Information Systems: Transforming the Future

24th Australasian Conference on Information Systems, 4-6 December 2013, Melbourne

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WHEN AND HOW TO FACILITATE THE INTRODUCTION OF NEW KNOWLEDGE PROCESSES IN ORGANISATIONS.

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Abstract

Why has implementing new processes into well-established organizations proved to be problematical? We present two case studies hosted between 2012 and 2013 by a large Australian retailer that address this question. The first study focused on devising cost extraction ideas and the second investigated how facilitation could mitigate adverse impacts of new ideas. A gap was found between the capability to implement a new process and that required to achieve the promised benefits. Investigation of new process implementations found three prime contributors to this gap. Firstly, knowledge flow was inhibited by social network structural holes; secondly, reliance on tacit knowledge made identifying training needs difficult; and lastly, high utilisation of experts reduced their effectiveness. We devised a four-pronged approach to estimate this gap and provided guidelines to facilitate new processes. Outcomes from these studies will help organisations enhance their ability to maintain a competitive advantage in a changing marketplace.

Keywords

Organisational Knowledge Processes, Collaborations in Organisations, Facilitations.

INTRODUCTION

The researcher's consulting experience prompted the question: why has implementing new processes into well-established organizations proven to be problematical? A review to explore this question showed much work has been published on process improvement (Paulk 2009) and the introduction of new processes and methodologies, particularly in software development (Dingsøyr et al. 2012; Drury, Conboy & Power 2012; Strode et al. 2012). However, we found little on post-adoptive process experiences (Senapathi & Srinivasan 2011) or experiences in introducing new ideas into existing optimized business structures. Our question was bought into sharp focus when we experienced this problematical aspect in our first case study conducted in 2012 for a Large Australian Retailer (LAR). The 2012 study research design was based on the model of an external consultant engaged with the purpose of devising cost extraction ideas and quantifying potential savings to business case standards for implementation in LAR's Logistics business unit. Participants were drawn from managerial positions in distribution centres, transport, logistics, operations' support and information systems. Additional subject experts were called in for clarification and joined the collaboration on a needs basis. The study was carried out through knowledge creation collaboration workshops based on concepts from Organisational Knowledge Creation Theory (Nonaka & Takeuchi 1995). Despite the depth of experience and expertise available to the study, only four out of twenty cost extraction ideas could be quantified in terms of costs and benefits to LAR business case requirements within the timeframe of the study. At the presentation of findings in July 2012, the difficulties associated with quantifying the costs and benefits of ideas were discussed with participants and stakeholders. Support was given to a new study to not only find out why implementing new processes was difficult, but also recommend when and how to facilitate the introduction of new processes into LAR. The new study was carried out between February and July 2013 and is discussed in this paper.

The tension created between exploiting existing processes to return short term, low risk benefits versus exploring new ideas that return long term benefits, but at higher risks has to be balanced for an organization to survive (March 1991). Choosing an optimal strategy to balance exploration versus exploitation is a complex problem (Debenham & Wilkinson 2006) that has been characterized as a wicked problem by Camillus (2008). It is possible to frame partial, provisional strategies to address wicked problems, but each wicked problem is in some way unique and strategies must be suited to its particular circumstances (Head & Alford 2013). Camillus asserts that "it's the social complexity of wicked problems as much as their technical difficulties that make them tough to manage" (2008, p. 100), indeed, he opined that the task of tackling wicked problems is itself a wicked problem (2008). A problem's wickedness not only places greater emphasis on collaborations in bringing together a diverse range of knowledge disciplines to meet the escalating challenge of devising solution strategies, but also, adds complexity to the task of managing the collaboration through the need to recognize and adapt to social conflict. We adopted a learning by doing approach (Batie 2008) to design and validate facilitation strategies.

Design thinking (Martin 2009) provided guidance for studying four selected LAR process implementations. In his book, Martin (2009, p. 8), depicts the refinement process as a funnel. Ideas at the top of the funnel move from a mystery (excites our curiosity and requires expert investigation), to a heuristic (a process that needs expert intervention to succeed) and finally to an algorithm (that delivers repetitive, reliable outcomes) (See Figure 1). The highly scalable algorithm is performed without expert intervention. An organization, such as LAR, by focusing on algorithmic processes, refines all aspects of their organization, infrastructure and related processes to minimize operational costs and ensure reliable, repeatable and predictable outcomes. We found that this refinement process created a capability gap in LAR between what is required to perform the algorithmic processes and that required to move new ideas through Martin's funnel. This gap was studied in the context of the four selected processes, to understand how it forms and devise facilitation processes to mitigate its impact.

