

THE ROLE OF ORGANIZATIONAL CULTURE AND MOTIVATION IN THE EFFECTIVE UTILIZATION OF INFORMATION TECHNOLOGY FOR TEAMWORKING IN CONSTRUCTION

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This paper is based on an on-going 2-year EPSRC sponsored research project, which, *inter-alia* focuses on the utilization and exploitation of IT for team working in the construction, manufacturing and the financial sectors. An important aim of the study is to ascertain and document what the construction industry can learn from other industrial settings. The study employs a combination of research approaches, including case studies, ethnographic interviews, semi-structured interviews, postal questionnaires, the analysis of archive documents, and practitioner and researchers' workshops. There is a substantial amount of literature in the area of IT in construction teams, many of which are based on anecdotal evidence of the perceived benefits of IT to construction activities. There are also articles based on empirical investigations, which have been conducted on construction IT. However, these mainly tend to look at IT from a wider perspective, with many of these studies failing to capture the importance of the social dimensions in their quest to produce best practice or guidance documentation. This paper attempts to contribute to our knowledge of the social aspects of IT usage, utilization and exploitation, especially as it pertains to effective and efficient employment of IT for teamworking in construction and design teams. The paper documents and discusses important social issues from a thorough review of the relevant literature in construction and other industries, as well as the tentative findings from an on-going 2-year study. The paper argues that culture and motivation are important factors to consider when studying IT usage for teamworking. The effect IT has on teamworking varies enormously and can range from being extremely positive to alarmingly negative. This is, in turn, reinforced by the cultural and motivational factors at play within the organization. The paper will draw its conclusions from the findings of a series of ethnographic interviews, which are currently being undertaken in six organizations. Tentative findings indicate that certain cultural types and specific motivational factors influence the effect IT has on teamworking. The paper recommends that there is ample scope for further studies to be conducted in the social dimensions of IT, exploring the role which subcultures and different motivational constructs play in both the utilization and exploitation of IT for teamworking in small, medium and large construction enterprises, and bringing these issues to the attention of practitioners

Keywords: culture, information technology, motivation, teamworking

INTRODUCTION

Few will argue that we now live and work in an IT era. Indeed, it could be said that, in one form or another, IT suffuses most areas of modern life. The contemporary organization is becoming increasingly complex, not least because of the influx of information technologies. Similarly, it can be suggested that the construction industry has been relatively slow in its recognition and uptake of IT as a major

communications tool. Things are definitely starting to move forward, however, and at an extraordinarily fast rate. It remains of concern, though, that the IT may be there, ready and available, but that it is not being exploited as fully and completely as it could be. This seems to be the case throughout the industry, across design and construction.

There has been a vast amount of research undertaken into the role of IT within today's organization. This is certainly becoming apparent within the construction academic community. However, it remains the case (with a few exceptions) that much of this work is directed towards issues such as the technical aspects and capabilities of IT, its benefits and weaknesses with regard to organizational effectiveness, and the best means by which to measure and assess IT. Little consideration it would seem is given to the 'human factors' associated with IT exploitation - the important and very real issues of teamworking, culture and motivation are often overlooked. The current study, therefore, aims to bridge this gap.

Over the past two decades, information technologies in particular have begun to pervade contemporary society and become of more interest to researchers. IT, in its different and constantly emerging forms, enables us to undertake activities and achieve outcomes that were not possible before. IT is most commonly perceived as encompassing the computer, its hardware and its software. This is indeed a very prevalent and important IT tool, but it is extremely limiting to think of IT merely in these terms. It is often perceived as being a 'support tool', mainly used to make routine work tasks more efficient. This particularly seems to be the case when we think of IT in the organizational context. However, it is clear as we scan the literature and make organizational observations that IT encompasses so much more. It not only affects the work task but it often has a profound effect on the entire organization, its processes and its people.

