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The Life History of a Knowledge Support System: Emerging a Change Process for Knowledge Rich Organisations

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THE LIFE HISTORY OF A KNOWLEDGE SUPPORT SYSTEM: EMERGING A CHANGE PROCESS FOR KNOWLEDGE RICH ORGANISATIONS

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Abstract

This case study traces the life history through several transformations of software used by knowledge workers in a global professional practice. The target application provides a globally operating major firm with knowledge management support for legal practitioners and provides data to support managing its relationships with clients. The research constitutes a careful longitudinal reflection using the processes and techniques of Action Research and Grounded Theory. An information systems change management process is promulgated.

The change process that was emerged is richer than existing change management processes with which it is compared. It is suggested that this enhanced change process may be useful particularly in organisations of knowledge rich practitioners.

Keywords: Information Systems, Change Management, Knowledge Management

1.0 Introduction

Recently, a new feature, was added to the system of interest in this research, which we are calling *Rebrand*, as part of a standard software release. The change simply added a checkbox under the application's main search bar, accompanied by the text 'Remove copies from search results'. This change, known as the "clone filter", would appear innocuous, yet its addition was the result of a complex interplay of organisational, economic, and technological factors that have unfolded over the life of both the system in which it is now inscribed and the organisation which produced it. This change was widely perceived by those involved in the development of *Rebrand* to be the latest in a line of changes that have delivered incremental improvements while larger and more fundamental problems with the system remain unaddressed. This case study, methodologically rooted in elements of Grounded Theory (Glaser,

1967) and Action Research (Mathiasson et al, 2012) advances a model of information systems change. The emerged model suggests that change can be understood as the outcome of a decision-making process involving the operation of mediating processes on the shared interpretive contexts of multiple participants.

1.1 The Research Object

The research focussed on the case of *Rebrand*. The project has evolved from the legacy *Operational System*, to the *ERP-Outlier* Database, to *Rebrand I*, *Rebrand II*, and is currently undergoing a proposed transition to *Rebrand III*. Despite its long history of development and a general consensus that successful realisation of the aims of the project would provide great value to the firm, overall adoption of the tool remains weak.

The vision for the *Rebrand* project has become to build a strategic tool that will capture all deal and credentials information, with the support of lawyers and staff in the Knowhow & Learning and Marketing functions. Achievement of this vision will require full adoption of the tool by the firm globally. The perceived value of the system is that it will 1) differentiate the firm from its competitors 2) assist lawyers and marketing staff in pitching for work, 3) help staff identify other staff who possess expertise, and 4) act as an archive of relevant historical documentation.

1.2 Methodology

The study investigates a complex project undertaken by a major law firm which we are calling "Global Law", using a qualitative, mixed-method approach. Grounded Theory was paired with Action Research as the lead researcher was actively involved in the enactment of the system changes. Neither of the methodologies selected for this research purport to be value-free, and action research in particular, explicitly involves "a participatory, democratic process concerned with developing practical knowing in …, grounded in a participatory worldview." (Coghlan 2009)

The researcher's involvement with the *Rebrand* project began in 2006, after joining the firm as an Information Advisor in the Tokyo office. At that time, he was trained on the legacy *Operational System* with the understanding that the *ERP-Outlier* database, which would later be re-branded as *Rebrand*, would be released in the near future. The expectation was that this release would significantly change the work

processes of Information advisors, who assist lawyers with research and managing business and legal information. This release, however, was significantly delayed. In 2010 the practitioner/researcher assisted with a limited roll-out of the *Rebrand* project in Asia, offering training sessions to legal staff in Global Law's, East Asian offices. This was followed by a lengthy suspension of his relation to *Rebrand*, as he relocated to the London office on other duties. However, in early 2014 his responsibilities changed once again, and responsibility for the future development of *Rebrand* came under his remit.

Research interviews were conducted face-to-face in private meeting rooms or via direct telephone calls, and each was recorded and fully transcribed. The university's ethical procedure for research was enacted and table 1 summarises data collection.

ID	Office	Group	Rank	Proximity	Length	Duration	Words
I.01	London	ISS	1	2	1	00:56:16	10,475
I.02	London	Practice	0	0	1	00:54:06	9767
I.03	London	Strategy	1	2	0	00:15:12	2663
I.04	London	ISS	2	1	1	01:15:40	12,299
I.05	London	K&L	2	0	0	00:57:19	9582
I.06	London	Marketing	4	0	0	00:22:51	3480
I.07	London	ISS	2	0	0	01:09:34	12,771
I.08	London	K&L	4	0	0	00:59:30	11,106
I.09	Frankfurt	K&L	5	1	2	00:29:22	5289
I.10	London	Practice	1	2	3	00:15:56	3205
I.11	London	K&L	3	0	1	00:54:03	8072
I.12	London	K&L	6	1	0	00:53:56	10,221
I.13	Hong Kong	K&L	5	2	1	00:56:35	10,720
I.14	London	Practice	0	0	0	00:58:01	10,642
I.15	Colchester	ISS	4	0	1	00:45:36	6582
I.16	Bangkok	Marketing	4	0	1	01:09:22	10,793
I.17	London	Marketing	2	1	0	00:52:56	10,519
I.18	London	Management	1	2	1	00:36:09	5788
I.19	London	Marketing	2	1	1	00:53:38	10,214

Table 1 . Summary of Data Collection

2.0 Structure of the Organisation

The law firm is headed by a Partnership with representative committees providing ownership and direction for the business. These committees oversee an organisation divided into the fee-earning Practice on one side and the supporting Business Services functions on the other. There is a number of broad Divisions (Finance and Projects, Corporate, and Commercial) which are broken down into Practice Groups focussing

on specific areas of law. It is also possible to distinguish between Transactional and Advisory Practices, with the former running deals that are structured as projects, while the latter tend to open matters of indefinite duration, providing legal advice to clients on an *ad hoc* basis.

