

Engineering the Organization from the Bottom Up

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Abstract. The paper asserts that the process of *emergence* which constitutes the cornerstone of contemporary sociological thought on organization lies also at the root of the process of organizational engineering. Furthermore it proposes that if the study of HRIS has crucial organizational implications, then the study of HRIS should encompass also engineering and modelling considerations. An organizational modelling framework is put forward which contains the following propositions, also applicable to the design of HRIS from an integrated perspective: (1) Enhanced traceability of organizational agents, (2) Situated enterprise modelling, (3) Model acquisition from action repositories, (4) Capturing and modelling work practices, (5) Aligning design and execution.

1 Introduction

An agenda for Human Resources Information Systems (HRIS) research is put forward by [1] arguing from an integrative perspective and stressing that research in organization and information systems cannot be separated. They argue that the integration of HRISs within organization can be seen as an intricate web of many causes and many consequences and that HRIS cannot be studied separate from the organizational context where they are interwoven. Hence when researching HRIS from an integrated perspective, it is crucial that the researcher approaches the topic from an appropriate ontological point of view.

Social emergence is the ontological point of view defended by those authors. [2] explains that the emergence paradigm research “focuses on the micro-interactional mechanisms by which shared social phenomena emerge and on how those emergents constrain those mechanisms” (p. 213). In this paper we discuss an issue which is relevant to HRIS, i.e. the problem of modelling individual-level behaviour in the context of broader organizational action. Hence, it is important that the problem under review is placed within an ontological framework of the organizational phenomenon. Ontology and methodology are two sides of the same coin, meaning that the methodology used to research a particular phenomenon will depend entirely on the ontological perspective that one holds.

Whereas current modelling efforts are mostly directed at organizational perspectives, little attention has been paid to individual or inter-personal perspectives. Several approaches to modelling organization strategy, processes and resources have been developed. However, models for individual or inter-personal levels are scarce and have typically, different purposes. Research is needed to address the modelling of individual and interpersonal behaviours and the definition of proper ways of linking these behaviours with perspectives of higher organizational levels. More specifically, research is needed to raise awareness and to illustrate the benefits of aligning individuals and the organization. The aims of such modelling are as follows:

- Enabling the organization to capture and visualize different concerns of individual behaviour.
- Enabling individuals to understand the relationship of their daily actions with organizational resources and activities.
- Facilitating the analysis, discussion and (re)design of individual and inter-personal work.

Organizational modelling and organizational engineering are of interest to HRIS due to the closeness of this category of information system and all organizational phenomenon. If organizations are defined essentially as groups of people working for a common goal, then it is clear that any information system dealing with human resources will tightly interwoven with the organization itself. There are many schools of thought in organizational modelling but in this paper we are particularly interested in a school of thought guided by the following characteristics: (1) Based on the actual activity of organizational agents, (2) Situated in the actual contexts where agents find themselves, (3) The model is acquired from action repositories, (4) The actual work practices are captured and modelled, (5) The design and execution of work practices are not considered in isolation but in an aligned fashion.

The school of thought in organizational modelling which is followed in this paper considers organizational phenomena as being emergent in nature. Hence, we begin the article by putting forward a model of emergent organization. The model is inspired on the evolutionary logic of autopoiesis which explains the construction of social groups starting from their biological origins and on the hierarchy of self-referential social systems put forward in [3]. Each level exhibits to the same autopoietic characteristics of *operational closure* and *self-referentiality* and represents a level of sensemaking at which the organization can be analysed or diagnosed. The remainder of the paper is devoted to an exposition on the proposed modelling approach.

2 The Emergent Organization

[3] argues that although autopoiesis cannot be transferred as a whole to social theory, there is one key principle of autopoiesis which can - the principle of organization closure. Such argument is based on the assumption that throughout the entire hierarchy of systems, as proposed by [4], all the systems' levels exhibit characteristics of organizational closure. As we have seen above, for autopoiesis the main guideline

for the characterization of living, autonomous systems is not a set of inputs and outputs, but the nature of their internal coherence, which arise out of their interconnectedness [5]. In turn, organizational closure “requires some form of self-reference, whether material, linguistic or social, rather than the more specific process of self-production” [3, p. 111]. Thus, it is suggested that organizational closure and self-referentiality are criteria which unequivocally define social systems.

