

## **STANDARDIZING KNOWLEDGE: A DIALECTIC VIEW ON ARCHITECTURAL KNOWLEDGE AND ITS MANAGERS**

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### **ABSTRACT**

*Many organizations within the construction industry are currently developing standardized practices. Increased standardization involves new ways of organizing construction projects, changing interrelations between professional groups, setting a new culture, i.e. challenging the institutionalized way of being. It, for instance, leads to a concentration of key knowledge into specific knowledge networks and artifacts. This in turn creates new and/or strengthened roles of expertise within the organizations leading to a reallocation of knowledge, as well as power, from the project setting to centrally organized functions, specialist consultancies and knowledge networks. Based on a case study of one Architect Company, this paper examines the tensions and paradoxes inherent in these 'new' roles. In the study, 13 persons were interviewed; actors responsible for changing practices, developing tools and ensuring learning among employees. The study contributes to theory building within a research field that examines the emergence of new roles and practices in construction and the contradictions which arise leading to tensions and possible conflict. Many of the assumptions that underlie these new practices run counter to the established norms and local practices as well as to construction practitioners' 'intuitions'.*

**Keywords:** social practices, roles, knowledge management, standardization, construction process, architect company

### **INTRODUCTION**

Many companies within the construction industry have today adopted strategies and procedures in order to operate in a more standardized and industrialized way. Knowledge Management related to standardized and industrialized building has been the focus of several recent studies. Most studies have focused on the procedural processes (eg. Höök and Stehn 2008, Koskela 2000) or ICT tools (eg. Persson et al 2009, Ekholm and Wiberg 2009). A few studies have had a more organization oriented perspective focusing on supply-chain relationships (Engström et al 2009a), quality control (Johnsson and Meiling 2009) and business barriers (Pan et al 2007). Conclusions are made that the industry's interest to adopt these new ways of building is still limited and suggestions are that to make it happen the project culture must change (Höök and Stehn 2008, Roy et al 2003), the client's power need to be strengthened (Engström et al 2009b) or peoples' perceptions on industrialized building need to change (Pan et al 2007). However, few have thoroughly studied these aspects. So far, much research has been 'trapped' within the theoretical frame of 'rational selection' and/or 'tool production' and thus not addressing on-going social processes related to standardization.

Increased standardization implies that strategic long-term decisions are embedded in the products and processes. This involves new ways of organizing a project, changing

interrelations between professional groups, setting a new culture, i.e. challenging the institutionalized way of being (Styhre 2009). It, for instance, leads to a concentration of key knowledge and expertise into specific knowledge networks and artifacts, such as technical platforms (Styhre and Gluch 2010) and ICT models. This in turn create new and/or strengthened professional roles of expertise within the organizations, such as production specialists, technical specialists, and BIM experts who possess knowledge that previously was to a great degree part of the professional role of an experienced project manager. This change leads to a reallocation of knowledge, as well as power, from the project setting and project manager to centrally organized functions, specialist consultancies and knowledge networks. However, results from a study of knowledge management in the construction industry (Johansson 2010) reveal that this change is not easily made. In fact it shows that individuals often mistrust the validity of the knowledge provided by experts and other professional groups. Consequently, if experts wield their power through their knowledge advantage it is perceived by practitioners as a possible threat towards the project manager's traditional role as site leader and as a disruption of institutionalized order within project practice and met with resistance (Gluch 2009).

Based on evidence from a case study of one architect company, and by taking on a dialectical perspective, on knowledge and its management (Benson, 1977; Zeitz, 1980; Seo and Creed, 2002; Omanović, 2009), this paper make an attempt to uncover paradoxes and contradictions that arise due to the ongoing change towards a higher degree of standardization in the construction industry.