Business Services are similarly specialised, and include most of the Functions that would be expected in an organisation of this size, pertinently, involved with *Rebrand*, Information Systems and Services (ISS), Knowledge and Learning (K&L) and Marketing. Each of the three core *Rebrand*-related Business Services functions is further subdivided into sub-units, each with its own goals and interests.

Whilst lines between the various groups and functions might appear impermeable on an organisational chart, there are many instances of cross-practice, cross-functional, and practice/function collaboration. Four examples that were of particular importance were the Project Approval Board, the *Rebrand* Steering Committee, the *Rebrand* BAU (business as usual) Support Group, and the *Rebrand* Network, each of which contains a diverse membership drawn from different areas of the organisation.

3.0 History of the System

According to one informant, *Rebrand* ultimately has its roots in a system we will call *Embryonic System*, which was developed around the year 2000 by the Capital Markets practice with help from ISS, and supported by a Partner described by one informant as 'a visionary'. This system was conceptualised to create a searchable repository of surrogate records, each of which corresponded to and recorded key features of Capital Markets deals, as described in offering circulars and deal binders. Routinely, this was stored in libraries housed within local information units. The target audience of Capital Markets fee earners was well-defined, though the system was not designed around an expectation of fee earner self-service. Information Advisors (IAs), belonging to the K&L function with Practice-based associations and training, were the primary gatekeepers between the fee earners and the physical library, running searches and directing fee-earners to the appropriate materials. The expectation that information professionals would be core users of the system at that time heightened the importance of controlled vocabularies for capturing deal information, while reducing the requirement for a simplified interface accessible to untrained users.

Embryonic System was replaced by *Operational System*, which preserved the key features but added functionality for the maintenance of controlled vocabularies. The second generation of the *Operational System* aimed at making broader and more significant organisational changes, opening access to the system to other practice groups and their corresponding Information Units. This necessitated the construction of elaborate, specialised controlled vocabularies for each practice. These vocabularies were the products of cooperation between Practice-based Professional Support Lawyers (PSLs) and Information Advisors. Adoption of the system was strongest amongst the largest transactional practices, such as Mainstream Corporate, Banking, and Projects. At this time access to the system was largely restricted to expert users in K&L, and the Operational System was never deployed on the desktops of normal users throughout the firm.

The *ERP-Outlier* project was an attempt to build a successor to the *Operational System* that would deliver a number of substantial improvements, including a new interface that would enable self-service for non-specialist fee earners and business services staff. There was an accompanying expansion of the scope of the system to include credential information that would be of use to the Marketing department in preparing pitch materials to be used by the firm for the purpose of winning new work. Accordingly, support from upper management in the Marketing function was strong at this time. However, development of the *ERP-Outlier* system was plagued by setbacks, prompting one informant who was active in several technical projects at the time to describe the system as a 'source of pain' for the firm. Interview data suggests a number of contributing factors including: weak internal requirements gathering processes; the decision to build *ERP-Outlier* as a new interface on top of the existing *Operational System* technical platform; retention of the *Operational System* knowledge model without active re-validation or re-design in light of the addition of Marketing data; an interface design based on the needs of the power users comprising the core audience of the incumbent system; the conscious exclusion of *Operational System* project team members, perceived as resistant to change, from the new project; ISS experiments with off-shore development that resulted in a poorly architected and poorly understood codebase; and integration with the firm's Enterprise Resource Planning (ERP) system.

The project was formally halted by the firm's CIO after it was perceived that an external team had seriously misrepresented the state of progress of development of the

software they had been tasked with. Marketing withdrew funding and support for the *ERP-Outlier* project. More generally, the reputational damage suffered by the initiative was found to be unrepairable, leading to a complete re-branding of the system as *Rebrand*, and the formation of a new supporting team. *Rebrand* never again enjoyed a level of institutional support comparable to the *ERP-Outlier* project. Now, changes, based on documentation drawn up by the new team, were forced into a number of phased mini-projects delivered through the firm's BAU processes.

Phase one focussed on upload of marketing data into the system, attempting to collate the *ERP-Outlier* data captured by Marketing staff around the world.

