

The Process Analysis as a Frame to Merge Social and Technical Issues in the Design of Information and Management Systems

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Abstract. A methodological approach for the design of socio-technical systems requires the analysis of the identity of the organizations and of the characteristics of the design process. The paper proposes to use the concepts of stakeholder and social behavior to describe the social identity of organizations and to merge studies and practices in the fields of Information Systems and of Management Systems to define the features of a design based on the participation of the interested parties. For this proposal, the Process Analysis could be a common frame because it supports the development of Information Systems and drives several studies in the field of Strategic Management and Organizational Behavior. Future research are suggested to investigate how the Process Analysis could be useful to encompass complexity and diversity of organizations and how it could support a social approach in the design process.

Keywords: Organization Identity, Social Behavior, Process Analysis, Design Methods, Information System.

1 Introduction

Within the current economic scenario, the socio-technical perspective has to deal with the continuous changes of the identity of the companies.

Starting from a practitioner experience in the field of Management Systems, the concepts of Stakeholder and of Social Behavior are proposed as criteria to describe the characteristics of the organizations.

The paper suggests to study design methods useful for a social design process that could merge the fields of Management System and of Information System. With this aim, the Process Analysis is proposed as a possible common approach for supporting the design of integrated systems that encompass the social and the technical features of the actual organizations.

2 About the concept of “Socio-Technical Design”

The economic scenario has broadly changed in the last ten years. Companies, and more generally, organizations have increased in complexity. For instance, as pointed out by [1], today the organizations are more and more influenced by values and personal relationships.

Hence the first question is: “What does social mean?”

The idea that the owners of an organization are the shareholders and the main social relationship is between employer-employee has evolved into the idea that companies have relationships with several stakeholders, such as customers and suppliers, workers and trade unions, legal and regulatory authorities. The concept of stakeholder enlarges the scope of the relationships of the organizations.

This approach, proposed as a structured model, is embedded in the requirements of the International Standard Organization (ISO) Standard on Management Systems. A similar approach, in a less structured way, is present in several sustainability and social values included in the profile and in the policies of many companies.

Furthermore, the identity of the organizations is deeply influenced by social behaviors.

Many studies of management propose a new beginning to the behavioral approach that explains psychological and social mechanisms by which mental processes affect organizations. Behavioral strategy merges cognitive and social psychology with strategic management theory and practice [2]. For instance emotions and social identities prompt middle managers to support or dismiss a strategic initiative [3], family firms may have family centered non-economic goals that could influence the firm's behavior [4], and growing interest is in studying and understanding unethical behaviors that can lead to enormous costs for organizations and society [5].

For these reasons, the business environment and the concept of (open) system encompass an increasing amount of variables that requires a broad and deep analysis of the internal and external context. For instance, the risk analysis, in the past, only focused on financial risks whereas, presently the concept of risk is characterized by references to potential events related to several disciplines, such as occupational health and safety, environment, crime, business continuity.

The second question is: “What does technical mean?”

A (partial) list of techniques that influence processes and activities of the organizations could include: Data Base for supporting production and provision of services, automation of equipment for manufacturing, identification of goods, such as bar coding, for traceability, automation of warehouse for logistics, wiring of working spaces for office activities, Web support for marketing and commerce.

The influence of these techniques has been huge in the last decades and has dramatically modified the activities of workers and employees and the relationship between the organization and its context. The layer of information, data, wire that has been introduced often leads to a status of an ‘out of control’ system, where the management of organizations is more and more complex [1].

To deal with this scenario, a socio-technical perspective requires new studies and practices to evolve the methods for designing Information and Management Systems.

The key word of "human needs"[1] should be carefully investigated to embrace several interested parties, such as employees, providers, customers and to compose with their points of view the social side of the design.

3 Process Analysis Approach

This paper proposes the idea that Process Analysis could be a way to merge the organizational and management aspects and the technical issues, because it is a common point in the research fields of Information Systems, Organizational Behavior and Management Systems and is at the basis of many practitioner activities.

In the Information System field, the Process Analysis supports the development of many applications and is embedded in standard and modeling tools.