## **THEORETICAL APPROACH: A DIALECTICAL PERSPECTIVE ON KNOWLEDGE AND ITS MANAGEMENT**

A dialectical perspective on organization views it as a multileveled phenomenon connected with contradictions that continuously challenge its existence (Benson, 1977). A dialectical perspective is thus strongly connected to the concept of on-going organizing processes, where organizations are constantly subject to change and where people continuously construct their social world. This means that the way an organization develops depends on the interests of actors and upon their ability to shape and maintain a social form. As such a dialectical model of an organization involves power and resource relations in organizational networks (Zeitz, 1980). A dialectical analysis therefore entails a search for accountants for the emergence of specific social situations. For management studies this means placing the process through which organisational arrangements are produced and maintained in the centre of analysis. It also aims at discovering ideas that are contradictory. Benson (1977) proposes four principles for a dialectical analysis: social construction, totality (context), contradictions, and praxis. It has been suggested that none of the four principles can be understood separately since they are intertwined and provide an overall perspective on social arrangements (Seo and Creed, 2002).

In this paper the first principle concerns how professional knowledge is *socially constructed* in the construction industry. This construction is influenced by actors involved in the social process of developing various ideas (Omanović, 2009). Here, human interaction, social patterns and a set of institutional arrangements are built, modified and eventually replaced. More, relationships are formed, roles are created and institutions are built (Benson, 1977). Human interaction is directed by people's interests and power (Seo and Creed, 2002) which makes these interesting to uncover in a study of knowledge and its management.

Knowledge is embedded in specific social contexts shaped by individuals taking part in this context (Fernie et al, 2003). The second principle in this paper therefore concerns how knowledge and its management are shaped by the *social context* where it occurs. Examining social context related to knowledge and its management entails linking structural networks of involved actors in their individual setting as they relate to one another and to a larger social environment. Seeing standardized knowledge and its management as part of a whole rather than an isolated phenomenon, includes studying not only new and emerging social arrangements, such as a more standardized way to manage knowledge, but also relating it to established and institutionalized social arrangements.

The third principle, *contradictions*, refers to various inconsistencies both among and within established social arrangements (Seo and Creed, 2002). Causing tensions and conflict within and across social systems, contradictions are in theory seen as possible forces of organizational change (Benson, 1977; Seo and Creed, 2002). The direction is however dependent on human action and practice where contradictions and inconsistencies may be used to facilitate new thinking (Foldy, 2006). Thus, identifying tensions in the process of standardizing knowledge in construction may uncover change agents as well as identifying actions for change.

The fourth principle of *praxis* incorporates aspects related to agency and structure in organizations. Benson (1977) uses the word praxis in the sense of a collective human action and mediating mechanism between contradictions and change. The perspective helps understand how interaction between actors, structures and artifacts forms identities and roles in a specific organizational setting (Lindgren and Packendorf 2007, Gerhardi and Nicolini 2002, Orlikowski 2002). Here this means exploring roles, interrelations and power positions of various actors in the context of increased standardization and knowledge management in construction projects.

## **METHOD AND CASE DESCRIPTION**

The present study is based on a case study methodology of one Swedish company within the construction industry; *Alpha*. One of the principal interests of the study was to understand which instituted arenas and practices for knowledge sharing were used in the studied companies. The centre of analysis has been the process through which knowledge management practices are produced and maintained in an organisation.

*Alpha*, a major Scandinavian architect firm, is a nationally renowned and a prestigious firm attracting some of the most skilled and creative architects, interior designers, lighting designers, designers, and engineers in Scandinavia. Alpha works in a wide variety of areas, including housing, health care buildings, schools, landscape design and architecture, furniture design, and interior design. The company was founded in the early 1950s and has grown both organically and through mergers and acquisitions, today being one of the largest architectural firms in Scandinavia. The firm employs 500 co-workers in 10 offices. In the spring of 2008, thirteen interviews were carried out with relevant actors; such as practicing architects, interior designers, and designers.

The interviews were conducted by two senior researchers and structured in accordance with a semi-structured interview guide, lasting for about one hour and being tape-recorded. All the

interviews were conducted at the company office. During the interviews, the interviewees were asked to tell about their day-to-day work, what they were working on at present, how they regarded their profession, what kind of media they were using, and what they thought was most rewarding in their day-to-day work. In general, the interview guide was structured so as to pave the way for detailed discussion about the day-to-day practices of their professional work. The interviewees were asked about their own professional biographies and careers, their work procedures, their preferences and beliefs regarding a range of work practices, and were encouraged to critically reflect upon their own work procedures and experiences.

