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An Experience Report. Using Maps to Bridge the Socio-technical Gap

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An Experience Report. Using Maps to Bridge the Socio-technical Gap

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Abstract. In my projects, devoted to the implementation of management systems, I have to take into account several social and technical features and I have to link and merge social and technical environments. To bridge the gap between these environments I find a useful support in maps and mapping.

These topics are presented through a cluster of projects I developed in large sized companies, where exploring the context could be difficult and time consuming and the relationships are structured as a complex network. I focus on the maps that describe relationships between organizational structures and IT technologies. I detail two cases: a success and a failure of my socio-technical approach.

The lessons I learned from my experiences are presented and proposed as reflection on the socio-technical perspective.

Keywords: Conceptual Modeling, Process Analysis, Socio-technical perspective, Ethnographic Approach, Mapping.

1 Introduction

I apply a socio-technical perspective [1] in my projects, following the suggestion of the action research approach [2]. My projects deal with the development of Management Systems, in compliance with the requirements of ISO (International Standard Organization) Standard on Management systems, in particular ISO 9001 "Quality Management Systems - Requirements" [3] and ISO 14001 "Environmental Management Systems - Requirements with guidance for use." [4].

Several requirements of ISO standards deal with data and information flows. For this reason, in my practitioner experiences, I pay particular attention to understand the relationship between the social side (for instance the business model and the organizational structure) and the technical side (for instance the software applications and the hardware network) of the organizations. I try to reduce the gap between the two sides, to increase the effectiveness of the systems.

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In Section 2 I present the methodological toolkit I exploit in my activity: Conceptual modeling and Process analysis, Social behavior and Socio-technical design, Ethnographic approach and Mapping. I briefly discuss the role of maps not only to describe the environment but also as an effective way to support communication, presenting the history of Beck's map of the London Underground [5].

The experiences, described in Section 3, are a cluster of projects I developed in the last two years in large sized companies. These projects have several common points: the commitment and the organization features, in terms of size, ownership and management approach. In these experiences I exploited several maps to explore and to communicate and, among them I focus on maps useful to define the relationships between people and Information Technologies. Reflecting on these relationships, a success (Case A) and a failure (Case B) of these projects are described. A third project (Case C), recently started, is briefly presented. In this case I have to deal, in particular with process taxonomy ad notation.

In Section 4, comparing results and lessons learned, I suggest that, even if the maps are an effective tool, the issues that influence a socio-technical approach could be several and to increase its effectiveness, the approach requires a set of iconic tools (including maps) which can be used as Beck's map even to change behaviors and to improve communication. Future actions are briefly proposed in Section 5.

2   Methodological toolkit

The methodological toolkit that supports my practice encompasses the following tools:
- Conceptual modeling and Process analysis
- Social behavior and Socio-technical design
- Ethnographic approach
- Mapping

I present each one in the following subsections.

2.1 Conceptual Modeling and Process Analysis

The criteria that drive my practitioner activities are based on the business models proposed by ISO standards on management systems.

From Since 2000, the Standard ISO 9001 on Quality Management System prescribes a process approach. I must therefore use process analysis for "understanding and managing interrelated processes as a system" [3]. This practice allowed me to refine a method, in particular for defining the conceptual coordinates that drive the analysis and the phases that drive the design [6]. I considered, for instance, as conceptual coordinates the stakeholder's point of view and the boundaries. I followed a project approach based on defined phases. In a first step of my projects I perfected objectives and constraints, getting people together to explore "new countries". Then I translated visions and feelings produced during the first phase into the management models and process descriptions, finalized to the project's objectives. Process mapping closed the projects, describing the results (flow, data, and procedures) and transferring them from the project team to the whole company.

With version 2015, ISO management models introduced, as new key topics, the requirements of Context Analysis and Risk Management. These deeply influenced my practice in the recent years.

To integrate them in my projects, I have to deal with several functional areas, taking into account an enlarged set of stakeholders and then exploring a broader field in the company's 'environment'.

