

Applying Social and Technical Topics in the Design of Management and Information Systems.

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Abstract. The methodological topics proposed by Process Analysis, Social Behavior, Socio-technical perspective are often applied in my practitioner activities. Two experiences are presented. The first experience is running in government-owned company. The aim of the project is to develop a management system in conformity with the requirements of an international standard. The novelty is the implementation of this model in a public context constrained by several regulatory requirements. The methodological focus of this experience is on the role of the management model and the influence of the context. The second experience is running in a co-operative organization that provides caring services. The aim of this project is the updating of the organizational structure and the re-engineering of its processes, including the management of information. In this experience the Process Analysis and the Socio-technical approach have been widely applied. The lessons learned through the described experiences are presented to evaluate the effectiveness of the proposed methods. In addition the relationship between practitioner and his/her customer are explored with reference to the topics of an Ethnographic approach.

Keywords: Process Analysis, Social Behavior, Socio-technical Design, Management System, Information System, Ethnographic Approach

1 Introduction

My practitioner activity is mainly oriented to the design of management systems in conformity to several standards, in particular the standard ISO 9001 “Quality Management Systems. Requirements” [1]. In these activities I have to understand the organization and its context and to take into account and to integrate management matters, technical matters and behavioral matters. My methodological framework includes the Process Analysis that influences and is influenced by Social Behaviors [2].

For the importance I assign to social concerns, I proposed in [3] that the topics of the Socio-technical Design, described in [4], could be effectively merged with Process Analysis in the development of management systems. Furthermore I think that the behavioral concerns could be refined with the suggestions of the Ethnographic Approach described in [5].

In this paper I summarize the key topics of these methods and I describe two experiences that I am following as a practitioner and where I am using these topics as a conceptual framework.

The first experience has been developed in a government-owned company and is mainly focused on the role of the management model and the influence of the context. The second experience is running in a co-operative organization that provides caring services. This experience could be useful to describe a system where data and process flows are crucial and where a Socio-technical approach has been successfully applied.

The lessons learned drive the conclusion and the proposal for future research.

2 Methodological topics

The methodological framework that supports my practice encompasses several topics. A short summary of these topics is described in the following, focusing on Process Analysis, Socio-technical Design and Ethnographic Approach. They have been progressively introduced in my methodological toolkit and applied in the described experiences.

2.1 Process Analysis

From 2000, the Standard ISO 9001 introduced the process approach as a key requirement of the quality management system. Since then, in implementing management system, I have to develop Process Analysis for “understanding and managing interrelated processes as a system” [1]. This practice allowed me to refine a method, in particular for defining the conceptual coordinates that drives the analysis and to the phases that drive the design.

This long term experience moved my attention from the technicalities of the process analysis to the social and behavioral characteristics that could influence the organizations. I realized that the process analysis is ‘a two-way interaction between processes and behaviors: practitioners need to take into account social behavior in developing the analysis while analysis and modeling can influence and modify social behavior’ [2].

Presently, in my practitioner activities, the process analysis, developed for obtaining the compliance to the requirement of the standard ISO 9001, is considered as a useful way to understand and interact with the organizations and to support involvement and participation.

2.2 Socio-technical Design

Recently, I found very interesting the approach of a Socio-technical Design described in [3], which suggested to my practice challenging topics. I think that this approach, conceived for information systems, could be applied to the design of any kind of management system.

In the Socio-technical approach I have identified several similarities with the concerns of my practitioner activities: the idea that “technical structure and work roles are both part of an inclusive system”, the attention on the environment and on the adaptive systems, the social support designed to reinforce social behavior, the incompleteness of the design, conceived as an iterative process.

For this reason, I proposed in [4] to merge Process Analysis and Socio-technical Design, suggesting a method where the Process Analysis could be useful to define criteria and phases and the Social approach could be useful to define principles and values. In [4] I suggested that this approach has to deal with several challenging topics. Some of them are summarized in the following.

- The objective of the design could be influenced by management models. For instance, predefined management models enforce the role of their requirements in the description of the processes while lean and adaptive approaches propose less structured frameworks.
- The criteria for exploring the environment and developing the process analysis could be influenced by the stakeholder’s point of view. For instance, for the shareholder, the key characteristics of the process could be related to investment risk while, for workers, to health and safety concerns.
- The concept of social could be wide. A clear definition of “who commits, who designs, who practices” is fundamental for identifying the objective, the scope, the interfaces, the internal and external subjects of the project team and hence the required competences and attitudes.
- The relationship with incompleteness and iteration could be crucial and it requires the assumption of a never-ending approach. 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 results.

