USER PERCEPTIONS OF ICT IN A MAJOR SWEDISH BUILDING AND CONSTRUCTION COMPANY

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ABSTRACT

The use of information and communication technologies (ICT) in building and construction companies has steadily been growing during the last decade. However, just a few studies inquire perceptions of the ICT actually being used and perceptions among different professional groups in companies. The objective of this paper is to contribute to an enhanced understanding of general perceptions of ICT in building and construction companies and among professional groups by taking the point of departure in the concept of perceived usefulness.

Data was collected using a web-based survey in two regional units of a major Swedish building and construction company. 257 completed questionnaires were returned which corresponds to a response rate of 49 %. The data was analysed with T-tests and multiple regression analysis. It can be concluded that respondents are generally fairly satisfied with their ICT and that the ICT is perceived as necessity for the fulfilment of work tasks as well as a valuable support in various areas of decision making. Moreover, a further developed use of ICT is perceived as an opportunity to increase the company's competitiveness, but this opinion is negatively correlated with the opinion that the ICT is well adapted to the industry's conditions. Finally there are some significant differences in perceptions of the outcomes of ICT-usage among professional groups, differences that can be explained by distance to operations and nature of work tasks.

Keywords: Perceived usefulness, post-adoption, surveys, IS-success, construction companies

1. INTRODUCTION

The use of information and communication technologies (ICT) in building and construction companies has steadily been growing during the last decade. In the Scandinavian context the workplace computerisation is today 100 %, and a total of 70 % of all employees, including site workers, have access to their own computer, their own e-mail address, and access to the Internet (Samuelsson 2008). Studies of adoption and diffusion of ICT in the industry also show an increased diffusion rate even if sophistication of ICT-deployment and the obstacles for diffusion vary among countries (see e.g. Goh 2005; El-Mashaleh 2007; Oladapo 2007). However, despite the rapid diffusion of ICT in the industry during the last decade, there are only a few studies inquiring users' general perceptions of the ICT they actually are using, i.e. what benefits and disadvantages the users perceive. This phenomenon is however not unique for the building and construction industry. In the research field of information systems prior research has examined factors that have an impact on users' intentions to adopt ICT, but users' perceptions and ICT usage at the post adoption stage is claimed to be under examined (see eg Jasperson et al 2005; Saeed and Abidinnor-Helm 2008).

Past research has demonstrated that "perceived usefulness" of ICT is an important user perception that influences both pre- and post adoption phases (Venkatesh and Davis 2000). Perceived usefulness, or job impact, has been the most common measure of impacts on the individual level in the broad

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strand of literature on IT-success (Petter et al. 2008). The construct of perceived usefulness originates from the so called technology acceptance model (TAM) (Davis 1989). In order to predict the adoption and use of information technology, the constructs of perceived usefulness, and ease of use of IT, has been widely applied in order to understand attitudes held by individuals (Petter et al. 2008).

Despite the significant contributions of TAM, it has however diverted researchers' attention away from other important research issues as well as attempts to expand TAM in order to adapt it to constantly changing ICT environments (Benbazat and Barki 2007). With this unfortunate development, which is described as a theoretical chaos, it is today unclear which version of TAM that is the commonly accepted one. (*ibid*). However, this confusion can probably be explained by the fact that the ICT-maturity has developed since the first version of TAM was launched in the late 1980-ies and that no closer attention has been paid to the ICT-artefacts studied. Moreover, it is important to bear in mind that perceived usefulness of ICT should not be regarded as static or stable over time, because user perceptions of ICT do vary over time and space, as well as among social groups (Orlikowski and Gash 1994).

With regard to the building and construction industry, there does not seem to be a clear path towards an enhanced understanding regarding users' general opinions about ICT. Nevertheless, our aim with this paper is not to contribute to a further development of constructs measuring perceived usefulness. Instead the overall aim is to contribute to an enhanced understanding of general perceptions of ICT in building and construction companies as well as among professional groups by taking the point of departure in the concept of perceived usefulness. The paper will have an explorative approach, analyzing both quantitative and qualitative data from a major Swedish building and construction company.

