses.

H6: ICT support for smart-work will have a positive impact on perceived usefulness.

H7: ICT support for smart-work will have a positive impact on the level of confirmation.

3.3. Concerns about Career Disadvantage

It is argued that despite the evidence that smart-work can bring a variety of positive outcomes to individuals or organizations, it can lead to negative results in that it can be a signal of low job commitment to managers. In other words, the use of flexible work arrangements reduces the opportunities for face-to-face in the workplace, making it less likely to observe or perceive the role performance, which could lead to career disadvantages (Bailyn, 1993). In many cases, the way of working through the existence and face of workers in the workplace is being used as an index to judge the degree of contribution and commitment to work. This is especially due to the domestic business sentiment that emphasizes face to face rather than performance itself can see. Utilizing the smart-work program ultimately involves acquiring the autonomy of time, place and method of doing business like flexible work arrangements.

Therefore, reducing face time can reduce the opportunity for workers to show commitment to the organization, which can lead to negative performance evaluations (Perlow, 1995), and can lead to difficulties in promotion or wage increases (Glass and Fujimoto, 1995).

Concerns about career disadvantages can be attributed not only to face-to-face but also to cultural characteristics that judge work time as an organizational commitment. Organizational culture that compensates for long working hours makes the motivation for flexible use of labor time helpless. Smart-work can create a new way of working, but if the organizational culture is still a culture that compensates for long working hours, workers who use it will be avoided from using it because they worry that they will be adversely affected (Perlow, 1995; Thompson et al., 1999). This is because visible work hours in promotion and compensation affect the performance (Judge et al., 1995). Especially, the atmosphere where the night shift is taken for granted and the organizational culture which is difficult to leave due to the unauthorized work after the official work hours restrict the use of the smart-work program. Likewise, concerns about career disadvantages can arise due to the evaluation of a superiors that the use of a smart-work program would be detrimental to organizational commitment if it is motivated by personal life rather than productivity. According to Signaling Theory, managers deduce characteristics that are difficult to observe, such as organizational commitment, from the observable behavior of employees (Spence, 1973). Based on this signal theory, scholars have theorized that managers interpret employees' use of flexible work arrangements as a signal that they have a personal life responsibility that weakens organizational commitment. Thus, the manager applies penalties by refusing pay increases, promotions, or other

career-related compensation to employees who use flexible work arrangements (McCloskey and Igbaria, 2003; Williams, 2000).

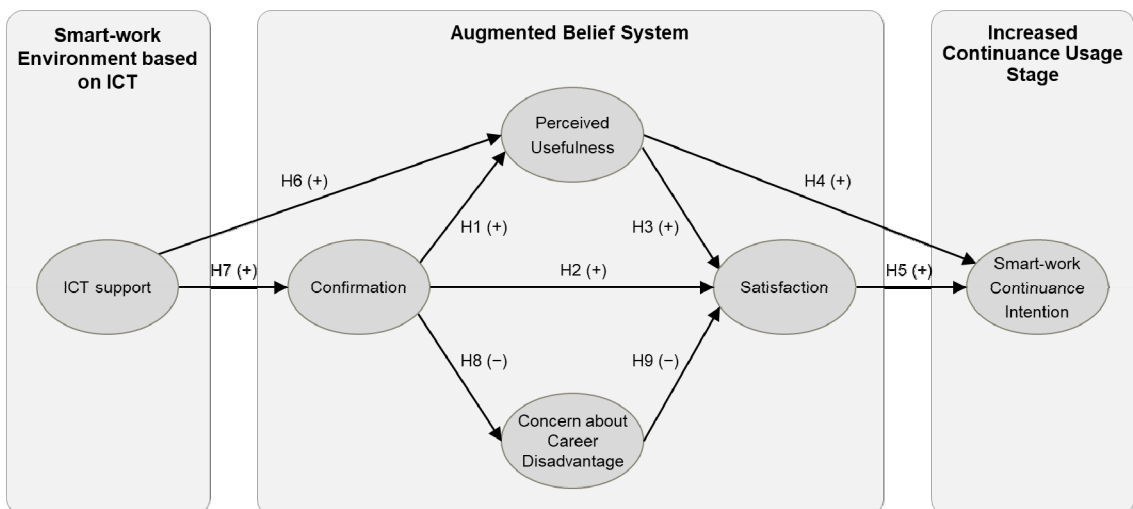
In this regard, the use of smart-work programs is associated with the autonomy of working hours and working places. As a result, there is a concern that an organization or a manager may suffer disadvantages in their careers. This can have a negative impact on satisfaction. On the other hand, if there is a high degree of confirmation between the expectation and the perceived performance of the smart-work program, it is possible to see that the worries about career disadvantage will be reduced by recognizing that it supports the work smart not only in the form but also in the purpose. This is similar to the concept of perceived ease of use that has been covered in many IS-related studies. Empirical evidences show that confirmation positively affects perceived ease of use (Hong et al., 2006; Liao et al., 2007; Roca and Gagné, 2008; Sørenbo and Eikebrokk, 2008; Thong et al., 2006). In this regard, concern about career disadvantage can be understood as a concept opposite to perceived ease