2.3 Ethnographic Approach

Last but not least, the Ethnographic Approach described in [5] suggests interesting questions for the observation of social interaction. “The way the ethnographer is introduced in the field, the way she talks and she behaves have significant effect on her relationship towards the people in the field and the data the ethnographer will be able to have access to.”

The methods proposed by ethnography, in particular the reflexive position of the ethnographer, the observer/participant positions and the insider/outsider perception are applied in the requirements elicitation for information systems and I think that they could be applied to design management systems and to investigate the relationship between a practitioner and the organization.

These topics suggested an interesting analysis on my behavior and on the relationships between me and my customers. These relationships, often, could determine the success or the failure of a project.

3 Experience_1. The influence of the management model and of its relationship with the context

With reference to the described methodological topics, the key features of this experience are related to the influence of a prescriptive model that has to be transferred to a context with a high level of complexity and a low level of adaptability.

3.1 The project

The context is a government-owned company where the top management responds to an area of the government structure. The company statutory rules and the internal code of conduct are constrained by the national and country laws of the Public Administration. Furthermore, the governance is influenced by several political issues.

One of the functional areas of this company has a department that performs inspection services on the import/export of goods. The inspection process and its practicalities, for instance the inspection methods, are established by national and international regulatory requirements.

On the basis of a law of the European Community (in development), the functional area that performs inspections is required to become an inspection body compliant with the Standard ISO/IEC 17020 [6]. This objective was assumed by the manager of the functional area that performs inspection and it is the commitment of the project.

To reach the conformity to the standard, the inspection area has to implement a management model in accordance with its requirements of the organizational structure, the operating procedures, the data recording, the employee competences, etc.

One of the key requirements of the standard is the management of risk of impartiality and independence and the analysis of the relationships that could influence the impartiality (parent organization, departments within the same organization, related companies, regulators, clients, personnel, etc.).

In the project I was directly involved from the beginning, with the support of a colleague. As practitioners, our responsibilities include: planning and leading the design process, explaining the standard requirements and transferring them into the organization. The outcome of our activities has been documented in a Quality Manual that references organization chart, procedures, registration sheets, etc. This documentation has to be evaluated by the Accreditation Body and its implementation audited on the field.

The first step of the project was a feasibility study (three months, a meeting every week). This activity was performed by a project team, composed of the two practitioners (myself and my colleague), the manager of the functional area ('who commits, who designs'), the manager of the inspection department and an internal coordinator ('who designs, who practices'). The team developed a gap analysis through the comparison of the management models, in particular analyzing the rules of governance of a public administration structure and the ISO/IEC standard requirements. The gap analysis was exploited to measure the "distance" from the objective and hence to define the project planning and the required resources.

After the approval of the project and of its budget, the team started the activities. A great effort of the analysis was devoted to the internal relationships that have been re-designed for managing the risk of independence. For this objective, a new organizational structure was discussed, defined and formally issued by the CEO of the company. During this phase of the project (six months, a meeting every week) all the processes were analyzed in the team and the inspection activities were observed on the field. The information systems, that assist the inspection activities, were evaluated too. They are outsourced, 'not agile' and centralized: a lot of time is required to update/modify the applications.

Following the accreditation rules, a detailed description of the whole functional area, was produced, approved by the manager of the area and by the CEO. The documentation describes the responsibilities and the methods exploited by the management system. At the end of this phase the documentation was submitted, for evaluation, to the Accreditation Body.

At the same time, 'outside' of the project boundaries, the organizational structure of the whole company was deeply revised by the CEO and a new organization chart was issued. This organization seems not to fully guarantee the impartiality required by the standard, in particular because the functional role of the manager of the inspection area seems not to guarantee complete independence.

Recently, the company received from the Accreditation Body the evaluation report: the main remark was on the impartiality and it will be deeply discussed during the next steps of the accreditation process.

3.2 Methodological topics of the project

Two aspects feature the environment of the government-owned organization: the influence of political parties and the presence of legal requirements that lead the governance. This kind of system is not 'agile' and has a low level of adaptability. The ISO/IEC 17020 management standard, in turn, is very prescriptive. In this project the management models are predefined, strongly structured and influenced by external issues. Then the design process was strongly constrained by the compliance, with the aim to modify and to adapt the context to the new requirements.