Steven L. Chan defines IT as "... the convergence of computing, telecommunications and imaging technologies" (2000, pp. 224). He goes on to point out that "in its various manifestations, IT processes data, gathers information, stores collected materials, accumulates knowledge, and expedites communication" (Chan, 2000, pp. 224). It becomes clear, then, as we take a closer look at the subject that IT encompasses much more than just hardware and software designed and utilized to make routine work tasks more efficient. Within the organizational context, IT is becoming increasingly geared towards the enhancement of communication. It is commonplace for today's business organization to encompass a wide variety of IT 'tools'. Network systems (Internet and Intranet), e-mail, voice mail, video and audio systems, video- and tele-conferencing, and GroupWare are widely available for use in conjunction with word-processors, database, presentation and spreadsheet packages, telephones, and fax machines. Theoretically, it can be argued that this entire package of IT tools will make for a highly integrated and cross-functional organization, one in which a 'dynamic network of inter-relationships' will enable effective communication to take place (Johnson *et al.*, 1998).

It is certainly the case that the construction industry is starting to become more aware and acquainted with the potential offered by what are referred to as 'Information Communication Technologies' (ICTs). Unfortunately, it also seems to be the case that available and often easily accessible technology is not being utilized to the full. This is reflected in both the literature and in practice.

AIMS AND OBJECTIVES OF THE PAPER

The main objectives of the EPSRC sponsored research on which this paper is based are:

- To identify the potential of IT to contribute to close integration (including effective communication and collaboration) between clients, design and project team members at all stages during the briefing, design and construction cycle.
- To identify the opportunities for, and barriers to, IT-supported interdisciplinary working (identifying where the non-use, or inappropriate use of available IT tools forms a barrier to effective team working. There may be instances when IT is not appropriate.
- To establish the impact of organizational culture and sub-cultures (team culture and dynamics) on the adoption and exploitation of IT tools in construction, manufacturing and the financial sector.
- To explore the varying motivational factors that encourage the utilization and exploitation of IT tools in the financial industry (Banking), manufacturing industry, design and in construction with a view to ascertaining what the construction industry can learn from other industrial settings.

The primary aim of this paper, however, is to contribute towards improving our understanding of the complex social dimensions associated with the utilization and exploitation of information technology in design and construction teams. In doing this, it explores the nature of teamworking within an organizational context. The important factors that impact upon the exploitation of IT for teamworking, for the benefit or the organization, is also documented. Whilst it acknowledges the importance of IT as an aid to effectiveness and efficiency, it study pushes forward the notion that IT affects and is affected by the social and human factors inherent within the organization.

METHODOLOGY

The study on which this paper is based is currently being undertaken in collaboration with six organizations representing the construction industry - two architecture practices, a QS and project management firm, a contracting organization, a financial institution and a manufacturing company. The study employs a combination of research approaches, including case studies, ethnographic interviews, semi-structured interviews, postal questionnaires, the analysis of archive documents, and practitioner and researchers' workshops. To date, 30 in-depth ethnographic interviews have been conducted in an attempt to gain a real understanding of the often complex IT, teamworking, cultural and motivational issues associated with the utilization and exploitation of IT for improving teamworking. Postal questionnaires are currently being undertaken to corroborate the interview analysis.

At this stage, however, tentative findings are emerging which are enabling important understanding and discussion to take place. This will be valuable not only for the research community, but also for those practitioners thinking about IT and its social/cultural/motivational implications.

LITERATURE REVIEW ON TEAMWORKING

The idea of the 'team' and 'teamwork' is not new. Throughout history, individuals have been coming together in groups in an attempt to make life easier. "Groups are an important instrument of socialization ... and provide an important source of direction

to the individual for understanding social values and norms” (Ingram and Desombre, 1999, pp. 16). Groups are formed for a variety of reasons, but within the organizational context they are generally “... deliberately created by leaders for a specific purpose ... with the aim of implementing plans and achieving objectives” (Ingram and Desombre, 1999, pp. 17). For the present study, this deliberation, purpose and formalization characterizes a ‘team’.