of use. In other words, the confirmation of the smart-work program will be negatively related to the disadvantages of the career, and the higher the expectations match, the more likely it is that concerns about career disadvantages will be resolved. Based on this logic, we set the following hypotheses.

H8: Confirmation of smart-work will have a negative impact on concerns about career disadvantages.

H9: Concerns about career disadvantages will have a negative impact on satisfaction with smart-work.

<Figure 1> shows a conceptual model based on the contents discussed so far. It aims at explaining how the process starts from the ICT support, and the intention of the workers to use the smart-work continuously. In other words, the level of ICT support for smart-work programs affects cognitive perceptions of the positive attributes (perceived usefulness), and cognitive perceptions of the differences between initial and post-use performance (confirmation) (Ball-Rokeach, 1985; Bhattacharjee, 2001; Stafford et al., 2010; Turel et al., 2011). This perceived usefulness



<Figure 1> Research Model

and confirmation affects the intention of continuous use of smart-work through satisfaction. Also, the concern about career disadvantage is negative (-) between expectation and satisfaction.

IV. Research Methodology

4.1. Measurement

The variables in this study were measured on a 5-point Likert scale (1: very unlikely ~ 5: very likely), and the measurement items of each variable were modified and used in accordance with the present study based on the proven reliability and validity of the existing items. The components of the smart-work continuance model were measured using the scale provided by Bhattacharjee (2001). ICT support was measured using the scale of IT support provided by Lee and Choi (2003). Concerns about career disadvantages were based on three items based on the items presented by Thompson et al. (1999). <Table 2> shows the operational definition for each

construct and measurement items used in this study.

4.2. Participants and Procedure

In this study, the data to be used for the analysis were collected through online survey method in October 2017. Since this study is intended to show the intention of continuous use of smart-work, employees who have experience using smart-work are set as target population. Prior to the questionnaire, respondents were asked whether they are using or have used the smart-work programs. Only those who had experience were able to respond to the remaining questionnaire items. As a result of random distribution through the domestic online survey agency, about 10% of the respondents answered that they are using or have used the smart-work programs and collected the final 333 response data. <Table 1> shows the total 333 respondents used in this study. SPSS 18 and AMOS 18 were used for the analysis

V. Data Analysis and Results

<Table 1> Characteristics of the Samples (N=333)

Criteria	Items	N	%	Items	N	%
Gender	Male	181	54.4%	Female	152	45.6%
	Age					
Age	20's	70	21.0%	40's	72	21.6%
	30's	173	52.0%	50's or above	18	5.4%
	Job	Sales & Marketing	50	15.0%	Finance & Accounting	49
Mgmt. Support & IT		107	32.1%	R&D and Design	60	18.0%
Operations & Procurement		42	12.6%	Etc.	25	7.5%
Position		Junior Level	86	25.8%	Manager Level	94
	Senior Level	93	27.9%	Team Leader or above	60	18.0%
Industry	Manufacturing	74	22.2%	Information & Comm.	46	13.8%
	Wholesale and Retail	25	7.5%	Food & Beverage	3	0.9%
	Construction	20	6.0%	Consulting & Advisory	20	6.0%
	Finance & Insurance	18	5.4%	Public Institutions	52	15.6%
	Service	63	18.9%	Etc.	12	3.6%