2. THEORY

In research on ICT there are considered to be four core research topics (Benbasat and Zmud 2003:186). These are; 1) ICT uses associated with implementing and applying ICT artefacts, 2) ICT capabilities for developing and/or applying ICT, 3) ICT practices such as methods and techniques used to develop IT artefacts and manage the IT function, and 4) ICT impact, or consequences (direct and indirect, intended and unintended) of use for individuals, collectives, structures, and contexts. The focus and scope of this study falls under the fourth category.

Impacts, or benefits, on the individual and organizational level has been a core topic in the broad strand of literature on ICT-success, trying to develop models explaining IS (information systems) success (see e.g. DeLone and McLean 1992; Seddon 1997; Rai et al. 2002; Petter et al. 2008). In this literature net benefits are the essential construct determining ICT-success (DeLone and McLean 2003). However, Petter et al. (2008) state that there is an abundance of methods to measure net benefits on the individual and organizational level. At the organizational level profitability measures have been preferred, but Petter et al. (2008) claim that there is insufficient data for supporting a success construct on the organizational level. On the individual level perceived usefulness, or job impact, originating from TAM has been the most common measure (Petter et al. 2008).

When users should assess perceived usefulness of an ICT-application a construct with a six item scale has been used (Davis 1989: Rai et al. 2002). These six items are:

- accomplishment of tasks more quickly,
- improved job performance
- increased job productivity
- enhancing effectiveness of job
- makes job easier
- useful in the job

However, occasionally and for different reasons, the original construct of perceived usefulness (see Davis 1989), has been recognized as problematic or insufficient. For example, Adams et al. (1992) found that the items, "accomplishment of tasks more quickly", "improved job performance", and "enhancing effectiveness of job" did not fit well with perceived usefulness. Other authors have found that "task productivity", "task innovation", "customer satisfaction", and "management control"

are central items to include in a construct describing net benefits (see Torkzadeh and Doll 1999). Thus, despite rich empirical research on relationships among constructs related to IS-success, as well as determinants for IS-success, findings have often been inconsistent (Sabherwal et al. 2006). Reasons behind this inconsistency are for example whether the use is voluntary or compulsory (Seddon 1997), or whether exclusion of factors is affecting the constructs (DeLone and McLean 1992; Rai et al. 2002). Moreover, the role of re-invention and learning has been overlooked in the traditional model measuring perceived usefulness of ICT (Saeed and Abdinnour-Helm 2008).

In the context of the building and construction industry perceived benefits of ICT-use has been studied in different national contexts. In a study of the Canadian AEC-industry the three highest ranked benefits from IT-use were: "better quality of work", "work done more quickly", and "better financial control" (Rivard 2000). In Goh's (2005) study in Singapore the top three advantages provided by ICT was: "work done more quickly", "better quality of work", and "faster access to information". In a study of Nigerian construction companies Oladapo (2007) found that "improved quality of work", "making complex task easier to perform", and "time saving" was the top three benefits from use of ICT. In a study among Malaysian companies Lim et al. (2002) found that "time savings", "improved efficiency", and "cost saving" were the top three perceived benefits of using the Internet. In a Swedish context Samuelson (2008) has 2007, 2000 and 1998 (in 1998 together with Howard and Kiviniemi) studied the experienced advantages of increased use of ICT. The top three experienced advantages are showed in table 1.