My long- term experience, with this broader field, moved my attention from the technicalities of the standard requirements to the social and behavioral characteristics that could influence the

organizations. For instance, I realized that the process analysis is a two-way interaction between processes and stakeholders behaviors: I need to take into account social behaviors when developing the analysis while analysis and modeling can influence social behavior.

Presently, in my practitioner activities, I consider the context, process and risk analysis as a useful way to understand and interact with the organizations and to support involvement and participation.

2.2 Social Behavior and Socio-technical Perspective

My increasing awareness of the key role of social and behavioral characteristics moved my attention to the Socio-technical Perspective, presented by E. Mumford in [1].

In the Socio-technical Perspective 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" [1], the attention on the environment and on the adaptive systems, the social support designed to reinforce social behavior, the incompletion of the design, conceived as an iterative process.

Sharing this approach, I decided to apply the Socio-technical perspective in my projects, considering that the Social approach could be useful to refine principles and values that drive my practice. In a first set of experiences [7] I achieved positive results because the Socio-technical Design and the Process Analysis improved, in the project teams, 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 on the logical structure of information and data flows and improved the effectiveness in data recording and analysis. This knowledge was exploited, for instance, for a preliminary elicitation of information system requirements. These results enforced my idea that Process Analysis could be a way to link the organizational and management aspects and the technical issues: it is a common point in the research fields of Information Systems, Organizational Behavior [8] and Management Systems

The topics on Context Analysis and Risk Management enlarged the role of my Socio-technical perspective.

Presently these requirements drive my exploration of human relationships (inside and outside the companies), while the analysis of requirements related to resources and information (including Information Systems) supports my definition of the technical needs of the organization. In my projects, I consider the gap between the social side and the technical side a week point for an effective management system and I focus my practice for bridging the two sides.

2.3 Ethnographic Approach

The Ethnographic Approach, described in [9], posed me interesting questions. "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."[9]

Considering myself as an ethnographer, I reflected on my practice [10], in particular on my field observation and on the definition of my position in the field of an economic organization (a company, an enterprise, a public owned group, etc.).

I am introduced in the field through a contract, which offers consultancy services. My consultant services, in general, have the commitment to measure compliance to standards, by means of audits or to develop a management system and to support its implementation. I am introduced in the organization by the person/function who defines the commitment and the project.

I could develop my initial analysis through interviews and observations, which often are simultaneously exploited. Led by the ISO requirements, nearly always I have to deal with several functions, processes (e.g. sales, purchasing, operations, and human resources) and ownerships.

The first challenge is to understand my position in the organizational structure in order to plan the process of field observation.

At the beginning, I didn't know the field and I found some help for my exploration in the organizational charts. They are a kind of maps, useful to identify 'the villages' and to state 'You are here'. Figure 1 is an example of the complexity of big companies, where different sites could have different organizations and even different notations to describe the role: manager, leader, responsible, focal point, coordinator, and so on. The relationships amongst the sites and among sites and staff structures may not be clearly defined and hierarchical versus functional responsibilities could be difficult to manage.

Furthermore I have to decide 'How, Who and When' to interview and to observe. They are shortly described in the following.