5.1. Measurement Model Test

To confirm the validity and discriminant validity of the variables used in this study, confirmatory factor analysis was performed using AMOS 18. The model fit of the confirmatory factor analysis was $\chi^2=344.497$, $df=168$, $\chi^2/df=2.051$, $p=0.000$, GFI=0.906, AGFI=0.871, NFI=0.940, CFI=0.968, RMSEA=0.056, which was found to be suitable for analyzing the structural model. All of the measurement variables of the study had a standardized factor loading of 0.8 or higher and were significant at the level of $p < .001$, suggesting that there is convergent validity of each variables (Bagozzi and Yi, 1988). Also, if composite reliability is 0.7 or more, it is judged that each variable is internally consistent, and AVE value should be 0.5 or more (Fornell and Larcker, 1981). In this study, as shown in <Table 2>, both composite reliability and AVE exceed the standards of 0.7 and 0.5, so it is reasonable to analyze the structural model. The square root of AVEs were also calculated to evaluate the discriminant validity. If the square root of AVE is larger than the correlation coefficients with other variables, it is judged that there is a discriminant validity (Bagozzi and Yi, 1988). In <Table 3>, the values on the diagonal line are the square root of AVE, and the values of the remaining matrices mean the correlation of the constituent concepts. All of the study units used in this study were found to have validity of discrimination.

5.2. Structural Model Analysis and Results

As a result of confirmatory factor analysis of the measurement model, it was concluded that there was no problem in performing the structural model analysis. Therefore, the structural model was analyzed using the AMOS 18 program. As a result of verifying

the structural model used in this study, the fit model as shown in <Figure 2> with model fit of $\chi^2=352.908$, $df=176$, $\chi^2/df=2.005$, $p=0.000$, GFI=0.905, AGFI=0.876, NFI=0.939, CFI=0.968, RMSEA=0.055 was derived. And the model fit to all the criteria of the index GFI(>.90), AGFI(>.80), CFI(>.90), NFI(>.90) that evaluates the fit (Gefen et al., 2003).

Seven of the nine hypotheses were accepted. First, ICT support has a positive effect on expectation coincidence, with $\beta=0.60$ and $t=10.007$. However, ICT support is not statistically significant for perceived usefulness ($\beta=0.01$ and $t=0.097$). This can be interpreted to be due to the fact that the effect of confirmation on perceived usefulness is relatively large compared to ICT support. In addition, ICT support has no direct effect on perceived usefulness, but indirect effect on perceived usefulness through confirmation is very large. Confirmation positively affects perceived usefulness ($\beta=0.85$, $t=11.752$) and satisfaction ($\beta=0.68$, $t=7.125$), consistent with the results from Bhattacharjee (2001). Satisfaction was also found to have a strong positive effect on continuance intention, with $\beta=0.78$ and $t=7.993$. On the other hand, perceived usefulness has a positive effect on satisfaction with $\beta=0.23$ and $t=2.617$, but it does not have a statistically significant effect on the intention to use persistence ($\beta=0.15$, $t=1.734$). These results are inconsistent with the results of the IS continuance model, but it seems that the perceived usefulness is due to the relatively large indirect effects of satisfaction through the satisfaction rather than directly affecting the continuance intention (Carillo et al., 2017). Confirmation negatively affects concerns about career disadvantage ($\beta=-0.13$, $t=-2.149$), and concerns about career disadvantages negatively affect satisfaction ($\beta=-0.18$, $t=-4.963$).