The Socio-technical approach was applied in the team: practitioners and internal members worked hard to understand environment, systems and objectives and to share methods. For instance the risk of independence, not considered in the internal risk management, was deeply analyzed and transferred in the new management model.

During the feasibility study the practitioners focused on the observation and on the understanding of the context, while during the project development, their aim was to define the new procedures and to support the implementation of the system.

The awareness and the knowledge in the team changed during the project and the members shared common points of view: the initial distance of the conceptual coordinates of the team members was reduced. The system developed inside the boundaries of the inspection area was consistent and compliant.

Outside the boundaries of the inspection area, the project encountered several problems. For instance, it was very difficult to involve the IT department and no communication was established with the other functional area and with the top management.

3.3 Results and Lesson learned

With reference to the methodological topics some points of discussion are posed in the following.

The criteria followed for the analysis were strongly influenced by the standard requirements on the management model, and then the analysis method was driven and constrained by the prescriptions and by the context. The effort to match the impartiality and independence requirements with company relationships and hence with the organizational structure seemed fruitful but the changes in the organization and in the internal responsibilities, determined by the executive board, nullified the result. A less structured system could better adapt to the changes, but the context and the commitment do not allow this choice.

The Socio-technical Design was applied in the boundaries of the project, involving the team and, partially, the employees that perform the inspection activities. But the method was not extended to the other functional areas and the team had insufficient attention of the changes running in the other organizational areas and in the board.

The commitment influenced my relationship with the team: even during the feasibility study. From an ethnographic point of view I was not a 'pure observer' because the context was observed with the aim to modify it in accordance to a defined model. The way I introduced in the field was effective, I was considered insider in the project team and at the end of the development of the model I shared with the team member a common design approach. But, as seen before, the field was influenced by external issues that have not been considered and I had no opportunity to establish relationship with the other people.

The strength of the commitment of a manager could become a weakness, if the internal responsibilities change because often an organization is a set of "ethnic groups".

4 Experience 2. The role of process analysis and of the socio-technical design

The experience described in the following is an example of how a Socio-technical approach could be positively applied to perform Process Analysis and to improve the management system and the information system as well.

In this case the design choices were not constrained by a model and hence a less prescriptive commitment allows me and the team to freely develop the project.

4.1 The project

The context is a co-operative organization that provides caring services for young people in need, for people suffering from physical and mental disability and for elderly people. The co-operative has a broad distribution and rootedness in the local territory, with relationship with several interested parties: care receivers, families, communities and public structures. The co-operative is managed by a board of directors. The activities are widespread on several territorial areas and hence the working places are distributed on the territory. The employees are also “associates” of the co-operative and the organization shares social values with the employees.

As practitioner, I understood the complexity of this structure during a previous project for the development of the quality management system, in compliance with ISO 9001 standard. The management system is running with good results, actually improving the processes of caring services.

A weak point of the systems is the functional area that manages the supporting processes, such as financial and purchasing processes. The responsible retired and the area suffers a lack of defined responsibilities. In particular the management of data and information is ineffective: the co-operative had a previous negative experience with the implementation of an information system that was not tailored on the internal processes. Presently, most of the information are recorded on paper and copied in several spreadsheets.

The commitment of the board of directors is to update the organizational structure and its responsibilities and to re-engineer the processes, including processes for information management.

The project group is composed by the director and by all the employee of the functional area and by me. The project has been conceived with a Socio-technical approach and based on the Process Analysis: the meeting has been held with the participation of the director and all the employees.

In this experience I act as a facilitator and my responsibility is relaxed. I attended the meeting, tracking the discussion and the proposals and suggesting possible solutions. The meetings developed through an initial brainstorming on all the activities, listed and sketched on a board, without predefined model. The sketches has been modelled in IDEF0 diagrams by myself and shared with all the team members for a better understanding (see Fig.1). The discussion was worth to fix the critical points and to discover the cross functional activities. As described in [2] the main result of the orienteering has been “Getting people together”, also catching feelings and relationships among employees.

