RETHINKING OPERATING MODELS FOR INTANGIBLE SERVICES : FROM A MECHANISTIC STRUCTURE TO A SUSTAINABLE MODEL

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Abstract

This paper presents a co-design process in which operations managers and researchers engage in designing within the aim of radically innovate the operations' management thinking focusing on the whole operation's environment and system, beyond operation's optimization. Organization's operating models have a key influence on the organization's governance and strategy. The design of operating models is thus pivotal for organizations and a key stake for those whose operations are based on high speed information and sophisticated knowledge, such as intangible services like banking, financial, insurance or internet services.

A main challenge is to produce new knowledge and tools to address specific intangible services' operating models at a time where service systems' operations cannot any more be understood and planned under a mechanistic view of pre-established continuous chains of standardized micro tasks.

The focus in this paper is specifically on the challenges related to pass from a static and mechanistic middle and back office operation's system view to a dynamic, living system like operation's model. The design process itself is designed as an iterative action-learning process.

Keywords: Participatory design, Sustainability, Business models, Super-vision

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1   INTRODUCTION

The only two questions related to operating models having been tackled in academia as well as
in corporations are the make or buy decision making and the location: onshore or offshore.
Little nor to say no attention has been given to the broader organizational context in which operations
are embedded. Besides high risk industrial facilities such as energy plants or airplanes, where
operations and operators are given strategic attention, other industries and particularly services do not
seem to consider operations as strategic as, for example, commercial, compliance or financial issues.
As far as design is concerned, the most sophisticated practices are focused on the process engineering
commanding the tasks' linear chaining patterns. No attempt seems to exist in order to model
operations on the basis of the impacts they receive and impulse in the whole system. This article
contributes to fill this gap and to think at operations beyond decision making or cost reduction. The
work presented here is the first part of a larger study: consistent criteria for an operational model from
the governance to the tool have been defined as well as the main positive, negative and neutral links
among criteria. The next step, not included here because still in progress, will concern the
identification of loops and the test of the organizational validity of the model.

Until now researchers have looked at operations in a quite disciplinary-clustered manner. The three
main disciplines having tackled these questions are Operations Research, Anthropology and
Organization Sciences, each with its own data gathering and analytical methodologies. Organizations
delivering intangible services have not yet developed any specific design regarding operating models,
they have mostly applied and adapted ready to think models issued from the manufacturing industry.
As a result, organizations have a structure oriented, mechanistic approach of operations, less and less
consistent within today's changing environments calling for organic like organizations *(Burns and
Stalker, 1961; Bellomo, 2008; Collinson, 2012)*. Mechanistic shall be understood here as the
fundamental conviction that operations need to be homogenised, standardized, over parcelled and over
optimized. That much so until tasks get reduced to their more elementary content, loose value and
become ideal candidates for offshoring. We feel this philosophy has reached its limit because of the
huge induced bureaucracy and loose of sense making for workers, managers and decision makers.

Contrary to manufacturing industry, banking or financial services organizations have not developed
any inhouse R&D departments within their organizations. They would rather have some punctual,
limited interfaces with research organisms and so for subjects like consumer's perceptions about
quality or, eventually, IT solutions development but much less for subjects related to operating models
and operations themselves. Whether manufacturing companies and industrial engineers were used to
have carefully designed processes, service companies were not until recently used to do so. Consulting
firms had an important influence within service firms when learning and encouraging them not only to
design processes but to design them as if the firm was a manufacturing one.

It appears that operating models for the tangible, manufacturing industry are less and less adequate for
intangible knowledge and information based middle and back office services: excessive process
optimisation has reduced the global vision of the system in which processes take place. There is a need
to find new ways of linking the global and the particular, understanding their dynamic interactions
among the macro and the micro levels in other ways than the well-known traditional linear subordinate
alignment. Banking and financial services, all eyes turned towards quick win commercial development
are lacking in specific, long term, organizational design oriented research teams.