<Table 2> Reliability and Validity Analysis

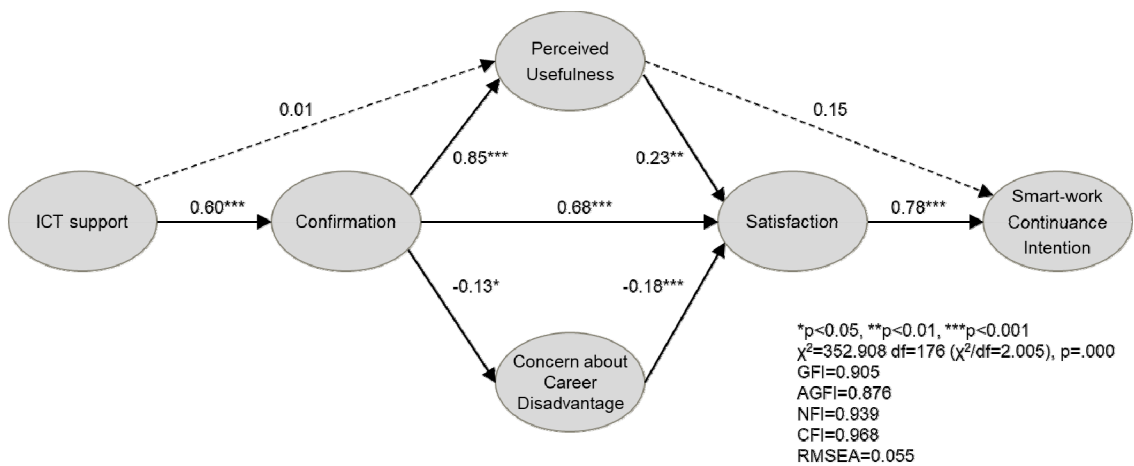
Measurement Items	Loading	CR	AVE	<i>a</i>
ICT Support (SUP) <i>Degree of ICT support for collative work, for communication, for searching and accessing, for simulation and prediction, and for systematic storing.</i>				
My company provides an ICT environment that supports collaborative work, regardless of time or place.	0.890	0.948	0.819	0.926
My company provides an ICT environment that helps us to find and access the information I need.	0.916			
My company provides an ICT environment that supports systematic information storage.	0.930			
My company provides an ICT environment that supports communication among organizational members.	0.883			
Confirmation (CF) <i>An employee's perception of the congruence between expectation toward the use of smart-work program and the actual performance derived from the use.</i>				
Smart-work seems to be better than originally expected.	0.882	0.924	0.801	0.876
Using the smart-work program is better than initially expected.	0.911			
Smart-work satisfies the level initially expected.	0.893			
Perceived Usefulness (PU) <i>An employee's perception of the expected benefits of using smart-work program.</i>				
Smart-work is useful in balancing work and life.	0.841	0.932	0.773	0.902
The use of smart-work helps to improve work efficiency.	0.861			
The use of smart-work helps improve performance.	0.895			
Smart-work is useful for productivity improvement.	0.918			
Satisfaction (SF) <i>An employee's experience with (feelings about) previous use of smart-work program.</i>				
I am very pleased with the use of smart-work programs.	0.836	0.915	0.729	0.876
I am willing to use smart-work programs.	0.861			
I want to encourage people around me to use the smart-work program.	0.852			
I am very pleased to take advantage of the smart-work program.	0.866			
Concern about Career Disadvantage (CCD) <i>An employee's concern about disadvantages resulting from smart-work program use.</i>				
It is worrisome to use the smart-work program, which will result in a disadvantage of promotion or compensation.	0.897	0.939	0.836	0.905
I worry that I will not be able to get a good evaluation using smart-work.	0.917			
There is concern that using smart-work will have disadvantages in career development.	0.929			
Continuance Intention (CI) <i>An employee's intention to continue using smart-work program.</i>				
I will continue to use smart-work programs in the future.	0.872	0.915	0.782	0.861
I plan to use smart-work programs more aggressively.	0.906			
I will continue to use smart-work programs rather than other schemes.	0.874			

Note: $\chi^2=344.497$, $df=168$ ($\chi^2/df=2.051$), $p=.000$, GFI=0.906, AGFI=0.871, NFI=0.940, CFI=0.968, RMSEA=0.056 CR: Composite Reliability / AVE: Average Variance Extracted / α : Cronbach's α

<Table 3> Correlation Analysis

	SUP	CF	PU	SF	CCD	CI
SUP	0.905					
CF	0.544	0.895				
PU	0.450	0.731	0.879			
SF	0.453	0.771	0.709	0.854		
CCD	-0.030	-0.152	-0.067	-0.256	0.914	
CI	0.419	0.758	0.673	0.772	-0.243	0.884

Note: The number in bold is the square root of AVE



<Figure 2> Results of Structural Model Test

<Table 4> Summary of the Results

	Hypotheses	Beta	t-value	Results
H1	Confirmation → Perceived Usefulness	0.85	11.752	Accepted
H2	Confirmation → Satisfaction	0.68	7.123	Accepted
H3	Perceived Usefulness → Satisfaction	0.23	2.617	Accepted
H4	Perceived Usefulness → Continuance Intention	0.15	1.734	Rejected
H5	Satisfaction → Continuance Intention	0.78	7.993	Accepted
H6	ICT Support → Perceived Usefulness	0.01	.097	Rejected
H7	ICT Support → Confirmation	0.60	10.007	Accepted
H8	Confirmation → Concern about Career Disadvantage	- 0.13	- 2.149	Accepted
H9	Concern about Career Disadvantage → Satisfaction	- 0.18	- 4.963	Accepted

VI. Discussion

6.1. Summary of the Results and Discussions

In this study, we focused on how the continuance

intention of smart-work is formed, and examined the mechanism based on Bhattacharjee's IS continuance model, and examined the role of ICT to facilitate the mechanism. The results of this study are summarized in <Table 4>.