There are many simple examples of organizational closure and self-referentiality in every-day life. Conversations are one case in point. In order to maintain its internal coherence, a conversation between two persons has to be self-referential, meaning that it must be anchored on statements already made and for the conversation to remain meaningful it must build on past knowledge. Our own perception of events around us is also self-referential. An example comes from Gestalt theory in psychology and concerns the phenomenon of apparent movement. When the light in one place is turned off and the light in another place is immediately turned on, we experience the perception of light movement. This illusion is the basis of the apparent movement of neon advertising signs. The observer does not see two lights going on or off and she immediately infers that something is moving. The immediate perception, on the basis of past knowledge, is one of movement and it is only by careful analysis that the observer realizes that there was no physical movement [6].

In Table 1 it is explained how social systems evolve from the level of the individual to the level of society, consistently maintaining the attributes of organizational closure and self-referentiality. Starting from the non-social individual, enacted cognition theory [7] posits that knowledge of the world is formed through the establishment of enduring relationships between the movement of the body and the changes in the neuronal activity of the brain. In the words of [8] “to know is to evaluate through our living, in a creative circularity” (p. 260).

The next stage is the stage where the first inter-personal bonds are created. In order for the non-social individual to become a social individual the first and crucial ingredient is communication, the most fundamental social category. As defined by Luhmann, communication is “the reciprocal interaction between two individuals” [3, p. 116]. Whereas actions may not be inherently social, communication is always social and for action to be classified as social there must be communication involved. Furthermore, communication generates understanding, meaning, emotions and behaviour, the bases for the formation of bonds between people. “Double contingency” is the basic mechanism behind the creation of such bonds.

“Double contingency” is an expression coined by Luhmann [3] to explain the situation that everybody faces in interpersonal interactions of not knowing what the other person knows or thinks. Given that knowledge is personal and self-referential, when we speak or when we listen our interpretation of what we said or of what we heard is always subjective and we are permanently engaged in an ongoing effort to “guess” what the other person’s expectations are. Thus, double contingency can be summed up in the following sentence: “I will do what (I think) you expect of me if you do what (you think) I expect of you”. Still according to Luhmann, it is the resolution of this daily conundrum that leads to the establishment of an emergent order of regular patterns of behaviour known as social structure.

Table 1. Emergent levels of self-referential (social) systems.

Level	Type of component	Structural relations	Mode of organizational closure or self-referentiality	Emergent properties
Society/ Organization	Societal communication	Interaction generates society and society structures interaction	Closed communication domains	Closed networks of communication bound by structural rules reproduced through social interaction
Social networks	Recurrent interaction within groups	Structural coupling to a behavioural domain in terms of meaning, legitimation and power	Conversations	Enduring social or cultural practices
The social individual	Direct interaction between people	Expectation of other's behaviour in terms of meaning, emotion and behaviour	Double contingency	Creation of inter-personal bonds
The embodied individual	Body, action and nervous system	Neuronal and bodily relations	Enactive or embodied cognition	Self-awareness. Learning

Source: Modified from Mingers (2001)

The explanation regarding the level of social networks and its evolution to the level above - society/organization - rely also on the social theory developed by Anthony Giddens. [9] makes an important contribution to an understanding of how social systems are formed and how reality is socially constructed. For that author, the evolution of society is radically different from the evolution of living organisms in that society is a human production. Giddens' central proposition - structuration theory - provides a conceptual basis for explaining how social systems are formed through communication, with new meanings and new words being generated through a continuous process of narrative making by social actors.