Table 1: Top three experienced advantages of IT use in Swedish AEC companies in 1998, 2000 and 2007

1998	2000	2007
1. Simpler/faster access to common information	1. Better financial control	1. Simpler/faster access to common information
2. Better quality of work	2. Simpler/faster access to common information	2. Better financial control
3. Work done more quickly	3. Better communications	3. Possibility of sharing information

When these studies in different national context are taken into consideration "quality of work", "time savings", and "better financial control" are the top ranked perceived benefits. The perception of "time savings" is well aligned with, at least, four of the items included in the traditional construct of perceived usefulness: "accomplishment of tasks more quickly", "improved job performance", "increased job productivity", and "enhancing effectiveness of job". Moreover, in the Swedish studies the item "simpler/faster access to common information" can also be seen as an expression for "time saving", even if the explicit item of "work done more quickly" was ranked as 6:th respectively 4:th in the two latest surveys 2002 and 2007 (see Samuelsson 2008). The focus on time saving does not come as a surprise as building and construction projects are constantly facing approaching deadlines. Moreover, what is striking in the rankings of experienced benefits of ICT in the Scandinavian countries is that the ranking "better quality of work" has dropped compared to other countries. In Sweden the factor was ranked as 7:th respectively 6:th in the two latest surveys 2002 and 2007. An explanation might be that "better quality of work" is taken for granted and the focus has moved to other features of ICT-systems.

The previous studies of perceptions of the usefulness of ICT in the building and construction industry have provided researchers and practitioners with important knowledge. However, the understanding is still limited regarding the perceptions of ICT held by different professional groups in a building and construction company. In addition there is also a lack of understanding with regard to variables reinforcing the attitudes held towards ICT.

3. METHODOLOGY

The company in which the study was conducted is a branch of one of the leading construction and property development groups in the Nordic region. In 2008 the company group had sales of € 5 billions and approximately 20 000 employees. In the same year the company itself had sales of € 2,5 billions and approximately 8 000 employees. The company builds everything from schools, hospitals, sports facilities and housing, to roads, bridges, railways and, power plants.

The data collection has been based on both quantitative and qualitative methods. The quantitative data collection tool is a self-completed web-based questionnaire. The process of questionnaire development and administration involved a number of steps. First, the draft questionnaire was developed, tested, and revised through interviews with decision makers in the construction sector. Second, permission to conduct the survey was granted from two regional offices in the company. The target population was de-limited to "white collar workers", i.e. for example off site managers, site managers, foremen, purchasers, estimators, and project managers. The process of identifying respondents and sending out the surveys was handled by the company. After the initial distribution of the web-based survey, two reminders were sent out. A total of 530 responses were received, however with an internal loss of approximately 50%, i.e., respondents that did not answer all the questions. In total 257 wholly completed questionnaires where received. Analysing the final sample an overrepresentation of "off site managers" and "site managers", compared to other professional groups, were identified. The exact numbers of respondents in the different professional groups are presented in table 2. This implies that mean values might not be representative for the whole company if there are significant differences in opinions held by the different professional groups. However, this uneven representation does not constitute a main problem with regard to our aim; to merely inquire possible differences in attitudes held by the different professional groups.

Table 2: Number of respondents in professional groups

	Number of respondents starting to filling in the questionnaire		Completed questionnaires	
Position	**Number**	**%**	**Number**	**%**
Manager off site	67	13%	37	14%
Site manager	144	27%	84	32%
Foremen	124	23%	60	23%
Estimator / Planner	58	11%	35	14%
Purchaser	35	7%	17	6%
Design	24	5%	10	4%
Accounting /Finance	12	2%	3	1%
Other	66	12%	12	5%
Total	**530**	**100%**	**257**	**100%**

In order to strengthen the survey results, qualitative data has been collected with a total of 17 interviews with actors on different hierarchical levels within the permanent as well as the temporary (project) parts of the organisation. Interviewees are for example, the CEO of the company, the head of a regional unit, the head of a business district, site managers, ICT managers, project managers and managers in an R&D department. All conducted interviews varied in length from one to two hours. Empirical material was moreover collected through participant observation in a building project – existing of attendance of 45 meetings, encompassing a total of 80 hours.

The limitations of the study are first and foremost that only one company has been studied, which imply that we cannot claim any ambitions of generalization of the results to other building and construction companies. But the results presented in the paper will serve as a valuable input for further studies.