First, confirmation has a positive effect both on perceived usefulness and satisfaction, and satisfaction has positive effect on smart-work continuance intention. These results are consistent with the results of Bhattacharjee (2001), so that H1, H2, and H5 were accepted. Aligning Bhattacharjee's IS continuance model with the viewpoint of smart-work, expectation of smart-work positively affects the intention of continuous use through perceived usefulness and satisfaction. In other words, the higher the level of confirmation between the initial expectation for smart-work and the perceived performance after actual utilization, the higher the level of perceived usefulness and satisfaction. Satisfaction, resultingly, has a direct impact on the continuance intention of smart-work.

Second, perceived usefulness has a positive effect on satisfaction, but does not affect the continuance intention. As a result, H3 was accepted but H4 was rejected. This implies that the perceived usefulness does not have a direct effect on the continuance intention, but it has a significant indirect effect on the continuance intention through satisfaction. In contrast to the results of Bhattacharjee (2001), other pertinent study has also shown that perceived usefulness indirectly affects satisfaction rather than directly affecting intention to use (Carillo et al., 2017; Hong et al., 2006; Kim and Kim, 2015).

Third, ICT support has no significant effect on perceived usefulness, but has a positive effect on confirmation. Therefore, H6 was rejected, but H7 was accepted. This implies that ICT support does not have a direct effect on perceived usefulness, but

it has an indirect effect on perceived usefulness through confirmation. Especially, the result that ICT support affects confirmation can be interpreted as evidence that ICT based smart-work environment influences decision making about usage through user's belief and perception mechanism.

Fourth, confirmation affects the concerns about career disadvantages negatively, and concerns about career disadvantage have negative effects on satisfaction, so both H8 and H9 were accepted. This can be interpreted as the concern about the career disadvantage is reduced by recognizing that the smart-work environment supports the work smart more faithfully than the format as long as it is consistent with the expectation that was first achieved after using the smart-work program. In other words, the expectation of smart-work has indirect effect of raising the level of satisfaction by lowering the concern about career disadvantage.

Based on these results, the following points can be discussed. First, the establishment of ICT based smart-work environment influences the intention to continue the smart-work as a result of amplifying the user's belief system. ICT support affects workers' belief systems that use smart-work, and this increased belief system also affects the satisfaction by lowering the concern about career disadvantage and ultimately increasing the continuance intention. The reason and purpose of using smart-work program may differ from person to person, but when ICT faithfully supports such purpose, smart-work system is effective.

Next, smart-work should be based on autonomous participation of companies and employees. If a corporate culture emphasizes 'face-to-face' and 'relationship' rather than achievement or performance, it is difficult to engage in smart-work. It can be said that one of the main reason why Korean firms' adoption and utilization rate of smart-work is low compared

to other developed countries is this cultural characteristic. Therefore, to successfully establish a smart-work environment, it is necessary to build an appropriate performance evaluation system that guarantees performance and trust, and also form a consensus on smart-work within the enterprise. As an infrastructure to support performance management, companies can establish a comprehensive website related to teleworking, develop remote task time and teleworking performance tracking system, clarify teleworking standards, and utilize equipment to facilitate communication with workers (OPM, 2008). In addition, efforts should be made to offset the anxieties in the worker's stance, such as the provision of institutional devices to overcome career disadvantages and weakened employee ties.

6.2. Implications for Research and Practice

Based on the results of this study, academic implications can be summarized as follows. First, despite the steady increase in interest in smart-work, there is still a relatively lack of theoretical basis and prior research. In this study, we propose a systematic research model that can reveal the user's smart-work continuance intention, and it is meaningful that empirical analysis is performed. Second, based on the existing widely applied theoretical model in relation to the IS persistent use, it has been found through literature review that influential factors such as ICT support and concerns about career disadvantage have been derived. We also tried to analyze the effect of these influences on the intention to continue the smart-work. Based on the research model presented in this study, researchers in related fields will be able to extend and elaborate the intention of continuous use of smart-work considering various situations.

This study also suggests the following implications and direction from a practical point of view. To achieve the success of the smart-work program, it is necessary to establish an appropriate ICT based environment for the smart-work. To do so, smart-work will not only replace the basic task with a device such as a laptop or a mobile device. In order to improve the process and create new value by utilizing the characteristics of ICT, it is necessary to consider not only the analysis of the work suitable for the smart-work, but also the suitability of the program performing by the client. In addition, It is also important to consider building an organizational culture suitable for smart-work through the improvement of the personnel management system (Chang, 2011).