All interviews were transcribed verbatim. The transcribed interview material was examined and analyzed by the two researchers individually. The analysis of the interview transcripts focused on the ways in which the different actors constructed their social world in their narratives. Key words, phrases and concepts were extracted, compared and contrasted. Representative extracts were then selected to construct the narratives represented in quotes used to illustrate specific phenomenon related to knowledge management practice. All the interviews were conducted in Swedish and thus translated into English.

## **STANDARDIZING KNOWLEDGE: A STORY OF BUILT-IN CONTRADICTIONS**

Alpha has established a medium which they refer to as *The Knowledge Construction (KC)*. KC consists of extensive networks active throughout the whole company. KC is supposed to work as a meeting place with no geographical boundaries. One major aim with KC is to make use of, bring together and promote all knowledge, skills and wealth of ideas possessed by Alpha's employees. Although open for all employees KC is governed by a set of employees assigned as *knowledge masters*. Besides leading an assigned field of expertise within KC, the *masters* are also responsible to maintain the corporate intranet. The *masters* are assigned this function as a side-task to their regular consultancy work. Although it varies between different *masters* and over time, they spent about half-a-day per week working within KC.

KC is divided into various expertise areas, for example sustainable building, ICT, public buildings, landscape, and interior design. Each *master* is responsible for the activities within each field of expertise. Based on personal and/or professional interest the employees can freely choose which network(s) they like to join. They can also decide to not participate in any. Although the utilization may vary there is a standardized set of activities that should be carried out within each field of expertise. These activities may be conducted internally or together with clients and partners in order to highlight relevant topics. KC has a system to arrange various activities, such as seminars, workshops and study trips. More, internal education and network meetings are arranged within the frame of the network as well as an online discussion forum. KC also supports the organization with reference documents and other 'inspirational artifacts' (checklists, texts, photos, presentations, links etc). The interviews showed that KC has a general support from the employees and, which is exemplified by the following quote:

*KC is very important for Alpha, one of this company's strengths is that top management allocates resources on a more systematized sharing of knowledge. The industry is rather changeable and being involved in the early phases you have to sense which direction it may take.*

### **Contradiction 1: Masculine individualism versus a collective interest**

That knowledge and knowledge sharing is an important resource for an architect company is thus evident but the interviewees had difficulties in framing what ‘architectural’ knowledge actually is. As professional group architects are traditionally generally located between the artistic and aesthetic fields and the engineering sciences, described as a hybrid by the following architect.

*The role as architect is a bit peculiar; it combines the technical with the artistic, the technical side of this role possesses a more verified knowledge while the artistic side possesses a more intuitive knowledge.*

So besides their distinct architect skills and competences they are also expected to understand technical aspects as well as taking account of the demands and expectations of a wide range of stakeholders including clients and end-users. This scattered competence makes it difficult to know what should be systematized in the KC, or as one of the knowledge masters expresses it:

*It is difficult to systematize architectural knowledge: what is it exactly? As architects we still struggle to define it, what kind of expertise knowledge do we possess actually? It is difficult to tie individuals’ tacit knowledge and articulate this in seminars and discussions.*

Here, the KC network was partly working as a mean in the process of constructing what architectural knowledge is. One of the interviewees said that within the KC “we become conscious about what we do and what we see, placing wordings on our aesthetic preferences”. Another said that “during these discussions I get ideas that I normally do not have time to think of. These I can ‘save’ for later use’ ”. And one of the masters said that taking an active part in the KC network forces her to “step outside my regular role and think: ‘What do we want to do?’ Where are we going?’ ”.

What complicates the framing process of architectural knowledge is the existence of a dominant view of what ‘good architecture’ is and what the ‘right’ architectural vocabulary is. The right architecture is today, according to the interviewees, a masculine view that is “taught the very first semester in architecture school, and thereafter becomes habitual”. Considering that the world are changing we can here see a tension between two social processes that influences the role of architects, the drive towards a collective ability to handle holistic societal demands through a more systematized sharing of knowledge and the individual and masculine force to build ‘good’ architecture according to institutionalized norms. As a consequence some employees feel uncertain of his/her architectural preferences “when you no longer know what you believe in anymore” and/or become sidestepped due to conflicting professional interests which the following quote by a master within the environmental knowledge network illustrates:

*They [the architects and building engineers] lack genuine interest in my expertise area; ... Therefore it is very difficult for me to learn them anything.*

The above reasoning illustrates how ‘standardizing’ of knowledge in this company is a social construct influenced by self-interest and traditional preconceptions of the social world. For Alpha it was clearly important to maintain the opportunities to engage their employees in the process of constructing architectural knowledge.