The investigation and findings outlined in the following sections provide an adaptable process for deciding when and how to facilitate the introduction of new ideas. The methodology enables a repeatable, transparent and auditable process for evaluating and if necessary refining ideas before they create adverse impacts in their implementation. Our work not only has pragmatic business outcomes to enable adaptation to changing markets; but also provides a rigorous, theory informed structure suitable for use by innovation and knowledge researchers. The remainder of this paper is structured as follows: a literature review covers knowledge processes, collaborations; and facilitations as boundary processes. The research design and a description of the case study experiences follow. Finally, findings and discussion lead into our conclusion and recommendations.

LITERATURE REVIEW

The literature review surveys existing publications in: oorganisational knowledge processes; collaborations in organisations; and facilitation of collaborations. Figure 1 summarizes how the concepts relate to each other.

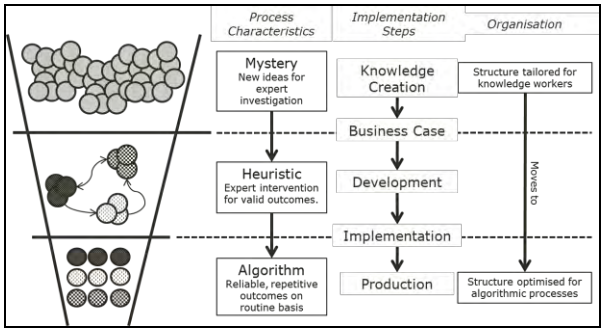

Figure 1 Knowledge Funnel based on Martin (2009, P7 Fig 1-1)

Organisational Knowledge Processes

Organisations create knowledge by tackling problems and learning from experience. Boisot and MacMillan (2007) "conceive of knowledge as comprising a set of beliefs which inform decisions by agents to take actions" (p. 50). They use Plato's definition of knowledge as justified true belief. The definition contains three conditions, namely "a truth condition, a justification condition and a belief condition" (p. 52). In the Mystery level of the knowledge funnel (see Figure 1) knowledge has a high degree of uncertainty because these constraints have yet to be applied. To move down the knowledge funnel, constraints must be applied to transition knowledge to a state of certainty sufficient to support the implementation steps. This refinement process is described by organisational knowledge creation (OKC) theory originally developed by Nonaka (1991). In his theory, knowledge creation begins with the individual creating tacit knowledge (Polanyi 1966). Nonaka (1994) formalised a four step refinement process he called SECI: socialisation - "from tacit knowledge to tacit

knowledge"; externalisation – "from explicit knowledge to explicit knowledge"; combination – "from tacit knowledge to explicit knowledge"; and finally internalisation – "from explicit knowledge to tacit knowledge." (pp. 18-9). Mobilising knowledge is "through a dynamic 'entangling' of the different modes of knowledge conversion in a process which will be referred to as a "spiral" model of knowledge creation" (p. 20). This is a dynamic synthesizing process where the mix of tacit and explicit knowledge forms a continuum manipulated through dialectical thinking (Nonaka, Toyama & Hirata 2008). It is these dialectical interactions between participants that results in the emergence of new organisational knowledge.

Collaborations in Organisations

Living Systems Theory (LST) (Miller 1978) is a framework that unambiguously describes the collaboration's organisational context. In its final form, LST is a hierarchy of 8 open living concrete systems, each of which has the same 20 subsystems (Miller & Miller 1995, p. 27 Fig.1). The left of Figure 5 shows the position of organisation, group and participant (organism) system levels in the LST hierarchy. A subsystem is defined as performing a particular purpose (Miller 1978, p. 18). We are concerned with the decider subsystem, which coordinates and controls all other subsystems. The decider provides a way of distinguishing the LST levels in this study: organizations "always have at least two echelons in their deciders" (Miller 1978, p. 595); group "deciders have no formally designated echelons" (p. 595); and the community's decider is disbursed (Miller & Miller 1982, pp. 304-5). Finally, a human participant's decider is their "cerebral cortex" (Miller 1978, p. 1029). We treat a collaboration of knowledge workers as a LST group. We considered alternative models including the Viable System Model (VSM) Theory. VSM was formulated by Beer to explain "how systems are viable, that is, capable of independent existence." (1984, p. 7). It is a recursive model of 5 subsystems that interact through the performance of rules within an organism or organisation. We decided against VSM because it fails to deal explicitly with the behaviour and motivation of people (Merali & Allen 2011).

