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Help the desk: an SSM investigation - Research Project in Information Systems

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Abstract: This is a case study about a groupware system adoption that, despite the efforts beyond the technical aspects, did not led to the expected improvements. Through a SSM (Soft System Methodology) process of inquiry, a consistent pattern of social involvement needs emerges. The generalizable lesson deduced from the findings is that a system is more profitable - or at least more difficult to be opposed - when participated and agreed in its parts. Yet, change sometimes is imposed and divergent and never stable-for-too-long standpoints always exist. In such a context, incentives are effective in enforce the above and conduct the actor's actions towards a wanted path.

Keywords: SSM, Knowledge, Knowledge Management, Groupware, Resistance, Information Systems adoption

I. Introduction

This is a case study (Yin, 2014) about a groupware system adoption that, despite the efforts beyond the technical aspects, did not led to the expected improvements. The system was deliberately introduced to promote a change into some organisational processes, to capture and share organisational knowledge and to allow for performance recognition and further insights. Unfortunately, the outcome was partially unsatisfactory and, perhaps most importantly, the causes and the correctives to adopt remained unclear.

Following a SSM (Soft System Methodology) process of inquiry revealed a consistent pattern of social involvement needs and incentives as enforcing mechanisms. Involving the users of the system (the IT staff) resulted effective in improving the situation. This was achieved by concurrently exposing the IT staff out of their zones of comfort and rewarding them with a deeper feeling of involvement and ownership.

This report is organised as follow: Section 0 introduce the case under investigation. Section 0 presents the research questions. Section III provides the literature review while section 0 reviews the methodology used for the investigation. The case findings are presented in Section 0 and analysed in sections 0. Finally, section 0 concludes the report and provides some notes of warning and suggestions for future research.

I.A The Case: the ABC Company

The ABC Company is an international service firm of about 500+ practitioners among consultants and staff. The information systems are governed by an 'IT and innovation' board, composed by the IT Director and a 'IT Committee' of representative stakeholders. The organisation runs internally all the key IT services even included the IT Help Desk Service which is the focus of this paper.

I.B Growth and change in the information technology services

Perhaps as a consequence of the rapid organisation's growth, its initial technological structure started to exhibit inefficiencies and limitations. These were soon noted, not only in the underpinning IT infrastructure, but also in the front-line IT Help Desk service especially in terms of quality and time-to-response against reported technical issues. Also, it became increasingly relevant the disparity in the workload experienced by the branch-resident technicians (the assigned users ranged from roughly one hundred per technician at one extreme, to fifteen per technician at the other one).

The above settings were in force up to mid-2013 and the issues described above constituted the determinant for a change. To list them, at that time there was no mean to:

OBJ1)Track analyses and measure technical

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intervention.

OBJ2) Reap insights about frequent or repeating issues, improvement areas, or user satisfaction.

OBJ3) Equilibrate the workload of in essence isolated technician.

OBJ4) Create operating procedures based on captured knowledge.

Furthermore, alongside the request of better IT Help Desk performance and responsiveness it emerged also the need of:

OBJ5) IT support outside the classic working hours (i.e. night-hours and days-off).

I.C The ticketing system

Since the early times, several attempts were made in order to log and manage incoming requests. For instance, it was created a dedicated support mailbox and a first endeavour in collecting solving procedures was made. Yet, the mailbox was considered by users just a slowest second-choice alternative to phone-calls and become prevalently used for mid-term requests and claims. The technical procedures was stored in a shared repository as MS Office files and resulted in fragmented, duplicated and not up-to-date information. Therefore, no substantial improvements emerged at that time. Yet, the awareness of a well-structured, ad-hoc applications was evident.

Later in 2013, it was decided to implement a centralised web-based ticketing system. An exploration of the possible solutions was carried on and then it was selected an appropriate service management software, that was considered a conveniently flexible, relatively fast and within budget, solution to implement.

Coupled with the selection of the software, an external Help Desk service provider was contracted in order to satisfy the emerged extra-working-time support need (OBJ5 above).

To sum up, the introduction of the ticketing system aimed at satisfying the first three objectives stated above (OBJ1-3). The need for extended support (OBJ5) was satisfied by contracting an external support service, finding in it an agreed level of service and a convenient technology in common: the same service management software. Finally, it was implemented a frequently-asked-questions (FAQs) system, essential for passing information and procedures to the external support and implicitly aimed at capturing technical knowledge from the IT Staff (OBJ4).

In spite of the above, the general outcome was an unsatisfactory one: the new system, even if well designed and implemented, did not lead to substantial performance improvements; neither the business objectives were deemed satisfactory reached.

So, what did wrong?

II. Objectives (research questions)

The implemented software produced a set of planned (desired) and mainly procedural outcomes, and unplanned (unexpected) and mainly behavioural ones. Overall, the software was poorly used and merely perceived as a further (unwanted) administrative burden. Even the FAQs' practical application resulted in controversial interpretations and divergent standpoints. This also left the external support with too limited and inaccurate resources to provide the adequate level of assistance they was asked for.