4. RESULTS

In this section the results from the study will be presented. First the mean values of the users' perceptions regarding ICT will be presented. Thereafter a multiple regression analysis is conducted in order to identify variables that have an impact on perceptions of "higher quality of work", "IT as mean for reducing the company's costs", and "IT as a mean for improving competitiveness". Finally, differences in attitudes among different professional groups are presented.

4.1. General attitudes towards IT

In the questionnaire consisting of 12 statements regarding use of ICT, respondents were asked to hold a position on a six grade scale (from totally disagree, to totally agree) towards the statements. In table 1 the mean values for each statement are showed. From the results it can be concluded that respondents are fairly satisfied with the ICT both with regard to its impact on the organizational as well as on the individual level. It is obvious that ICT is considered as a necessity when performing the daily work tasks. Users are moreover fairly satisfied with the information they get and IT is perceived as a mean that has improved the quality of the respondents work. The IT is also perceived as being fairly well adapted to the conditions of the construction industry. Interviewed respondents also claim to have witnessed a great improvement over the last decade. Moreover, IT is perceived as valuable support in decision making, e.g. as a mean for reduction of the company's costs and improvement the quality of products and processes. What can be seen as surprising is that respondents on the one hand agree with the statement: "A further development of the company's IT systems would increase our competitiveness", but on the other hand slightly disagree with the statement: "In my workplace, we should use IT more". A question can be raised whether the use of prevailing IT could be more sophisticated in order to improve competitiveness? Similar results appeared in Samuelsson's study (2008), where the item "doing things in new ways" was ranked as number three among experienced obstacles of increased used of IT.

If the perceived usefulness of IT is taken into consideration, improved quality of work can be claimed to be the variable that contribute to the perceived usefulness on the individual level the most. If the individuals' use of IT and its impact on the company is taken into consideration, a perception of reduction of the company's costs is the most important variable and an increased competiveness of the company is considered as a consequence of a more encompassing use of IT. In more general terms, ICT is perceived as a support that to a varying degree aid decision making and imply positive outcomes for the company. However, the question is which variables in regards to outcomes of IT-use have an influence over the top three attitudes ("IT as a mean for improving individual work quality", "making decision that reduces the company's costs", and" improving the company's competitiveness")?

Figure 1. General attitudes towards ICT

4.2. Analysing predictors

In order to identify the variables influencing attitudes towards IT as a mean for "improving individual work quality", "making decision reducing the company's costs", and "improving the company's competitiveness" a multiple regression analysis was conducted. Multiple regression analysis is a statistical technique that allows the prediction of someone's score on one variable on the basis of their scores on several other variables. In the tables below the independents variables, their beta-value, and significance are showed. First the predictors of higher quality of work were analyzed. Using the stepwise method, a significant model was obtained ($F_{7,257}$=81,419 p < 0.000). Adjusted R square = 0,681 (table 3).

Table 3. Predictors for higher quality of work

Predictors for higher quality of work	Beta	p-value
IT supports decisions improving quality of products and processes	,307	p < 0,000
IT is a necessity in my work	,148	p = 0,002
IT leads to less errors and misunderstandings	,178	p < 0,000
IT increases competitiveness	,223	p < 0,000
IT gives the information needed	,105	p = 0,018
To much communication via computers	-,083	p = 0,020
IT is a support for reducing the company's costs	,109	p = 0,035

With regard to the variables included in the model it is a logical consequence that "IT as a support for decisions improving quality of products and processes" has the highest impact on "higher quality of work". The opposite situation had been more surprising, that "IT as a support for decisions improving quality of products and processes" have had a low impact on "quality of work". Moreover, it can also be claimed that the variables "increased competiveness" and "less error and misunderstands" could be expected as having a high impact on "quality of work". What is a bit more interesting is that "the

necessity of using IT in the work" has a rather high impact on "quality of work". A question can here be raised if "necessity of using IT" corresponds to a real impact of improved quality of end products, or if responds just perceive that the quality of their work has been higher by using IT? There is also a slightly negative significant correlation for "to much communication via computers". This means that respondents who have this attitude do not believe that use of IT increases the quality of work.