We adopt the definition of a collaboration as a dynamic, purposeful, human co-operative process "characterised by the communication relations binding its participants to each other and with the actions they are performing" (De Michelis 2001 p. 126). This definition determines the collaboration's dimensions (See Figure 2). The dimensions allow us to devise perspectives (Hawryszkiewycz 2010b) that act as a lens to focus on particular aspects of the collaboration. The dimensions are interdependent, and the derived perspectives and measures display path dependence (Page 2006). Multiple perspectives can be used to provide a degree of "triangulation" (Runeson & Höst 2009, p. 136) that increases the research's precision. These dimensions and perspectives provide a basis to establish the state of the collaboration in relation to the expectations imposed on the collaboration by the organisation. We call the state of the collaboration its "Collaborative Wellness (CW)". In the past, CW referred to collaborations of health practitioners that delivered wellness outcomes (Carney 2007). We generalise CW to encompass both outcomes and the processes that deliver those outcomes.

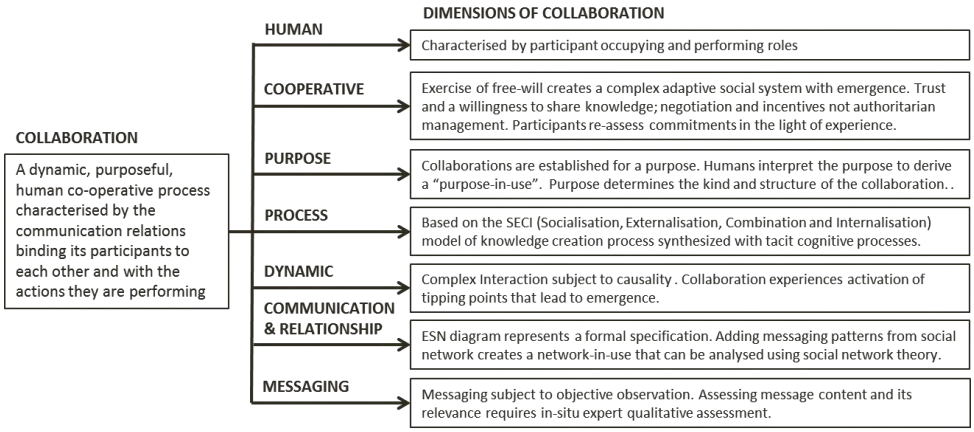

Figure 2 The Dimensions of a collaboration based on De Michelis (2001 p. 126)

We are concerned with collaborations of "knowledge workers", a term coined in 1960 by Drucker (1994, pp. 5-6). Knowledge workers "bring their expertise to develop products and services. They require flexible work environments to come up with ideas, evaluate them and put them into practice" (Hawryszkiewycz 2010a, p. 8). Drucker opined that "knowledge workers are not 'subordinates' but 'associates'." (2001, p. 78). These characteristics manifest themselves as a requirement for autonomy; attaching importance to commitment; and a reluctance to share knowledge (Davenport 2005). Knowledge workers collaborate by occupying one or more roles and interact through these roles. A role is "a responsibility within a business model" (Hawryszkiewycz 2010a, p. 335) and the "Extended Social Network (ESN)" (p. 49 Fig. 3.3) nomenclature is used by designers to define their interpretation of the necessary roles required to fulfil the collaboration's purpose (see Figure 3).

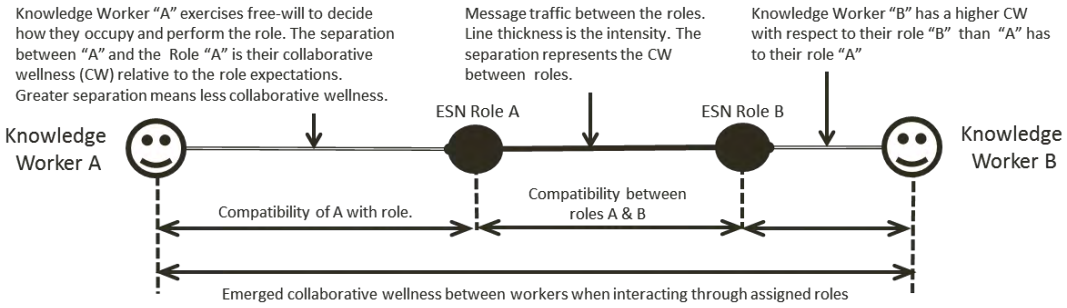

Figure 3 Collaborative Wellness in Role Interactions. Based on Hawryszkiewycz (2010a).

The building block of the research framework is the participant exercising free-will judgement to occupy a role and decide how to perform the role to meet the expectations of the collaboration's purpose. CW measures can be applied to assessing how participants perform their roles and the result can be illustrated in an interpretation of the ESN diagram as shown in Figure 3. The LST framework allows the generalisation of the role construct to consider an entity, such as a group, to occupy one or more roles. Interactions are assumed to pass through roles.