When addressing the stake of renewing the focus under which the operating model issue can be
viewed, the design process can be organized through the following steps :

- understand operations through a global lens including environment (such regulatory, technical
  state of the art, etc…) governance (such as vision, arbitration and control) strategy (such budget
  allocation and operational decision making) and resources needed to work (mainly staff ,
  processes and tools). This implies to expand the focus and to identify key relations between the
  different parts of what should be considered like a network rather than as hierarchical levels. This
  understanding rests on expert's narratives
- describe the system as it is understood today, that is through the mechanistic lens of structures,
  over- parcelled up and standardized processes, hierarchical top down influences, tasks reduced
  until their more elementary constituents
- introduce a functional perspective to understand how far or how near the day to day reality is
  from the expected one. This can be better understood under the "in vivo" / "in vitro" metaphor

familiar to biologists and chemists. Under this perspective new points of view emerge as well as new data and thus, new criteria to look at operating models under an interdependent multi criteria focus

- process the whole data under specific methods- in this study the Analytic Network Process (ANP) method and Fuzzy Cognitive mapping methods (FCM) - allowing the identification of relevant links between the operation's system criteria as well as the reinforcing or balancing loops. Ultimately, these two methods will lead to the identification of the key balance factors. (Figure 1)

The dynamic aspects of the new operational model under design will be addressed via Fuzzy Cognitive Mapping. This method was originally developed by B. Kosko (1986) as an extension of Axelrod's cognitive maps, which were designed to represent social scientific knowledge. FCM are widely used in situations in which numerous interdependencies are thought to exist between the important components or variables of a system but when quantitative, empirically-tested information about the forms of these interdependencies is unavailable yet.

The deliverables or outputs of these design steps are of two kinds: narratologies and maps. Narratology techniques have provided a way of getting a global feel of the system under study, tying objectives together, expressing deep basic assumptions and identifying challenges and risks. Mapping helped in taking into account the verbal expression of expert's subjectivity as a powerful mean for creativity and collective wisdom. They have also been used as a multi-dimensional, multi-level and multi-criteria participative modelling tool for recognizing the plurality of expert's perceptions and values as well as for filtering, organizing and storing heterogeneous data. This focus can also generate predictions on what should happen if some elements were modified (Collins and Gentner, 1987).

Stories, in the present case have proven to be important cognitive events for they encapsulate into one compact package information, knowledge, context, and emotion. They have provided the context for anchoring understanding and for assessing and integrating new knowledge within the aim of getting a high level vision of the system components and their dynamic relations.

Both techniques, well known in anthropology as well as in organizational sciences have fostered a high level of trust amongst all the members of the design team, operations experts as well as researchers. Mutual trust being a key value for the design of intangible and almost unobservable systems. Anthropologists (Eaton, 2011) strike the methodological challenge for this discipline, used to gather data through in situ observation and micro-level, face-to-face, relational fieldwork when studying invisible multi-sites systems where flows are connected through electronically -mediated communication. The use of cognitive maps has allowed the building of a holistic view of the system and its connections. Cognitive maps did also provide a quick intuitive and understandable way to represent the successive models delivered by the operational research analysis.
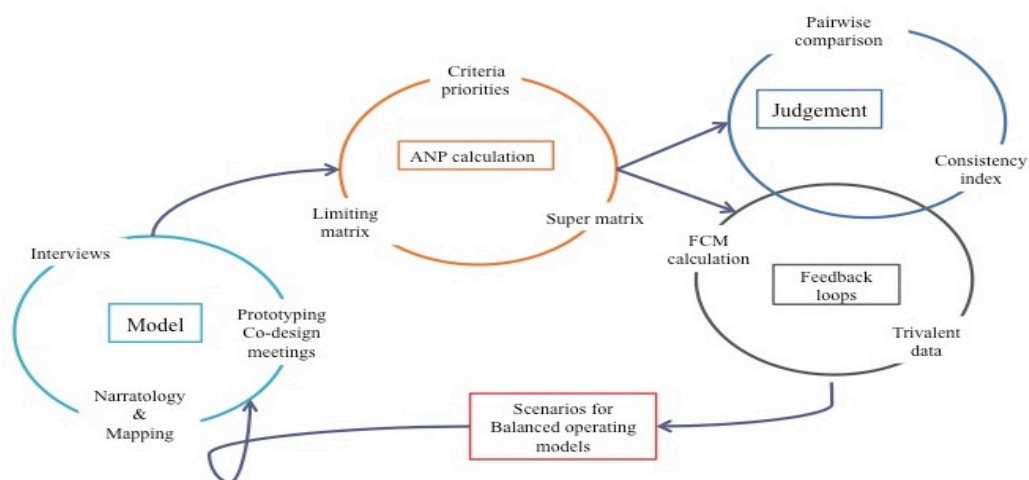

