

THE PRINCIPLES OF IDEACTIVITY

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ABSTRACT

Improving productivity has been one of the major concerns among the construction management community for the past few decades. A number of developed methodologies and practices have ranked productivity among the top indicators of firms' success and economic growth in general. However, is productivity really such a good indicator to assess firm's success and employees' involvement in its developmental process? Even in construction with its overwhelming labor intensity one cannot neglect that creative thinking and resulting innovation are not products of intensifying existing work practices. They stem from a totally different human activity that relates to ones ability to think outside the box, and to bring about changes that question the existing ways of thinking and current practices.

The purpose of this paper is thus to introduce the concept of ideactivity that captures the very idea of the human ability to develop so called observable-specific communicative domains which result from and are necessary components of the communication process. In particular, the objective is to introduce and define a set of measurables through which ideactivity can be equally successfully implemented into firms' practices as productivity, which is viewed here as only a side-effect of firms' ideactive capacity. The two major measurables are time-related increases of individual firm-specific communicative domains, and proportions of compatible, semi-compatible and incompatible relations.

It is suggested here that proportions of compatible, semi-compatible and incompatible relations, time-related increases of individual firm-specific communicative domains, and a degree of propagation can serve as a good measure for firm's internal and cross-boundary ideactivity. However, it is believed that the measurables can only be successfully identified in firms that fully adopt the agent based knowledge and information management systems.

Ideactivity is thus viewed as a new frontier for achieving competitive advantage and appropriate development of product and/or project specific knowledge.

KEY WORDS

Ideactivity, Knowledge Management, Communication, Productivity, Construction.

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INTRODUCTION

BACKGROUND

Improving productivity, embracing innovations and creating/retaining knowledge are some of the most widely accepted processes in the struggle for better construction. A quick assessment of a number of publications shows a great deal of interest of a wider scientific community to study these issues. The search within Science Direct, Elsevier's major database retrieved more than 10,000 matches for productivity and more than 400 for labour productivity alone and this excludes the well known journals that are not part of this database. Several thousand matches were also obtained for studies on innovation with more than a hundred of them focusing specifically on construction. The two aspects of firm's route to success are without any doubt important and it seems appropriate that researchers study them closely.

Are they the only measures of firm's success? By far not since firms have to monitor a number of various more or less measurable success factors but there seems to be very little interest in one particular factor. A quick search of studies on creativity retrieved only 1380 matches and only 44 of them were more or less related to the construction industry. This time it involved four major construction management journals plus the above database (Construction Management and Economics, Journal of Construction Engineering and Management - ASCE). Why is creativity so much less interesting than productivity or innovation? One reason might be the nature of creativity. It is an ongoing process of producing novel ideas rather than an outcome (Amabile, 1988; Drazin et al, 1999, Magee 2005). It is believed that so called employee creative behavior (ECB) is materialized as an employee's perceptions and beliefs about his/her creativity-related behavior in the workplace (Rice, 2006). Measurability thus represents one of the major obstacles in studying creativity. Another reason might be that creativity is not understood by everyone as one and the same feature. Creativity is notoriously difficult to define (Sawyer, 2003). While many social scientists see creativity as a process that does not necessarily relate to any specific matter (Magee, 2005), others, and in particular in construction, view it as the outcome or the production of useful ideas concerning products, services, processes, and procedures (Oldham & Cummings, 1996; Ford, 1996; Zhou, 1998). Regardless of how one might see it, creativity is obviously not a measurable outcome like, for example, productivity. Although facing these difficulties a number of social scientists have been trying to assess creativity since early 1950's (Guilford, 1950, 1970; Wallach and Kogan, 1965; Sternberg 1999). Sternberg for instance discusses six different roadblocks in the history of creativity studies that have more or less affected the interest of science in this immensely important social phenomenon. Mystical, pragmatic, psychodynamic, psychometric, cognitive, and social-personality approaches are, according to Sternberg, the main reasons for neglecting creativity in psychology and other related fields. Some recent studies on creativity raise hopes by suggesting that it is triggered by the convergence of multiple components (Amabile, 1983, 1996; Sternberg & Lubart, 1991, 1995). Amabile describes creativity as a confluence of intrinsic motivation, domain-relevant knowledge and abilities, and creativity-relevant skills while Sternberg & Lubart describe it as a confluence of intellectual abilities, knowledge,

styles of thinking, personality, motivation and environment. These studies are therefore referred to as confluence approaches to studies of creativity.