Social boundaries, social norms, and the emerging social practices transcend the individual and remain even after the individuals have departed. Particular members may join or leave but the social organization carries on. This is true of small groups, such as families, micro-communities or sub-cultures in the workplace but it is also true of larger groups such as clubs, associations, firms, armies or nations. The transcendental or extra-subjective properties of social organization are the same at both the level of social networks and of society/organization.

3 Individual-Organizational Alignment

If we now turn to the individual level (non-social individual) of organizational emergence discussed above, there are some key questions that individuals may legitimately ask about their organizations. Questions such as:

- who am I in this organization, that is, which roles do I play, what work do I perform?
- how, when, where or why is work accomplished here?

Answers to these questions will clearly help in the effort towards the next level of emergence, i.e. the social individual. Such evolution is done through a process known as *sensemaking* [10, 11]. Sensemaking is the basic mechanism which allows the process of socialization to evolve in human beings. For sensemaking to ensue a degree of “alignment” between the individual and its environment (i.e. the organization) is required.

Individual-organization alignment refers firstly, to the capacity of answering the questions related to the individuals and organizations as a whole. Second, it refers to achieving an acceptable level of coherence between individual and organizational answers. For example, the roles a given individual play in the organization should be consistent with the roles the individual thinks he plays; or the particular ways that individuals have of accomplishing activities should be in line with organization’s processes and goals. Lastly, achieving this coherence should require a reasonable amount of effort. On one side, the organizations should be tooled with methodologies and technologies to retrieve the proper information about individuals. On the other side, individuals should be able to relate their work to organizational processes and resources.

An individual-organizational alignment means that the organization and its individuals work together to organize the flow of processes and resources such that they both address individual requirements and the strategic objectives of the organization [12]. An adequate alignment level between individuals and organizations enables innovation and, consequently, a competitive and sustainable advantage of the organization. Enterprise models need to reflect this interaction between individual and organizational views.

Agents are typically defined as active component parts of organizations. Individuals, groups and enterprises are all organizational agents that correspond to different levels of organizational behaviour. Hence, aligning individuals and organizations entails aligning organizational agents of different levels. In practice, achieving this kind of alignment has proved to be neither straightforward, nor easy. Despite the existence of several IS/IT tools for this purpose, this alignment is partial, frequently inconsistent or outdated.

Organizational agents are not only active. They are also adaptive and interdependent entities. Hence, they both change in time. Moreover, changes on individual agents trigger change in collective agents and vice-versa. Therefore, the alignment of organizational agents need to be addressed as a dynamic and continuous

process. Enhancing organizational modelling to facilitate the alignment between individuals and organizations as defined in this section, and illustrating its benefits, are the main motivations of the present research.

4 The Problem Statement

It is submitted, firstly, that the emergence of the organizational phenomenon depends to a large degree upon the alignment between the individual and the organization. Secondly, that such alignment cannot be taken for granted; rather, it requires conscious, systematic and continuous efforts. Thirdly, that the alignment of the individual and the organization can be facilitated by (1) the development of a semi-formal models of agent behaviour at different organizational levels and (2) methods and tools to build, update and analyze the representations based on those models. It is believed that on-going IT developments, particularly in semantic technologies, data mining, and enterprise applications, should be explored in enhancing this type of alignment.

5 Organizational Modelling

Models are abstractions of real life systems [13]. The use of abstractions has several benefits [14]. First, it provides an increased ability of processing more information and/or to process information more quickly. Second, it facilitates the communication of knowledge to others. Third, abstractions give enormous powers of thought. Therefore, models simplify and enhance the ability to reason about the system modelled by omitting certain aspects according to specific purposes and points of view.

Modelling is present in almost every discipline. One overlapping work area of both organization science and IS communities is Enterprise –or Organization- Modelling (EM). Organizations communicate, document and understand their activity through models [15]. In organization sciences, models are visual representations of given theories, described in terms of concepts and their relationships [14]. Organization theorists use them to make abstractions more tangibles. In this field, the main goal of models is to provide ways of thinking about the organization and to produce management principles based on these ways of thinking. These models have a high level of abstraction and are described in natural language. Thus, they are limited to human use and may lead to different interpretations.