Figure 1. Overview for the design process

2   Theoretical framework

Existing Operations Research literature about operating model is almost exclusively focused on *quantitative based approaches* for decision making models. Organizational sciences as well as anthropology will consider operating model's multi-criteria issues mainly under a qualitative approach and be attentive to the ways quantitative data are gathered and given sense to. Actually, these three disciplines are developed in specific and often separate research departments and institutions. Publications are also specialized and, for example, operations research literature will pay little attention to organizational sciences or anthropology literature (and way of thinking) and vice versa.
 Organizational Research focuses on issues like resilience and management of high-reliability organisations (Weick and Suttclife,1999). Operations Research focuses on decision-making issues taking into account macro criteria such as costs, benefits, opportunities and risks (Padillo, 1995, 1999). Anthropology will focus on cross-disciplinary methods, group dynamics, creativity and cultural and cognitive issues (Mahadevan, 2009 ; Borgehammar, 2008). It has to be noticed that while Operations Research and Organization Sciences' academic literature will mainly focus on the make or buy issue, anthropologists will rather focus on the cultural stakes of the on shoring / off shoring process.
Metters and Verma (2007) draw a short history of the knowledge services off shoring practices. According to them the off shoring of service work from developed countries to less developed countries has gained significant public attention and fear. They point out that off shoring has essential roots in a variety of disparate concepts besides technological advances, such as the general view of business processes, governmental attitudes and regulations, and international historical relationships. Foreign governments have also played a prominent role when proactively looking for offshore service business. Off shoring has had an influence on processes standardization and replication, making managers think on their processes in terms of added or non added value. Nevertheless, an unexpected side effect has appeared: there are few added value operations left "onshore" and centres "offshore" have developed new competences due to the important amount of standardized operations they receive. Interestingly enough, there exist creative ways to add value from important volumes of processes' parts considered as being without any value added any more. This is a turning point for the onshore-offshore organizational management principles and ways of thinking. Moreover, wage rates gaps between countries- the main incentive for off shoring- are becoming less important, requiring drastic revision of cost reduction oriented business plans.
Given the heterogeneous and multi level nature of the operating model question, the Analytic Network Process (Saaty, 1999, 2005, 2008) was identified as the most adapted one for the study presented here. This method is devoted to decision-making but a moderate change (Minzoni et al, 2014), it showed to be a suitable method for design, that is, for inventing a new way to think at operating models in an integrated view from the governance to the tools. In this case ANP was essentially useful to identify the operations network's constituents and nodes giving a robust and consistent basis for design despite the heterogeneous and sloppy nature of the data. Obtain a consistent model is of paramount importance when expert's subjectivity is a key element for data gathering and understanding.
The stake in the current research is to take advantage of the ANP method to imagine a new system and not to choose between alternative solutions to a well delimited problem. Organization sciences and anthropology have the adequate tools and methodologies to address this question and to facilitate expert's identification of the suitable criteria needed for the ANP. Designers also stress in recent publications the need to address methodological issues involving different actors experiencing environments' design in more holistic ways than only efficiency driven one's (Jorgensen et al, 2011). Some studies do focus particularly on conflicting co-creation perspectives calling to expand user-driven innovation to design-driven innovation thus reframing business as well as design (Bonde & Leerberg, 2010)