Within an organizational context, a team can be defined as a group of individuals working interdependently to achieve a specific objective or attain a particular goal. The team’s activity is co-ordinated and each member of that team has a unique role to play or function to carry out which becomes integrated with that of the other members. An effective team is made up of people with different skills and talents. It is generally agreed that the grouping of various people’s creativity is one of the team’s greatest assets. “In situations that require a combination of multiple skills, experiences and judgements, a team would achieve better results than would individuals working within confined job roles and responsibilities” (Conti and Kleiner, 1997, pp. 26). Although this now appears to be an accepted viewpoint within management and organizational literature, it is only in recent years that organizations have realized the important role teamworking has to play within business and working environments. For the contemporary organization, “teams have become essential elements in problem solving and in helping businesses move forward into the future” (Conti and Kleiner, 1997, pp. 26).

For all this, however, and for all the attention teams are being given in the literature, organizations and their employees still appear to be failing to get the most out of teamworking. Many are even struggling to come up with a shared definition of ‘teamwork’. The authors suggest that when we look at teamworking we must direct our attention not only towards such concepts as skill, purpose and accountability, but also towards the ‘softer’ issues of communication, inter-relationships, integration and human behaviour. If an organization and its employees are to gain any benefit from teamworking, it is essential that the whole idea of ‘the team’ is fully understood. An effective team is made up of individuals who are all aware and supportive of the need for interdependence, and fully comprehend the benefits associated with this level of interaction.

Teamworking certainly has the potential to benefit the organization. Teams can work well for a number of reasons. Firstly, they bring together complementary skills and experiences. Secondly, in jointly developing clear goals and approaches, teams establish communications that support real time problem solving and initiative. Thirdly, teams provide a unique social dimension that enhances the economic and administrative aspects of work. Finally, teams have more fun, and this is an integral part of their performance (Stewart and Kleiner, 1996, pp. 13). Ideally, then, teamworking is especially suited to activities such as decision-making, communication and implementing change.

In many cases, teamworking is seen as the ‘great solution’ to communication, decision-making and efficiency problems. Indeed, the six participating organizations in the current study have each demonstrated a commitment to the idea of teamworking within and across all organizational levels. At the senior management level, in particular, it is accepted that propounding ‘high-energy’ team effort will offer enormous benefits to overall organizational effectiveness. It seems to be the case, however, that too much attention is perhaps being paid to the perceived benefits of

teamworking. As Drew and Coulson-Thomas point out, “high-energy team effort has enormous potential. However, the benefits are all-too-often exaggerated and the difficulties underestimated” (1997, pp. 163). Research within the six organizations is beginning to suggest that the desired outcomes of teamworking are high on the agenda, but the means of actually achieving effective teamworking is not being given quite as much attention. In fact, the actual technicalities and procedures associated with team building and teamworking are, it would seem, largely being ignored at strategic levels.

Organizations throughout the construction industry are becoming increasingly complex. This is certainly the case with regard to our six organizations. As a result, those individuals working within the construction industry have to become more adaptable and flexible in their approach to work. This often involves some degree of change, especially when the organization has little or no experience of dynamic teamworking, if it has traditionally operated within an autocratic or bureaucratic environment, for example. Any sort of organizational change involves a necessary degree of learning and development. It can be suggested that team learning is more effective than individual learning, as knowledge, information and idea sharing is enabled. Drew and Coulson-Thomas support this: “Teamwork is one of the most common prescriptions for coping with change” (1997, pp. 162). Preliminary findings from the current study are suggesting that individuals across the industry, and at all levels, believe in the ‘team ethos’. Indeed, it certainly appears to be the case that employees prefer to work in groups and teams rather than on a purely individual basis. Problems arise, however, when different individuals have different notions and ideas about teamwork. It is clear that individuals at different levels and within specific functionalities do perceive and approach the notion of teamworking in certain and atypical ways. Those at the strategic level tend to think about teamworking mainly in terms of efficiency and organizational effectiveness, whilst those at the mid- to lower-levels consider more how teamworking can aid their everyday working practices and procedures.