EM has also been addressed by two fields related to computer sciences: IS and Artificial Intelligence (AI). In these fields, it has been mainly used as communication tools to facilitate the design and implementation of business applications [16]. Despite their differences, the frameworks developed in these fields share some characteristics. First, they allow representing different concerns of enterprise in terms of several perspectives, dimensions or architectural viewpoints. Second, these perspectives are inter-related, that is, means of relating concepts from different perspectives are

provided. Third, enterprise models are described with semi-formal or formal languages and most of them enable graphical representations.

Current EM frameworks are restricted to concerns relevant to system stakeholders. Moreover, these models are not consistent with the contemporary paradigm of organizations, since they are based on static, mechanistic and deterministic views of the phenomenon. They are also based on an objective position of reality, that is, organizational representations offer an 'aerial' view, are assumed to be unique and shared by all members of the organization. Another limitation of current EM approaches stems from the model acquisition process. Several frameworks provide means to capture the data required to build the models. These means have varying levels of detail and support among the different approaches. In general terms, the acquisition process is mostly manual, and supported by data collection techniques including interviews, surveys, text/document analysis, among others. This type of acquisition requires effort and is time-consuming, thus hinders updating representations to reflect organizational changes, as soon as they take place.

Regarding model acquisitions, the development of information technologies (IT) has increased dramatically the number and frequency of computer mediated interactions among individuals. The value of emerging IT is not restricted to supporting daily operations. Footprints of these interactions can be found within the repositories of all these applications. Enterprise applications also provide analytical power, with tools allowing the discovery of hidden patterns in data. Several frameworks have been proposed to use these applications to enhance and accelerate sensing and reacting capabilities of organizations. The development of semantic technologies allows the extracting relevant patterns from non-structured computer-mediated interactions. Hence, these technologies can be used in further enhancing the analytical power of enterprises. The combined use of all these technologies looks promising in facilitating the acquisition and update of enterprise representations from actual actions and interactions among organizational members.

It is important to note however, that an essential pre-requisite for the successful use of all these technologies entails overcoming the former limitation. This means developing models addressing different concerns of organizations and its human resources. The definition of these models need necessarily to be supported by exploratory research works reflecting on the nature of organizations, its human resources, and the critical questions that need to be answered.

6 A Proposed Model for Individual-Organization Alignment

The model proposed in this paper was developed as part of a doctoral research program [17]. This work makes the case for an enterprise perspective centred on agents and contexts. More specifically, this research (1) develops an agent-centric perspective that is complementary to activity, technology, information, and strategy/organization perspectives, and (2) proposes a way to link the agent perspective with these perspectives. The concept of context provides the key for this 'linkage'. The proposed view is part of a conceptual framework, integrated by a

layered model of organizational agents, and a methodological approach to build representations based on this ontology. This framework aims at enriching enterprise modelling, providing and analytical tool for organizational analysis and (re)design ends.

The model departs from five essential concepts (activity, resource, agent, role, and context), and integrates agent and enterprise architectures that integrates multiple concerns of agent behaviour. As a result, agent behaviour is captured in terms of activity and resource-related roles, which are organized in three layers; (1) action, (2) deliberation, and (3) change/learn layer. The separation of behavioural concerns in different layers allows not only the addressing of more complex concerns, but also defining modes of representation consistent with the complexity level of each behavioural layer. Moreover, it provides a means of exploring and uncovering the influence between different concerns.

The methodological approach developed to build representations based on this model is organized around the notion of context, and encompasses six activities: (1) bootstrapping, (2) action capture, (3) context discovery, (4) context-based analysis and (5) context integration .