6.3. Limitations and the Direction of Future Studies

Despite the implications mentioned above, this study has the following limitations and suggest future research direction from this point. First, in this study, we examined ICT support as one construct, but it is necessary to segment each dimension of ICT support. If we look at the role of ICT in smart-work by each component, we can give more practical implications for the implementation of smart-work environment based on ICT. Second, the degree of concern about career discrepancies is likely to vary depending on motivation. There are two main reasons for the intrinsic motivation of use of flexible work arrangements: motivation for productivity and motivation for personal life (Ko and Kim, 2017; Shockley and Allen, 2010). And from the results of previous studies that managers can affect the success of the career, depending on the attribution of certain aspects (Leslie et al., 2012), it can be expected that the degree

of concern about career disadvantages will vary depending on the motivation for employees to use smart-work. Therefore, if we examine these motivational aspects in future research, it can provide more meaningful implications for the formation of organizational culture for activation of smart-work.

Third, this study focuses on the continuance intention of smart-work but does not include performance factors. Future research will expand the results of the study if it includes performance factors in addition to the relationship between continuance intention and actual utilization. Finally, this study has

limitations as a cross-sectional study. Data from the same time does not provide direct evidence of the causal relationship between constructs. In particular, it may take a long time to build up the smart-work environment until the intention of continuance is formed. Therefore, a difference may occur depending on the time of measurement. Therefore, in future research, it is necessary to review the mechanism of continuance intention, the role of ICT support, and its performance over time through longitudinal research.

<References>

- [1] Alavi, M., and Leidner, D. E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25(1), 107-136.
- [2] Bagayogo, F. F., Lapointe, L., and Bassellier, G. (2014). Enhanced use of IT: A new perspective on post-adoption. *Journal of the Association for Information Systems*, 15(7), 361-387.
- [3] Bagozzi, R. P., and Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94.
- [4] Bailyn, L. (1993). *Breaking the mold: Women, men, and time in the new corporate world*. Simon and Schuster.
- [5] Ball-Rokeach, S. J. (1985). The origins of individual media-system dependency: A sociological framework. *Communication Research*, 12(4), 485-510.
- [6] Benbasat, I., and Zmud, R. W. (1999). Empirical research in information systems: The practice of relevance. *MIS Quarterly*, 23(1), 3-16.
- [7] Benbasat, I., and Zmud, R. W. (2003). The identity crisis within the IS discipline: Defining and communicating the discipline's core properties. *MIS Quarterly*, 27(2), 183-194.
- [8] Bhattacharjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, 25(3), 351-370.
- [9] Bhattacharjee, A., and Barfar, A. (2011). Information technology continuance research: Current state and future directions. *Asia Pacific Journal of Information Systems*, 21(2), 1-18.
- [10] Carillo, K., Scornavacca, E., and Za, S. (2017). The role of media dependency in predicting continuance intention to use ubiquitous media systems. *Information & Management*, 54(3), 317-335.
- [11] Chang, H. S. (2011). Success conditions for smart work program proliferation. *Hyundai Research Institute VIP Report*, 484, 11-14.
- [12] Chung, C. H. (2011). Smart work promotion trends and challenges for activation. *Korea Information Processing Society Review*, 1(2), 82-89.
- [13] Coates, J. F. (1997). Long-term technological trends and their implications for management. *International Journal of Technology Management*, 14(6-8), 579-595.
- [14] Damasio, A. R. (1995). *Descartes' error: Emotion, reason, and the human brain*. Putnam Berkley Group, Inc., New York, doi:<http://dx.doi.org/10.7202/051028ar>.