Phase two had two chief aims: global, firm-wide adoption, and integration with Business Objects. As in the past, Business Services staff members are the primary users of the system, though Marketing use has grown considerably and now slightly exceeds use within K&L. This effort ultimately proved unsuccessful, owing to technical issues with the *Rebrand* platform. With the prospect of Business Objects use ruled out, the chief aim of *Rebrand III* was a 'lift and shift' of the system's data store from the *Operational System* to the ERP, achieving more direct integration. However, this phase was never initiated. At the time of writing, the Innovation Centre concept has been replaced by a technical demonstration being run within the ISS Architecture team, with cooperation from K&L and other functions, and the future of *Rebrand* as a distinct application remains uncertain.

4.0 Research Results

Because development of the *Rebrand* system has been on-going for many years and has involved many participants from different groups within the organisation, the case presented an abundance of potential themes. Similarly, the openness of the methodology employed meant that a large number of perspectives emerged. Choosing a central topic from among the many processes that emerged therefore required taking a step back from the low-level codes that had been assigned to discrete data points, and considering the overall high-level perspectives expressed by informants.

The selection of the primary phenomenon on which to focus was motivated by two statements made by senior stakeholders in the course of the interviews, which neatly

encapsulated the themes that pervaded discussions with many of the informants. The first came out of a discussion about how *Rebrand* compares with similar projects within the organisation:

"…You know, I do all sorts of steering committees and things – [Rebrand] is the most depressing. Just because it's frustrating to be dealing with something that…everyone knows that there are problems with it. And they may have different views as to what the particular problems are but fundamentally everyone knows there are problems with it…"

The second provides a perspective on the overall historical development of the system:

"I guess my perspective is obviously influenced by where we are now, which is actually I think…we've let it evolve in a way that is unsatisfactory. And we've been told that, that's kind of an inevitable consequence of the way [Rebrand] was originally established."

These themes – widespread consensus that an existing technical system is problematic combined with an organisational inability to commit to resolution of the root problems, resulting in an unsatisfactory evolution of the system and frustration among stakeholders – appear in the interview data again and again. This research, therefore, sets out to explain this dynamic by offering a substantive theory of the change process leading to superficial change, and the potential constraining effects thereof.

The model shown as figure 1, represents an abstraction of the process that emerged out of the details described by informants in the course of data collection. The next stage of this research will be to seek validation of this model with models of Organisational Change Management as found by Todman (2005). In the sections that follow each element in this high level model of change will be explored in further detail.

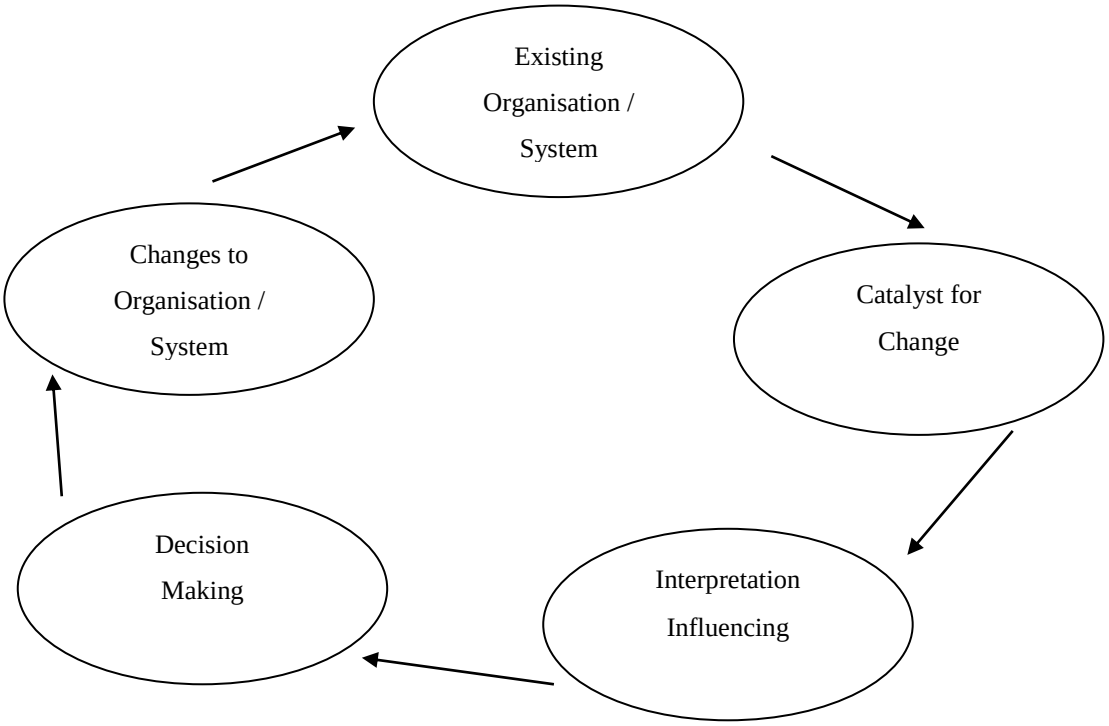

Figure 1. The Change Process Model

4.1 Existing System

Because the present model is concerned with the decision-making process in regard to existing systems, it assumes the presence of such a system as a given. The technical and social systems co-exist in a complex, reciprocal relationship.