The project has been developed with the aim to share the practices: the changes discussed during the meeting have been applied and tested during the everyday activities. The process mapping facilitates the definition of a new functional organization and the understanding of information requirements (see Fig.2). For instance the data structure and the recording of job time were transferred in a spreadsheet template, exploited by employees to record their hours and to define the communication rules among the functional areas. The continuous monitoring allows testing and verifying the effectiveness of the analysis results.

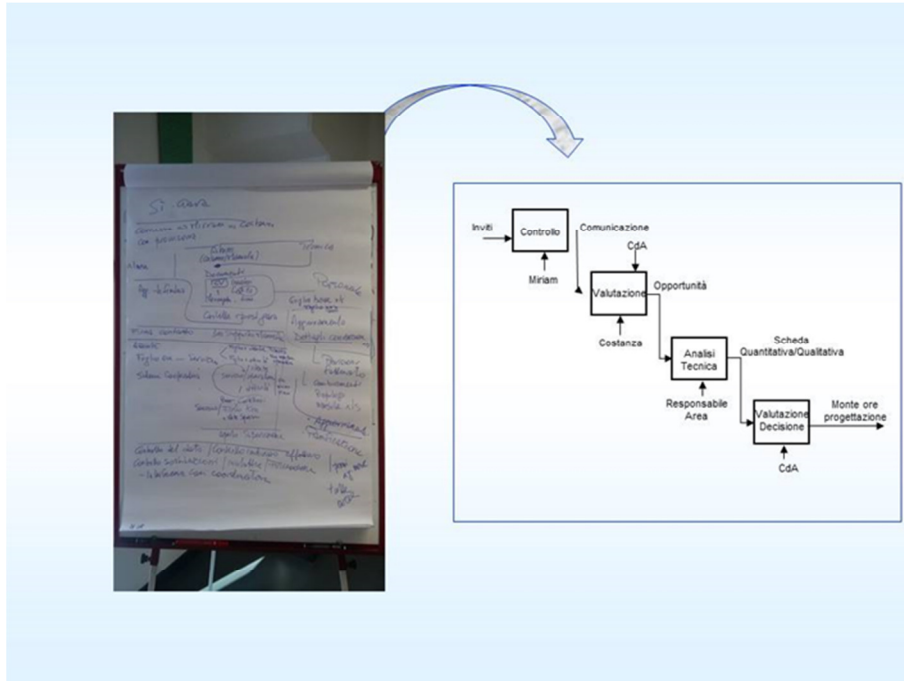


Fig. 1. From blackboard to process mapping

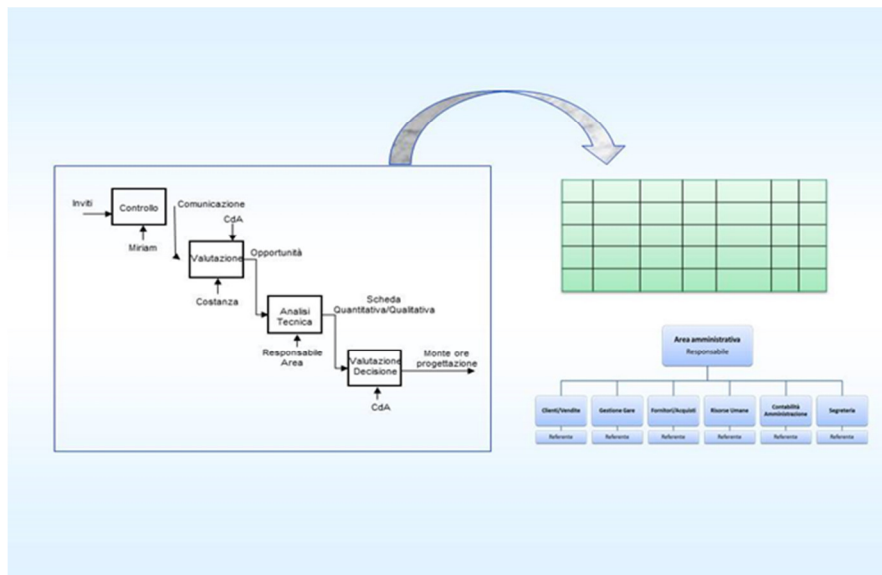


Fig. 2. From process mapping to responsibilities and information management

The design phase of Process Analysis has been closed and presently the group is testing the responsibilities and the processes also to define the requirements for the new information system. The deadline of the project is fixed for the end of this year.