- [15] Davenport, T. H., and Prusak, L. (1998). *Working knowledge*. Boston: Harvard Business School Press.
- [16] Davis, F. D., Bagozzi, R. P., and Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982-1003.
- [17] Dewett, T., and Jones, G. R. (2001). The role of information technology in the organization: A review, model, and assessment. *Journal of Management*, 27(3), 313-346.
- [18] Eaton, S. C. (2003). If you can use them: Flexibility policies, organizational commitment, and perceived performance. *Industrial Relations: A Journal of Economy and Society*, 42(2), 145-167.
- [19] Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.
- [20] Gold, A. H., Malhotra, A., and Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, 18(1), 185-214.
- [21] Gefen, D., Karahanna, E., and Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51-90.
- [22] Glass, J., and Fujimoto, T. (1995). Employer characteristics and the provision of family responsive policies. *Work and Occupations*, 22(4), 380-411.
- [23] Gottschalk, P. (2000). Strategic knowledge networks: The case of IT support for Eurojuris law firms in Norway. *International Review of Law, Computers & Technology*, 14(1), 115-129.
- [24] Gupta, A. K., and Govindarajan, V. (2000). Knowledge management's social dimension: Lessons from Nucor Steel. *MIT Sloan Management Review*, 42(1), 71-80.
- [25] Han, E. S., Huh, P. S., and Sim, J. B. (2011). Analysis on core technologies and solutions for the smart work. In *Proceeding of Co-Conference Spring*, 1092-1096.
- [26] Hong, S., Thong, J. Y., and Tam, K. Y. (2006). Understanding continued information technology usage behavior: A comparison of three models in the context of mobile internet. *Decision support systems*, 42(3), 1819-1834.
- [27] Judge, T. A., Cable, D. M., Boudreau, J. W., and Bretz, R. D. (1995). An empirical investigation of the predictors of executive career success. *Personnel Psychology*, 48(3), 485-519.
- [28] Kim, D. J., and Kim J. S. (2015). A study on the strategies for improving user satisfaction and continuance usage of social network service. *Information Systems Review*, 17(1), 171-197.
- [29] Kim, H. G., Lee, H. J., and Hong, H. J. (2009). *Analysis of Smart Work's Social/Economic Effects and Survey Result on Public Awareness of Smart Work*. National Information Society Agency.
- [30] Kim, S. Y., Bae, M. S., and Go, S. J. (2015). An analysis of the factors influencing the adoption of flexible work arrangements in public agencies. *Journal of Korean Regional Development*, 24(2), 187-217.
- [31] Ko, E. J., and Kim, S. S. (2017). Motivation to use flexible work arrangements: Focused on the moderating effect of personal, organizational, and job characteristics. *Korean Management Consulting Review*, 17(4), 87-101.
- [32] Kossek, E. E., Lautsch, B. A., and Eaton, S. C. (2006). Telecommuting, control, and boundary management: Correlates of policy use and practice, job control, and work - family effectiveness. *Journal of Vocational Behavior*, 68(2), 347-367.
- [33] Lee, H., and Choi, B. (2003). Knowledge management enablers, processes, and organizational performance: An integrative view and empirical examination. *Journal of Management Information Systems*, 20(1), 179-228.
- [34] Lee, J. H., and Kim, S. B. (2012). A desirable corporate culture under smart work environment. *The Journal of Digital Policy & Management*, 10(11), 93-102.
- [35] Lee, J. S., and Kim, H. S. (2010). The Study of Invigoration on Smart Work Current Situation. *The Korean Association for Regional Information Society*,

- 13(4), 75-96.
- [36] Lee, M. H., and Lee, J. K. (2011). *Smart work research: Review and agenda for future research*. National Information Society Agency.
- [37] Lee, S. H., Do, H. O., and Seo, K. D. (2011). A Study on Management Plans for Activating of Smart Work. *Journal of Digital Convergence*, 9(4), 245-252.
- [38] Leonard-Barton. D. (1995). *Wellsprings of Knowledge: Building and Sustaining the Sources of Innovation*. Boston: Harvard Business School Press.
- [39] Leslie, L. M., Manchester, C. F., Park, T. Y., and Mehng, S. A. (2012). Flexible work practices: A source of career premiums or penalties? *Academy of Management Journal*, 55(6), 1407-1428.
- [40] Liao, C., Chen, J. L., and Yen, D. C. (2007). Theory of planning behavior (TPB) and customer satisfaction in the continued use of e-service: An integrated model. *Computers in human behavior*, 23(6), 2804-2822.
- [41] McCloskey, D. W., and Igarria, M. (2003). Does 'out of sight' mean 'out of mind?' An empirical investigation of the career advancement prospects of telecommuters. *Information Resources Management Journal*, 16(2), 19-34.
- [42] Ministry of Employment and Labor (2010). *A plan to spread the flexible work system*.
- [43] Ministry of Science and ICT (2015). *Survey on smart-work usage status*.
- [44] Morgan, K., Morgan, M., and Hall, J. (2000). Psychological developments in high technology teaching and learning environments. *British Journal of Educational Technology*, 31(1), 71-79.
- [45] Noh, K. S., Kim, K. G., and Byun, J. B. (2011). A study on the competence model of smart worker. *Journal of Digital Convergence*, 9(5), 215-224.
- [46] O'Driscoll, M. P., Brough, P., Timms, C., and Sawang, S. (2010). Engagement with information and communication technology and psychological well-being. In *New developments in theoretical and conceptual approaches to job stress* (pp. 269-316), Emerald Group Publishing Limited.
- [47] Oliver, R. L. (1977). Effect of expectation and disconfirmation on postexposure product evaluations: An alternative interpretation. *Journal of Applied Psychology*, 62(4), 480-486.
- [48] Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, 17(4), 460-469.
- [49] Oliver, R. L. (1993). Cognitive, affective, and attribute bases of the satisfaction response. *Journal of Consumer Research*, 20(3), 418-430.
- [50] Oliver, R. L., and DeSarbo, W. S. (1988). Response determinants in satisfaction judgments. *The Journal of Consumer Research*, 14(4), 495-507.
- [51] OPM (2008). *Status of telework in the federal government: Report to the congress*. Retrieved from <https://www.telework.gov/reports-studies/reports-to-congress/annual-reports/>.
- [52] Palvalin, M., Lönnqvist, A., and Vuolle, M. (2013). Analysing the impacts of ICT on knowledge work productivity. *Journal of Knowledge Management*, 17(4), 545-557.
- [53] Park, W. C., Chung, H. S., Park, D. G. (2013). The perceived usefulness of smartwork and work-family conflict. *Korean Journal of Culture and Social Issues*, 19(2), 109-131.
- [54] Perlow, L. A. (1995). Putting the work back into work/family. *Group & Organization Management*, 20(2), 227-239.
- [55] Roberts, J. (2000). From know-how to show-how? Questioning the role of information and communication technologies in knowledge transfer. *Technology Analysis & Strategic Management*, 12(4), 429-443.
- [56] Roca, J. C., and Gagné, M. (2008). Understanding e-learning continuance intention in the workplace: A self-determination theory perspective. *Computers in human behavior*, 24(4), 1585-1604.
- [57] Samsung Economic Research Institute (2011). *Study on practice strategies of work smart*.
- [58] Shockley, K. M., and Allen, T. D. (2010). Investigating the missing link in flexible work arrangement utilization: An individual difference