4.2 The *Rebrand* System

As outlined in the section on its history, the existing system comprising *Rebrand* is a result of the historical development which shaped its antecedents. Its underlying technical platform is composed of an SQL database (which still uses the legacy *Operational System* interface to fulfil many administrative and taxonomical functions), a search engine, a bespoke web interface, and a reporting interface. Other tools, are technically distinct but have functionality so intimately connected with *Rebrand* that they should be considered as part of the same overall technical platform. This technical system is used in diverse ways, and numerous supporting processes are performed in relation to both system inputs and outputs by participants within the business. These processes are in turn carried out by staff belonging to various organisational groups. Overall responsibility for the future development of the system is effectively held by the Knowledge Systems Manager within K&L, but is managed

with the support of several cross-functional teams. However, decision-making power as it relates to fundamental changes is held by approval bodies in upper management within ISS and in the Strategic Project teams, which consider proposals for change that are prepared by ISS. Given the complexity of the technical platform, the supporting processes, and the resulting organisational structure, most proposals for change should not be considered in terms of any of these dimensions in isolation.

4.3 Catalyst for Change

The proposal for change is the result of organizational tension brought about by misalignment between the system and the requirements of organisational units, which themselves shift in relation to changes in the internal and external environments. The change process can be initiated as the result of established, formal review processes or of unanticipated demand, depending on the management style of the organisation.

Responses to proposals for change to an system can take one of four forms: a) maintenance of the as-is system, b) improvement of the system within existing design constraints, c) improvement of the system by changing existing design constraints, and d) decommissioning of the system.

4.3.1 A Catalyst for Change to *Rebrand*

Due to the historical circumstances of its development – in particular, its early roots in a single Practice group, its expansion to other groups without revalidation of requirements, and the high-profile failure of the *ERP-Outlier* project – *Rebrand* has been a locus of organisational tension since it first went live; requests for change have been less about enhancing existing or adding new functionality and more about resolving core design issues and fundamental misalignments of the system with its user base.

One informant comments:

"…I discuss this system with people and try to explain it to them, how it came about, and the fact that it started off as Operational Systems, and then somebody tried to…make Rebrand fit around the Operational Systems, rather than trying to just use the raw data and input it into a new system. Anytime you start that way, you're starting off at a disadvantage."

The 'clone filter', is an example of a response to one such issue. The problem stems from three facts: 1) a single matter can correspond to multiple 'deals', 2) a single matter can be represented by multiple deal records within the system, and 3) all deal

records are stored within a Practice-specific sub-Index in the database (i.e., a record 'belongs to' the Corporate Transactions sub-Index or the Capital Markets Transactions sub-Index).

There is no simple explanation for this design choice, since it is largely lost to organisational memory, but interview data suggested at least two partial explanations: 1) the decision was made to implement a system that was not in third normal form due to performance inherent in available technology at the time it was first implemented, and 2) the sub-Indexes offered a way of determining the scope of deals, allowing content owners (PSLs and Information Advisors) full control over the taxonomies that would be applicable to deal records in their 'buckets'.

While this allowed the creation of a Practice-specific 'perspective' on a matter as represented by a practice record, it also led to fragmentation. Due to the complex nature of the work carried out by the firm, many matters involve multiple Practices, and each of these perspectives are encoded in separate deal records, creating the possibility that important information could be missed unless one checks all records pertaining to a given matter.

These design choices were further complicated by the fact that *Rebrand* is not integrated with the firm's financial and matter opening systems, meaning that records of matters only appear in the system when they are manually added. This not only led to data coverage problems, but also necessitated the creation of complex processes that involve several participants. Further, the Marketing function asserted that they would need full coverage of deals in order to support their pitching processes, and because wider adoption of the system by Marketing was considered desirable a process was put in place whereby Deal Announcements published by one Practice would be 'cloned' into the sub-Indexes of any other Practices involved in the given matter. The result was the on-going creation of large numbers of virtually identical records, which then served to undermine the perceived quality of search results in the eyes of fee earners.

This conflict between the needs of the K&L, Marketing, and Fee Earner groups therefore created the need for a change to the technical system, though the root problem is deeply embedded in the system.

5.0 Interpretation – Influencing

The organisation's decision-making process is characterised by the interaction of interpretive contexts with mediating processes. The interpretive contexts frame individuals' understanding of the benefits and costs associated with the proposed change in relation to them. The mediating processes define the way in which individuals' interpretations of the costs and benefits of proposed changes are shared. Both the epistemic and economic mediating processes are subject to the operations of power within the organisation; power determines which interpretive contexts are privileged in the decision-making process. This stage of the change process is described as 'Interpretation – Influencing' because interview data suggests that, just as the technical system cannot be completely understood in separation from the larger organisation, the processes of interpreting the meaning of proposed changes to the system and influencing those changes are never fully distinct. This comment from a senior K&L manager involved in the project demonstrates how interlinked the contexts and processes, described in fuller detail below, can be:

"We had a wish list of 300 items for Rebrand II. We bid for the money and bid for the time to be able to do it. It was approved. But then, of course, at the end of 2009, the market crashed...so we were told we could have a third of the money...and we had a week to redo our business case to cover the requirements that we thought we could live without. So we tried doing a MoSCoW, as you do in any project. The Musts still left us with a list of 200. So we sat down - me, my counterpart from Marketing, and someone from ISS - the three of us sat down and negotiated what we felt were the most important things."