Facilitation

The case study design was based on an appointment of a consultant to LAR to recommend how and when to facilitate the introduction of new ideas. The context of the consultant is depicted in Figure 4. A framework of three leadership strata is shown to manage organisational knowledge creation collaborations (Von Krogh, Nonaka & Rechsteiner 2012, p. 258 Fig. 1). The framework directly maps to the LST hierarchy. The structural and conditional layers form the multi-echelon decider of the organisation and the teams are LST groups.

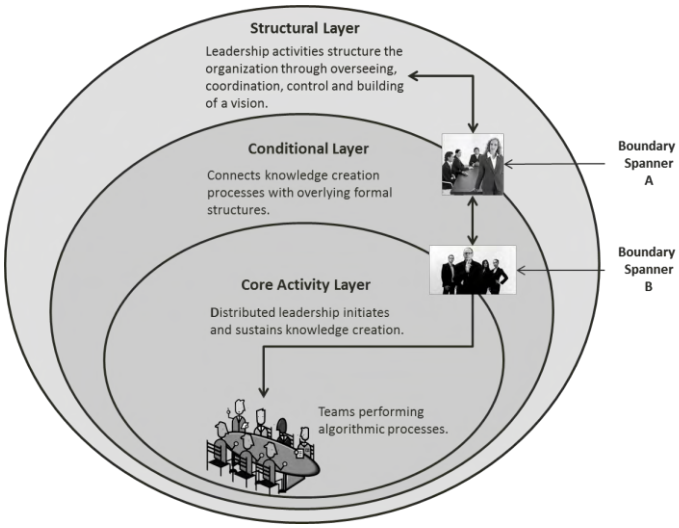

Figure 4 Facilitation Model based on Von Krogh et al (2012).

The researcher as the appointed consultant is located as Boundary Spanner B. He reports to one or more managers in Boundary Spanner A that in turn, reports to LAR leadership. The researcher creates associations with participants in teams performing algorithmic processes: to study in-situ processes and communications (Williams 2011, p28 Fig. 1); examine social interactions (Hawkins & Rezazade 2012); and understand the artefacts used in and produced by the processes in the core activity layer (Yuan & Sutanto 2012). The effect of the boundary spanner is that of a broker across structural holes (Burt 2004) in LAR's social network.

Actor Network Theory (ANT) has been applied, in conjunction with other approaches, to understanding complex organisational change programs (Pollack, Costello & Sankaran 2013) and is appropriate for understanding the dynamic associations formed by our boundary spanner investigating the introduction of new ideas. ANT emphasizes "the importance of exploring how a given state of affairs has come to be, or is coming to be" (Korsgaard 2011) and is a "trail of associations between heterogeneous elements" (Latour 2005, p. 05) that renders "the social network as flat as possible in order to ensure that the establishment of any new link is clearly visible" (p. 16). ANT is not a theory but a kind of "ontology" (Latour 1999, p. 19) that in our research informs a methodology for examining collaborations. We regard ANT as a set of tools that can be matched with our LST framework to provide detailed insights into messaging and associations. ANT has tools for "critiquing and

sometimes reconciling other theoretical explanations of particular situations" (Underwood & McCabe 2012, p. 85) which adds additional advantages to employing it in our research.

An actor, in ANT, is any "thing that does modify a state of affairs by making a difference" (Latour 2005, p. 71). Latour advises that to detect an actor, one should ask the question "does it make a difference in the course of some other agent's action or not?" (p. 71). Actors are divided into intermediaries and mediators. An intermediary "is what transports meaning or force without transformation… a black box… or counting for one even if it is internally made of many parts" (p. 39). On the other hand, a mediator's input "is never a good predictor of their output; their specificity has to be taken into account every time. Mediators transform, translate, distort, and modify the meaning or the elements they are supposed to carry" (p. 39).

During implementation, participants join the collaboration's ANT network and become actors through the four steps of translation: problematisation, intéressement, enrolment and mobilization (Callon 2007). However, in our case study, participants were assigned by LAR to our collaboration while still performing their other business roles. Our task was to determine the associations relevant to the research. Latour (1992)'s notion of scripts and inscription suggests a method for distinguishing between associations in an ANT network. A script describes actions performed by or to be performed an actor. An example of a script is "close the door after exiting the room". An association is created between two actors when one actor's script is translated into something that another actor will understand and be willing and able to implement (Underwood & McCabe 2012). When an association is created, a message containing the script is passed between the actors. Our ANT network is conceptualised not by following "the actors themselves" (Latour 2005, p. 12) but rather following "the scripts, looking in detail at how they are translated" and "looking in detail at conversations, emails, manuals and other types of text." (Underwood & McCabe 2012, p. 88).