The work done within this research aimed at addressing and possibly improving the above situation. To that end, the following research questions were formalised:

Q1) What did wrong and why it was so?

Q2) Which correctives may be implemented *ex post*?

Q3) How to (try to) prevent future, unrevealed *ex ante*, negative occurrences?

III. Literature review

This literature review is divided in three core sections. In section 0 below, the focus is on specific literature about knowledge, knowledge management, and knowledge management systems. Section 0 aims at widening the focus and offers relevant considerations about information systems and their interaction with the human-social domain they operate in. To deepen the investigation and conclude, section 0 offers several viewpoints about the wide theme of resistance and effective usage of information systems. Overall, the three sections aim at providing a solid set of conceptual tools in support of the case-specific analysis subsequently conducted.

III.A Knowledge and related aspects

The following sections outline the debate and the variety of viewpoints present in literature about knowledge, knowledge management and knowledge management systems. Considerably, in times of high uncertainty and global

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competition, knowledge is perhaps the most resilient asset organisations may utilise.

Knowledge can be viewed as the outcome of iterative processes of elaboration and interpretation upon row data and actable information. Personal values, beliefs, education, attitudes and experience, influence understanding and shape the knowledge produced (Davenport and Prusak, 1998, in Alavi & Leidner, 2001).

A widely used distinction is between implicit (tacit) and explicit knowledge. Implicit knowledge refers to knowledge that is owned by an individual but cannot easily externalised (Turner, et al., 2012). 'tacit knowledge exists in human brains', […] 'it also depends on experience, intuition and discernment' (Jiangping, et al., 2013). It is the knowledge that people usually acquire, individually or as a group in the workplace, in the process of learning by doing (Panahi, et al., 2013). In contrast, explicit knowledge is captured, codified and documented. It can be therefore managed and communicated in symbolic form or natural language (Alavi & Leidner, 2001). The two above (tacit/explicit) are not dichotomous states, rather they are mutually interdependent and reinforcing qualities: 'tacit knowledge forms the background necessary for assigning the structure to develop and interpret explicit knowledge' (Alavi & Leidner, 2001). For a further account see also (Turner, et al., 2012), (Nonaka, et al., 2006).

Knowledge may have several dimensions. It can be placed at the individual, collective and organisational level. (Nonaka, 1994). Also, it may be viewed from several perspectives and thus considered as (i) a 'state of mind' (similarly to the implicit above), (ii) an 'object' i.e. a thing to be stored and manipulated, (iii) a 'process' of simultaneously knowing and acting, or a 'capability' with the potential for influencing future action (Carlsson et al. 1996; McQueen 1998; Zack 1998a, in Alavi & Leidner 2001). Additionally, some refer to knowledge as declarative (know-about) (Nolan Norton 1998, in Alavi & Leidner 2001), procedural (know-how), causal (know-why), conditional (know-when), and relational (know-with) (Zack 1998c in Alavi & Leidner 2001).

Another dimension relates to knowledge as a key feature *embedded* in the tools it contributes to create: we implicitly use it, without the need to own or master it, through the use of the (capital) goods that knowledge contributes to create (Baetjer, 1998). In the context of software and information systems, this dual relationship (knowledge as embodied in capital and capital as knowledge expression) appears even more evident:

'With the most other kind of capital goods it is easy to overlook how much knowledge is built into them because we see their physical form. […] With software by contrast we do not see at all; we think about it independent of its physical form. Indifferent to the physical medium in which it is embodied, we are readily able to focus on the knowledge that software embodies' (Baetjer, 1998).

From the above follow two relevant considerations: first, software (thus information systems) design is a matter of composing *dispersed* knowledge, and because of this, it is a '*social* learning process' (Baetjer, 1998 emphasis added). Second, the validity of 'pure' engineeristic approaches may needs to be reconsidered, in the light of a surrounding context that shows systemicity and continuous evolution (Baetjer, 1998).

Yet, there seems to be, in literature, a debate about the information systems effectiveness in sharing tacit knowledge. It is actually possible? A former school of thought believe that tacit knowledge sharing through IT is too limited, if not absolutely impossible to achieve (Flanagin, 2002; Johannessen et al., 2001; Hislop, 2001; Haldin-Herrgard, 2000 in Panahi, et al., 2013). They believe that tacit knowledge is too personal and human-bounded to be shared by IT and not even by language. Accordingly, tacit knowledge can only be shared as tacit without even being converted to explicit.

A more recent school of thought, argues that IT can indeed contributes to tacit knowledge sharing, even if with some limitations and drawbacks. With a less rigid perspective, they place knowledge on a continuum that can have different degrees of tacitness (Jasimuddin et al., 2005; Chennamaneni and Teng, 2011, in Panahi, et al., 2013) and accordingly, consider IT *effective* in sharing knowledge with a 'low to medium' degree of tacitness and *supportive* in sharing knowledge with a 'high' degree of tacitness. (Nonaka et al. 2000 in Panahi, et., al 2013).