5.1 Interpretive Contexts

The meaning of the proposed changes is interpreted by participants through a variety of contextual lenses, in terms of their anticipated costs and potential benefits at the technical, psychological, and structural, and procedural levels. Each of these is a perspective on the system as a whole. These theoretical constructs were drawn from the interview data during axial coding, by overlaying the hierarchy of concepts that emerged with a higher-level scheme of classification.

The Technical Context refers to participants' understanding of the functionality, goals, limitations, and potential of the system conceived as a technical platform. It frames questions such as "What will the proposed change mean for the system?" and "How can the changes be implemented?" Codes were associated with Technical contexts where they referred to distinct software or hardware tools and applications, or where they related to aspects of those technical artifacts.

The Psychological Context refers to the motivations of participants in the process, based on their understanding of the role they play as individuals in the process. It frames questions such as "What will this change mean for me?" Strong motivation will lead individuals to become more engaged in the process. Weak motivation will lead individuals to avoid the process. Codes were associated with Psychological contexts where they related to individual, subjective assessments of value.

The Structural Context refers to participants' understanding of the formal structure (size and shape) of the organisation, the place of participants within that structure, the malleability of the structure, and the potential effects that the proposed changes will have on that structure. It frames questions such as "What will this change mean for the size, structure, and responsibilities of the groups of which I am a member?" Codes were associated with the Structural Context where they referred to formal and informal groups or roles within the system.

The Process-oriented context refers to participants' understanding of the nature and scope of the supporting processes carried out by themselves and others within the system, as well as the potential effects that the proposed changes will have on those processes. It frames questions such as "What will this change mean for the processes in which I am engaged?" Codes were associated with processes carried out by participants, including operations performed on the inputs and outputs of the technical system.

5.2 Interpretive Contexts for Changes to *Rebrand*

5.2.1 Technical Contexts

There is a heavily embedded perception among informants that further development of *Rebrand* is heavily constrained by existing issues in the technical platform. Changing the basic design at this point is a considered by ISS informants to be a major hurdle, which would require rebuilding the system from first principles.

However, incremental change also has its share of obstacles; even the estimation and implementation of incremental improvements are further complicated by the quality of the legacy code base. One informant comments

"…when you're fighting the system, when you're fighting the code you're maintaining, you're always going to hit 'Oh, it's going to take two months now to do…just a small change.'… It shouldn't be like that."

Note that even this assessment of the technical prospects for change is coloured by the psychological context, highlighting the multi-faceted nature of the interpretive process.

5.2.2 Psychological Contexts

Interview data indicate that participants involved in *Rebrand* development or support over the years have made active decisions to engage with or avoid the system. The respondents cited various motivating factors. Interview data suggest that this context is less affected by the specifics of a given change request but more concerned with the long-term effects of prolonged development and perceived failures. The comments of one informant show how the context of his own psychological interpretations of involvement with the project has changed over time:

"As I am today, I would probably have been high sceptical about what was being planned. But maybe that's not just the power years after being here five years now, but perhaps specific to having hindsight on [Rebrand] *itself and seeing where it is…a combination of "it's my job", youthful enthusiasm, and youthful naiveté… is why I stuck by it. I definitely believed in the fact that, you know, it wasn't going anywhere, and five years later it has not gone anywhere."*

5.2.3 Structural Contexts

A system of *Rebrand's* size and complexity necessarily involves several participants. This leads to different interpretations of the scope of the unit's responsibilities in relation to the system. The involvement of the Marketing department is particularly interesting, given that the *ERP-Outlier* project, which laid the groundwork for *Rebrand* in its present form, was strongly supported by Marketing prior to the project's eventual failure. Furthermore, integration of Marketing data with the existing K&L database was one of the most significant features to emerge out of the

project. Finally, efforts to persuade the Marketing functions fully to adopt the system and transfer their deal-related data continue to this day.

This complex history of joint ownership and development between K&L and Marketing has been the source of continuous tension that has motivated changes to the system, particularly around data entry practices. This appears to be related to the perception that the definition of data entry standards is 'owned' by K&L. In fact, the situation has led the setting up of another set of standards defining how *Rebrand* data should be used after exporting from the system, rather than changing standards at the input stage, owing to the complexity and inflexibility of the standards 'owned' by K&L. One Marketing-based informant illustrates the nature of the conflict:

"...what happened for me was I got edit rights onto [Rebrand] *...I was correcting our* [ERP-Outlier] *and marking things up, and I kept getting these e-mails from somebody at I&I saying you're doing it wrong...and, I remember, I'm like "well how come someone...who's not Marketing is telling me - someone in Marketing - how I should write a credential?"...then they're like "well the manual was written this way"...I'm like "well if we're using it from Marketing why am I doing this?"...it wasn't even a Catch-22, it was just a little bit of idiocy as far as I was concerned; it just made no sense. "*

5.2.4 Process-oriented Contexts

A technical change to the system that enabled integration with the financial system or decoupling of data entry for K&L and Marketing data would change the nature of ownership over entry standards, resolving the conflict noted above.