All those interviewed in the current study regard teamworking as desirable; generally arguing that teamworking is essential. There does not appear to be any significant difference of opinion amongst the different organizations, but attitudes definitely vary at different levels. Basic content analysis has shown that these can be grouped as senior level, mid-management level and lower level. Across the organizations, senior level managers and directors talk about teamworking mainly in strategic terms - teamworking is *regarded* as important and is vital for organizational effectiveness. As we begin to consider the next two levels, though, it becomes clear that teamworking is regarded as essential, but only exists to a *certain extent*. It appears, however, that teamworking often suffers at operational level for one reason or another. IT is often cited as one of those reasons.

SELECTED TENTATIVE FINDINGS ON THE IMPACT OF IT USAGE AND EXPLOITATION ON TEAMWORKING

Information Technology and team working

The current study is primarily interested in looking at the relationship between IT and teamworking. Therefore, a large part of the ethnographic interview process has been concerned with this and other issues.

All those interviewed, regardless of organization or level, agree that teamworking is important. They also generally agreed that IT is vital to them in carrying out their work. It enables faster and usually more efficient outputs to be generated, and greatly aids their working processes in this way. 'Speed' is definitely the main advantage of IT. When asked to comment on whether IT aids or encourages teamworking, though, many of the interviewees failed to understand and articulate how IT could in any way be related to teamworking. This was less of a problem at the senior level, as those interviewees were able to draw on the official strategic ideal of teamworking and IT. It was more difficult for the other interviewees, though, as teamworking and IT were generally considered to have completely different strengths and weaknesses. When questioned further, interviewees at the middle and lower levels did begin to see how IT and teamworking could be reconciled in an inadvertent way. It was generally agreed that good quality and speedy information was vital to the team if tasks were to be completed effectively and on time. IT is vital in ensuring that this happens. E-mail is deemed particularly useful in this respect.

Communication is a vital part of organizational activity. It can be argued that IT has a central role to play in the communications of the organization. The expected advantages of IT tools to communication are many. Belmiro, *et al.* state a number of benefits: "... speeding up of communication flow; speeding up of decision making; getting geographically dispersed groups to work together; eliminating departmental borders; sharing databases ...[and] ... eliminating intermediates from the communication process" (2000, pp. 291).

The preliminary findings in our study would support Belmiro's statement, but only to a certain extent. Whilst IT certainly appears to speed up communication and decision-making, and allows more people more access to more information, there is a down side. Many of those interviewed feel that 'too much' computer-mediated communication can lead to feelings of alienation and frustration, a point supported by Rozell and Gardner (2000). The use of e-mail is frequently cited as being both indispensable and troublesome. Although it speeds up communication and reduces much of the need for paper, it can cause 'interactional difficulties' (Rozell and Gardner, 2000). It has been suggested that e-mail and other computer mediated systems, such as video-/tele-conferencing, can 'make people lazy' and less likely to partake in face-to-face communication.

The perceived influence of culture and motivation on the role of IT in improving teamworking

The movement towards team-based structures with their attendant flatter hierarchies and dispersal of responsibility clashes with tradition" (McHugh and Bennett, 1999, pp 82). This statement tends to suggest that organizations are attempting to bring about structural changes without first addressing important cultural implications. The current study has given much consideration to the relationship between teamworking and culture. We define organizational culture as a set of values and beliefs that filter through a specific organization. This culture affects the behavioural practices within that organization. At this stage in the study, it is becoming clear that teamworking, in its different forms, definitely needs specific cultural characteristics if it is to be effective. If the culture of the organization isn't 'team-oriented', then it is likely that teamworking initiatives or processes will not work well and may even fail. The ethnographic interviews we have conducted into this area, indicate that both organizational and individual beliefs have a crucial effect on teamworking. However,

it appears that, to a certain extent, the cultural characteristics of many companies are being overlooked when planning and undertaking various work tasks.

Ingram and Desombre are adamant that “co-operation is at the essence of teamworking” (1999, pp. 22). It is essential for successful teamworking, therefore, that the culture of the organization is as co-operative and open as possible.