Limitations and drawbacks mainly relate to: (i) the loss of cohesiveness, (ii) the (in)ability to share, (iii) the reduced richness in IT-mediate interactions if compared to their face-to-face equivalents (Turner, et al., 2012), and also: (iv) socialisation issues due to loss in perception of a common context and content salience/value; (v) information transfer issues due to discrepant distribution of information (either purposive or unintended); (vi) coordination issues due to asynchronism in communication (Hinds & Bailey, 2003).

Nonetheless, it should be considered that, as the 'virtuality' of work and teams increasingly takes hold, traditional interactions may become ineffective or merely unfeasible. At the same time, the developments in technology and the advent of the so-called social media tools may present an

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opportunity for different (even enriched) forms of socialisation and interaction. In fact, many argue that with the 'new' IT-mediation most of the early limitations are likely to disappear.

Knowledge management is a multidisciplinary field (Argote et al., 2003, pp. 571-572 from Turner et al., 2012) that encompasses those activities, practices and processes aimed at identify, capture, store, maintain relevant and share, the 'right knowledge to the right people at the right time' (O'Dell and Grayson, 1998, from Pinho et al., 2012 p. 217). Related to this is therefore the notion of **organisational knowledge**, which is:

> 'the capability members of an organization have developed to draw distinctions in the process of carrying out their work, in particular concrete contexts, by enacting sets of generalizations whose application depends on historically evolved collective understandings' (Vladimirou, 2001).

Knowledge management systems (KMS) refer to a class of information systems applied to manage organisational knowledge (Alavi & Leidner, 2001), (Liebowitz, 2004; Marshall and Brady, 2001; Randeree, 2006 from Turner et al., 2012). As it may be noted, most knowledge management projects aim at: (i) highlight the role of knowledge and making it visible; (ii) building a knowledge-supportive infrastructure and a related (iii) knowledge-intensive culture. (Davenport and Prusak 1998 in Alavi & Leidner 2001). Organisations may therefore employ KMS to: (i) capture, create and share knowledge assets; (ii) locate relevant information knowledge; (iii) provide an environment for knowledge exchange; (iv) connect people with relevant interests and/or skills, and (v) facilitate and support intelligent problem solving and decision making (Tsui 2004, in Her-Sen & Hui-Chin, 2009).

Finally, several studies identify 'barriers and facilitators' (Pinho, et al., 2012), 'deficiencies and mismatches' (Nevo, et al., 2008), 'gaps' (Chinho, et al., 2005) and general 'factors' (Finnegan & Willcocks, 2006), that may affect a successful adoption of a knowledge management system.

Categorised, they may reside in the (a) technological domain, (b) socio-organisational domain and (c) individual domain. They can be summarised as follow:

(a) Poor, inadequate or inefficient technological infrastructure, misalignment between the IT infrastructure, Knowledge management and business processes.

(b) Socio-organisational key aspects:

i) Leadership (lack of/inadequate style and poor top-level commitment), communication, hierarchical structures and power-based relationships, organisational culture and training.

ii) An over focus on non-core or administrative bureaucratic tasks (that may be seen *per se* as an internal inefficiency indicator).

iii) Sub-cultural silos among different groups and cultures within the organisation.

iv) Functional silos (within departments and departments and the business) that may lead to misalignment and divergence of interests.

v) Lack of trust and perceived safety; poor social/relational capital that may reduce willingness and propensity to share. According to (Krogh, Ichijo and Nonaka 2000, in Finnegan & Willcocks, 2006), 'effective knowledge creation depends on the physical, virtual, and emotional context of an organisation. When a relationship is felt to be reciprocal then a trust is developed which can work even to overcome power-based relationships'.

(c) Poor T-shaped skills and inability to think 'out of the box' i.e. lack of transversal abilities and open mindset.

Notably, the above factors do not operate in isolation; rather, they are likely to interact and reciprocally reinforce. Therefore, it is suggested they should be such holistically approached.

Even if different perceptions may be developed about what may be considered effective in implementing knowledge management strategies (and related information systems), (Carlsson et al. 1996 in Alavi & Leidner 2001), success in them is widely believed to be a key element for business: it fosters innovation, facilitates responsiveness and adaptability, supports decision making and create competitive advantage. (Carlsson et al. 1996; Watson 1999 in Alavi & Leidner 2001).

Furthermore, in a knowledge-intensive society, relevant knowledge has also the capacity to alter the power relationships among organisations and their members: as it has also been argued, organisations may need knowledge workers more than the latters may need them (Drucker,

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2003). This may have a twofold effect: it may both represents yet another factor of relevance for effective knowledge management practices and suggests a further theme of resistance to be considered.

To conclude this section, I would note that the centrality of knowledge is far from being a pure novelty (UNESCO, 2005, p. 17), (Marshall, 1890). Probably, what changes is the pervasiveness that knowledge has in our times. Drucker (1961) for instance, claims that knowledge, 'changes its meaning form being *understanding* to being *control'*. Interestingly, he poses it in relation to technology and considers how both are not automatically beneficial: they may *enable* positive outcomes but are *tools* of production and as such, bounded to the use that people do with them. (Drucker Peter, 1991).