In the past years the paradigm of workflow based systems dominated the analysis approach.

In the last years, several notes have highlighted the limits of a too schematic and deterministic approach that forces the complexity of the activities in predefined frameworks and wired the attention of the analysis to the adaptability of the systems. Critics to this methodology are, for instance, in Adaptive Case Management (ACM) approach, that explores methods for analyzing processes in the new enterprise [6] and proposes that Case Analysis could be performed by end users while working [7].

Several studies in the field of Organizational Behavior and Management are concerned with Process Analysis. For instance, research in Management and Organization Science suggests that organizational processes in the current business scenario may be the strategy of firms in unpredictable markets. Processes such as internationalization, product development, acquisitions and alliances enable firms to acquire, shed and recombine resources.

An overview on methodologies for the study of organizational behavior processes is described in [8] that compares qualitative and quantitative, experimental and non-experimental methods exploited for analyzing and describing processes. Particular attention is devoted to evaluate the impact of time variable.

Furthermore Standards on Quality Management, such as the forthcoming version of ISO 9001 [9], are based on processes and highlights the concept of "promoting awareness of the process approach".

More generally, the structure of Management Systems, proposed by Annex XL[10], followed for the updating of all the standards on Management Systems, such as ISO 14001 [11], ISO 45001 [12], is an useful reference. The requirements of the standards related to the context and the interested parties could drive the exploration of human needs, while the requirements related to resources and documented information could support the definition of the technical needs of the organization.

To develop a shared and social process analysis, a new methodological approach has to be explored, starting with an evaluation of weak points of the present approaches.

Some of them are listed in the following:

- A weakness of Information System studies is the subordination of Process Analysis to the Information Technology. As pointed out by [1], the systems are exploited at a low level of efficiency, because the environment has not changed and people are passive receivers of the new technologies and not active member of the team.
- A weakness of Organizational Behavior studies is the prevalence of a too academic approach, with a point of view in the investigation of organizational processes that is “outside”: the organization and its social behaviors are analyzed and not followed, for instance, during the projects that drive organizational and management changes.
- A common weakness of both the research fields is that the attention is mainly devoted to describe the results (e.g. workflow maps or management models) and not the practice exploited to reach these results.

4 Challenges

To overcome the previously described limitations, a social process analysis has to encompass complexity and diversity of the organizations and has to move towards an “insider design process”.

Two research questions are proposed: how the criteria followed for the analysis could be useful to encompass complexity and diversity of organizations and how the design process could support a social approach.

For the first question, some topics to address could be:

- **The management model.** Predefined management models, such as ISO 9001 and/or Lean Enterprise enforces the role of conceptual frameworks for the definition and description of the processes while Case based and adaptive approaches propose less structured frameworks.
- **The context of the company.** The conceptual coordinates are influenced by the stakeholder’s point of view that differently describes the same organizational environment and processes. For instance, for the shareholder, the key characteristics of the process could be related to investment risk while, for workers, to health and safety risk.
- **The direction of the analysis.** The paths of the analysis, usually, are proposed as moving top-down or bottom-up, but even moving forwards and backwards or following the “brownian motion” of the activities with a less structured approach could be useful.

The Process Analysis methodologies should merge theoretical thinking and approaches based on experience, should carefully take into account the context and find out the models and notations that better fit the processes. For instance the workflow notation is still a good way to map workflow processes, as operations or order management, but a variety of activities require the investigation of new methods. In these context Adaptive Case Management approach could be the effective method.

Furthermore the analysis ought to consider several factors that lead analyst ‘eyes’ and several coordinates that describe the conceptual space. The coordinates (stakeholder-

point of view, tangible and intangible items, boundaries and granularity, time) define the frame to transform fuzzy assets into more structured models and, therefore, into “new systems”.