In spite of a lack of research creativity has been recognized as an important element in construction research as well. Anumba and Ebuomwan (1997) developed a process model to address shortcomings of common procurement routes. One of the discussed shortcomings in their study are unnecessary constraints to design creativity. It has also been recognized that some particular aspects of project-organizational integration enable harvesting of expertise and creativity from all team members (Nicolini, 2002; Ellis et al, 2005). These aspects also include employees themselves, supportive organizational climate and conflicts (Druker et al, 1996; Green, 1996; Dulaimi et al 2005). The question however is if construction professionals understand a creative process. A survey of the relative importance of management skills and knowledge, conducted by Egbu (1999), reveals that refurbishment managers do not treat creativity as part of their job activities. It was ranked 45th out of 55 studied job activities. This is a surprising result since some top ranked activities like leadership, communication, motivation of others, health and safety and decision making contain at least some degree of creativity if they are to be efficiently performed (Hensey, 1999; Cheng et al, 2000; Dainty et al, 2003). Hensey and Cheng et al identify creativity as one of the project's critical success factors, while Dainty et al argue that the industry needs to define more appropriate performance criteria that would also consider knowledge, skills and behavioural inputs.

Although many recognize that the organizational climate has a profound impact on individual's and group's ability to think and behave creatively, no study has been found that would try to exemplify organizational capacity for activating and maintaining creativity. This, as it will be shown later in the text, is the main objective of this study.

PROBLEMS, AIMS AND OBJECTIVES

Construction is a labor intensive industry whether we talk about site operations or management. Its complex processes require constant management attention and some most delicate integrating activities known. This should be the sole reason for studying creativity at most seriously since it is a prerequisite for increasing productivity, inducing innovation and enhancing problem-solving. The review of relevant construction-related literature reveals an apparent need for further research through the following problems:

- Although there is an increased recognition of creativity as one of the success factors in managing projects, very little is known of the organizational capacity for activating and maintaining creativity.
- So far we still do not have metrics for assessing this organizational capacity (e.g. how well a particular organization is performing in terms of activating and maintaining employees' creativity in comparison to other organizations).
- We also do not have a universal term for this capacity and provide researchers with a common ground for further development of creativity-related metrics and methodologies.

The aim of this paper is thus to provide a conceptual representation of the organizational capacity for activating and maintaining employees' creativity with particular objectives being:

- To define 'ideactivity' as a common expression and as an overall modular metric relating to the organizational capacity for activating and maintaining employees' creativity (e.g. productivity is also a modular metric as it can be expressed in many different ways).
- To develop a set of measurables through which ideactivity can be equally successfully implemented into firms' practices as productivity.
- To use these measurables in the assessment of a real-life project and check whether ideactivity can serve as a valuable success indicator.

These objectives, however, do not indicate that this study is providing a full or final set of measurables nor they indicate an attempt to complete formal discussion and research. The study should be viewed as a mere introduction into what is hoped to become a fruitful focal point of research that may elevate the construction industry beyond productivity.

THE CONCEPT OF IDEACTIVITY

The fundamental principle of ideactivity is that it reflects or it should reflect the organizational capacity for activating and maintaining employees' creativity. Specifically, it should reflect and quantify the speed, momentum and degree of propagation of spontaneous or organization-driven formalized creativity. Ideactivity is thus a modular metric representing a family of specific creativity-related measurables. These are discussed later in the text.

The basic principle of ideactivity is the so called Luhmann's concept of social communication (Luhmann, 1986). According to this concept human beings are viewed as observers having a specific ability to develop communicative domains as a result of hetero-referentiality and communication. In other words, whenever perceiving an unknown object, we necessarily create an object-specific sub-domain by making a reference to other communicative sub-domains in order to compare it with other things and create/enhance understanding of the observed object. The same applies to the process of communication, which involves two or more persons, the subject and relations of interactions that reflect understanding of involved people of the communicated subject. The sub-domains are actually elements of person's own general communicative domain representing a total history of observation and communication. An employee working for a particular firm thus, through the above processes, develops a firm-specific communicative sub-domain that may be further divided into function- and work-specific sub-domains, and so on (see Figure 1).

Relations of interactions in Figure 1 that represent communication between two individuals may be represented as compatible, semi-compatible and incompatible relations reflecting full agreement, partial agreement and full disagreement. Strictly speaking, compatible relations would need to correspond to individuals' identical histories of observation and communication so in reality they do not exist. However, the reality shows that some people and teams develop a higher degree of agreement than others. This may be a

result of a greater proportion of ‘more compatible’ semi-compatible relations that reflect similarities of developed understanding between people or team members.