III.B The adaptive philosophy

Traditional 'hard' schools of thought about information system generally aim at delivering finite products, completely determinable *ex ante* and measurable *ex post*. Solid engineering methods, standards and best practices are often thoroughly applied to this end. In contrast, 'soft' schools claim for a more social dimension of information systems and for a more dynamic representation of the environment they operate in. - For an account of the above see (Walsham, 1993), (Avgerou & Cornford, 1998). Below instead, I present a brief introduction of three key standpoints.

First, Ciborra (2004) argues that 'models' are based on idealised views of the world that are difficult to be found in reality. Strategy and technology tend to drift; that is diverge and exhibit and unexpected outcomes. *Alignment* itself is a vague concept, neither easily definable nor measurable. However, if alignment exists at all, better is to see it as an ongoing process rather than an end to be reached. Furthermore, as people in their daily activities rely on evidence, intuition and empathy, surprise arises constantly and opportunistic adjustments may be necessary. To address the above, Ciborra suggests an approach based on several core principles of: c*are*, *hospitality*, *cultivation*, *bricolage & hacking* and competent *improvisation*. For a further account see (Ciborra, 2004).

Second, (Orlikowski, 2000) argues that human interaction is typically recurrent, time and context bounded, based on procedural knowledge and experience. She sees change as 'endemic in the practice of organising'. Accordingly, technology and social structures are *emergent* and *enacted* by the 'behaviour of actors as they improvise and adjust their work routines, initiate opportunistic shifts and improvised variation in responding to unpredicted events, thus accommodating the evolving nature of their job'. (Orlikowski 1996, emphasis added). Technology is seen as an artefact that, when *mobilised* in use, *structures* human action (Orlikowski 2000, emphasis added) concurrently setting the limits of the allowed and being shaped by the actual use made of it. Therefore, it will never be fully stabilised or complete, as it continuously evolves (Orlikowski, 2000).

Furthermore, different actors may have different perceptions about technology. As these are often tacit, conflicts may ultimately emerge at later stages (Orlikowski & Gash, 1994). Accordingly, the scenario that emerges seldom may be effectively managed with traditional cycle-like approaches. As a better strategy (Orlikowski, 1995) proposes, from a case study of a successful groupware adoption, to promote at first some planned changes '*and then later builds on these to enact emergent organizational changes in response to the opportunities and new conditions occasioned by the planned changes'*. Emergent changes, she argue, '*together with the prior planned changes, provide a technological and organizational base from which further planned and emergent changes may be enacted'* in a supposed virtuous ongoing process.

Third, perhaps a further shift is needed: as accuracy in prediction is nonsense and sensing the variables at hand is increasingly difficult (Nogueira, et al., 2000) better it would be *surfing* and competing on the *edge of chaos*: a natural state between order and chaos, *a grand compromise between structure and surprise* (Glenn, 1996, emphasis added). This view suggests combining limited structures with few rigid rules so that enforce a high (but not excessive) degree of flexibility, coordination and communication. As attractive it may be, being in such an equilibrium is certainly risky; yet, is argued, it may be a more rewarding way if not an obliged one to survive (Nogueira, et al., 2000).

In essence, therefore, better than models and abstract rational thinking, is relying on processes of sense-making (competent interpretation and response) based on everyday experience. Better than striving to achieve predetermined outcomes is trying to addressing an expected unknown.

As discussed, positive outcomes from an over focus on 'hard' methodologies are widely believed to be unlikely or at least unrealistic. The proponent of 'soft' methodologies shed light over a relevant dimension to be considered; yet, in their view less is argued about how to counteract the shortcomings that may emerge from a negative, even if expected, change. One may wonder how to anticipate, or even better drive, such a change? How to deal with negative unpredictable occurrences? How to try to profitably direct the actor's actions?

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Thus, if by one side one may recognise the issues of a fast changing environment and propend for 'soft' approaches, by the other side, it is arguable that 'hard' techniques are still needed in order to implement reliable solutions. It may well be a case of balance between agility and technique, time and requirements, solidity of solutions and openness to change. Considerably, as (Avgerou & Cornford, 1998) argue, it is also a relevant matter of organisational settings:

'A flexible technology and management style, prepared to encourage and support a dynamic environment of continuous change, are needed. The effort shifts from planning to continuous decision making on the basis of the evolving information system use and experience'.

So, the emphasis shifts further 'away from patterns of stability, bureaucracy, and control to those of flexibility, self-organizing, and leaning' (Orlikowski, 1996).