The contested ownership over the data entry standards related to *Rebrand* led to the establishment of supporting processes that had a direct bearing on the proposed implementation of the 'clones filter'. In particular, the process whereby 'clones' records based on the involvement of fee earners was established has directly provided information about the matter.

Clone creation is managed by the Indexing and Inputting Team, which oversees the quality assurance process that is carried out in conjunction with Information Advisors. Furthermore, these several processes are tailored to conform to the requirements of several Practice and Office groups, resulting in a large body of defined rules and exceptions. One Assistant notes the difficulties caused by this complexity:

"…it's good to have this process in hand…but I felt sometimes…people got confused…By changing one part in [a record] then you reshuffle the whole thing, and that took a bit of time for people to master. And by the time they become confident with that they will have to leave. Then we have to start the whole process again… there needs to be more training guidelines in place for [Rebrand] *because people do get overwhelmed in the beginning when they sit [down with it]."*

5.2.5 Mediating Processes

The varied interpretations of the proposed changes are integrated through the mediation of a number of processes.

Epistemic Processes are related to the distribution of knowledge between participants in the organisation. Understanding of the complex system is dispersed. Furthermore, the understanding of the nature, aims, and limits of the system is not fixed, but subject to revision through knowledge sharing. Epistemic processes are the means through which diverse participants mutually shape their understanding of the system.

Economic Processes are related to the performance of rational calculations of costs and benefits. These processes are informed by the epistemic processes, which determine how costs and benefits are defined and measured.

Both of these processes are permeated by the exercise of Power, which privilege certain views over others in the epistemic processes, and determine which costs and benefits are considered for the calculations considered in the economic processes.

Just as the interpretive contexts cannot be easily distinguished, the mediating processes are also intertwined. For example, perceived mastery of a given interpretive context means that the perspectives of a group will tend to be empowered in epistemic processes. Similarly, control over funding and budget allocation has a direct influence on participation in the economic processes.

5.3 Mediating Processes for changes to *Rebrand*

5.3.1 Epistemic Processes:

A number of formal and informal epistemic processes have been employed with varying levels of success over the course of the *Rebrand* project, though some informants cite an early failure to gather core requirements and re-validate existing

documentation during the transition from the *Operational System* through *ERP-Outlier* to *Rebrand* as one of the primary sources of continued problems with the system as a whole:

"My sense at the time was always that…it was being delivered…without really ever having fully understood the requirements…we needed a Credential system - that was without a doubt - but nobody really had taken the time. [We were] delivering a system that was meeting the ERP-Outlier needs without really knowing what that meant."

Following the implementation of *Rebrand* and the roll-out of the system, a number of cross-functional *ad hoc* groups were created that played some role in helping participants make sense of problems and proposed changes to the system; however, for some informants these groups sometimes failed to produce a truly open or shared vision. When asked about coordination between the different governing groups involved in *Rebrand*, and whether this was a net benefit, one informant replied

"Not really, no. Well, I just think there's been a lot of time-wasting over the whole [cloning issue], and you feel that decisions have been made and then you're working towards something, right? And then, all of a sudden, something comes up…and everything has to be changed. You know, we thought we kind of resolved that issue…It was all stop, start, stop, start."

An important epistemic process cited by informants is the creation of business cases, which have been compiled at many junctures of the various phases of the *Rebrand* project.

5.3.2 Economic Processes:

Discussions of the ways in which costs and benefits are calculated were covered in the interview data, but most comments along these lines were heavily coloured by references to politics and power. One informant who is relatively remote from *Rebrand* but who holds decision-making power by virtue of participation in Project Boards summarised the economic criteria used in terms of cost, priority, and value relative to other competing projects:

"...obviously there are other competing projects in the business, and...you need to understand what else is going on in order to be able to prioritise but...the only justification for investing significantly in Rebrand would be if we felt it was really going to generate some efficiencies that we're not currently getting from the system."

In fact, these three criteria played a significant role in development of the interpretive contexts described above, since these seemingly straightforward criteria conceal considerable complexity. Determining the true cost of an involved system such as *Rebrand* is not a straightforward task, since many costs of maintaining the system in its current form are absorbed by diverse parts of the business. Furthermore, the opportunity costs of maintaining the system in its current form are difficult to calculate, as summed up by the comments of this ISS informant:

"...they don't see the bottom line; there's no bottom line to them. I know I have had two developers...working on Rebrand consistently for about four years...let's call it £500 a day...So 220 days a year...220 times £500 times 4 [per developer]...that's your ball park figure, and that's just developer time. You've then got tester time, [business analyst] time, your time, your team's time, IT Support time...plus opportunity costs."

This highlights the importance of communicating economic information to decision makers, to ensure that the full range of costs is considered.

5.3.3 Operations of Power:

Epistemic and economic processes are both constrained by the operations of power, which can obstruct knowledge and value-sharing (Dhillon, 2011).