- **How.** My approach could be 'one-to-one', 'one to many', 'many-to many'. For instance the interview during an audit is one-to-one activity, a training session is one-to-many, and a project meeting is many-to-many. Many-to-many allows me to simultaneously evaluate the responses and to screen them. I could observe activities, technologies, behavior and relationships, even digging into the personal relationships and into family histories.
- **Who.** I have to compare and match the roles of people in the organization, because they could produce different responses.
- **When.** During the project, my position in the field could change, during the project. For instance in a long lasting project my role could move from an observer role to a participant one.
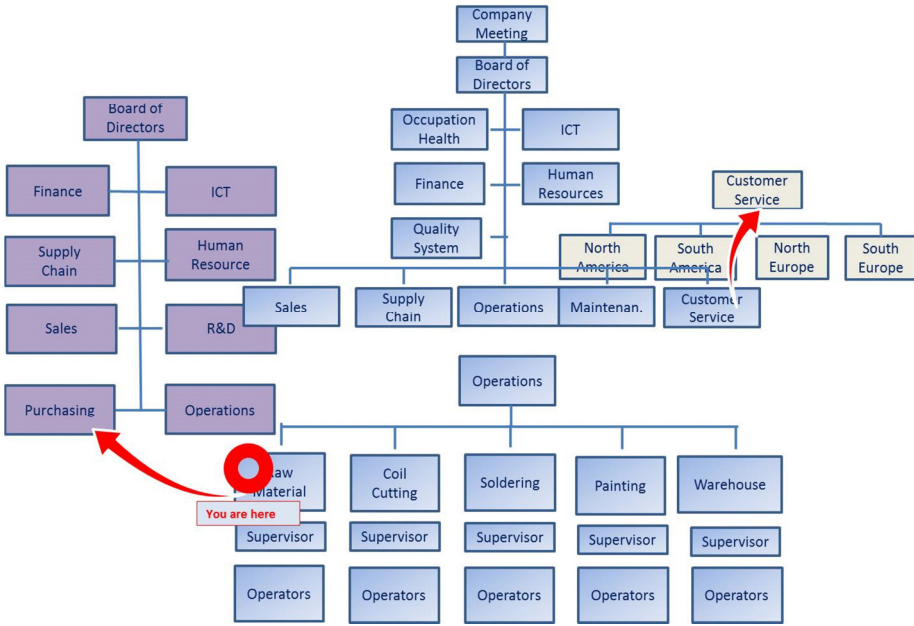

Figure 1. Organizational Charts

Presently, in my activities, I often reflect on my ethnographer role: the reflexive position of the ethnographer, the observer/participant positions and the insider/outsider perception could be applied to my activities and, more generally, could be applied to investigate the relationship between a practitioner and an organization.

2.4 Mapping

I perfected my practitioner toolkit, reflecting on the framework of topics that I have previously described. In this paper I describe how I enlarged this reflection to maps, focusing on their role in describing the framework of complex relationships of the organizations and in reducing the gap between the social and the technical side.

To introduce this topic I briefly present two examples: Beck's mapping of London Underground and Christian Nold's experiential mapping.

Henry Beck created the present map of the London Underground Tube in 1931 (Figure. 2). As described in [5] the map changed the strict geographical rules that impose an exact correspondence with the represented location and presented a regular pattern of horizontal, vertical and diagonal lines. The new 'artifact' clearly depicted the relative location of the U-tube lines and the sequence of stations.

The map, published by The London Passenger Transport Board (now Transport For London) in 1933, was a success: after two months more than 850,000 copies circulated and it became a model for urban transportation.

But the interesting point was that this map modified the inhabitant's perception of London territory, presenting an 'increasing chaotic city as an object of coherence'. It was an effective way of communication with the underground users, influencing their sensibility and behavior. In this sense the map could be considered as an artefact.

**Figure 2**. H. Beck's map (from http://active.tfl.gov.uk)

For these reasons maps could be conceived as windows for viewing the world, as artefacts to modify the world, as an art form for visualizing people's reactions to the external world. In the 'emotion maps' of Christian Nold, described in [11], the maps are emotional portraits of a location. In Nold's workshops, participants re-explore their local area with the use of a unique device which records the wearer's Galvanic Skin Response (GSR), which is a simple indicator of emotional arousal in conjunction with their geographical location.

Considering these suggestions, I reflect on the role of maps in my practice.

My activities are backed up by several types of graphical tools: organizational charts, process maps, and hardware and software networks, information networks, etc.. To perform field observation of large sized companies maps are always in my hand during meetings, workshops, interviews, audits.