The confirmation of the result is mainly based on a good definition of responsibilities and method that could be verified through internal audit and through the implementation of the new information system.

4.2 Method and topics

The collective behavior of the co-operative organization is characterized by social values that are shared inside the structure with the involvement of the associates and outside with the attention to the caring needs in the local communities. The quality management model is tailored on the co-operative identity and it has been designed by means of a deep process analysis that allowed practitioner and responsible to share knowledge and experience. For these reasons this context was still orientated to social approach and to process management and it was quite easy to apply a Socio-technical Design exploited by means of Process Analysis.

I proposed a project team composed by all the employees because, in this way, the group can capture and modify behavior. Most of team member are employed for a long time and they have a great experience. Their practice is tailored on their habits and this could cause resistance to change and suspicion to new tools and methods. Then a shared approach can mitigate this resistance.

I was not constrained by predefined management models. Then I can observe the team and maintain equidistance between the director ('who commits, who designs') and the employees ('who designs, who practices') and among the team members. The participation of all the employees reduced the bias in gathering information, because the information was controlled in real time. From an ethnographic point of view, because of my previous experience in the organization, I was considered as an 'insider' in the project team and, in some sense, in the whole organization. For instance I am aware of the relationship between front-office and back office and of their interrelated processes.

4.3 Results and lesson learned

The project achieved positive results because the Socio-technical Design and the Process Analysis improved the common vision of the activities and of their interaction, as well as effectively re-engineering the organizational structure and related processes.

In particular the Process Analysis increased the knowledge of the group on the logical structure of information and data flows and improved the effectiveness in data recording and analysis. This knowledge is now exploited for a preliminary elicitation of the information system requirements that will support in choosing the IT supplier. The requirements could include the same social approach.

As weak point of this project could be the lack of a simultaneous involvement of all the required competences, in particular the practitioners with competence in the management system and the practitioner with competence in the information system.

5 Outlook

The methodological framework described in the previous sections will continue to support my practitioner activities. The described experiences are still running and hence the results and lessons learned require completion and updating.

Using the described approach I am developing new projects with the aim to implement and integrate management system where the requirement of quality, of environment and of occupational health and safety could be supported by a common information system.

I think that this method could require changes in the management approach of the organizations. For instance the management of data and information is often projected as an outsourced activity and the relationship of information systems with social behavior and processes neglected and underestimated.

This approach could require changes in practitioners and consultant companies as well. For instance the practitioner's point of view is strongly influenced by their models and by specialized skills. For these reasons, an Ethnographic Approach could help them to understand their role in the customer environment and to make more flexible their conceptual frames.

6 Conclusions

In this paper I describe two working experiences where I am applying a methodological framework that merge Process Analysis and Socio-technical Design. The experiences have been useful to evaluate the effectiveness of this method and to reflect on some topics related to the analysis criteria and to the design process. In these experiences I considered some suggestion of an Ethnographic Approach as well.

I think that the proposed method could be a useful way for overcoming the separation of functional areas and hence for supporting communication and integration of management systems and information systems. This positive result has been reached in one of the described experience.

Some weak points have been presented as well. In particular the commitment could negatively influence the effectiveness of the Socio-technical approach if the management model is too prescriptive and the scope of the project is too strict.

7 References

1. ISO 9001:2015 "Quality Management Systems. Requirements."
2. 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
3. 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

4. Paola Mauri. The Process Analysis as a Frame to Merge Social and Technical Issues in the Design of Information and Management System. S.Kowalski, P.Bednar, I.Bieder (Eds.) CAiSE 2015 Workshop STPIS 2015 CEUR Vol-1374, pp.100-105
5. Gil Regev, Laura Regev, Yasmina Naim, Julie Lang, Alain Wegman. Teaching an Ethnographic Approach to Requirements Elicitation in an Enterprise Architecture Course. S.Kowalski, P.Bednar, I.Bieder (Eds.) CAiSE 2015 Workshop STPIS 2015 CEUR Vol-1374, pp.5-19
6. ISO/IEC 17020:2012 "Conformity assessment – Requirements for the operation of various types of bodies performing inspection"
7. T.C. Powell, D.Lovallo, and C.R. Fox. Behavioral Strategy. *Strategic Management Journal* 32: 1369-1386 John Wiley & Sons (2011)
8. 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)
9. 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
10. 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)
11. 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
12. 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
13. 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)