III.C Failures, resistance and misuses

Given the above, also the information systems related failures should be investigated and understood with such a holistic perspective. According to the literature, information systems failures may be categorised as follow:

Human related failures	Perception failures	Perceived as unuseful or effort outweigh benefits	(Davis, 1989), (Karahanna, et al., 1999), (Matayong & Ahmad, 2011).
	Correspondence failures	Failing in meeting objectives and expectations.	(Mukherjee, 2008)
	Interaction failures	Low degree of usability or user satisfaction.	(Mukherjee, 2008)
	Motivation and job satisfaction	'Fits' failures	(Mumford, internet)
Design related failures	Process	Deviations from the scheduled, resultant de-optimisation of existing processes.	(Mukherjee, 2008), (Markus & Keil, 1994), (Matayong & Ahmad, 2011).
	Technical	Poor performance, inadequate infrastructure.	(Matayong & Ahmad, 2011)

Advancing the idea of a continuum (the left arrow), aims at stressing the belief that failures seldom have one isolated cause. Positioning the human aspects at the top level indicates the predominance, found in literature, of these as root causes. Complementarily, placing the design and technical aspects at the bottom level stresses their satisfaction as founding requisite. Overall, the effect of a failure may express itself in nonuse, misuse, resistance, waste of resources and not meeting of desired gains.

In tone with the above, a relevant perspective about why systems are resisted is offered by (Markus, 1983). Accordingly, resistance is regarded as the outcome of the *interaction* between people-determined (personal traits and cognitive abilities…) and system-determined (usability, performance…) factors. The two above should not be considered in isolation as doing so may convey to partial, too narrow and discordant viewpoints and therefore lead to divergent (and probably ineffective) correctives. Conversely, it is the interaction as a whole that should be addressed. In doing so the interaction can '*explain different outcomes for the same system in different settings'* and *'different responses by the same group of users to different settings'* thus being able to reveal better solutions. Resistance, in Markus' view is 'the product of the settings, users, and designers' and per se a 'neither desirable nor undesirable factor'. Resistance may be considered as neither good nor bad; rather it is a signal, a 'practical warning' that something is going wrong and further inquire and corrective actions are needed (Lawrence, 1969). Notably, (Markus & Keil, 1994) make the point when they claim that:

Systems do not improve organisational performance or create business value; users and their manager do. If the desired improvement conflicts with what people are motivated to do, a system alone will not solve the problem. There are only two alternatives: one is to change people's incentives, in which case a system may not be needed; the other is to build a system that conforms to incentives, in which case change may not occur. The real design skill is to bring together both system use and performance improvement by building a system that helps bring about a change because people want to use it (Markus & Keil, 1994).

This literature review had not only focused on groupware systems issues but deliberately, it had widened its range of interest. The purpose of this was threefold: firstly, it aimed at revealing a shared human-and-social pattern in information systems adoption and use. Secondly, it depicted how scholars have addressed such a complexity and highlighted their findings. Thirdly, such an activity was deemed necessary in coping with the controversial nature of the specific treated case as, since the beginning, it was felt that a too narrow focus would have been indeed, ineffective.

IV. Conceptual Framework: The Soft System Methodology (SSM)

Having framed the problem domain and researched for relevant literature, this section describes the tools used for the investigation.

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The ticketing system was implemented and delivered between the mid-2013 and early 2014. Currently, it is still in use.

This project's data was collected and analysed through a process of action research (Cornford & Smithson, 2006, p. 73), (Checkland & Poulter, 2007), (Vinten, 1994), in a period of approximately ten months from June 2014 to April 2015 as depicted in Figure 1 below. The methods of collection ranged from direct observation and interviews with the IT staff and the users (prevalently semi-structured/unstructured and informal), to the live attendance to local IT meetings and training sessions. Also, reports, circulated emails and supporting material were evaluated. In addition, specific sessions were conducted with the IT staff, in the process of trying to improve the situation. These will be exposed and discussed in the next sections, as they constitute the analysed findings of this case study.

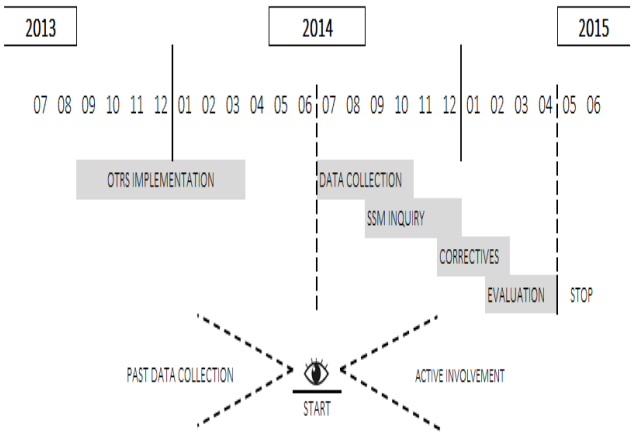

Figure 1 Research project timeline

The chosen methodology of analysis is the soft system methodology (SSM). It offers a structured, rigorous but flexible-enough framework of analysis for human situation perceived as problematical and possibly conflictual. The methodology does not prescribe any particular technique; rather, it aims at encouraging investigation and learning from the real events. These are the reasons why it was believed adequate in addressing the ABC Company case. Then, according to its creator:

SSM is an action-oriented process of inquiry into problematical situations in the everyday world; users learn their way from finding out about the situation to defining/taking action to improve it. The learning emerges via an organized process in which the real situation is explored, using as intellectual devices - which serve to provide structure to discussion – models of purposeful activity built to encapsulate pure, stated worldviews (Checkland & Poulter, 2007).

