Business Processes in the Agile Organisation: A Socio-Technical Perspective

Keywords: Socio-technical Systems, Organisational Agility, Business Process, Technology Affordance

Abstract: This paper takes a cross-disciplinary view of the ontology of "business process": how the concept is treated in the IS research literature and how related concepts (with stronger human behavioural orientation) from organisation and management sciences can potentially inform this IS perspective. In particular, is there room for socio-technical concepts such as technology affordance, derived from the constructivist tradition, in improving our understanding of operational business processes, particularly human-centric business processes? The paper presents a theoretical framework for understanding the role of business processes in organisational agility that distinguishes between the process-as-designed and the process-as-practiced. How this practice aspect of business processes also leads to the improvisation of various information technology enablers, is explored using a socio-technical lens. The posited theoretical framework is illustrated and validated with data drawn from an interpretive empirical case study of a large IT services company. The research suggests that processes within the organisation evolve both by top-down design and by the bottom-up routinization of practice and that the tension between these is driven by the need for flexibility.

Introduction

Organisations, as the subject matter of research, have been approached from a number of perspectives ranging across organisation science, management science and information systems (IS) disciplines. Over time and with the advance of technology, it could be said the research agendas across these disciplines have been brought closer together as understanding the role of technology in the modern organisation assumes a greater importance and focus. Each discipline, however, brings with it its own philosophical position, ontologies and epistemologies, which have given rise to a wide variety of conceptualisations of the organisation and of organisational building blocks, such as "business process". Notwithstanding this, we believe, there are benefits to taking a cross-disciplinary approach to synthesising new and useful conceptualisations. This is the primary focus of this paper, specifically in relation to the idea of business process and its role as a conceptual organisational building block.

An overarching motive for the converging research agendas mentioned is technology's role in the *agility* of the organisation. In the modern, dynamic business environment much is made of the need for organisational agility and the role technology (and in particular IT) plays as a contributor to this attribute [e.g. 1, 2, 3]. However, modern organisations are also faced with an ever burgeoning IT applications portfolio, both in size and complexity [4]. This intrinsically creates problems for organisational agility as

there is an increasing need to respond to environmental change and at the same time redeploy (or deploy new) IT functionality from the existing complex IT applications portfolio. In doing this, organisations are faced with not only technical challenges involving application architecture, but also socio-technical issues that go to the heart of how technology is used operationally in business processes to deliver the new or changed capability. How easy or otherwise it is for the organisation to make changes across these "layers" is a significant research problem.

As Tallon puts it: "The critical alignment lesson for companies is this: Increased strategic alignment will improve IT's value to the business, but only if the company is wired flexibly enough to react to sudden business change" [5 p.2].

So the question we ask is how we can better understand this "*organisational wiring*" and what are the contingencies that determine the ability of the organisation to adapt to business change. In looking at this overall research problem, we identify these sub-problems:

- Recognising that organisations are as much cultural as mechanistic phenomena [6], how do we accommodate the "soft" and "hard" aspects of the organisation into a consistent model of organisational wiring?
- In particular, how should we conceptualise organisational building blocks such as "business process" given that when dealing with human-centric processes, what is *practiced* is not necessarily the same as the what is *designed* [7]?
- How can we inform or augment the traditional, somewhat mechanistic, IS view of business processes with allied concepts from other disciplines, such as organisational capabilities [8, 9], organisational routines [10] or technology affordances [2] and imbrications [11] that have a stronger human-behavioural orientation?
- What are the implications for business process design?

These questions reflect the motivation of our research into understanding the role of business processes (and the IT enablement thereof) in organisational agility.

This paper represents an extension of our presentation at BPMDS 2014 [12]. In that paper, we developed a new the theoretical model that places an emphasis on the distinction between the process-as-designed and the process-as-practiced. Applying a socio-technical lens, we posited how this practice aspect of business processes also leads to the improvisation of various information technology enablers. In arriving at our new conceptual model, we found some of the organisational terms such as capabilities, routines and affordances mentioned above as useful conceptualisations. The concepts of routines and affordances, in particular, highlight the human dimension as being integral to understanding the as-designed versus the as-used dichotomy, which has a bearing on business process design considerations.

In the current paper, we extend this theoretical work by adding a significant empirical case study to illustrate and validate the conceptual model. Our research suggests that processes within the organisation evolve both by top-down design and by the bottom-

up routinization of practice and that the tension between these is driven by the need for flexibility.