### **Contradiction 2: Stereotyped copycats opposing conformity**

Within the social world, the context, there are contradictions related to the architect role. The interviewees revealed a frustration of being torn between the idealistic innovative and creative person and the stereotypical copycat. Or as expressed by the following two architects:

*We need to stretch the boundaries a bit more, learn from other countries, in some offices in Europe it is not unusual to have about 20 nationalities in one office, here we think alike, come from the same school, has similar ideas, belong to the same networks, reads the same magazines, like the same things...*

On the same topic another architect with 22 years of experience says:

*Over time I have become the weary architect which I mocked when I was 25.*

Although aware of this autonomous stereotyping of their role and the outcome from their work, or maybe in spite of it, there seem to be an self-assumed attitude among the interviewed architects to oppose conformity in other contexts, for example when adopting management systems and work routines. One of the more experienced architects says:

*Creating a collective stock of knowledge is a linchpin in our office. We are convinced that we perform better together than each one individually.... [however] we have a hard time keeping up routines... we are a typical kind of organization that has difficulties in maintaining things... We lash out if it becomes too squared and institutionalized... we have to balance between a more standardized knowledge available in systems and databases and our curiosity. Otherwise we will dig our own grave and become deadly boring.*

The more standardized and systematically way to work, as prescribed by KC, is conforming to the way the employees believe is the most efficient way to work with regard to the product to be delivered, but is simultaneously conflicting with the attitude regarding the ‘curious’ architect.

### **Contradiction 3: Cross-fertilization of like-minded**

To maintain business Alpha has, according to one interviewed head manager, chosen to strategically market the company as “a company that possess expertise knowledge within a range of areas”. As such Alpha offer a broader but also a more specialized service, encompassing architects with focused expertise areas, such as school buildings, infrastructure, lighting, hospitals etc, as well as experts from other professional expertise areas, such as energy experts, project managers, ICT engineers. The interviews reveal that this change causes a professional identity conflict among the architects, moving away from the traditional role as the generalist that “knows everything when it comes to building a house”. This strategic change involves, with KC as an intended motor, making people with various professional background but common expertise interest, meet in a more systematic way. This idea is met differently by the employees. One team manager supports the idea although the outcome from it may, according to him, be disputed. He says:

*Top management has an outspoken strategy to cross-fertilize between different professional groupings... I encourage that my team members also work in other teams*

*than my... Sometimes it gets nowhere but you have put something to stake to go beyond the predictable.*

Another senior architect is of a similar view and addresses a challenge of un-locking professional barriers within the organization. She says:

*One challenge is to get to that different professional groupings benefit and spur each other, and not locking-in each other in predefined boxes.*

However, a contradiction to this determination to cooperate and exchange over professional and organisational borders is that many of the interviewed also emphasise the effectiveness inherent in teams that share a long common history. Talking about a shared and intuitive collective knowledge and reference frame and the necessity of “having a professional home base” contradicts to the idea of KC. More, educational background was found to serve as basis for a very distinct grouping of employees within the company. The development of KC as a mean to share knowledge more systematically is in Alpha also obstructed by an existing and dominating culture of ‘learn-by-doing and seeing’. Listening and reading, which are cornerstones in the KC framework, is not considered as ways to learn. One of the interviewed architects says: “...the most important knowledge sharing happen when you work together, not when you just listen... I learn by confronting people face to face.” More, a strong individualism and prestige-mindedness were forwarded by the interviewees as a hinder for knowledge sharing. The interviews indicate that this attitude is nurtured and driven by the project based organising, where a strict economical project frame only “cover ‘you’ and your personal interest”.