In our research, we are concerned with the complex emergence of knowledge. LST is a multi-level model that supports emergence (Bailey 2005). Although ANT supports studying fine grained micro-level dynamics (Underwood & McCabe 2012), it has limited capacity to link micro-level dynamics with emergence at the macro-level (Merali 2006). We opine that linking ANT actors and LST systems overcomes this issue (Figure 5).

RESEARCH APPROACH

Our research vision is to find out why implementing new processes into well-established organizations has proven to be problematical? Two questions arise from this vision. Firstly, how do we identify new idea implementations that need facilitation and secondly, how can these implementations be facilitated? To address the research questions we decided to start with a network analysis of knowledge flows within the organisation. The approach is composed of three stages as follows:

Stage1: Towards a research framework

Our design of the research framework is based on the literature review and a novel synthesis of Actor Network Theory (ANT) with Miller's Living Systems Theory (LST) by considering systems at each LST level to be actors in an ANT diagram. Figure 5 shows ANT networks for the LST participant, group and organisation levels. Actors in the ANT network are "punctualized" (Law 1992, p. 385). In explanation, refer to the figure. Organisation B is an ANT network of three groups 1, 2 and 3. In turn, group 2 is also an ANT network of associations between three human knowledge workers a, b and c. Each actor corresponds to a concrete system in the LST hierarchy. In this way, participants occupying roles in an ESN diagrams are also actors in an associated ANT network. In our research, the ESN diagram is a representation of the expectations of the organisation for the collaboration; whereas the ANT network represents the dynamic associations of the collaboration, that is, its state of affairs (Latour 2005). Comparing the ESN diagram to the ANT diagram allows us to deduce the collaborative wellness either as a whole or for each dimension of the collaboration (see Figure 2).

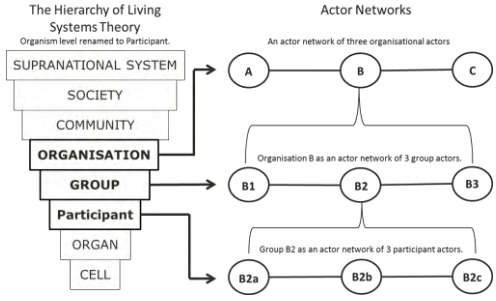

Figure 5. The Research Framework. Based on Miller (1978) and Latour (2005).

The adaptable research framework is configured and deployed using the methodology of "Design Science Research" (DSR) (Gill & Hevner 2011). DSR ensures consistency; transparency; and reliable replication of facilitation strategies. DSR treats the deployment process as a series of layered iterative activities. Consider the choice and deployment of a facilitation strategy. The top level of the three tier DSR hierarchy is called the "design space" (pp. 238,9 Fig. 1) and contains all of possible facilitation strategies. The middle tier is the "Design Artefact Layer" (p. 238) and contains the selected strategy synthesised with appropriate dimensions (Figure 6) and measures. Once configured, the strategy is deployed to the "Use Artefacts Layer" (p. 238) and this last layer represents the application of the facilitation strategy to the collaboration.

Stage2: Approach to Organizations

The case study, being based on a consulting engagement, is required to deliver a benefit to the host; minimise disruption of business activities; and conform to the organisation's culture. The study was therefore limited to an elapsed period of 16 weeks. Ideally the number of direct participants in the study would be between 5 and 15, including the researcher. The researcher was a "participant-observer" (Silverman 2010, p. 29). It was accepted that although his presence would introduce bias and create unforseen feedback, it was necessary in order to deduce the nature of participant interactions. The approach is summarised in Figure 6.