- perspective. *Journal of Vocational Behavior*, 76(1), 131-142.
- [59] Sørenbø, Ø., and Eikebrokk, T. R. (2008). Explaining IS continuance in environments where usage is mandatory. *Computers in Human Behavior*, 24(5), 2357-2371.
- [60] Spence, A. M. (1973). Job market signaling. *Quarterly Journal of Economics*, 87(3), 355-374.
- [61] Steinmueller, W. E. (2000). Will new information and communication technologies improve the 'codification' of knowledge? *Industrial and Corporate Change*, 9(2), 361-376.
- [62] Stonehouse, G. H., and Pemberton, J. D. (1999). Learning and knowledge management in the intelligent organization. *Participation and Empowerment: An International Journal*, 7(5), 131-144.
- [63] Thompson, C. A., Beauvais, L. L., and Lyness, K. S. (1999). When work - family benefits are not enough: The influence of work - family culture on benefit utilization, organizational attachment, and work - family conflict. *Journal of Vocational Behavior*, 54(3), 392-415.
- [64] Thong, J. Y., Hong, S. J., and Tam, K. Y. (2006). The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance. *International Journal of Human-Computer Studies*, 64(9), 799-810.
- [65] Turel, O., Serenko, A., and Giles, P. (2011). Integrating technology addiction and use: An empirical investigation of online auction users. *MIS Quarterly*, 35(4), 1043-1062.
- [66] Williams, J. (2000). *Unbending Gender: Why Work and Family Conflict and What to Do about It*. Oxford, U.K.: Oxford University Press.

◆ About the Authors ◆



Sang Soo Kim

Sang Soo Kim is an assistant professor of Department of Business Administration at Yong In University in Korea. He holds B.S. and M.S. in Business Administration from Sogang University as well as LL.M. in Fair-trade Law from Yonsei University, and a Ph. D. from Graduate School of Business at Sogang University. Also, as a consultant for Deloitte's Seoul office, he has served as a senior manager specializing in corporate risk management. His research interests include organizational behavior, knowledge management, risk & compliance, and IS success.



Eun Jung Ko

Eun Jung Ko is PhD Candidate of Graduate School of Business at Sogang University. Her research interests include organizational behavior, human resource management, CSR, compensation.



Sang Yeoul Kim

Sang Yeoul Kim is currently a Senior Industry Specialist in Deloitte Consulting. He holds B.S. in Economics from Sogang University and M.S. in System Engineering from Ajou University, and Ph. D. in Business Administration from Sogang University. His research interests include management information system, knowledge management, project management office, and health-care information system.

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