3   Data collection methodology : the experts, the researchers and the tool

When using multi criteria decision-making tools not for decision-making purposes but for thinking about new ways of understanding the functioning of a networked system in which middle and back office operations are embedded, the approach leads to examine the role of experts in these two different contexts: decision-making on the one hand, organizational co-design on the other. In the first

case, experts will express their preferences – mostly on quantitative and so called objective basis-about well known alternatives either by academic research or by previous corporate experience. In the second case, the one presented here, experts do not yet have preferences because the stake is to give birth to a new system and not to optimize or adjust the old one. In this case, experts will not elicit preferences but will generate information through narratives which bind experts to each other. Narratives have shown to be a powerful instrument for construction knowledge giving meaning to past, present and future (Bruner, 2002). Moreover, narratives facilitate some sort of equality among experts themselves and among experts and researchers

Bonde & Leerberg (2010) explore the need for equality between co-creators as well as the differences between the development of autonomous, self-directed users group activities and organization's driven innovation workshops. In the case developed in this paper, the attempt is to develop autonomous self directed co-designers groups within the organization itself.

For the present research, the primary data allowing to lay the basis of the study by making explicit the need for innovation regarding the operating models' system was collected through initial interviews with 23 keys actors having knowledge and experience in all the operations' aspects from the governance to the tools. During this phase a considerable amount of corporate documents was also analyzed. At the end of this phase, the scheme showed in Figure 2 emerged.
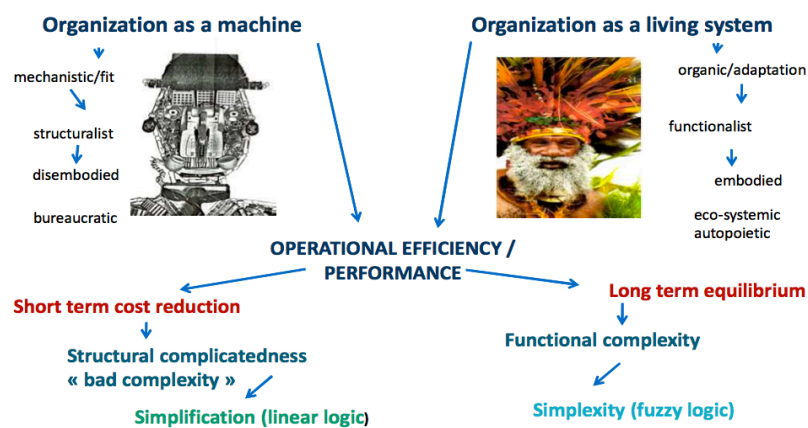

Figure 2. Initial basic assumptions

A complementary round of individual interviews determined the main clusters of the network for the operations to be understood in their holistic frame from the governance to the tool, that is: governance, strategy, processes, procedures and tools. Staff being included in each cluster onshore as well as offshore. After this, a core group of 11 operations experts has been set up to work in interaction with the researchers, creating the co-designers teams. Experts bringing their knowledge on operations and researchers bringing the design methodology and academic framework for the prototyping of a living system like operation's organization. The work is clearly about meaning innovation (Bonde & Leerberg, 2010) leading to the understanding, anticipating and influencing the emergence of a new organizational meaning. In this case design thinking meets management thinking. The co-designers teams have been working together since 12 months now on a basis of two meetings (4h each) per month. For the narratives as for the presentation of the ANP results, researchers will not give any interpretation by themselves, their role being to facilitate the expert's emergence of new points of view, capable to foster the shift towards a living system like networked organization for the operations.