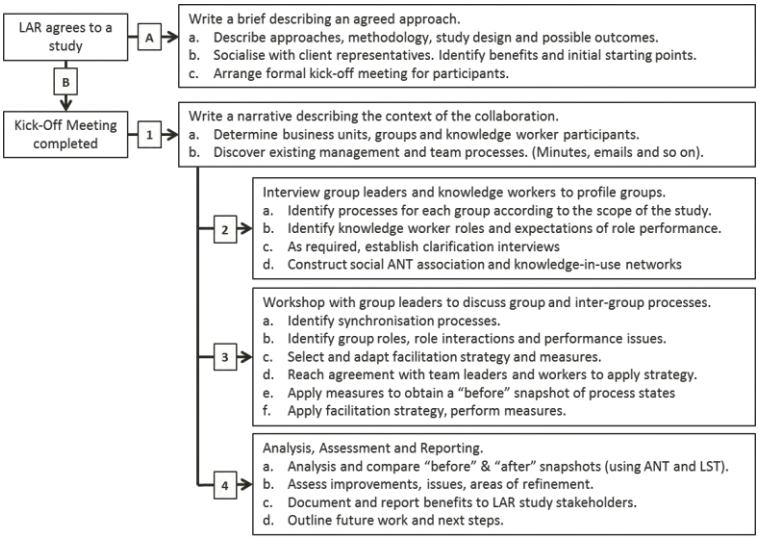

Figure 6 Approach to Organisation

Stage3: Data Collection and Analysis

CW measures were devised for each of the collaborative dimensions summarised in Figure 2. The CW measures estimate the gap between the current and future desired states of a collaborative dimension. The desired state is determined by an interpretation of the collaboration's purpose as represented by the designers' ESN diagram. CW measures are qualitative and use a comparative scale with between 5 and 9 categories appropriate to the measure (Peterson 2000). Where necessary, scales are adapted to each case study. Measures are constructed such that the lower the value of the measure, the closer is the current state to the desired state and therefore the higher the CW. Figure 7 shows the process flow of the analysis. The key feature of the design is that data gathering and parsing (sense making), wherever possible, is a repetitive non-discriminatory activity reflecting the symmetries and precepts of ANT (Latour 2005). It is only at step 6 in Figure 7 that data is abstracted into the ANT networks and dimensional measures applied. This technique allows for the application of data triangulation techniques and if necessary, the reworking of the analysis based on all the raw data collected during the on-site phase.

Measures in the communication and relationship dimensions require parsing of message content (i.e. scripts). Parsing of messages, particular verbal, to identify informative and useful content relies upon an in-situ observer with expertise in the subject matter of the message. Before parsing can take place, the message needs to be validated. Message validation is a three step process: firstly, verifying message receipt; secondly, confirming that the receiver derived meaning from the message; and lastly, assessing the fidelity of the receiver's understanding against the sender's intended meaning. Once validated, the "informativeness and usefulness" (Davenport & Prusak 1998, p. 4) of the message's meaning is determined relative to the purpose of the collaboration. The more useful and informative the message, the more certain is its content. In the case studies knowledge workers were co-located. Interviews and conversations were face-to-face. If the collaboration was

disbursed and mediated by technology, then "Media Naturalness Theory" (Yuan & Sutanto 2012, p. 145) would be applied to consider how the appropriateness of technology choices affects the collaborative wellness.

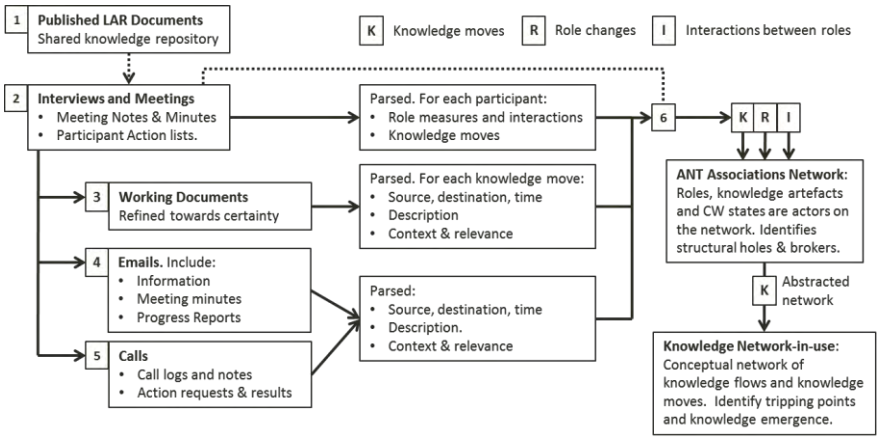

Figure 7 Process flow of Analysis

The parsing process is similar to techniques used in linkography to identify the "design moves" (Goldschmidt 1990, p. 292). Goldschmidt (1995) extended linkography and its parsing process to the group level. Our framework extends linkography's parsing to all collaborative message interactions irrespective of media format and times between communications. The design moves in linkography become knowledge moves and their links trace the development of ideas during the collaboration. These links form an enhancement of Merali's concept of the "information content of the network-in-use" (2006, p. 218) which we call the knowledge-in-use network.

CASE STUDIES

A qualitative methodology was used throughout the case studies. Two case studies were conducted at LAR, the 2012 study emulated an external consultant engaged with the purpose of devising cost extraction ideas and quantifying potential savings to business case standards for implementation in LAR's Logistics business unit. Participants were drawn from managerial positions in distribution centres, transport, logistics, operations' support and information systems. Additional subject experts were called in for clarification on a needs basis.

