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What Information Brazilian Construction Managers Really Need to Improve the Design Stage Decision-Making Process: A Multiple Case Study

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Abstract

Information has become a key point for competition in global markets. As a first step, organizations need to identify the purpose of information in developing competitive strategies. The development and flow of information is especially critical if the process is dependent on different types of participants.

The involvement of professionals with different interests, knowledge, and abilities in the production process results in communication problems at the interfaces among those participating in a given stage and also among different stages of the process. For example, cultural diversity of participants (architects, engineers, customers, etc.), who need to work together to produce a final product can be a major obstacle in construction industry.

The objective of this paper is to relate the theory on the usefulness of data and information with the available information about the production process. We take as a specific example, the design stage of the building construction process and evaluate the presence of information, in companies of the building construction industry in two Brazilian cities, Porto Alegre and São Paulo. We accomplished this objective through a multiple case study (Yin, 1994).

Introduction: Need of Information

The management of the design stage is fundamental for the success of the building construction process (design, execution and use). It is necessary, according to Austin et al. (1994), to consider two difficulties: the presence of different types of participants, and the manner in which communication and information transfer occurs among participants. According to Kähkönen and Koskela (1990), the administration of the design stage of building construction will have numerous possibilities for the application of information technology, with the goal of improving quality and productivity.

A literature review on data and information relating to the management of the design stage, suggests that the value of information is associated with its cost and its usefulness. Speier et al. (1997) and Vessey (1991) discuss the effects of information presentation format on decision-making performance. In Davis and Olson (1987), the usefulness of information is explained through its format, time, locality, and availability. Alter (1996) considers these same items for the evaluation of the usefulness of the information, even though he separates them into the following categories: quality (age, timeliness, accuracy, precision, completeness, source), accessibility (accessibility, access restrictions), and presentation (format, level of summarization).

Case studies were conducted in 10 companies – 6 in Porto Alegre/RS/Brazil (locality of the research) and 4 in São Paulo/SP/Brazil (the largest center of the country) – chosen by convenience, in order to identify the characteristics of the information used. We constructed an interview guide based on the literature review concerning the design stage for building construction and information. Face-to-face interviews with the first author serving as interviewer were conducted at all companies. The interviews were tape recorded and transcribed later for analysis.

Real Information to Support the Organizational Process

The building designers group can be considered a temporary multi-organization, with specific objectives and time of existence, which will cease to exist at the end of the design stage. Its members have different professional and cultural origins. Further, they participate in more than one multi-organization and, therefore, must obtain an appropriate level of understanding and cooperation in a timely fashion.

Each of the design participants carries out a group of individual tasks. The individual tasks are compiled to produce a set building construction documents which should describe the building in a complete and unambiguous way. The achievement of this objective depends directly on the efficiency of the communication within the group, due to the fact that the work of one member may result in constraints on other members.

Examples of the information generated or used in the design stage in the sample companies are analyzed in the appendix, according to the factors considered by Alter (1996). These factors (quality, accessibility, and presentation) allow one to identify the aspects of the communication process (related to information) that the companies should improve.

The first column in the appendix (aspect/company) shows some aspects identified during the interviews in the sample companies. These aspects are related with information in the design stage. The other columns (quality, accessibility, and presentation) discuss briefly how these aspects are related with the usefulness of information according each factor (quality, accessibility, and presentation). In the appendix, the companies are identified with the letters A to J to preserve their identity.

Final Considerations

The customer - user of the building - is one of the essential considerations for any building design. However, they are still not well integrated into the process as sources of information. Customer integration can be achieved in two ways: by identifying their needs and expectations of the building (proactive), and with an evaluation of satisfaction with the building (reactive).

Another important point is the use of the building execution stage as a valuable source of data and information. Currently, no record is made of the consequences of incorrect, incomplete or ambiguous information supplied by the design stage. No feedback of the corrective actions required to circumvent poor information is provided to designers. The same lack of information and communication exists for designs that are especially good (or high quality). Further, one could not notice integration of engineers in the design stage.

The sample companies showed to be improving the quality of information in the essential documents, as much in content terms as in presentation and accessibility. This can represent the first step toward valuing actual information for decision-making as opposed (or in addition) to intuition.

These final considerations attend to the involvement of different type of professionals to produce the final product. The focus is on the record of knowledge and information generated in the accomplishment of the works.

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References

- Alter, S. *Information Systems: a Management Perspective*, 2nd ed., The Benjamin/Cummings Publishing Company Inc., Menlo Park, 1996.
- Austin, S., Baldwin, A., and Newton, A. "Manipulating the Flow of Design Information to Improve the Programming of Building Design", *Construction Management and Economics* (12:5), 1994, pp.445-455.
- Davis, G. B. and Olson, M. *Sistemas de Información Gerencial*, McGraw-Hill, Bogota, 1987.
- Kähkönen, K. and Koskela, L. "A Scenario of the Evolutionary Development of the Computerized Construction Project Management Systems", [S.I.]:[s.n.], 1990.
- Oliveira, M. *Evaluation of Indicators for Decision-Making in Building Design Stage*, Doctoral Dissertation Project, Escola de Administração, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil, 1997.
- Speier, C., Valacich, J., and Vessey, I. "The Effects of Task Interruption and Information Presentation on Individual Decision-Making", *Proceedings of the Eighteenth International Conference on Information Systems*, K. Kumar and J. I. DeGross (eds.), Atlanta, GA, 1997, pp. 21-35.
- Vessey, I. "Congnitive Fit: a Theory-Based Analysis of the Graphs Versus Tables Literature", *Decision Sciences* (22), 1991, pp. 219-240.
- Yin, R. K. *Case Study Research - Design and Methods*, 2nd ed., Sage Publications, Thousand Oaks, 1994.

Appendix: Analysis of Some Information for the Design Stage of the Building Construction Industry in Brazil

ASPECT/COMPANY	QUALITY	ACCESSIBILITY	PRESENTATION
Only in company “B” the engineer participates in the design stage and execution stage; in companies “B” and “G” the architect visits the work only when requested		The integration between the design stage and execution stage would allow access to important information, for example, difficulties of execution of solutions adopted in the building design	
Only companies “D” and “T” record design modifications, and company “T” has a control system of the various design versions	This regarding to the information timing, that the failure to record modifications can lead to professionals working with wrong information	There is no record of alterations and therefore the professionals don't have access to the right information	
All the companies were told that it should be important to pay attention to identifying the satisfaction of building users, even so, none of them accomplished this activity	This information could increase the reliability of the product really representing market needs	Without access to this kind of information it is not possible to have product feedback	
The company “B” has a specific concern at the level of design detail that all the measures should be in the design leaving nothing to be calculated in the working place	Decisions must be made during the execution stage in spite of a lack of information in the building design, which normally generates unsatisfactory solutions	Care should be taken to allow participants access to all the needed information for the execution of the design	
None of the companies use the customers' complaints and warranty repairs as information for new building designs		When summarized appropriately, complaints provide product feedback	These data if summarized appropriately can provide information at tactical or strategic level for the company
The sale documents used by the companies are traditional ones, except for company “B”, which shows the plan of the garages	The documents presented during the sale period do not always have all the information requested by the customers	In some situations, the information exists, but is just not shown to the customers	The organization and the detail of the information in this case are important, besides the summarized data level
All the companies make use of the information technology (IT), in various stages	The use of the IT facilitates the necessary modifications and it activates the transfer of information among the designers	The IT eliminates rework. For example, the designer of facilities can make use of the architectural file	The use of the IT facilitates the organization and detail of information in the building design