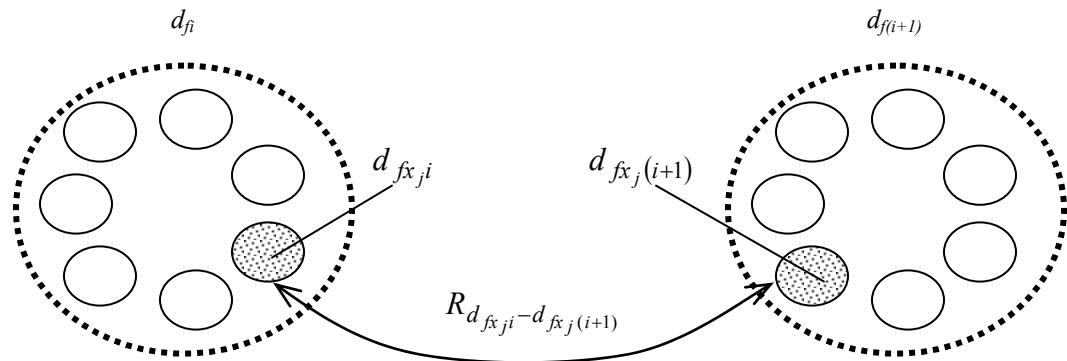


Figure 1: Communication between two employees, each contributing a personal firm and function-specific communicative sub-domain (d_{fi} represents a personal firm-type communicative domain of an individual; d_{fx_ji} represents a function-related specialized communicative sub-domain of personal firm-type communicative domain of an individual; $R_{d_{fx_ji}-d_{fx_j(i+1)}}$ represents a specific set of relations between two function-related specialized communicative sub-domains of personal firm-type communicative domains of two interacting individuals)

Communicative domains and sub-domains are created and changed through the processes of observation and communication. The creation of a new domain or changes of an existing one thus represent ideas that either outline an entirely new approach or changes of an existing approach (see Figure 2). These may arise from observations of processes/products outside firm’s environment or from communication with other employees or people external to a firm.

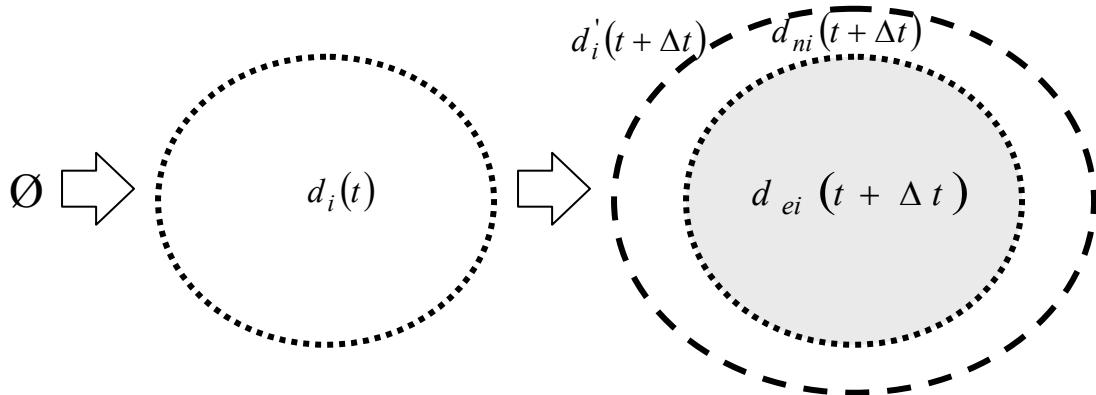


Figure 2: Development of a specific communicative sub-domain (d_i represents an emerging personal product/process-type communicative sub-domain of an individual resulting from

communication or hetero-referential comparison to something else at time t ; d'_i represents a personal product/process-type communicative sub-domain of an individual developed through communication and hetero-referential comparison to something else at time $t+\Delta t$; d_{ni} represents newly created understanding, as part of d'_i , of the product/process created through communication and hetero-referential comparison to something else at time $t+\Delta t$; d_{ei} represents existing understanding, as part of d'_i , of the product/process at time $t+\Delta t$)

Clearly, individual's creativity may either create a new domain or enlarge/enhance an already existing domain. Now, if firms' managers are to measure the impact of these ideas, they need to collect data that would reflect the speed, momentum and degree of propagation:

- Who contribute ideas and how many in a given time (implemented and unimplemented sorted by each individual employee)
- How much time and how many interactions of communication are needed in the idea-incubation time; from the suggestion until the start of implementation (the acceptance of new ideas by superiors or the proportion of 'more compatible' semi-compatible relations and incompatible relations)
- Who in the organization is informed about details of proposed ideas (degree of propagation through time)

It is suggested here that proportions of compatible, semi-compatible and incompatible relations, time-related increases of individual firm-specific communicative domains, and a degree of propagation can serve as a good measure for firm's internal and cross-boundary ideactivity. The above data could only be rigorously collected using agent based knowledge and information management systems where each employee's portfolio of suggested ideas would be processed by a community of software agents which automate tasks such as interaction with other portfolios, idea-incubation communication, etc. In fact, this would probably be the only sensible way to assess how ideactive a firm is (e.g. how many ideas, how many of those are implemented, idea-incubation time, degree of propagation).