Table 1 LAR 2013 Idea Implementations

Idea	Problem Summary	Research Perspective.
Reclaimed Stock Distribution	Current manual process for managing reclaimed stock from damaged cartons does not provide traceability.	An example of a business-as-usual approach to implementing a new process in the logistics system by Technical Services.
Vendor pack resizing.	If inbound product process is not followed correctly, it is possible to change the number of units per package even though inventory of the old stock still exists.	The solution was an example of innovation by Technical Services in restating the problem so that it could be addressed by existing processes.
Mixed vendor storage	Spare capacity in warehouse to be shared with vendors to reduce costs and inventory value.	Implementation was cancelled after 6 months. Could facilitation prevent this outcome?
Transport fuel reduction idea.	Follow-up to the 2012 case study to validate a cost extraction idea on using low rolling resistance tyres.	Provided a perspective to study the interaction of LAR and its vendors.

At the completion of the 2012 study in LAR, support was given to a new study to not only find out why implementing new processes was difficult, but also recommend when and how to facilitate the introduction of new processes into LAR. This new study was carried out between February and June 2013. The study involved seven senior managers and three subject matter experts in the investigation of four idea implementations (see Table 1) selected in mid-February 2013. Figure 7 summarises the methodology followed for each idea.

RESULTS

Our initial analysis was based on a consideration of the CW measures. This analysis lacked the precision necessary for us to characterise the root causes of issues and make recommendations. We revisited the messaging data and the derived knowledge moves and found patterns visible in the raw messaging were lost in the subsequent analysis. Our novel solution was to synthesize Actor Network Theory (ANT) with its fine grained view of associations with LST's structural framework. The ANT networks revealed the structural holes in the social and derived knowledge-in-use networks. Messaging frequency and concentration of associations were used to identify resources with high utilisation. Encouraged by these results, we redesigned our research approach in 2013 and formalised the use of ANT networks. Results showed capability gaps between those required for performing existing algorithmic processes and the capabilities required to adapt to the introduction of new ideas and achieve the promised benefits. If the gaps are large, the risk of the new idea failing to deliver its

promised benefits is high. If the gap is small, the team could adapt to the new idea with minimal disruption to existing processes. Table 2 details the issues that we found contributed to the capability gaps.

Table 2 Factors contributing to capability gaps.

Finding	Discussion
Structural Holes in Social Networks	LAR structures and processes have been optimised to ensure efficient performance of algorithmic processes. Managers had depth of knowledge and extensive experience in their fields; and shared long term working relationships with their staff. A close-knit social network existed within teams that effective in helping resolution of production issues. This social network, while effective in local issues, imposes limits on the team's capability to deal with changes associated with implementing complex new processes and ideas outside of team experiences. Interviews showed that searching in LAR for experts with the time and willingness to answer questions was time consuming and impacted implementation of new ideas.
Knowledge Access	LAR teams support complex, specialised business processes and systems. There is reliance on tacit knowledge that is held by knowledge workers and subject to their willingness to share. Tacit knowledge is in-situ and difficult to access without being an active member of the team's social network. Failure to accurately assess a team's knowledge-in-use inhibits planning for training and introduction of knowledge management systems; and creates a risk to achieving the new idea's promised benefits.
High Utilisation of Key Staff	The capacity issue for a new process implementation depends on whether it is an additional process, an extension to an existing process or a replacement of an existing processes. Extending or adding processes places tensions on staff with high utilisations and may impact the performance of existing processes and negate benefits associated with the new process. It is recommended that the new idea implementation can only be carried out if existing processes can be improved; or the new process be merged into existing processes; or existing processes be rationalised across teams. This requires a negotiated implementation to ensure acceptance by the team of the changes and difficulties associated with transition to the new process.

CONCLUSIONS AND RECOMMENDATIONS

We addressed two research questions: firstly, how do we identify new idea implementations that need facilitation; and secondly, how do we facilitate the implementations? These are timely and important questions because prior scientific research shows that to survive organisations must balance exploitation of existing processes against exploration and implementation of new ideas.

Recommendations for identifying implementations that need facilitation.