The next step in the analysis was to identify predictors for IT help me making decision that reduce the company's costs. Using the stepwise method, a significant model was obtained ($F_{4,260}$=60.388, p < 0.000). Adjusted R square = 0,602 (Table 4)

Table 4: Predictors for IT as support for reducing the company's costs

Predictors for IT as mean for reducing the company's costs	Beta	p-value
IT supports decisions improving quality of products and processes	,369	p < 0,000
IT supports decisions reducing environmental impact	,333	p < 0,000
IT is a necessity in my work	,182	p < 0,000
IT is adapted to the industry's conditions	,093	P = 0,027

Once more, the variable "IT supports decisions improving quality of products and processes" has the highest impact. This can be regarded as a perception that better decisions are made, or the right decisions are made, which saves money for the company. What might be surprising in this model is the relative high impact the variable "IT support decisions reducing environmental impact". It can be interpreted as if information can be retrieved in order to avoid use of hazardous substances that cause environmental damages and demands for financial compensation from the company. However, this finding needs closer investigations.

The final step in the analysis was to identify predictors for IT as a mean to further increase the company's competitiveness. Using the stepwise method, a significant model was obtained ($F_{4,260}$=55.627, p < 0.000). Adjusted R square = 0,453 (Table 5).

Table 5: Predictors for IT as a mean to further increase the company's competitiveness

Predictors for IT as a mean to further increase the company's competitiveness	Beta	p-value
Higher quality of work	,363	p < 0,000
Use IT more in the workplace	,174	p < 0,000
IT supports decisions improving quality of products and processes	,227	p = 0,001
IT is a necessity in my work	,133	p = 0,020

In this case quality related predictors have had a high impact on the attitudes towards whether IT can be used as a mean for improving the company's competiveness. This can be interpreted as if quality is regarded as an important competitive mean and that the IT support is contributing to the development of this competitive mean. Using IT more in the workplace is also a logical, but not uncomplicated predictor. First, with regard to the overall attitudes towards this predictor (see figure 1), the challenge is probably to find out how IT should be used when it is used more in the workplace. Second, in a bi-variate analysis of the predictors, a negative correlation was found between the statements "We should use IT more in my workplace" and "Our IT-systems are generally well adapted to the construction industry's conditions (-0,154, p = 0,007). Obviously there are opinions among respondents expressing a perception that more use of IT would improve the company's competitiveness, but the prevailing IT-systems are not adapted to the industry's conditions. This opinion has also been expressed during interviews. Opinions expressed in the interviews have been ranging from a frustration that it is difficult to move data between different systems, to irritation that system are not adapted the project based mode of organizing operations. This is a topic for further studies, to deeper inquire the group who has the opinion that IT can be used more in order to improve competitiveness and concerns about prevailing IT.

4.3. Differences among professional groups

When analyzing differences in attitudes among the professional groups it should initially be stressed that attitudes are not polarized even if there are significant differences. Among the twelve items presented, significant differences between professional groups were found in five variables. In another three variables differences were mildly significant. In table 6 the significant differences between professional groups are presented. The numbers given directly below the professional groups are the mean score for the specific group and the numbers in bracket are the mean value for the professional group in the heading. P-values smaller than 0,05 are highlighted with bold style.