The remainder of the paper is in two main parts. Firstly, we re-state the theoretical work covered in the original paper. In this we examine how organisational concepts, such as "organisational capability", "organisational routine", "technology affordance", can inform the ontology of business process. We introduce a new conceptual model that seeks to align these concepts, and outline the new model's implications for business process design. In the second part, we present a detailed empirical case study (a large IT services company) to illustrate our conceptual model and to validate some of the theoretical constructs in our developing framework, using empirical data.

Background Literature

Philosophical Traditions

One can recognize two underlying philosophical positions at play in organisational and IS research [13]. It is important to understand the influence these have had on how the "organisation" is conceived. On the one hand we have the *realist* world of objective reality where the researcher is free to observe measure and develop testable theories about "real world" entities and their causal relationships. This is the realm of the deterministic physical and natural sciences that is largely responsible for modern scientific thought since The Enlightenment. In this paradigm, the organisation is conceived as an objective entity in which we can identify clearly delineated components such as resources, processes, humans and technologies. We can characterise relationships between them of the form "under condition A, B causes C" that can then inform our theories of how organisations work in a deterministic sense. The epistemology associated with the realist tradition is strong empiricism (positivism) in which objective phenomena are observed, measured and analysed [14].

The alternate *constructivist* paradigm, one that has developed in the social sciences, holds that the world, as observed by humans (including the researchers themselves), is a social construction such that any true "objective" reality cannot directly be perceived. In this world view, the organisation is conceived in terms of complex, messy social interactions in which causality in the scientific sense is difficult to determine [13]. Each person's perception of the world is coloured through the lens of the meanings they ascribe to it. The epistemology here is interpretivist, and researchers in this field attempt to interpret these "meanings" typically through rich and complex case study information [15].

Notwithstanding these ontological and epistemological differences, *both* the physical and social sciences are relevant in the IS discipline. In most if not all cases, the "information system" in question comprises human behaviour intersecting with material world entities such as technology.

Recent work [15, 16] has shown that the dichotomy could be bridged in some sense by the "critical realist" perspective, which admits a stronger form of causality into the interpretivist fold. Others have pointed to complexity theory as a unifying mechanism [13].

Gregor [17] argues that, in developing IS theory (be it descriptive, explanatory or predictive) the choice of underlying epistemology is not important per se. In other words valid IS theory can be built with any of those mentioned. We therefore remove ourselves from any further philosophical discussion by reiterating this view: that the theory itself once developed has a validity that is independent of the philosophical tradition under which it was developed. This means we do not have to particularly embrace a positivist or interpretivist position to leverage the theoretical organisational work that will be further discussed in the following section.

Organisational Building Blocks

Besides the ontological debate, there are some more prosaic issues that confront the prospective cross-disciplinary organisational scholar. One of these is the characterisation of the organisational building blocks themselves. Over time some "generally understood" common definitions have emerged that have allowed strands of research to cross-fertilise and propagate. Similarly, however, inconsistency and confusion have also arisen in some of the concepts and terminology. Dosi et al. express it colourfully when referring to one of these: "The term 'capabilities' floats in the literature like an iceberg in a foggy Arctic sea, one iceberg among many, not easily recognized as different from several icebergs nearby" [18 p.3]. This could equally apply to the term "routine". In fact capability and routine are the terms most frequently used in organisation science to describe what it is the organisation does and how it does it, including how it uses IT. The ontology of these building blocks in particular and their relationship to the more familiar IS term, business process, is the subject of the discussion that follows. In this discussion we navigate the "icebergs" by representing well established perspectives and noting controversy where it exists.

Organisational Routines

Feldman and Pentland define an organisational routine as "a repetitive, recognizable pattern of interdependent actions, involving multiple actors" [7 p.95]. Those not familiar with the term would immediately notice the similarity with how we generally understand "business process". Before positioning the routine against the business process, however, we look at a particular aspect that has been studied in the context of routines: *human agency*.