Figure 3 is a patchwork of some of the graphical tools that could support my practice and that are often the basis to explore the organizations and to define the relationships in my projects. A non-exhaustive list of these maps could include: Business Model, Organization Charts, Process

Flows, Hardware network, Information Systems network, Plant Layout, Spaghetti Chart, Data logical structure, SWOT analysis.
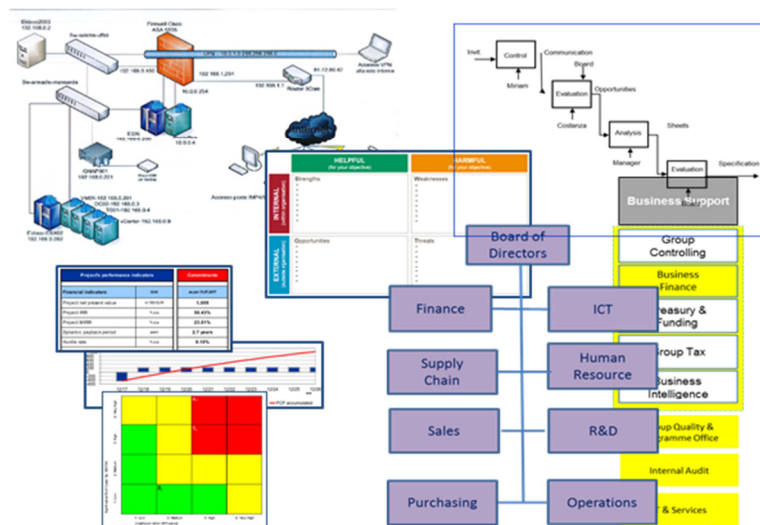
Figure 3. Maps to explore the organizations

Some maps have an iconic appeal. For instance the square of SWOT (Strengths, Weaknesses, Opportunities, and Threats) Analysis or the Process Flows are immediately recognized by the participants. In some sense they are, as Beck's map, an effective way of communication.

In the paper I consider any type of graphical descriptions as 'map' to underline their role in an ethnographic approach.

I find maps useful for exploring, for describing and defining relationships (organizational charts and processes), for tracking and modifying behavior.

Exploring the environment.

In section 2.3, I described the role of Organizational Chart, from an ethnographic point of view. In general, large sized companies are managed on the basis of Business Models that could be described through maps, for instance as a Matrix Organization. The business model influences the organizational frames and then roles and responsibilities. These topics are essential in defining a Management System and in mapping its processes because, for instance, the process ownership depends on the organizational structure that, in turn, depends on the business model.

In my projects I have to explore the technical side of the companies, as well. The technical side could include machineries, hardware, software and network infrastructures, data and knowledge warehouse, information systems. The maps could be: plant layouts, hardware configuration, data logical structures, process maps embedded in information systems.

Defining and describing relationships.

As previously stated, in several of my experiences I noticed that the gap between the two sides, social and technical, could be very large and could produce lack of effectiveness. Then my actions and efforts are to bridge this gap, defining closer relationship, in particular, between Management Systems and Information Systems and exploiting maps to describe them.

The experiences, described in the following section, focus on these actions and efforts and on the support I found in maps.

Tracking and modifying behavior.

Furthermore, in several of my projects, process mapping has been a way to change the perception of the social environment and then the social behaviors. The 'You are here' approach could involve people and modify their behaviors, as well [9]. For instance, tracking process maps, managers, employees and workers can discover unknown corners of their own company and understand, with new awareness, the internal relationships.

3 Experience. Management Systems and ICT Functions in Large Sized Companies

I summarize the common features of the projects I developed in seven large sized companies in 2017 and 2018.

3.1 Characteristics of the Large Sized Organizations

The cluster of large sized companies I worked with share several common features that are described in the following.

- The ownership is based on shareholders and the governance on board of directors (CEO, CFO, COO, etc.).
- The distribution of sites and markets is worldwide. My practice is in Italy, mainly with operation sites.
- The organizational structures are complex and often subject to changes through corporate projects that redesign the management approach.
- The complexity and the frequent changes of the organization make it difficult, even for the employees, to understand their 'positions in the field'.
- ICT management could be far from my point of observation. My interfaces are often end-users or local functions, not involved in the strategic development of new applications.

3.2 Projects

The main and common features of my projects are described in the following.