Table 6. Differences in perceptions among professional groups

Variable / professional position	Manager off site	Site man	Foremen	Estimator/ planner	Purchaser
ICT support is a necessity for me in my work	Foremen 4,66 (5,05) p = 0,085	Foremen 4,66 (5,06) **p = 0,022**			Foremen 4,66 (5,30) **p = 0,014**
There is too much communication and information via computers at my workplace	Purch 3,33 (2,68) p = 0,074		Purch 3,33 (2,67) **p = 0,043**	Purch 3,33 (2,57) **p = 0,036**	
Our ICT-systems are generally well adapted to the construction industry's conditions	Site man 4,20 (4,63) **p = 0,035**			Site man 4,20 (4,57) **p = 0,029**	Site man 4,20 (4,67) 0,065
Use of the ICT systems imply less errors and misunderstandings	Site man 3,67 (4,12) p = 0,060			Site man 3,67 (4,14) **p = 0,044**	
ICT systems has made the quality of my work becoming higher	Site man 4,29 (4,68) p = 0,053 Foremen 4,31 (4,68) p = 0,070			Site man 4,29 (4,80) **p = 0,029** Foremen 4,31 (4,80) **p = 0,038**	Site man 4,29 – 4,86 p = 0,081 Foremen 4,31 (4,86) p = 0,091
In my workplace, we should use ICT more				Site man 2,96 (3,42) p = 0,091	
The IT systems I'm using give me most of the time the information I need				Foremen 4,46 (4,78) p = 0,082	Foremen 4,46 (4,91) p = 0,052
ICT systems help me to make decisions that positively affect the quality of our products and processes	Site man 3,98 (4,37) p = 0,095				

When the differences among the professional groups are more closely scrutinized, "distance to operations" can be claimed to be the main dimension explaining the differences among the professional groups' attitudes towards the items. There is, however, one surprise when differences among professional groups are analyzed: The purchasers' attitude in relations to the statement "too much communication and information via computers at my workplace". At the first glance this can be surprising as the purchases, in general, are rather positive towards ICT. One explanation to this result can be that the purchaser role traditionally has been rather relation oriented. Today, however, more and more purchase activities tend to be managed electronically.

5. DISCUSSION

As previous research this study has confirmed perception of the main impacts ICT-use has on a construction company regarding improved quality of work. What has been added to previous knowledge is that predictors for perceived "higher quality of work" and "ICT as a mean for reducing the company's costs" has been identified. ICT's perceived role as a support for decision making that leads to an improved quality of products and processes have a significant impact on both the quality of work and in reducing the company's costs. This result is interesting because it shows an explicit or implicit awareness of the cost dimension of lacking quality. Moreover, the quality dimensions are also shown to be important predictor for ICT as a mean for improve the company's competitiveness.

For higher level managers the results from the study are interesting. The respondents perceive that the ICT-support has helped them making decisions leading to and improved quality of products and services as well as reduced the company's costs. Moreover, the IT-support is also perceived to aid decision making in order to improve the working environment and reduce the company's environmental impacts, even if this support is not perceived as valuable as in the case of quality and cost reductions. This can be seen as evidence that the prevailing systems in the company are appropriate for aiding decision making, which also is reflected in the opinions that the ICT is well adapted to the industry's conditions.

However, from a managerial point of view there are some concerns when it comes to the use of ICT. There is a belief that a further development of the company's ICT would lead to an increased competitiveness, but at the same time respondents do not want to use ICT more in their workplaces. The negative correlation between the perception that a further development of ICT use would increase the company's competitiveness and the perception that the ICT is well adapted to the industry's conditions, should be a concern for the company's management. In this area more knowledge is needed in order to understand what features of ICT are regarded as problematic by people who have a belief that a development of the company's ICT can improve the company's competitiveness.

The differences among the professional groups can mainly be explained by distance to operations and nature of work tasks. Professional groups who are not directly involved in operations, have a slightly more positive attitude to ICT than professional groups directly involved in operation, i.e. foremen and site managers. In this vein the nature of work tasks, i.e. the context of the IT use, can further help to explain these differences. For example, one of the primary tasks for off site managers are to keep track of project performance in order to control the use of recourses and by that the profitability of a portfolio of projects. The benefits of ICT as a mean for better cost control is also confirmed in previous studies (see e.g. Samuelsson 2008). If it is taken into consideration that the common idea reinforcing IT implementation initiatives is to integrate all information in order to reduce fragmentation and increase efficiency (see e.g. Monteiro 2003), there is a underlying differences in the logic between off site managers, site managers, and foremen. The latter professional groups sometimes have to manage messy processes in practice that does not follow the practice inscribed in the systems. Moreover, the site managers' dependency of IT, compared to foremen, is a natural consequence of what Styhre (2006) labels as the bureaucratisation of the site manager's role. The professional groups with the most positive attitudes are the estimators and planners, and the purchasers. This result is not surprising as these professional groups are searching and processing data to carry out their work tasks. What is interesting is the purchasers' attitude towards that "too much communication and information via computers in the workplace", compared to other professional groups. This attitude is probably grounded in a somewhat changed content in their work, which is a