Several principles underpin the SSM actions (Checkland & Poulter, 2007):

i) The everyday life is perceived as a 'flux of changing events and ideas that unroll over time'. We all live in this flux, both uniquely and purposefully act and being parts of a common, adaptive whole.

ii) Each of us, is claimed, has specific worldviews, that is: 'built-in and relatively stable tendencies to see the world in a particular way'. Notably, worldviews are often implicit and taken-as-given. In conditioning our actions, they therefore remain tacit and not directly addressed.

iii) In SSM there is not a problem to definitely solve; rather, it may exists a social situation *perceived as problematic* that therefore calls for action. To improve the situation, the aim is to find an *accommodation* both *desirable* and *culturally feasible* between different, always existing and possibly clashing worldviews. It is not a matter of expecting the worldviews to leave out, or finding an extended and true consensus (a rare case that SSM subsumes to the more realistic concept of accommodation). Rather, is a matter of compromise towards a workable solution in which 'different people with different worldviews can nevertheless *live with'*. As the authors claim '*outside of the arbitrary exercise of power, this is the necessary condition which must be met in any human group if agreed action to improve is to be defined'* (Checkland & Poulter, 2007).

SSM operationalize the above principles with five key processes:

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1) Finding out about the situation:	Making 'rich pictures' of the situation, analysing the issues, the prevailing culture and the disposition of power. 1a) Rich pictures: Written and pictorial representations that highlights interaction and relationships. To note is that, however rich they could be, they nonetheless are recorded 'snapshot' unlikely to remain static for too long. 1b) Analysis one - 'The intervention itself'. It is based on the identification of three roles: the 'client', the 'problem solver' and the 'problem owner'. Each of them aims at reveal respectively: *why* a particular situation is perceived as problematic, *what* resources are available to improve it and *who* is affected by it (Checkland & Winter, 2006). 1c) Analysis two (social): It aims at investigate and reveal the local culture in term of three key dynamic and interacting elements: 'roles' i.e. the social positions inside the organisation; 'norms' i.e. the expected behaviours associated with roles and 'values' i.e. the judgment criteria and standards. 1d) Analysis three (power): It aims at revealing the disposition of power. Power 'commodities' (sources) may be, for instance: roles by themselves, personal traits, exclusive relevant information holding, ability to affect decision making processes, ability to provide resources, ability to cope with uncertainty, irreplaceability… (Markus, 1983).
2) Exploring the findings with (relevant) models of purposeful activities:	Use the findings of (1) to build 'activity models' that are purposeful (i.e. action oriented) and that encapsulate each a declared worldview. In this sense they never will be a representation of the reality, rather, they are just devices to be used in the process of improve the situation. Three key guidelines are suggested here: 2a) Root definitions: statements that describe the system to be modelled, its activities and transformation processes. Importantly, Each RD embeds a pure declared worldview and describes what the system does, how it does and why (the so-called PQR formula). 2b) CATWOE: A mnemonic device that focuses on Customers, Actors, Transformation processes, Worldviews, Owners and Environmental constraints. 2c) Indicator of performance against the above. Three general criteria always hold: (i) efficacy: the extent to which the system produce the intended output; (ii) efficiency: the extent to which the system make a convenient use of resources; (iii) effectiveness: the extent to which the system leads to the achievement of the desired objectives.
3) Discuss and debate:	Use the activity models identified in (2) as a source of questions and debate about the real world situation.
4) Defining/taking actions to improve:	Bringing the above together to identify desirable and culturally feasible solutions to implement.
5) Critical overall reflection	

In SSM, the above processes (1) to (4) constitute a 'learning cycle'. They are depicted linearly here just for the sake of exposition. Yet, as also stressed by the authors, they are very likely to be implemented iteratively as the inquiry process advances and learning occurs (Checkland & Poulter, 2007). Lastly, the cycle *ends* when a broad-enough comprehension of the situation is reached and action to improve identified and taken. As new actions will change the situation itself, the cycle could possibly starts again. To this respect indeed, SSM may be very well considered as a possible devices to manage probably not-static-for-too-long human situations.

To be noted is that, despite the success of SSM and the extensive use made of it, the methodology is not exempt from criticism and limitations.

First, the performance indicators are deemed by some as nebulous, poorly supported and integrated in the methodology (Kotiadis, et al., 2013).

Second, the core CATWOE concepts, according to (Kareborn, 2002) lack of definition, are poorly theoretical backed and prone to different interpretations. The authors also argue that the CATWOE usage often tends in resulting in a single root definition and conceptual model rather than a set of some.

Third, even the SSM outcome is challenged in its (argued) tendency in resulting prevalently in regulatory rather than radical changes. There is not a general rule claiming for a radical change being better that a regulatory one; nonetheless, it is a limitation of the methodology not being able in effectively support both (Bergvall-Kareborn, et al., 2004). Yet, it is not this the nature of accommodation (and SSM) itself? It could not be the case that when SSM takes place, change - and possibly a radical one - has already occurred? Are not the negative effects of such a change that SSM - which in fact very rarely is used as a system design tool (Checkland & Winter, 2006) - tries to alleviate? In literature, while some propend for the above, others argue that it is a considerable matter of context, climate, willingness and ability of participants. (Bergvall-Kareborn, et al., 2004).