- The commitment of my contracts was the design and implementation of management system in compliance with the model of ISO standards. In particular, due to the requirements of the new ISO standards, during the project I had to understand how the internal and external context was analyzed by the organizations and if/how risk management was performed. The process analysis was a key topic, as well.
- My contractual interfaces in the companies were 'Management System' function, usually identified as Integrated Management Systems (IMS) or Quality, Health, Safety, Environment (Q&HSE) function. In a Socio-technical Perspective, I tried to develop my consultant activity through the involvement of all the functions that could contribute to the commitment. The involvement was based on interviews, meetings and workshops.
- The projects had been developed in companies where I had never practiced before and then understanding the social environment was for me very challenging. Considering myself as an ethnographer, my first objective was to understand my position in the organizational structure in order to plan the process of field observation.

3.3 Maps

In this subsection I describe how, in general, maps supported my projects and, in particular, I focus on maps that described the relationships between company functions, information systems and ICT functions.

Planning the project with the Management System function. Practitioner: 'observer'.
The maps in my hands were high level descriptions of the governance and/or business model with the related organizational charts and process descriptions (diagrams, flows). With these maps, for instance, I could understand if the company was structured by market segments, by geographic area, by technology, by product and what were the relationships with staff functions and operations, with corporate and local structure, etc. The results of this phase were a plan of interviews with managers and/or of workshops with a project team.

Performing interviews and/or attending meetings. Practitioner: 'observer-as-participant'.
The map's inventory increased step-by-step because often the involved functions presented their own map toolkit. For instance top management could describe the structure of the business plan or of strategic risk tools by means of SWOT Analysis, operation managers by means of plant layouts or manufacturing process flows. Progressively a network of relationships was sketched. The results of this phase were text notes and maps.

Defining a documented framework to connect the requirement of ISO standards with the company identity. Practitioner: 'participant-as-observer'.
Several maps could be linked together and with management system tools. For instance the manufacturing process flows presented by operation functions could be exploited to develop an operating risks analysis and documented with operating risk techniques such as Ishikawa Diagram or FMEA (Failure Mode and Effect Analysis). (A detailed list of risk analysis techniques and related maps can be found in [12]). The result of this step was the construction of a network of links that could improve the internal communication.

In all my projects I had to consider the links between Management Systems and Information Systems.

I had to define the repositories (file systems, data warehouse, social network, etc.) for the information related to systems management, for instance procedures, instructions, guidelines.

I developed the evaluation of environmental risks (for instance the measure of pollution impacts) and/or health and safety risk (for instance risk injury due to equipment misuse) with the support of specific software applications.

I analyzed the processes (sales, supply chain processes, operation, logistics, etc.) considering the software applications that support them. For instance the customer order process flows could be common in Customer Relationship Management (CRM), Enterprise Resource Planning (ERP) applications and in a quality control plan.

In performing these activities, several maps were presented and discussed, that I cluster in these classes.

- Maps that link IT functions with the organizational structure or with user's categories (end users, key users, business process experts, etc.).
- Maps that describe the processes embedded in the Information Systems.
- Maps that describe the processes embedded in the ISO Management Systems.

Among the shared maps, I describe a table (Figure 4), shared with one of my customers, where a synthesis of these relationship was effectively described. I collected similar descriptions in several other projects.

A software local support function presented the map during a meeting, when the project team was discussing the integration between software application (CRM, ERP) and ISO Standard requirements.

The map described the Socio-technical relationships inside (and outside) the company in many directions through the link among Users, IT tools and IT supports.

The column 'WHO' identifies the users of the application. They could be external (Customer), internal as specific function (Sales, Human Resources,) or generically identified as employees (All).

The column APPLICATION lists the types of the Information and Communications Technologies exploited in the company.

The rows WHO and APPLICATION are strictly linked. They could be related to the processes of a specific functional area (CRM for sales, E-Learning for human resources management, etc.), or exploited by all the functions (ALL).

The row with 'ERP' highlights a weakness: 'WHO' are not functional areas but two specific applications. It is difficult to identify 'people' (managers/employees) as the actual 'WHO'.

The third set considers 'users' as 'all' and defines links with applications (DATAWAREHOUSE, Extranet, WEB). It highlights the increasing role of Social media in

several organization processes. For instance Social media are implicated in Human Resources processes for recruitment, communication, training, on-boarding and team building [13].