Power is often connected with control over funding. Sometimes this takes the form of control over economic discussions, as demonstrated by the control over the ISS department over estimating the cost off *Rebrand III*, which was passed on to the Project Board with no visibility or justification of the overall calculations for the other functions involved in the process. Other times, power is spread across multiple groups. This, too, can lead to problems, as cross-functional systems require support that requires approval from many groups based on recognition of mutual benefit. The comments of one informant with considerable experience of such projects demonstrate this point:

"That's where the politics comes in...This is always the problem...everyone agrees that it's a good idea to integrate data. But funding goes by these verticals, and data goes in horizontals, and nobody has budgets that go in horizontals. So you're almost going cap in hand [to] all these different places... but no one in the line is going to volunteer their budget to help anyone else."

The operations of power are not purely focused on funding, however, but can also play a role in determining who controls key epistemic processes. The Engagement

Consultants team was created as a way of mediating relationships between the ISS department and other functions, with each Consultant assigned responsibility for relationships with a certain group. Since the Engagement Consultants become responsible for the production of business cases, this has been cited as creating an extra layer of separation between decision-makers in ISS and stakeholders in other functions:

"And in fact, the business case, for this system and others, was primarily written by this ISS engagement consultant… The actual establishment of, engagement consultants is a relatively new thing. I think it's a bit problematic because within K&L we already had existing relationships with ISS. So basically to in-house your relationships with external parties and to centralize them in one of your own resources then responsible for creating business cases, etc., strikes me as potentially having some conflict in the role."

5.4 Decision-Making

The operations of power on the epistemic and economic processes produce a decision that is supported by the organisation, by filtering the integrated interpretations of the various participants and stakeholders in the project and producing a set cost-benefit calculations based on the overall organisation-level interpretation of the nature and value of proposed changes. The decision is 'organisation-level' in that it reconciles participants' perspectives with the power structures, and is capable of motivating change at the organisational level.

It was noted above that proposed changes to a given system can be met with one of four responses: a) maintenance of the as-is system, b) improvement of the system within existing constraints, c) improvement of the system by changing existing constraints, and d) decommissioning of the system. The attraction of the first three of these options can be explained in relation to the interpretive contexts and mediating processes outlined above.

Because the catalyst for change often has its roots in misalignment of the system with the internal or external environment that leads to organisational tension, means that maintenance of the as-is system, will rarely be effective or desirable for decision-makers, despite the fact that it entails no explicit cost, since it also does nothing to

address the catalyst for change. The ability to flat out reject valid proposals for change is only tenable where power is concentrated.

By contrast, improvement of the existing system within existing constraints is more attractive. Because change is incremental, explicit costs are low, as is the need to engage in more fundamental processes that challenge current interpretations of the meaning and value of the organisation system. At the same time, incremental change does have the effect of lessening the organisational tension embodied by the catalyst for change, though it may not eliminate the root causes of this tension.

Improvement of the system by changing existing constraints is more costly than incremental change. It often involves large explicit costs that must be managed in order to replace problematic technical components and supporting processes. It also requires deep engagement in costly and time-consuming epistemic and economic processes as described above. The potential benefits of successful initiatives of this type, however, are greater – not only in terms of fully addressing the catalyst for change, but also in realising new efficiencies. Failure, on the other hand, can come at a great organisational and psychological cost – especially for the decision-makers who support such initiatives.

5.4.1 Decisions in relation to *Rebrand*

The most significant organisation-level decisions in the history of *Rebrand* have been the initial freezing of the ERP-Outlier project and denials of all requests for funding to address its core technical and design issues. The firm has consistently chosen change within existing constraints, as described above.

5.5 Changes to the System

The set of changes embodied by the formal consensus that has emerged from the interpretive-influencing activities and the mediating processes can have varying degrees of fit with the actual requirements. Where the resulting changes to the technical platform of a system do not fully align with the critical needs of participants, those participants are forced to adapt the existing processes under their power in order to address the catalyst for change.

5.5.1 Changes to the System in *Rebrand*

The story of *Rebrand* development since the initial freeze of the *ERP-Outlier* project is a story of adapting non-technical processes to compensate for constraints imposed by the technical design and implementation of its legacy systems. Because *Rebrand* was not integrated with the firm's financial and enterprise systems at the outset, data entry and quality assurance teams were put in place to provide the benefits of integration. Because the system design was based on the assumption that deal records should be associated with specific Practice groups within the firm, a manual process for duplicating records was deployed to ensure data coverage that would meet the requirements for adoption of the system by Marketing.

These changes to manual processes can sometimes become catalysts for technical changes in their own right, as in the case of the clone filter, which was implemented because duplicate records interfered with usage of the system by fee earners.

Changes of this sort run the risk that they become part of the new *status quo*. This can be observed in the case of *Rebrand* development. Though those informants closest to the project were unanimous in their belief that the system is in need of substantial change due to the inefficient supporting processes, the connection between the system design and these processes was invisible to some commentators more removed from the project:

"I've got some visibility of other IT projects that are in the pipeline...and my sense is that Rebrand is a long way off being on the priority list and...that's probably right, because it does do a job. I think if we were to make any investments, my gut feeling is it should be around the process rather than the system itself. I think the system can generate useful information but it just goes back to junk in, junk out."