The main stakes related to the identification of experts according to their position in the organization, are presented here. Three groups of 3 to 5 managers in three different business units have been empowered by the organization to be the members of the design team for the so called 'prototyping' of alternative operating models. Asking these managers to sit in a room as design experts put them in a very different posture compared to being involved as an expert in decision making. Making decision is quite usual for managers whether they are operational managers in charge of running business units or

functional ones involved in organisational choices. Decision making is supposed to be about identifying and choosing alternatives based on values and preferences. But generating alternatives – new alternatives because the system is modelized according to a living system like organization- is not a priority for managers compared to choosing the one that has the highest probability of success or effectiveness and best fits with the company objectives. Thus, being an expert involved in a group during a design process is much more challenging than being involved in a decision-making exercise than can sometimes be based upon a single interview. Firstly it means energy dedicated to the project over a long period that we estimate up to two years minimum. Secondly it means participating in a working group with peers, for the group being able to cover expertise over the different areas, from the governance to the tools. Thirdly as excessive process optimisation has lessen the global vision of the system in which processes take place, it can be lengthy and difficult for the group to encapsulate their detailed knowledge of daily operation and decision processes into a coherent model. Facing that difficulty and allowing themselves (and feeling allowed) to spend the time necessary to overcome that collective pitfall is not straightforward. Lastly, once a more global view on the current system is reached, more energy is needed to imagine alternatives with a prospective stance.

The maps associated with the first narratives (Figure 3) drawn by hand with coloured pencils, were called "structural" maps, addressing the "what" issue as they are mostly composed of units, departments, committees, rules, etc…It shall be noticed that for figures 3 to 6 the original criteria have been modified in order to be compliant with confidentiality commitment. These figures intend to give insight into the modelling method and its evolutions

This first step made it clear (for experts and for researchers) that there was no whole spectrum data easily available that could be used to build upon, but also that teams will have to use some measurable data and many sloppy factors to describe the system.
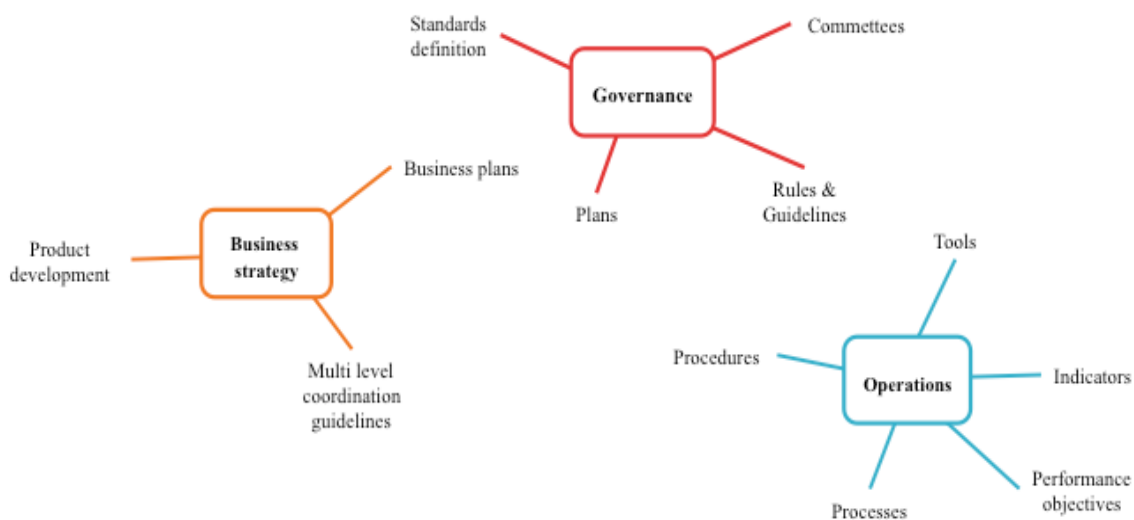

Figure 3. Example of the so-called "structural criteria" (the what) identified during the first narrative phase under a mechanistic point of view.