The column SUPPORT, split in five sub-columns, identifies the resources that support the users. They are classified as internal (local and global) and external (supplier).
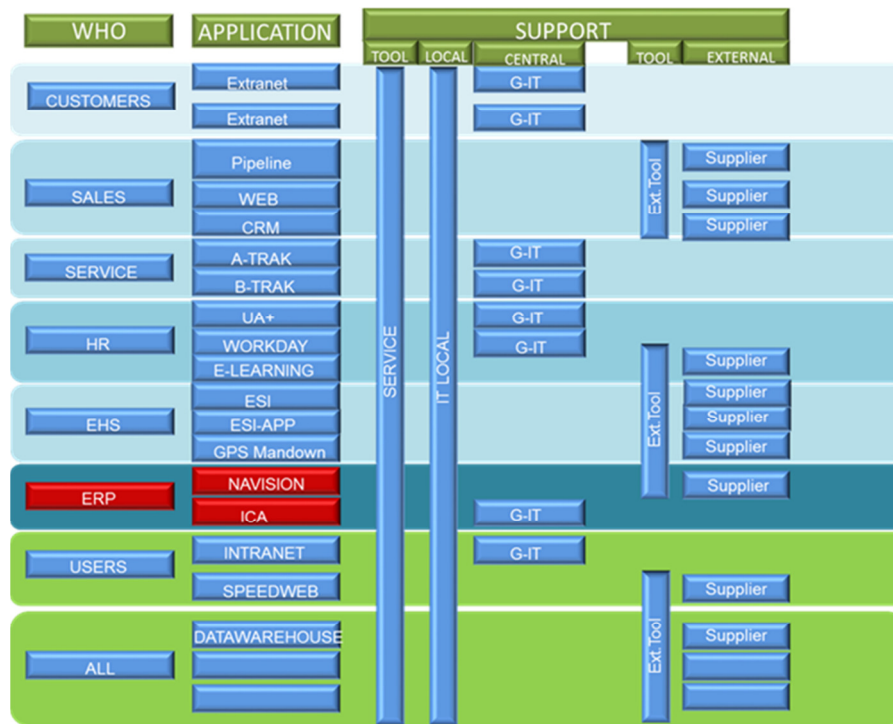

Figure 4. Relationships between organization and IT systems

3.4 Cases

In the following I present, among the set of experiences, a success (Company A) a failure (Company B) and, briefly, a work in progress (Company C).

Company A. Updating an area-specific application with users.

In Company A, where the previously described map was discussed and shared, my interface and the project leader was the Manager of Health and Safety function. This function had the role of IT internal support for the EHS (Environment, Health, Safety) Applications (ESI, ESI App, GPS Man-down), as well.

During the context analysis and risk evaluation, the project team met all the functional area (Marketing, Sales, Finance, Human Resources, Technical service, etc.) and observed activities and processes.

The team perceived the map as an effective way for communication (as Beck's map) and it was part of the success of the project.

Through this social approach several degrees of interaction with the IT applications were exploited. For instance users interface and data structure were modified to record customer complaints in the CRM.

In the same way, the team suggested to update an EHS application, to encompass the project objectives on quality. The application (ESI) was initially exploited only for Health and Safety Management. Through the project, it was updated to include the new topics. The content and the exploitation of the application become fruitful for a larger set of end-users, who deal with quality management system. The process analysis finalized to employee safety was enlarged to take into account customer oriented processes, for instance customer service management.

This updating was possible because the project team, the application developer and I could interact and cooperate to re-design a specific software tool. Maps that link functions and maps that describe processes were a fruitful support.

Company B. Exclusion from the project of the new ERP.

In Company B the project was developed with the same features in term of objectives and methodological approach, as in Company A. This new customer operates in a high technological field (testing equipment for microelectronics) with a complex and integrated management system, that include ethics, quality, environment, health and safety requirements. I had little time to plan and perform my activities (three months). In this project my interface was a manager with a high level of experience on management systems and with a deep knowledge on the company, but not directly involved in the IT area.