This final remark from one of the interviewees is summing up the main essence of KC and standardized knowledge sharing in Alpha illustrating the paradox of ‘no matter how ‘good’ a system is, it is never better than the user’:

*KC is a great initiative; not very many architectural companies’ have such an organized knowledge network to rely on. But I am quit bad using the opportunities given within it.*

## **DISCUSSION AND CONCLUSIONS**

By adopting a dialectical perspective on knowledge and its management focus of this paper has been to create a wider understanding of how architectural work practice, knowledge and context relate to the ongoing change towards a more standardized way of knowing what to do in the company. By focusing on these aspects a number of paradoxes and contradictions have been uncovered. The following discussion will be out of the perspective of contradictions as a possible force of change.

The KC idea of a more systematic knowledge sharing and the creation of a collective knowledge base and mind, were found to conflict with the institutionalized embedded perception of ‘good’ architecture and practice among the employees. The characteristic of ‘good’ architecture, as well as practice, was: *individualistic* with a practice where curious and independent creativity is favored, *masculine* with a practice inspired by male ‘star’ architects as role models and, *competitive and prestigious* with a culture where winning architect competitions and large contracts give credibility leading to a successful career. This

individualistic view on architect practice was further nurtured by the temporary ‘bracketing’ (Kreiner, 1995) of construction projects, which frame the individuals’ performance in relation to short-term project goals and not the long-term objectives of the company. The collectively standardized and systematically way to work, as prescribed by KC, was nevertheless found to have support within the organisation as it conformed with the way the employees believed was the way forward towards a more efficient way to work. Simultaneously it conflicted with this attitude regarding the ‘successful’ architect and ‘good’ architectural practice. In addition, the company’s strategy to provide broader but more specialized service lead to shifting roles, from the traditional generalist to specialist within a targeted expertise area. In Alpha today this conflict between perceptions of architectural preferences and ‘good’ practices creates an identity crisis among the employees, with employees not knowing what they are and what they stand for. They wished to be innovative and creative but found them self as adaptable copycats. A stressful awareness of a present on-going process leading to a more stereotyped architect role and architecture with the risk of losing professional authority, led to that many chose to oppose conformity in situations where they were in control of their decisions, for example to not fully adopt management systems and standardized work routines.

The standardization of knowledge sharing in Alpha, by the means of the KC network, did however facilitate a continuous process of constructing what architectural knowledge is. Thus, various and sometimes conflicting views became more evident when people met leading to a reconsideration regarding one’s habitual architectural practice. Participating in KC activities also permitted stepping out of their regular role which allowed them time to reflect, time seldom available in a time pressed consultancy life. However, the main basis for entering to a specific KC group was personal and/or professional interest. This might lead to that the group will consist of like-minded and even like-minded already belonging to previously established personal networks. Consequently there is a risk that KC fails creating the cross-fertilization of various professional groupings as hoped for, and instead creates sub-groupings of like-minded with a previous common history. It is therefore very important to maintain, and even enhance, the opportunities to engage within the KC network, so that a viable process of constructing modern architectural knowledge and practice is stimulated. Thus, provide a place where employees can reflect upon aspects that lie outside the every-day work. Preconceptions will be challenged, eventually leading to change. So, if the company wishes to change into the multi-professional company they constantly need to confront the reigning institutional norms of ‘good’ architecture and architectural practice. The KC framework show good potential in serving as mean for this change process.

In conclusion, the attempt to standardize knowledge and knowledge exchange within the KC frame in Alpha together with an attempt to broaden their market share could mean shifting from being a specialist company with hybrid employees to a hybrid company with specialized employees. Rightly used the KC could provide an opportunity to cross-fertilize professional knowledge within the organisation and also un-lock professional barriers. However, more standardized practices as well as more defined and specialized roles contradict with the current perception of what an architect is and know which resulted in that KC only existed on the periphery of regular work.

From this study it can be concluded that ‘standardizing’ of knowledge is a social construct influenced by self-interest and traditional preconceptions of the social world. In line with conclusions made by Fernie et al (2003) it is therefore important to consider that for a more systematic, ‘standardized’, knowledge sharing between organizational entities, professional groupings and individual professionals, it is necessary to facilitate a dialectic debate within

the organizations. By uncovering dominant ideas and interests in the process of standardizing knowledge the results from present study can serve as a starting point for such a discussion.