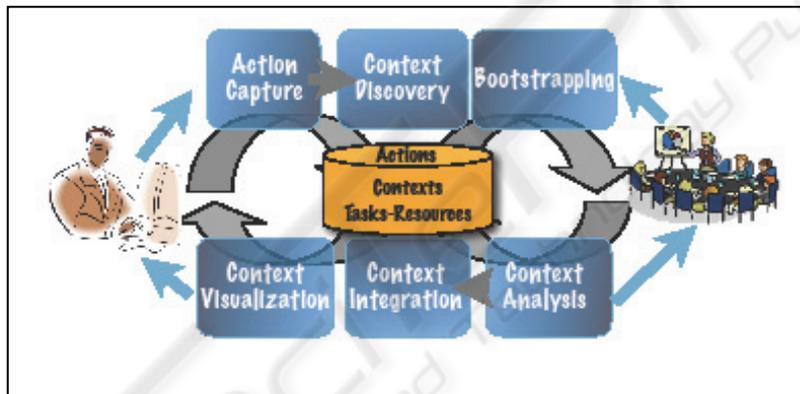


Fig. 1. The Methodological Approach.

In Figure 1 it can be seen that the bootstrapping phase is used to define the group of agents to be observed, as well as the basic type of actions and resources to be captured. The action capture phase collects agent daily actions and the resources involved in such actions, in their chronological order of execution. Context discovery aims at identifying and characterizing different personal and inter-personal contexts from action groupings. Context-based analysis aims at finding recurrent patterns within personal and inter-personal contexts. Context integrations aims at relating contextual representations with formal tasks and resources.

Case validation was accomplished using non-structured interviews and questionnaires, and enabled evaluating not only the benefits, but also the limitations of the framework.

6.1 Some Proposed Solutions for Organizational Modelling

The ontological position of emergence poses several requirements on organizational models. The model put forward proposes some solutions that aim at overcoming the shortcomings of organizational modelling in satisfying such requirements.

Enhanced Traceability of Organizational Agents. Current EM modelling approaches address organization's complexity defining several, inter-related perspectives. Nonetheless, none of these approaches fully acknowledge that agents themselves are complex entities, which also needs to be handled with their own architecture. Consequently, EM frameworks provide limited support in addressing questions about organizational agents. A framework that integrates agent and organizational architectures and contributes to an uncovering of agent-centric behaviours is needed.

Situated EM. Current EM approaches assume the existence of unique, external viewpoints, and produce 'aerial' representations i.e. representations seen from the outside of the organization. These representations, while meaningful for some organizational members, are meaningless or incorrect for others. Enterprise representations make sense for specific agents, and specific contexts. Departing from actual actions and interactions, and the inclusion of the notion of context enables situated enterprise representations. Modelling frameworks that take this fact into account and allows the modelling of behaviours, situated within specific contexts are needed. Developing 'context-aware' enterprise representations provides the conceptual richness required to address more properly, the complexity of organizations and their agents. It also enables a proper understanding and comparison of such representations, as well as their evolution in time.

Model Acquisition from Action Repositories. Enterprise models are mostly built from interviews, surveys, questionnaires, observation and analysis of textual descriptions of activities. The requirement is for a model acquisition approach that allows creating representations from action repositories, an approach that departs from a discussion of basic action types, and resources, as well as their meanings. This departure aims at building representation conveying the same message to all participating agents. In EM achieving consensus around the meaning of activity and resource names requires is a time consuming processes. The usage of small semantic units such as actions and resource-related items as the basic building blocks of the approach eased the process of achieving consensus around their meaning.

Capturing and Modelling Work Practices. Current EM frameworks capture generic task, activity, and process model that define behaviour at a role level. Modelling work practices require the capability of answering the question; "How does Individual i perform Activity A? Which resource(s) use?". This compound question has been addressed by independent research in systems development and simulation, but not by EM frameworks.