Even in this project the process maps were a useful tool. They helped me to quickly merge in the new context. My internal interface presented process/organization/IT maps that I used to explore, to learn and to share concepts with the involved employees. I sketched a framework of relationships among the management system and the processes.

IT applications that support the front-end and back-end processes were, as usual, a key point for the implementation of the management systems (CRM, design tools, customer order process etc.). The analysis of that systems highlighted several (well known) weak points.

In the same period the company started a project to implement a new ERP application and the analysis phase almost overlapped with the context analysis of my project. The internal project leader proposed to top management an integration of the two projects and a common activity with two different suppliers. I found this opportunity very challenging and I accepted to share my methods and approach with competitors. A common activity plan was defined and a kick-off meeting defined, as well.

In this crucial phase, my customer interface and I were not able to quickly update the framework of relationships to include the IT requirements that we have defined during the project.

A few days before the kick-off meeting, the top management and the IT application supplier refused. Due to the priority of new ERP implementation, my project was stopped and I had no further feedback.

Company C. Process mapping. The role of notation.

Company C is a large sized company where I started a project in 2018, to develop context and risk analysis for quality and environmental management systems. This was the first phase of my experience. The business model of this company is very complex and encompasses, worldwide, Divisions, Business Units and functional areas, such as Marketing, Sales, Research and Development, etc. The maps of the business model and of its organizational charts supported my activities, in particular to plan the interviews and to define the scope of the management systems. The objective of the second phase of the project, which just started, is to develop an analysis of processes and to map them, taking into account the business model (and its mapping). I shortly describe the project guideline and its key open points.

- The team decided to exploit a Socio-technical approach. 'Who' has to be involved was defined having business model and organization charts as a reference.
- During the first set of interviews, several process approaches were presented: taxonomies exploited by Research and Development area, processes considered by the internal auditing function, processes embedded in IT applications.
- Exploring relationships with Information Systems was difficult because the ICT functions are not in the scope of the project. For this reason, the relationship with the IT process notation is not clear.
- The choice of a common process notation became crucial.

This complex experience enforced my conviction on the role of maps and notation in developing an effective Socio-technical project.

4 Results and Lesson Learned

Considering the cases previously described I summarize my reflections.

Companies A and B are a synthesis of opposite outcome, while company C, up to now, is just an interesting lab.

The experience in Company A was a success due to the possibility of sharing contents, methods and languages in a project team representative of several functional areas, in particular management systems and information systems. Effective maps supported my socio-technical approach. They were useful to modify the perception of the team member on the relationships between people (end users and IT support) and information technologies. This perception helped the team in proposing new features for the information systems and then reduced the gap between the social side and the technical side.

Experience in Company B was a failure. Even in this case, I developed the project with a social approach. But the goal (I failed) was very challenging: in a short space of time I had to move from observer to participant position in a team where the project leader was a competitor and where the IT system involved several functions (ERP). The social design of a new Information system required a strong commitment and a broad vision of the top management that could also overcome the possible conflicts among practitioners of different areas.

In general, considering the cluster of the projects, I would reflect on these topics:

- the interaction of management systems with the information systems;
- the role of maps and notations to support this interaction;
- the variability of the results.

I describe, in the following, the degrees of the socio-technical interaction between management systems and information systems that I practice.

- **Low level**. The project team takes the information systems into account as reference for the management system but no modifications are produced on them. For instance, an E-learning application which records employee's courses produces documented information on job profiles and this information fulfil an ISO 9001 requirement.
- **Medium level.** The project team suggests/requires the updating of the information systems. For instance a link between customer complaints and corrective actions management tools could be inserted in an existing CRM systems.
- **High level.** The project team participates to the development of a new information system or the updating of an existing one. The information system could be a specific application, such as a health and safety risk management tool or a system involving many processes and functions, such as an ERP. The team deploys a socio-technical approach when functions, processes and information systems could be concurrently designed or re-designed in the same project.

I consider useful, to deploy a low or medium level of interaction, the maps that describe data structure and/or relationships among functions, IT departments and IT applications. These maps could support a structured method to include user's requirements (and their continuous change) in Information Systems.