For the second question- how the design process could support a social approach- the social issues should be investigated in the following directions:

- **Moving from ‘outside’ to ‘inside’.** Considering the process analysis as an useful way to capture and organize the social behavior of enterprises, to understand and to modify social behavior of people, increasing their knowledge and awareness on processes[Mau].
- **Defining “who commits, who designs, who practices”.** As previously described, the concept of “social” could be wide and, in the design process, it is necessary to define a scope, the interfaces, the internal and external subjects of the project team and hence the required competences and attitudes.
- **Assuming a never-ending approach.** The design process does not end with the releasing of a result. Continuous monitoring, for instance, through process based audits and an in-depth check of several actual cases allows testing and verifying the effectiveness of the analysis results. This choice implies the process maps could be updated and changed and then the process based system ought to be flexible enough to support fast changes.

For these reasons it is important exploring the phases of the design process.

For instance, in project development, the start-up of a process analysis is linked to a specific management commitment in which not all requirements are clearly stated. Therefore, the first step of the project is perfecting objectives and constraints and getting people together to explore “new countries”.

The key factor of this phase is to understand the heterogeneity, strategies and structures of the organization, including workflow and non-workflow processes, which is supported by tools useful for collecting information, habits, individual and social behavior, vision, energies and resources.

Considering these topics, a socio-technical design could support the implementation of an Information and Management System (IMS) that encompasses and integrates management issues (e.g. rules and responsibilities, practices and procedures), technical issues (e.g. software applications, equipment, materials) and behavioral issues (i.e. awareness, motivation and process based thinking) and could better fit the needs of the companies in the present economic scenario.

5 Summary and Outlook

The goal of the paper is to raise questions about the present meaning of socio-technical design and to propose future work for merging different areas of research and practice, Information System, Management Systems and Organizational Behav-

ior. Possible topics of this cross-functional activity are presented, assuming Process Analysis as a common framework.

References

1. Enid Mumford. The story of socio-technical design: reflections on its successes, failures and potential. *Info Systems Journal* (2006) 16, 317-342 Blackwell publishing Ltd
2. T.C. Powell, D.Lovallo, and C.R. Fox. Behavioral Strategy. *Strategic Management Journal* 32: 1369-1386 John Wiley & Sons (2011)
3. Quy Nguyen Huy .How Middle Managers Group-Focus Emotions and Social Identities Influence Strategy Implementation. *Strategic Management Journal* 32: 1387-1410 John Wiley & Sons (2011)
4. James J. Chrisman, Jess H. Chua, Allison W. Pearson, Tim Barnett. Family Involvement, Family Influence, and Family-Centered Non-Economic Goals in Small Firms, *ET&P March* 2012 , 267-293
5. C. Moore, J.R. Detert, L.K. Trevino, V.L.Backer, D.M. Mayer. Why Employees Do Bad Things: Moral Disengagement and Unethical Organizational Behavior. *Personel Psychology*, 2013, 65, 1-48 John Wiley & Sons (2012)
6. Ilia Bieder. Towards a Non-workflow Theory of Business Processes M. La Rosa and P. Soffer (Eds.): *BPM 2012 Workshops, LNBIP 132*, pp. 1-2, 2013. Springer-Verlag Berlin Heidelberg 2013
7. K.D. Swenson. Position: BPMN Is Incompatible with ACM. M. La Rosa and P. Soffer (Eds.): *BPM 2012 Workshops, LNBIP 132*, pp.55-58, 2013. Springer-Verlag Berlin Heidelberg 2013
8. Paul E. Spector and Laurenz L. Meier. Methodologies for the study of organizational behavior processes: how to find your keys in the dark. *Journal of Organizational Behavior*, 35, 1109-1119 John Wiley & Sons (2014)
9. ISO/FDIS 9001 Quality management system-Requirements
10. ISO/IEC Directives, 2012, Part 1 Consolidated ISO Supplement-Procedures specific to ISO Annex SL Proposal for Management Systems Standards
11. ISO/DIS 14001 Environmental management systems-Requirements and guidance for use
12. ISO/CD 45001 Occupational health and safety management systems-Requirements
13. Paola Mauri. Process Analysis and Collective Behavior in Organizations. A Practitioner Experience. Y.T. Demey and H. Panetto (Eds.): *OTM 2013 Workshops, LNCS 8186*, pp. 124-133, 2013. Springer-Verlag Berlin Heidelberg 2013