The narratives gathered during the second step, under a functional focus, delivered a pattern responding to the "how". The maps associated with the second narratives (Figure 4), always drawn by hand with coloured pencils, were called "organic" as they attempted to explicit the way things are done and not only how they should be done.
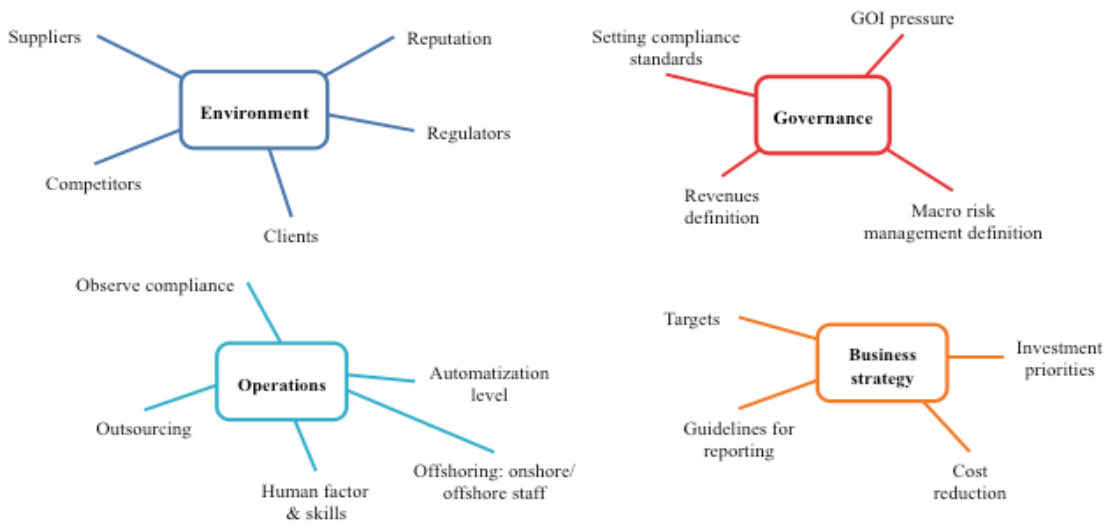
Figure 4. Example of the so-called "functional criteria" (the how) identified during the second narrative phase under an ecosystem-like point of view. Notice the appearance of the Environment cluster.