This paper should be seen as a setup for a continuing research project ending in 2013. The objective of the research is to stimulate and support development in the studied organizations (one construction company, one architect company and one prefabrication manufacturer) but also to visualise and raise knowledge and understanding concerning biases and consequences from changes made in each organisation. This means identifying opportunities and arenas where parties can share and adjust beliefs and values so that mutual knowledge sharing can take place. It also means bridging different interrelating theoretical and practical perspectives of technology, ICT, organizational theory and psychology.

## REFERENCES

- Benson K. (1977) Organizations: A dialectical view. *Administrative Science Quarterly*, **22** (1), 1-21.
- Fernie S., Green S., Weller S., Newcombe, R. (2003) Knowledge sharing: context, confusion and controversy. *International Journal of Project management*, **21**, 177-187.
- Foldy E.G. (2006) Dueling Schemata: Dialectical Sensemaking About Gender. *The Journal of Applied Behavioural Science*, **42**(3), 350-372.
- Ekholm A., Wikberg F. (2009) Design with architectural objects in industrialized building. In (Zarli and Scherer (eds) *eWork and eBusiness in Architecture, Engineering and Construction*, Taylor&Francis, London. p 213-222.
- Engström S., Sardén Y., Stehn L. (2009a) Towards improving client-contractor communication in industrialized building. *Annual ARCOM conference*, 7-9 sept. Leeds 2009.
- Engström S., Stehn L., Sardén Y. (2009b) Competitive impact of industrialized building – in search for explanations to the current state. *Annual ARCOM conference*, 7-9 sept. Leeds 2009.
- Gherardi S., Nicolini D. (2002) Learning in constellation of interconnected practices: Canon or dissonance. *J. of Management Studies*, **39**(4), 419-436.
- Gluch P. (2009) Unfolding roles and identities of professionals in construction projects – exploring the informality of practices. *Construction Management and Economics* **27** (10), 959-968.
- Höök M., Stehn L. (2008) Applicability of lean principles and practices in industrialized housing production. *Construction Management and Economics*, **26**, 1091-1100.
- Johansson K. (2010) *Knowledge Management i byggindustrin – en förstudie med fokus på kunskapsbärare vid standardisering av produkter och processer i byggandet*. Report 2010:5, Bygg- och miljöteknik, Chalmers.
- Johnsson H., Meiling J. (2009) Defects in offsite construction: timber module prefabrication, *Construction Management and Economics*, **27**, 667-681.
- Koskela L. (2000) *An exploration towards a production theory and its application to construction*. Diss. Thesis, VVT Technical research centre of Finland.
- Kreiner K. (1995) In search of relevance: Project management in drifting environments. *Scandinavian Journal of Management* **11**(4): 335-346.
- Lindgren M., Packendorff J. (2007) Performing arts and the art of performing – on co-construction of project work and professional identities in theatres. *Int. J of Project Management*, **25**, 354-365.

- Omanović, V. (2009) Diversity and its management as a dialectical process: Encountering Sweden and the U.S. *Scandinavian Journal of Management*, **25**,352-362.
- Orlikowski W. (2002) Knowing in practice: Enacting a collective capability in distributed organizing. *Organization Science*, **13**(3), 249-273.
- Pan W., Gibb A., Dainty A. (2007) Perspectives of UK housebuilders on the use of offsite modern methods of construction. *Construction management and Economics*, *25*, 183-194.
- Persson S., Malmgren L., Johnsson H. (2009) Information management in industrialized housing design and manufacturing. *J of Information Technology in Construction*, **14**, 110-122.
- Roy R., Low M., Waller J. (2005) Documentation, standardization and improvement of the construction process in house building. *Construction Management and Economics*, **23**, 57-67.
- Seo M-G, Creed D. Institutional Contradictions, Praxis, and Institutional Change: A Dialectical Perspective. *The Academy of Management Review*, **27**(2), 222-247.
- Styhre A. (2009) *Managing knowledge in the construction industry*, Spon Press, London.
- Styhre A., Gluch P. (2010) Managing knowledge in platforms: Boundary objects and stocks and flows of knowledge. *Construction Management and Economics*, **28**(6), 589-599 (eds Bresnen and Harty).
- Zeitz G. (1980) Interorganizational Dialectics. *Administrative Science Quarterly*, **25**(1), 72-88.