In organisation science, the ontologies of human and non-human (e.g. material or technological) agency have been argued by scholars. Theoretical developments in this area have variously placed human intentionality at the centre and ignored technology as with structuration theory [19]; regarded the human and technology agencies as an inseparable duality, as with Actor-Network theory [20] or sociomateriality [21]; or

viewed technology as mediating the relationship between the human actor and the "object" of an activity as in Activity Theory [e.g. 22]. A common theme that arises is viewing social and technology elements in *relational* terms where behaviours are emergent from the interaction. This could be summarised as the technology-in-practice viewpoint [23]. This can be contrasted with the more orthodox IS perspective where roles, processes, technologies are characterised as stable, independent entities with simple unidirectional relationships [e.g. 24, 25, 26].

The specificity of the organisational routine to its context, as noted by Becker [27], influences its ability to be replicated and the inertia it generates within the organisation. In their influential work, Pentland and Feldman [7] distinguish the duality of "ostensive" and "performative" facets: the former representing the idealised, codified representation of the routine and the latter the routine-in-use, or what actually happens in practice. The implication here is that the routine may be performed differently each time it is repeated even if the ostensive aspect remains the same. This duality is represented schematically in Figure 1. These authors note that the ostensive routine is *necessarily* an abstraction since it cannot fully specify all the detail required to perform the routine. Hence there is always an interpretative step required to get to the performative.

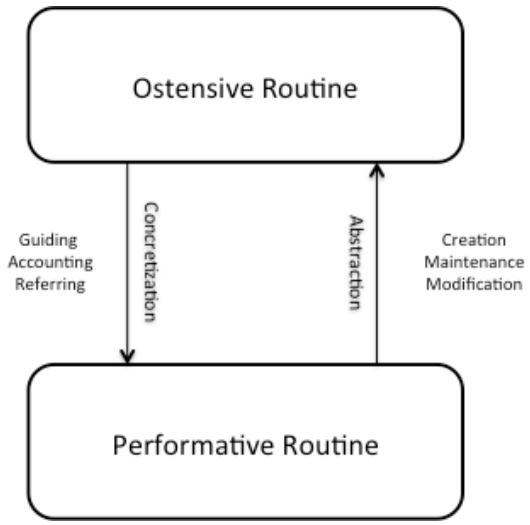

Figure 1 - Ostensive and Performative duality of routines (after Feldman and Pentland 2003)

The idea of the performative routine is taken a step further into the socio-technical realm by the emerging concept of the technology affordance [2, 11, 28, 29]. An affordance represents the perception of what can be done with an item of technology by a user with a particular goal – i.e. the affordance is the *potentiality* for action of a technology feature, not necessarily how the feature was designed. According to Leonardi [11], the flexibility of organisational routines as well as technologies will determine how the affordance will be realised by virtue of the way the human and material agencies become "imbricated" or intertwined. In other words, the affordance (or constraint) posed by an item of technology may prompt a change to either the routine or the technology depending on its flexibility and on what has happened in the past.

Organisational Capabilities

Another well-researched organisational building block is the organisational capability (OC). Winter defines an OC as "a high-level routine (or collection of routines) that together with its implementing input flows, confers upon an organization's management a set of decision options for producing significant outputs of a particular type" [30 p.991]. Dosi et al. [18] distinguish the *capability* from the *routine* on the basis of recognisable purpose. In their scheme, routines are repeatable units of activities, but a capability has a purpose or outcome that it is supposed to enable. Routines are thus the building blocks of capabilities. Schreyogg and Kliesch-Eberl [31] identify several higher order characteristics of OCs, such as representing collective organisational problem solving, combining explicit and tacit knowledge and being repeatable, reliable pattern of action. That these capabilities represent the product of organisational learning, and are what generates the value for the firm seem to be common across these viewpoints.

The capability concept has achieved some traction in the IS realm, notwithstanding that similar definitional difficulties have been recognized [35]. As an example, Capability Driven Development [36] can been seen as a method of decoupling an organisation's "hardwired" business processes and information systems from the variability of the environment by admitting a contextual component. In this model, the organisational capability can be realised by different business processes (and IT systems) depending on context, thus providing flexibility.

Like capability, the term "competency" (or "competence") has been used in a variety of ways both in specific technical and in more general senses. Core competency theory places them at a higher level of abstraction, being those valuable *capabilities* that specifically deliver *customer* benefit [32]. Consistent with this view is Volberda and Lewin [33], who place them at the top of a discrete three level hierarchy (with capabilities and routines occupying the other two levels) in their multi-level view of firm co-evolution. This view suggests that competencies are the "externally facing" view of the firm's capabilities – the ones that are important from a competitive marketplace point of view, whereas the other two are endogenous to the firm. McKelvey [34] uses the term collectively to include resources, capabilities and activities (per Porter's value chain). In the subsequent discussion, we similarly collapse the concept of competency into organisational capability.