Once the narratives completed, the team identified and mapped a set of contextualized criteria recognized as pertinent for an operations holistic vision from the governance to the tool. This first set was composed by 65 criteria and sub criteria (for confidentiality issues only some criteria are presented here, to illustrate the method). The conditions for starting the ANP method were met (Figure 5) Data collection through ANP starts by organising the pairwise questions into the ANP software. Pairwise comparisons proved useful for contexts where criteria are heterogeneous and where experts need to express relative judgements. This method offered the possibility to introduce the indispensable prospective focus for this study. Let's recall that the objective is not to optimize the actual mechanistic model but to find a new one, from scratch. Pairwise comparisons are an essential feature of the ANP methodology, experts are asked to define whether a criteria is more important than another one and by how much (giving a number according to an intensity scale from 1 to 9 where numbers 2, 4, 6 and 8 are considered as intermediate values and where 1 is used to define equal importance criteria). The item against which the comparisons were made was, for this study : to find a balanced operating model for middle and back office operations, that is a prospective goal.
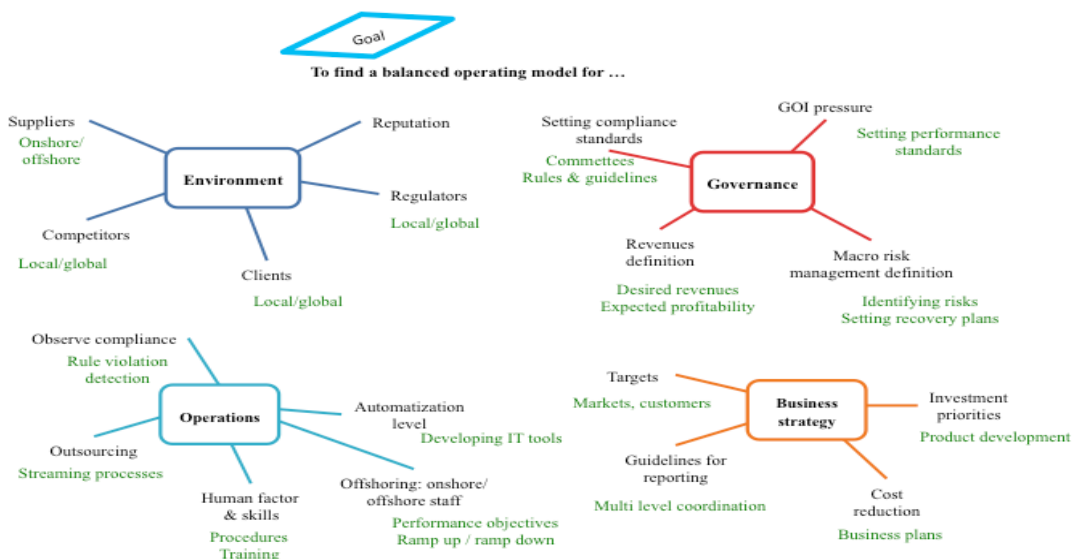

Figure 5. Map with the criteria ready to undergo the first round of ANP pairwise comparison.

Subjectivity being highly involved in the interdisciplinary method at work, different postures emerge, from those pretending that the system functions the way it is supposed to, to more critical voices on the difficulties, drawbacks and dysfunctional consequences of past decisions. Introducing ANP and practicing pairwise comparisons, was the occasion to go one step further, recognizing the legitimacy of subjectivity in the design process. A high level of trust is a necessary condition to ask people to put the subjectivity at work and engage in working differently in terms of tasks and relationships.

Once the model considered as stable via the ANP method, a new kind of data gathering became possible, this time based on trivalent (positive, negative, neutral), non reciprocal data. In this phase, data gathering and analysis will be processed through FCM methodology in order to identify the global map's feedback loops (Figure 6) and, besides this fact, the alternative scenarios for the design of long term balanced operating models " from the governance to the tools". This will also represent a more holistic way to visualize the operations system at glance than is the more traditional well known flowcharts or swim lane diagrams. For this the authors will inspire from advances in visualisation techniques such as weather forecasts, big data, pollen spread or virtual reality.
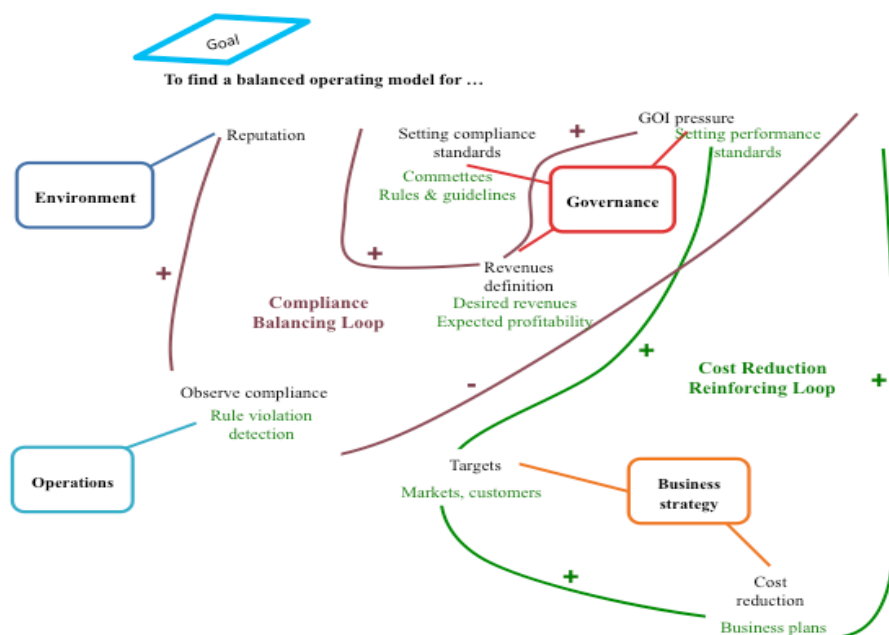