Table 3 Criteria to Identify Implementations for facilitation

Criteria	Discussion and Guidance
Does the process cross boundaries?	Boundaries exist between teams, business units and organisations. Boundaries can also exist within a team where people perform different specialised tasks. A process that spans boundaries needs co-ordination. Quite often, this co-ordination needs to be negotiated and modified to cater for special situations. Complex co-ordination requirements require test runs and tracking of test transactions. The facilitation would implement the co-ordination and then monitor/assist/correct for a period of time to ensure successful implementation.
How novel is the process?	Novel processes are new, original, or unusual in the context of the organisation in which they are being implemented. In practice, novelty is a subjective judgement and a perception of novelty widens the capability gap. In this situation, the facilitation group has to negotiate the acceptance of the new process and assist in its adoption. Novelty could be assessed by comparing the existing processes to the characteristics ascribed to the new process. The differences inform a decision on the novelty of the new process.
Does the team have capacity to meet new process requirements?	The capacity issue for a new process implementation depends on whether it is an additional process, an extension to an existing process or a replacement of an existing processes. Extending or adding processes places tensions on staff with high utilisations and may impact the performance of existing processes and negate benefits associated with the new process. It is recommended that the new idea implementation can only be carried out if existing processes can be improved; or the new process be merged into existing processes; or existing processes be rationalised across teams. This requires a negotiated implementation to ensure acceptance by the team of the changes and difficulties associated with the transition to the new process.
How well could the team adapt to the new process?	Our approach to this complex question is to consider how the team performs their currently assigned processes. If the team has a practice of resolving problems and is active in process improvement through collaboration and idea sharing, then it is in a better position to adapt and accept the implementation of new process without external facilitation.

The only way to confidently decide if a new idea requires a facilitated implementation is to carry out a full impact analysis to assess the capability gaps discussed in the results section. Experience shows that to be cost effective, the impact analysis has to be appropriate for the nature of the idea and its potential benefits in the context of the organisation. Consequently, we recommended a staged approach to the impact analysis. Firstly, undertake a brief appraisal of the idea to estimate the capability gap. This is followed by a decision to either undertake a more extensive impact analysis or implement with or without facilitation. Outcomes from a staged approach will improve as designers learn from their experiences. Table 3 summarises the criteria for facilitation.

Recommendation on how to facilitate a new idea implementation.

We recommended that a small ad-hoc facilitation group be hosted within LAR's technical services (TS) business unit. Based on our review of the 2012 case study and interviews associated with two of the four ideas studied in 2013, we found TS already practices a technical facilitation role in assessing ideas, constructing and presenting business cases, gathering requirements, building or enhancing systems and working with business clients to implement IT solutions. Our recommendation would extend TS capabilities. Once an idea had been selected for a facilitated implementation, the facilitation group's convenor informed by the impact analysis, would select and assign roles to participants using the established LAR temporary re-assignment process. The deployed facilitation group occupies the Boundary spanner B position in Figure 4 and reports directly to the idea's sponsors. The group takes ownership of the process: assessing the feasibility of implementing the idea; and with the appropriate authority, assuming responsibility for its implementation. We assessed the mixed vendor storage idea (see Table 1) for facilitation. Although technically feasible, it would require a change in basic warehouse

operations across LAR and a re-alignment of external vendor commercial arrangements. We concluded that the idea would need reframing before it could be considered for implementation. Our interviews and documentation review showed the impact analysis would have been time consuming, complex and expensive. It would not guarantee to identify all of the risks. This lent weight to our recommendation for staged impact analyses with go/no go decision points to ensure issues were identified and acted on quickly.

Improved access to knowledge is a key requirement for successful facilitation activities. Codified knowledge, in the form of process manuals, guides, and so on is readily available through the LAR networks. During interviews, we observed managers routinely accessing on-line knowledge repositories. However, there is a reliance on tacit knowledge in LAR. Accessing tacit knowledge requires knowing whom to contact. We recommended devising a roadmap, that is, an ontology for identifying relationships between processes, sources and consumers of knowledge in the LAR business context. We also recommended a pragmatic approach to implementation by developing a simple framework and then focus on small ontologies that serve a specific need and deliver benefits within small timeframes. New ontologies can be merged in the framework to broaden the depth, scope and use of the enhanced system. Each time a facilitation is carried out; new information would be combined into a small ontology, validated and then merged in the master ontology system.

Limitations and Future Research

The time constraints of the study and the specialised nature of LAR's business units mean that our recommendations and conclusions need careful validation before application to other business contexts. However, we are confident that the research is applicable to retail and wholesale distribution systems covering both physical and information products. Further validation case studies are planned for government agencies delivering information to their clients. The confined studies in LAR generated a significant analysis load by virtue of the requirement for expert parsing of the messages and derivation of knowledge moves. We propose to research computer mediation for parsing and characterising associations. Computational modelling could support mediation and aid testing and validating scenarios that cannot be performed with human actors.

Research Contribution

The synthesis of ANT with LST adds new directions by virtue of marrying LST's support for complexity science concepts with ANT's ability to support fine gain dynamic associations between heterogamous actors. Our work not only has pragmatic business outcomes to enable adaptation to changing markets; but also provides a rigorous, theory informed structure suitable for use by innovation and knowledge researchers.

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