Capturing and modelling work practices means building diagrams situated in particular contexts, reflecting the particular action types, action flows and resources employed by given individuals in performing given tasks. Since these resources can be human, diagrams reflecting inter-personal patterns must be built. This means the ability to answer questions such as (1) "Who (Individual i1) interact with who (Individual i2)?", and (2) "How does Individual i1 interact with Individual i2?" These questions must be addressed using a representation language and model acquisition approach better fitted for purposes of organization analysis.

Capturing and Modelling Multitasking Behaviour. The impact of human multitasking in individual productivity has been acknowledged by several researchers. In these works, multitasking behaviour does not reflect how work is accomplished. Rather, it reflects how agents manage themselves. It requires the capability to answer question such as "How does Individual I manage Resource R?", where Resource R is the individual him/herself. This behavioural concern has been addressed in research works of human-machine interaction, human resource management, cognitive sciences, but no EM framework has addressed it.

Capturing and modelling multitasking requires using a deliberation layer which means using the notion of context to define work fragmentation, rather than tasks. Multitasking behaviour is modelled in terms of context interleaving, and context activation rules. Different tasks may require similar resources. Likewise, the same task may require different resources, at different stages. Since switching costs are caused by the need to 'pull' different set of physical and cognitive resources, and contexts reflect resource groupings, this criteria is more appropriate to measure work fragmentation than tasks.

Aligning Design and Execution. The problem of linking individual behaviours with organizational activities and resources is disregarded by EM acquisition approaches, which depart from higher level of abstraction. The problem of aligning organization's design with actual execution using action logs, has been acknowledged and addressed by the process mining research. However, the focus of this field is restricted to the alignment of pre-defined application workflows, with workflows acquired from execution data collected from logs produced by WFMS, and enterprise applications. This work does not collect data from non-structured actions stored in message-based, groupware applications, where messages are not associated with tasks. It also disregards non-computer mediated actions and interactions, which require to be registered manually. Without unstructured, non-classified actions, it is not possible to get accurate definitions of actual organization workflows.

7 Tooling Algardata for Individual-Organization Alignment

The present case is an on-going case that is serving as a test bed for our approach. The organizational setting is Algardata, a portuguese IT enterprise created in 1990. Currently, Algardata employs more than a hundred collaborators, and provides a variety of IT services. Algardata's clients include banks, government institutions,

hotel chains, distribution enterprises, telecommunication operators, as well as professional law, architecture and consulting firms. During the last five years, Algardata has experienced a very fast growth. The high number of knowledge workers posed two important challenges. The first is related to the definition of effective productivity measures for these workers. The second is tooling the organization with appropriate means to identify all the variety of tasks performed, how and when these tasks are performed, and which human and technological resources are used. The goal of this work is to implement the proposed approach in combination with traditional business and task modeling activities. In short, the case goals were: (1) provide the basis for individual productivity measures, (2) provide the basis for a bottom-up discovery of individual and group strategies and, (3) uncover software development workflows.

The first step involved the identification of action logs sources. Three main sources were identified. The first is the current production control application. Algardata developed an application the production of software developers, where they introduce on a daily basis, the time spent on different activities. With minor redesigns, the logs created by this application are an ideal source of action logs. However, since they are registered manually, these logs do not capture all worker actions. Hence, additional sources are required. The second are e-mail logs. Though these logs require additional and more complex processing in order to identify actions, e-mail logs contain a great amount of valuable information in uncovering interaction networks. The third source will be provided the logs from the Microsoft CRM application ®, currently in implementation.

The second step involved the redefinition of the log structure of the production control application. Employees introduce the time spent on project phases. They introduce the client, project and phase related to that activity. Clients always refer to clients. Projects belong to a unique client but several projects may be related to a single client. Each project is divided in several phases. The specific activity performed is not registered. Though this structure allows extracting some statistics about the time spent by employees, it has several limitations for the purposes of this case. The structure assumes a unique hierarchy client -> project -> phase, which does not offer the flexibility and detail required to analyze the time spent from multiple perspectives. Activities performed for internal clients are not registered.