Notably, the SSM authors consider the methodology better if carried on by internals and not left to external experts (Checkland & Poulter, 2007). May this introduce biases in impartiality or increase the propensity at early stages towards anticipated outcomes? One may reconducts this question to the wider debate about the validity of action research itself. To this respect, (Vinten, 1994) in recognising the issues of to some extent less rigorous research procedures, nonetheless argues that there will be an inevitable trade-off between the above and the gains obtained from the deeper insight that only this kind of approach may enable. That is: action research may enable a depth and a variety otherwise not obtainable; this in turn place and additional burden on the researcher ability in order to effectively discriminate and place itself 'at the right distance' from the phenomenon under investigation. For further considerations see also (Cornford & Smithson, 2006, p. 144).

Lastly, three other main issues that may harm SSM effectiveness are to be considered. First, cultural barriers; particularly in Eastern cultures, which are often deemed more uncomfortable in enter into an open debate, possibly among non-peers and conflicting. Second, language barriers: if the English language is perceived as the 'language of the model', translation and loss of conceptual richness issues may arise. Third, high turnover or team provisionality (i.e. not stable-enough relationships). Solution emerges from a group-specific effort against group-specific perceived-as-problematical situations. As they embed participants-related worldviews, they are, to remain valid, bounded to the people that have devised them. (Moores & Hutson, 2000). Briefly on

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this latter point I would argue that, even if SSM is team-bounded, using it on ongoing basis may nonetheless provide a framework in which everyone can find both a method and historical knowledge. This may place anyone in the privileged position of knowing what functioned and what perhaps did not, thus being able to not continuing 'reinventing the wheel' of the next improvement.

V. FINDINGS

As expected, the new software adoption changed the way of handling user requests by introducing a formalised 'ticketing' process. Also, the FAQs gave impulse to a new collection of technical procedures and 'how to'. More interestingly, the SSM inquire revealed four relevant outcomes that accompanied, and to some extent undermined, the success of the above.

First, the software was, at its best, only partially used. The incidence of opened tickets was higher in the biggest office and less relevant in the smallest ones where users still preferred direct calls or emails to the local technicians. With regards to the FAQs, after an initial population with still valid knowledge from the previous repositories, did not followed an adequate effort in keeping it live and up-to-date; no fresh knowledge was substantially added. In practice, the FAQs were inserted as almost as they were at that time and subsequently poorly implemented and used. Almost no ticket was answered attaching a FAQ neither the external support had sufficient scope (no other knowledge) for dealing with requests. As a consequence, much of the extra-working-time requests were only looked into and postponed to the first on-premise support available. This unsurprisingly created dissatisfaction and shed a negative light to the overall initiative and for assimilation, to the IT staff also. To be noted is that a more subtle and self-reinforced pattern emerged. In the absence, perhaps, of the right motives and cohesion toward a common goal (i.e. using the FAQs), what a technician facing a new problem may do? Figure 2 below, based on findings, suggests that in the light of a new problem colleagues and the FAQs do not appear as consulted as they should be. Instead, an isolated process of self-search is preferred. This, besides reinforcing the tacit knowledge owned, works against its explicitation and ultimately against the identification of one 'best' solution to a given problem. No new knowledge is institutionalised, neither uniformity nor quality of service are eventually provided.

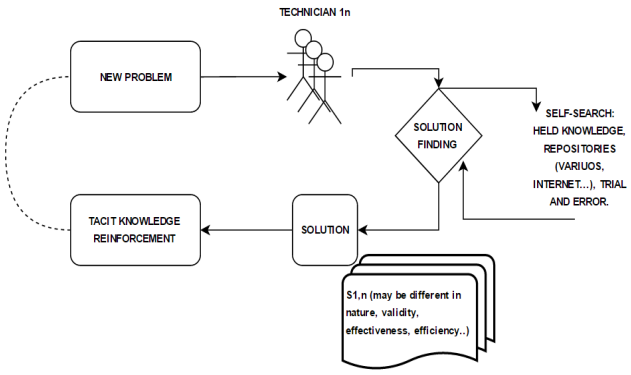

Figure 2: a self-reinforcing pattern of solution self-search and tacit knowledge reinforcement

Second, the ticket categories, aimed at classify incoming requests, resulted to be insufficient, unclear, and misunderstood: technicians in different branches differently interpreted the same category. Also, some categories were more relevant to some branches, while others categories, relevant to others sites were simply absent. As a consequence the tickets were being classified according to different interpretations at the best, too often in the 'others' catch-all category and, at the worse extreme, with the fist category available in the selection form (namely, 'Acrobat'). Statistics drawn from such data barely may be useful (in identifying training needs for instance) due to their intrinsic lack of correspondence with the reality.