MEASURABLES AND AN EXAMPLE

An agent based system would enable a firm to collect ideas, and determine the time and number of interactions between a contributing employee and key-people in the organization during the idea-incubation stage. Nevertheless it would also propagate and disseminate the developed knowledge/communicative domain throughout the organization which is a key element for achieving an organization-wide understanding with the intention of improving communication. Namely, employees need to understand changed processes or any other kind of implemented new ideas if firms are to avoid communication problems and employees' opposition.

Discussed measurables are not exclusive and even ideactivity of a firm or of a particular part of a firm itself can be expressed in different ways. One of the possibilities is the use of standardized rating scales like the Likert scale. The drawback of the Likert scale is that it can only categorize one single measurable so ideactivity would most probably need to be

evaluated using a spider diagram or any other multi-indicator reporting tool. Such flexibility is in fact required particularly for the purpose of opening a debate.

Since ideactivity is a new term in construction, it was not possible to study an explicit example of applied measurables. As an alternative, a project from the Scottish Construction Forum's (SCF) Demonstration Database has been studied in order to assess whether ideactivity could provide a better insight into site-related creative processes. Tay Road Bridge Box Girder Strengthening has become a SCF demonstration project in 2004 by demonstrating innovative approaches in bridge-repair and maintenance works. The bridge is approximately 1.75 miles long and comprises a series of twin steel box girders simply supported on columns and piers at generally 55m spans. The total value of works was £4.8m. The client, Dundee City Council, used a partnering approach with the prime objective to overcome problems that heavily affected all previous projects resulting in time and budget overruns. As part of a partnering scheme the project team shared all project-related data and unanimously supported any ideas that might have a positive impact upon its budget, completion or any other important aspect. They have conducted an early partnering workshop in the following way:

- involving all key stakeholders (client, designer, main contractor, specialist subcontractors)
- highlight principal concerns and issues (design-related, construction-related, weather-related, etc.)
- gain understanding and trust (processual approach in building a team)

Further to that they have implemented the so called issue resolution and continuous improvement processes, conducted weekly project and monthly partnering meetings, and organized interim and final partnering workshops. The described approach produced some very positive results. The project was completed on time and within the budget, and all involved parties were very positive about the council's new procurement route. The question however is how ideactive the project was. The continuous improvement scheme yielded a number of improvement ideas:

- Undertaking full-scale trial of the strengthening system using plywood to inform the final design and detailing of the strengthening works
- Access gantries providing catering to workers on the bridge
- Lighted interior and plywood walkways to minimize the risk of injuries (see Figure 3)
- Undertaking full-scale simulation of the accident within a bridge girder box using a full-weight dummy
- Enlarging access hatches

All of these ideas were accepted by the project team and the idea-incubation stage never lasted for more than a week. However, the continuous improvement scheme was open only to the project team representing roughly 10% of the total number of involved employees. Further to that the team did not consider including other employees from within involved

organizations. Therefore, while the core project team exhibited substantial ideactivity with 100% implementation rate, no incompatible relations, and fully developed knowledge of implemented improvements, these did not originate from and were not further disseminated within involved organizations.

Unfortunately the data were not collected in a way suitable for a more detailed analysis but these results can still serve as a glimpse of what ideactivity really is and how can it be approached.



Figure 3: Lighted walkway within a Tay Road Bridge girder box

CONCLUSIONS

Productivity and innovation are still some of the most widely covered areas in construction management literature. On the other hand and in spite of its importance creativity and creativity-related studies are still lagging behind the two, particularly in construction. The major reasons for that are problems with measurability, a variety of differing definitions, and inappropriate approaches in the past.

The aim of this paper was thus to provide a conceptual representation of the organizational capacity for activating and maintaining employees' creativity. In particular, the objectives were:

- Developing a definition of 'ideactivity' as a common expression and as an overall modular metric relating to the organizational capacity for activating and maintaining employees' creativity.
- Developing a set of measurables through which ideactivity can be equally successfully implemented into firms' practices as productivity.
- Assessing the ideactivity of a real-life project and check whether it can serve as a valuable success indicator.

Although simplified due to a lack of appropriate data, the assessment of a project revealed that ideactivity can provide some valuable information about the organizational capacity for activating and maintaining employees' creativity. Future studies would, however, need to rely on appropriate systematic and organization-driven suggestion schemes, and corresponding agent-based knowledge and information management systems.

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