The classification of individual actions in the corresponding project phase is performed by the employees, and does not obey to any scheme or structure representing the information requirements of the managers. Further, it poses the risk of inconsistent classifications since different employees may classify differently similar actions. Finally, the limited analytic possibilities of the actual structure have a negative impact on employees' motivation to register their actions because they do not see any benefits in this effort. The logs were thus re-structured to overcome these problems. First, the new structure acknowledges external and internal clients. Second, a set of action types will be defined. These types to be defined are semantically closer to daily actions (e.g. propose, request, promise, elaborate (document)). Action types are complemented with the resource-related items used or produced by the actions. These actions will be grouped in contexts. Since activities are abstractions, the specific relation of contexts and activities will vary according the activity definition.

Contexts are then related with formal activities in a many-to-many fashion, giving the possibility of relating individual actions to several activities.

This case has recently finished its bootstrapping phase, that is, the definition of the basic action types, and resource-related items. The identification of basic action and resource types is based on two main sources; (1) direct observation and (2) analysis of e-mail logs. An external observer captured the activities of the Aurora-Soft team during random visits, along a two month-period. A log of six hundred mails was also manually analyzed in searching for action types employed by the the Aurora-Soft team. As a result, a set of action was identified that is not included due to space reasons. A set of context types was also defined, by Algardata's management and will serve as action grouping criteria.

The description of this case seeks to better illustrate the model proposed. Nonetheless, this case is in a preliminary phase. The proper methods for context identification, analysis and integration phases, as well as the tools to support such methods remain to be discussed, defined and developed. Upon the case completion, we expect to enhance Algardata's capability of answering questions about their workers, particularly of their software developers. Algardata expects to know the actual action and interaction patterns associated to different developing contexts that uncover not only how tasks are performed but which specific resources are used or provided by individuals, and how individuals manage their tasks and resources.

8 Conclusions

Over the years organizational research has identified forces within the organization which are more enduring and hard to change as opposed to others with are more ephemeral or amenable to adoption. The former are usually of an informal nature (e.g. cultural norms) and the later are of a more formal character (e.g. HRIS). From the point of the view of the researcher these kinds of forces are quite unrelated and often difficult to reconcile. However, the implementer of systems in the real world knows that these kinds of forces *are* related and that neglecting either of them could mean failure of the project. Hence, when researching HRIS from an organizational and integrated perspective, as recommended by Ruel and Magalhaes (2008), it is crucial to combine concepts from the sociology of organizations with techniques from systems modelling. This is what we have tried to achieve in the present paper.

Social emergence is the ontological point of view which we defend in this paper. In line with the autopoietic view, Fuchs (2003) argues that society can only be explained consistently as self-reproducing if man is recognised as a social being and has a central role in the reproduction process. Through social actions, social structures are constituted and differentiated, meaning that social interaction makes new qualities and structures emerge which cannot be reduced to the individual level. This is a process of *bottom-up emergence* which we believe lies also at the root of the process of organizational engineering. If we concur that the study of HRIS has crucial organizational implications, then the study of HRIS should encompass the engineering and modelling considerations we have put forward in this paper.

We have put a conceptual framework whose main purpose is to facilitate the alignment between individuals and organizations. Nonetheless, organizations have several levels of complexity, which are typically structured around individual, inter-personal, group, organization-wide levels, as well as inter-organizational levels. Hence, aligning individuals and organizations need to be accomplished on a level-by-level basis. The proposed framework defines an approach to align individual and inter-personal views with group-level views. At these levels, alignment entails addressing several concerns of individual and inter-personal behaviour, and relating these behaviours with individual tasks, organizational activities and resources.

We have illustrated the framework by means of a case study which aims at highlighting some crucial modelling criteria of emergent phenomena such as organizations or HRIS in organizations. The key modelling propositions contained in this framework are as follows: (1) Enhanced traceability of organizational agents, (2) Situated enterprise modelling, (3) Model acquisition from action repositories, (4) Capturing and modelling work practices, (5) Aligning design and execution.

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