It is becoming clear, as our study progresses, that teamworking is regarded as vital for successful task completion. We are also being made aware that a team environment enhances job satisfaction amongst the majority of interviewees. Our study is also trying to find out the extent to which IT can aid or encourage teamworking. This is where difficulties arise, as, at the moment, it seems that IT and teamworking are viewed as two very different concepts amongst the workforce, and it is difficult for many to envisage how the two can be reconciled. It is here that the issue of motivation arises.

In this paper, we posit the view that motivation is a vital concept in bringing about the effective utilization of IT for teamworking. It is essential that managers at all levels fully understand what motivates their workforce. It can be suggested that if senior-level managers and directors achieve this understanding, then the ‘envisaged’ culture will become more reconciled with the ‘actual’ culture. Whether or not people effectively utilize IT for teamworking, depends, to a large extent, on whether they are motivated to do so. The culture of the organization has to reflect this.

As we speak to individuals at the middle and lower levels, however, confusion once again begins to arise over how IT can aid teamworking. There seems to be a real concern that rather than aiding teamworking, the ‘efficiency’ culture alienates people, forcing them to sit at their computers and “bang out the goods”. This particularly seems to be the case within the large QS and Project Management firm and one of the architecture practices.

It is extremely difficult to ‘classify’ culture or to put an organization into a ‘cultural type’. We are of the opinion that different groups and individuals interpret organizational culture differently. Early findings from our study indicate that at the present time there is a clear gap between what is perceived by those at the top as being the culture of the organization and those groups that actually work within the organizations. Those at the top need to gain a better understanding of the ‘actual’ culture and attempt to develop those ‘cultural characteristics’ that will enable and encourage teamworking and full exploitation of IT.

We can identify a number of dimensions that are crucial to assessing an organization’s culture (see Figure 1). These include communication, motivation, leadership, decision making and empowerment, creativity and innovation, organizational structure and training, education and development. Some of these are discussed below.

Whether communications are regarded as good or bad, formal or informal, open or secretive, can tell us a lot about the culture of the organization. The majority of interviewees regard IT as speeding up communication and enabling greater dissemination of written data. It is generally agreed that this is vital for overall organizational efficiency. However, it has been asserted by many of the middle and lower level employees interviewed that this ‘efficiency’ culture takes away a lot of the ‘enjoyment of work’. Individuals feel more dispensable than they did, say 3 years ago. Formal teamworking, required to get the job done, works well, but the more

informal side of teamworking - the 'face-to-face' communication - can suffer as a result of IT and its inherent efficiency.