consequence of the increased use of Internet portals for purchase activities. However, on the other hand the purchasers have a more positive attitude to the other items compared with other professional groups. This shows that a perceived deterioration, caused by IT, within an area, does not have to lead to negative attitudes towards IT in other areas. This indicates that the overall perceived usefulness does not need to be affected by negative attitudes within a single area.

6. CONCLUSIONS

As there is shown to be a previous lack of studies inquiring attitudes among IT-users in construction companies, the aim of this paper was to contribute to an enhanced understanding of general perceptions of ICT in building and construction companies and among professional groups. In order to achieve this, an explorative approach, analyzing both quantitative and qualitative data from a major Swedish building and construction company was chosen. The point of departure was taken in the concept of perceived usefulness which was discussed and contrasted to the technology acceptance model TAM (Davis, 1989), constructs describing net benefits (see Torkzadeh and Doll 1999), models explaining IS success (see e.g. DeLone and McLean 1992; Seddon 1997; Rai et al. 2002; Petter et al. 2008), and previous studies focusing on perceived benefits of ICT-use (see e.g. Rivard 2000; Goh 2005; Oladapo 2007; Samuelsson et al. 1998; Samuelson 2008).

Based on a sample of 257 respondents, working in the line and project organizations, it can first and foremost be concluded that respondents are fairly satisfied with the ICT both with regard to its impact on the organizational as well as the individual level. It is obvious that ICT is considered as a necessity when performing the daily work tasks. However, a number of surprising as well as interesting results were revealed. Surprising was that the respondents on the one hand agree with the statement: “A further development of the company's IT systems would increase our competitiveness”, but on the other hand slightly disagree with the statement: “In my workplace, we should use IT more”.

Differences among professional groups could be explained in relations to contextual aspects as the nature of their work tasks. One example of this is that higher level managers’, on the one hand, focus on control of project performance, and planners and estimators use of IT as an indispensable tool in their daily work. Whereas, on the other hand, the nature of site managers and foremen’s work are not always aligned with the intention of the ICT.

As there is shown to be a lack of studies focusing on attitudes among IT-users in building and construction companies there is a need for future research in this area – research that, for example, digs deeper into the differences in opinion among different professional groups. However, this study has a number of limitations that need to be recognised and addressed in future studies. First, the results gained in this study come from a single building and construction company. As the approach was explorative – analyzing both quantitative and qualitative data – there was an inevitable trade-off between sample size and depth. Further research should therefore extend this study into other construction companies and test to what extent the results of this study are generalizable to the building and construction industry as a whole. Second, future studies could also recognize differences in international context as well as include more items of information sharing and communication.

From a practitioner perspective this study shows that that respondents are generally satisfied with the IT-used in the company. They believe that quality of their work becomes higher while IT supports decisions improving quality of products and processes, which in turn reduce the company’s costs and improve the competiveness. However, if this belief is matched by an actual reduction in costs and increased competitiveness is difficult to determine as the realization of the potential benefits of IT use must go hand in hand with changes of the company’s processes and structures (see e.g. Markus 2004). A concern from a managerial perspective is that it seemingly exist groups of people who think that IT can be used in order to increase the competiveness of the company, but at the same time they do not think that current IT is well adapted to the industry’s conditions. A managerial challenge will be to deeper investigate this opinions and find out the deficiencies with the prevailing IT and how it can be adapted in order to increase the competitiveness of the company.

ACKNOWLEDGMENTS

This research project is funded by the Swedish research fund for environment, agricultural sciences and spatial planning (Formas).

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