Figure 6. Example of possible feedback loops stemming from FCM analysis. The FCM analysis is upon to begin, this figure is thus an insight of the kind of expected results. Balancing loop: more compliance observance, increased good reputation, increased expected profitability, increased GOI pressure, less compliance observance. Reinforcing loop: more GOI pressure, increased cost reduction, increased automatization, more GOI pressure.

4   Conclusion

In the complicated environment socially raised up, operational efficiency seems to be supported by multiple level procedures and rules, more regulatory mechanisms and long top down delegation cascades. This has lessen the innovative capacity, the long term view and the quality of professional relationships among operators but also among the hierarchy. Cope with complex environments (not complicated one's) and organisations is essentially a matter of relationships. This means the ways people put themselves together to act. The organization of relationships be they onshore or offshore are impregnated with uncertainty, interdependence and ambiguity, differently perceived according to national cultures. This shall not be erased, on the contrary, it shall be fully admitted as a part of human cultural behaviour.

These new research and academic approaches help banks & services to think their own system in other terms than the mechanical one's of car assembling automated factories and more in the terms used for the understanding of living eco systems. More than the everlasting optimizations based upon economies of scale where marginal gains equal marginal losses, research on living systems focuses on

the ways the system learns to regulate its own situation to the best of its abilities. This makes the difference between growth (increase in bulk or size) and development (balance). The first one is depleting , the second one, sustainable.

The work presented in this paper fall within the context described by the ICED 2009 SIG Workshop's research roadmap for modelling and management of engineering processes by academia (Peter Heisig et al, 2009). In particular, for the following issues: what is really going on inside the processes, metrics, social and human factors associated with system modelling and visualisation of design processes. Through the design steps unfolded until now, experts and researchers have gained in reflexivity and collective responsibility thinking beyond the usual levers of operating models such as outsourcing, off-shoring and automation. Experts have gained insight into the roots of their growing feeling of bureaucracy and complicatedness. An important issue has been to find an adequate granularity for the understanding of operations as a networked system from the governance to the tool. From an initial over parcelled view of the system encapsulated in a 95 isolated criteria grid, the design process has led to the identification of a network constituted by 33 linked criteria and, finally to the identification of the 5 key balance indicators and their relations. This network is now a suitable one to start the dynamic simulation of its behaviour, by using FCM. The new dynamic connections to be are aiming at a sustainable operating model equilibrium, determining the limit not to be overstepped for the system keeping its identity (Maturana &Varela, 1972). An important basis for the sustainability of the model will be its capacity to define the best level of auto regulation resulting from the internal adaptive means to mitigate the system's response to stimuli. Much like homeostatic properties described for complex living systems.

The expectation for future research in understanding organizational systems' models being indeed related to the challenge of being able to build a shared interdisciplinary understanding in an organisation, maps and narratives have proven to be powerful methodologies including their capacity to produce the necessary data for semi quantitative operation research methods. The maps, as models, did act as devices for establishing a mutual understanding of the issue at stake in the work presented here. The trade off between the level of detail of system modelling and the applicability of these models has been and will still be a challenge.

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