6.0 Comparison with existing models of change

In keeping with the grounded methodology employed, the model advanced herein is rooted in discussions with informants during the course of data collection. However, its value can be better assessed through a comparison with the existing academic literature (Eisenhardt, 1989). The substantive theory of change that has emerged from this approach can be compared with existing models for managing organisational change. One of the earliest is Kurt Lewin's three-phase model (Unfreeze – Change – Freeze). In the Information Systems context, this model is represented as a transition

from an As-Is System to a To-Be System, with the Unfreeze phase associated with analysis and design, the Change phase with a migration plan that involves technical conversion and change management, and the Freeze phase with support and maintenance. (Tegarden et al, 2012).

However, despite its wide adoption within the Information Systems literature, a return to Lewin's writings shows that his model is concerned with the social dynamics of group decisions; group standards are unfrozen and then performance is 'refrozen' at a higher level. Lewin argues, with reference to his theory of social fields, for the superiority of group procedures over individual decisions (Lewin 1947). In terms of scope, Lewin's model is applicable at all levels of social life, and can be used to describe society-wide changes in discrimination against specific groups as well as it can to explain increased milk consumption among a small group of housewives. (Lewin 1947)

A second model of change is that of punctuated equilibrium, advanced by Tushman, Newman, and Romanelli (1986. This model is characterised by two key phases convergence, and upheaval, which is described as "discontinuous or 'frame-breaking' change [that] involves simultaneous and sharp shifts in strategy, power, structure, and controls" (Tushman 1986). Convergence activities are categorised as instances of either fine-tuning of exploitation of existing resources or of incremental adjustments to environmental shifts. Upheaval, on the other hand, has its origins in major environmental changes, including industry discontinuities, product-life-cycle shifts, and internal company dynamics. The scope of this model is focused on the organisational level, and it is permeated by an emphasis on the role of executive leadership on the management of incremental and frame-breaking changes.

Recently, Besson and Rowe (2012) have combined the main phases outlined by Lewin and Tushman et al and advanced a four-phase model of change characterised by Uprooting – Exploration / Construction – Stabilization / Institutionalization – and Optimization, and used this model as the basis for an investigation into the whole range of subsequent discussions of change in the IS literature (Besson and Rowe, 2012).

The model of change that has emerged from the present study differs from both the Unfreeze-Change-Freeze and Punctuated Equilibrium models – and, by extension, the model advanced by Besson and Rowe (2012) - in several respects.

First, its object is rooted in the socio-technical, beginning as it does with a focus on the existing system, which can only be understood in its totality through attention to the full range of psychological, structural, process-oriented, and technical contexts that define it. By contrast, despite the prevalence of the model within the Information Systems literature, the constraints imposed by the technological artefact upon the potential and nature of the change process are not touched upon in Lewin's writings. While the technical artefact is invoked by the model of Punctuated Equilibrium, it appears as either a motivator for change (for example, substitute product or process technologies that play a role in creating industry discontinuities) or as an output of the frame-breaking change process. Instead, the locus of change in this model is the organisation as a whole, with technology playing a secondary role.

Second, the model presented here depicts the decision-making process as one emerging from the shared sense-making activities of diverse individuals, in relation to a catalyst for change that stems from misalignment of the system with the internal or external environment. Lewin takes sense-making processes into account but, there is an implication that a key decision-maker is defining a desirable level of performance and then arranging things so that this new level is attained and preserved. Punctuated equilibrium is more explicit in its focus on the role of central executive leadership, as frame-breaking change requires direct executive involvement in all aspects of the change. However, the Punctuated Equilibrium model does not address the processes through which decision-makers come to recognise the need for change.

Third, the model advanced here originated in an attempt to understand how the change process can lead to continued, sub-optimal outcomes for the system. The *Rebrand* case study illustrates how development can pass through successive iterations and incremental improvements while preserving core design constraints that undermine the overall value of the whole system, due to the difficulties that arise in the course of defining and sharing the diverse perspectives of multiple participants as to what is required from the system, and the economic and political attractions of applying half-way measures. Furthermore, failure to address fundamental problems in the system can lead to degradation, as complexity increases with excessive work-arounds. Lewin's model does not capture this aspect of the change process, since its focus is on the attainment and preservation of higher levels of performance. This no doubt implies that return to a lower level of performance is possible, but there is no indication that the Unfreeze – Change – Freeze process could result in a lower level of

performance. Punctuated Equilibrium, based on a two-phase model, seems at first less well-suited for describing the problems posed by an system that is - to appropriate Lewin's phraseology, 'semi-Frozen', but on a closer reading it becomes clear that this is only because Tushman et al. are focussed on change to an organisation in the broadest sense. In fact, the Punctuated Equilibrium model contains explicit recognition that sub-optimal changes can become constraints. Though the scope of this change model differs from that advanced in the present research, Punctuated Equilibrium is similarly based on the insight that incremental change can become a constraining factor to successful future development.

7.0 Conclusions

This study has used a case study methodologically rooted in elements of grounded theory and action research, to advance a model of information systems change that can help explain how incremental change can lead to suboptimal outcomes. The emerged model suggests that change can be understood as the outcome of a decision-making process involving the operation of mediating processes on the shared interpretive contexts of multiple participants. The model of decision-making demonstrated the attractiveness of incremental change to decision-makers with reference to concepts that emerged from interviews with informants, and observed that failure to make significant changes could result in corresponding alterations to processes elsewhere in the system.

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