I consider useful, to deploy a high level of interaction, maps as process maps, where the link between organization structure and process flows is explicit as well as the relationships with tools, equipment and measurements.

More generally, I consider these maps useful to describe the 'locations' of the organizations and then to explore them. This exploration changes my perception and the perception of my clients in the same way as Beck's map did: they propose structured patterns that become part of people mindset.

The experiences allowed me to reflect on the variability of the results, as well.

Projects in company A and company B have been developed with the same methodological approach. Then: why so different results?

The success of the socio-technical approach is subjected to highly variable constraints.
If the practitioner finds the 'right' interface that means a function that has competence and role to design and/or to update software application, the approach could be successfully applied.
If the constraints are less favorable the method shows some weak-nesses that could be related to the lack of a defined and strong identity, easily recognized in the market scenario. This specific identity should include proper maps, acting as an iconic reference. In these cases, the 'traditional' approach for the IT analyst is evaluated by the company as more effective and then less expensive.

5 Conclusions and outlook

My socio-technical perspective highlighted the importance to share methodological tools among different communities. These methods require a multifocal approach that involves research areas and practitioners. The aim is to explore new way for transferring knowledge and skills.
In this paper I propose to consider mapping as a useful way to understand the organization's environment, to modify social behavior and to improve communication, suggesting that specific Socio-technical mapping could be a strong reference as well.

References

[1] E. Mumford, "The story of socio-technical design: reflections on its successes, failures and potential," Info Systems Journal Vol.16, pp. 317-342, 2006

[2] R.L. Baskerville, A.T. Wood-Harper, "A critical perspective on action research as a method for information systems research", Journal of Information Technology (1996) 11, 235-246

[3] ISO 9001:2015. Quality Management Systems. Requirements

[4] ISO 14001:2015. Environmental Management Systems. Requirements with guidance for use

[5] W. Cartwright, " Beck's representation of London's Underground system: map or diagram?, " GSR_2, RMIT University, Melbourne December 2012

[6] P. Mauri," Process Analysis and Collective Behavior in Organizations. A Practitioner Experience," ACM 2013, Graz, Austria, September 10 Workshop Proceedings, 2013, Y.T. Demey and H. Panetto,Eds., LNCS 8186, pp. 124-133, 2013. Springer-Verlag Berlin Heidelberg 2013

[7] P. Mauri, "The Process Analysis as a Frame to Merge Social and Technical Issues in the Design of Information and Management System," STPIS 2015, Stokholm, Sweden, June 9 Workshop Proceedings, 2015 S.Kowalski, P.Bednar, I.Bieder, Eds., Vol-1374, CEUR pp.100-105, 2015

[8] P. E. Spector and L. L. Meier, " Methodologies for the study of organizational behavior processes: how to find your keys in the dark," Journal of Organizational Behavior, Vol. 35, pp. 1109-1119, 2014

[9] G.Regev, L. Regev, Y. Naim, J. Lang, A. Wegman, "Teaching an Ethnographic Approach to Requirements Elicitation in an Enterprise Architecture Course." STPIS 2015, Stokholm, Sweden, June 9 Workshop Proceedings, 2015 S.Kowalski, P.Bednar, I.Bieder, Eds., Vol-1374, CEUR pp.5-19, 2015

[10] P. Mauri, " 'You Are Here'. Exploring Social and Technical Environment of the Organization and Finding Your Position in the Field," STPIS 2017 Essen, Germany June 13 Workshop Proceedings, 2017 S.Kowalski, P.Bednar, I.Bieder, Eds., Vol-1854, CEUR pp.1-13, 2017

[11] K. Harmon, "The Map as Art. Contemporary Artists Explore Cartography," Princeton Architectural Press New York , pp. 143-144, 2009

[12] IEC/ISO 31010:2009. Risk management- Risk assessment techniques.

[13] D. Arjomandy, "Social media integration in electronic human resource management: Development of a social eHRM framework," Canadian Journal of Administrative Sciences Vol. 33, pp.108-123, 2016