Third, the assistance process was thought to be two-tier: a first contact and an escalation level for less obvious requests. Yet, the ticketing software initial outcome had a twofold effect: (i) an as marked as unexpressed feel of uncomfortably of senior technicians in deal with incoming user's requests and (ii) a perceived way, of first-tier technicians, to assign to others (the second-tier colleagues) unpleasant tasks. As a result, several tickets were worked with a too-slow pace, sometimes quickly passed and poorly commented back and forth between tiers and almost always not closed, even if dealt successfully. This created frictions between first-tier technician and users and between first and second tier technicians.

Fourth, it emerged a lack of clear roles identification. Who should be accounted for validating the FAQs? Who for operatively managing the external support service? Who, at last, for running overall statistics? As result, statistics were almost nor runt, the external support marginalised and a stagnant yet unsatisfactory situation took place.

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VI. CORRECTIVES

Being aware of the situation and its root causes, a series of correctives were agreed and implemented.

First, the ticket categories were jointly rethought, starting this time with a different underpinning logic: the scope they need to serve first than the kind of requests that come in from users. Thus, for instance, the category 'office' became 'office/how to' and 'office/not-working'; in this way the training manager had better evidence of training needs, technicians of installation problems, and so on… New categories were added, some were renamed or deleted. Finally, a reminder prospectus of the available categories and their intended usage were circulated among technicians. This led to more meaningful categories, realistic statistics (the 'adobe' and 'others' tickets were reduced) and useful insights towards proactive interventions (training, patching…).

Second, the FAQs were abandoned in favour of a wiki-based intranet web-portal. Besides the technical solution (yet noting its enabling role), the shift in paradigm is perhaps more interesting: now all the IT people are accountable for populating the wiki and given the ability (and the task) to self-edit the wiki contents. The web-portal also offers substantially no boundaries nor pre-built structures in content editing: it is possible to start from a blank html page, insert text, images, links to multimedia sources… In this way, it allows for a greater flexibility and immediateness: when a new solution or aspect worth of note is found, no barriers impede the technician to quickly record it in the wiki-FAQ; that is: there are less 'system-design' and 'not-my-role' excuses for not doing it!

Third, a new 'controller' role – held by the same *first-tier* technicians and initially on rotation basis – was though. Overall, the aim is threefold: (i) to solicit the wiki usage and prevent it from degenerating into disorder, (ii) to purposefully place control points close to action (to enhance quality and reduce cost of information) and (iii) to expose the IT staff to their own performance and that of the others, in the hope of unfreeze some positions, through visibility and empowerment, concurrently giving to all the possibility to bring their own contribute in an increasingly homogeneous and shared context.

Overall, the effect of the above was positive: the communication between technicians appears to increase, the FAQs being revitalised, the pace of responses form senior technicians and the overall rates of closed tickets show positive trends.

Fourth, the tickets are now rated by users. A precompiled five 'stars' Likert-like evaluation scale, plus an optional request for comments form are presented to users. In addition, users were reminded from the top management to use the ticketing system in making support requests.

To note is that, at least initially, no formal performance appraisal procedures and reward systems were adopted. Nonetheless, the above actions implicitly created the overall framework for the formers to be implemented.

VII. CONCLUSION, LIMITATION AND SUGGESTIONS FOR FUTURE RESEARCH

This research stops at the early but positive findings depicted above. Overall, it highlights how SSM proven to be useful in guiding a discussion and eliciting, as unexpressed as fundamental, standpoints. From genuine involvement and delegation of some micro-processes resulted commitment and sense of ownership. From the improved communication (promoted by the process of inquiry) it emerged a mix of agreed design and operational improvements, better team spirit and co-operation. As often good intents are not enough, the above was accompanied by a – though not so easily accepted at first - series of incentives as motivational devices in driving the IT staff behaviour.

Despite the above, this research has three principal limitations:

First, the limited time boundaries especially when confronted with the contingencies of the daily working life.

Second, at the time of writing, no data that confirms the sustainability of the above and positive effect on business performance is available.

Third, final users it has not given particular attention. It has been assumed their adherence to organisational rules but nothing about, for instance, their satisfaction with or motivation to the new system has been inquired; nor they have been involved in the SSM analysis (trough representatives for instance). One may wonder, for instance, to what extent, are they willing to open a mail ticket rather than calling? To what extent, are they accustomed and pleased to receive a first answer in a, one may say, pretty impersonal, FAQ form? There may be a trade-off between the less-likeable FAQ-answer and the reduced time-to-response? May unexpressed dissatisfaction covertly harm the ticket evaluation, making it too negative and manipulation prone?

So, why an information system, emerged from a live business need, and technically well implemented, failed to provide, at least initially, what expected?

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The answer is twofold: the research findings and the correctives applied, had consistently shown how failures resided in an initial underestimation of the human-behavioural related component. The generalizable lesson that emerges is that a system is more profitable - or at least more difficult to be opposed - when participated and agreed in its parts. But this may not suffice: as change sometimes needs to be 'imposed', divergent and never stable-for-too-long standpoints always exist, some incentives mechanisms appeared to be effective in enforce the above and conduct the actor's actions towards a wanted path.

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