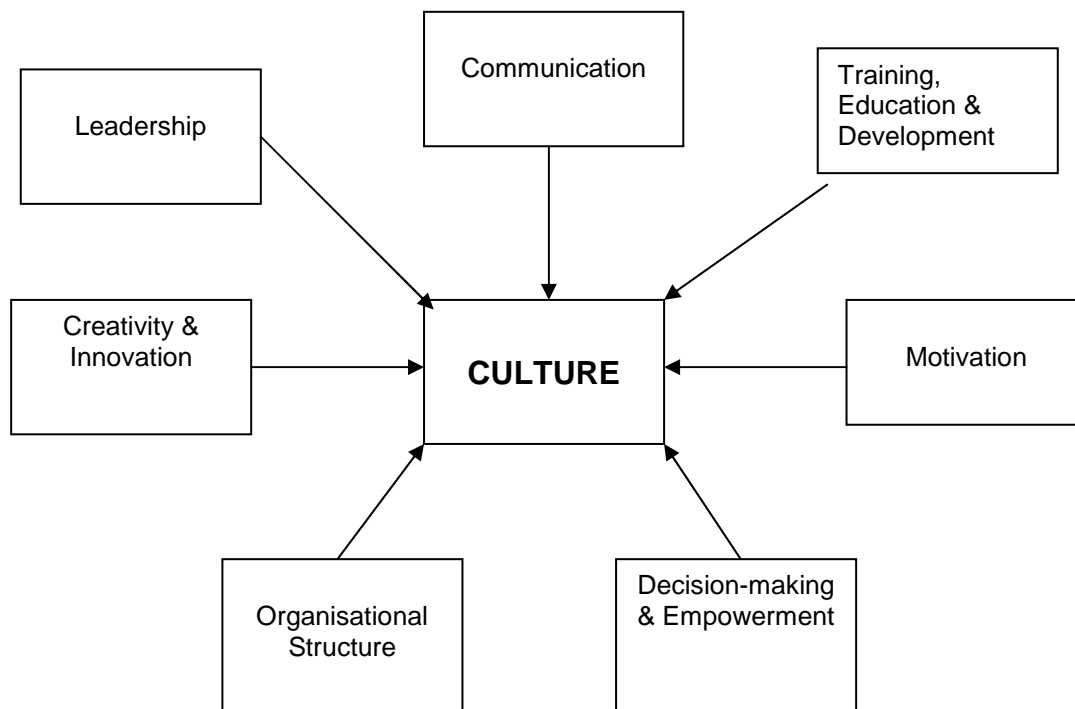


Figure 1: Cultural characteristics impacting upon the utilization and exploitation of IT for teamworking

Again, attitudes to training, the level of commitment to training and the training methods used, also tell us a lot about the culture of the organization. Staff development is crucial in ensuring a happy and effective workforce, and can go a long way in determining whether IT is exploited to the full. Each of our six organizations has clear-cut official training strategies. However, it was extremely rare to speak to anyone at the middle and lower levels who knew much about this training strategy. Of those interviewees that have actually received any IT training, the emphasis was always placed on the process of using certain packages and how to use them to ensure maximum efficiency. No interviewee had received any training relating to IT for teamworking.

It is vital that employees at all levels feel fully motivated to carry out their work. When the issue of motivation was raised in the interviews, most respondents agreed that the quality of the IT equipment made available to them was a major factor in ensuring they used it. However, no other motivational factors could be thought of that originated in the workplace. Of those who felt motivated to use IT, a great majority believed that this motivation came from within themselves, and not from the company they worked for.

Within each organization, IT in itself is a highly controlled entity. However, there is no evidence from our study of any formal procedure by which the benefits of IT for teamworking are measured or documented. It can be argued that if organizations hope to utilize and get the most out of teamworking and IT, they need to address the issue of organizational culture.

In summary, it appears that the culture of the organization largely influences the way IT is taken up and used. The preliminary findings seem to suggest that IT and teamworking are viewed as two very different concepts amongst the workforce, and it is difficult for many to envisage the association between the two. We argue in this paper, that motivation is a vital concept in bringing about the effective utilization of IT for teamworking. It is essential that managers fully understand what motivates their workforce. We also posit the view that if senior-level managers and directors achieve this understanding, then the 'envisaged' culture will become more reconciled with the 'actual' culture

CONCLUSIONS AND RECOMMENDATIONS

The paper has considered the role of information technology in improving teamworking in organizations. Consideration has also been given to the relationship between teamworking and culture. There are many factors that influence the utilization and exploitation of IT for improved teamworking. These include communication, motivation, leadership, decision making and empowerment, creativity and innovation, organizational structure and training, education and development.

Organizational culture affects the behavioural practices within organizations. Both organizational and individual beliefs have a crucial effect on teamworking.

As far as IT training is concerned, the emphasis seems to be placed on the process of using certain packages and how to use them to ensure maximum efficiency. No interviewee had received any training specifically relating to IT for teamworking. There is little or no evidence from our study of any formal procedure by which the benefits of IT for teamworking are measured or documented. This is important for benchmarking and for strategic planning purposes.

As the application of information technology pervades the way organizations do business, its impact on teamworking will become more obvious. The effect IT has on teamworking varies enormously and can range from being extremely positive to alarmingly negative. There is still a great deal to be uncovered regarding the complex ways IT impacts upon teamworking. There is, therefore, ample scope for further studies to be conducted in the social dimensions of IT. Such studies should explore the role which subcultures and different motivational constructs play in both the utilization and exploitation of IT for teamworking in small, medium and large construction enterprises, and bring these issues to the attention of practitioners

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