A related concept is dynamic capability (DC). The initial definition of a DC was as the "firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" [37 p.516]. Helfat and Winter [9] distinguish DCs from OCs on the basis of the latter being associated with "earning a living" [30] using the current methods and techniques; whereas the DC being about changing the way things are done [38] . This places them at a meta-level, where DCs can modify OCs (e.g. through reconfiguration, as defined above), or in other words, they can change the way the firm earns its living when the environment requires it. This is consistent with Winter's [30] hierarchy of capability types. Interestingly, Trkman [39] characterises the continuous improvement of business processes (contingent on business environmental change) in terms of dynamic capabilities.

Business Process

The business process (BP) concept is firmly entrenched in the IS literature, its use popularised by Hammer and Champy [40]. Weske's definition follows this lineage and is typical of the IS perspective: "A business process consists of a set of activities that are performed in coordination in an organizational and technical environment. These activities jointly realize a business goal. Each business process is enacted by a single organization, but it may interact with business processes performed by other organizations." [41 p.6]. The idea of BP as deterministic, executable entities is central to this conceptualisation and has led to the rise of Business Process Management (BPM) and associated technologies as a popular IS discipline [42].

Attempts have been made to admit other ontological perspectives, such as BP based on complex systems theory [e.g. 43, 44], for example. The importance of *context* when considering the instantiation of a BP has been recognised, both in terms of how it contributes to flexibility [45] and how it can be modelled [46]. There several dimensions that provide context, such as, for example, the circumstances of the organisational environment providing the backdrop for the particular BP instance, or substitution of different participant roles when the process is actually executed. The BP literature is mostly silent, however, on the contextualisation attributable to the human participants in the same manner as we have been discussing for organisational routines, or other words, how the human participants *construct* the business process instance in the act of practising it within a given situation. This last point has motivated the conceptualisation we present in the next section.

Development of Conceptual Model

Conceptualisation of Business Process

In this section we posit a number of extensions to the general concept of business process based on our preceding discussion of organisational building blocks.

We argue the distinction between the ostensive and performative aspects, discussed in relation to organisational routines, also has relevance to how business process should be conceptualised. It suggests that there has been a missing ingredient in the traditional IS orthodoxy when it comes to business processes [e.g. 40, 41, 42]. That is, we cannot treat a business process merely as an artefact that can be deterministically executed. Instead we argue that the non-determinacy of human agency must be factored in at two levels: firstly in the process-as-designed against the process-as-performed, noting that the latter aspect brings the human factors such as motivation, skills, tacit knowledge and experience which intrinsically means the process may not deliver what was "intended". Secondly, the way technology is used (by a human user) in the business process is similarly a function of the *potentiality* of the technology (for action) as perceived by the users, rather than just a set of pre-designed technology features.

For Business Process Management (BPM) systems [42], the ostensive/performative duality raises an issue. The automation of BPM is predicated on the notion of the "executability" of the process model, or in other words, "the model *is* the process" [44]. However, as we have discussed, the ostensive/performative duality implies that no matter how well we define and model the ostensive business process, there will be a performative dimension, one that requires (and delivers) "contextual flexibility", or in other words, flexibility that is bounded by these contextual human agency factors.

Turning to the question of the *purpose* a business process serves within the organisation, or in other words, its alignment to organisational goals and objectives, we find that the concept of organisational capability has a useful role to play. As something that defines what an organisation does to earn its living, organisational capability is a way of linking the business imperatives of the organisation (i.e. which capabilities it needs to deploy) to the work that is actually being done by the organisation (i.e. the routines or business processes). As such, we argue, it is a useful granular business alignment mechanism whereby the goals at the business process level can be aligned to the specific organisational capabilities they are enabling or delivering. This then allows the external competitive pressures being exerted on the organisation's capabilities to be linked to the work being done internally giving us two "fitness landscapes" that have to be balanced: the *fit* of the capabilities to the organisation's environment and the *fit* of the business processes to the capabilities. This follows the characterisation of external (evolutionary) fitness and internal (technical) fitness of capabilities by Helfat et al. [47].

The alignment of business processes to capabilities also offers the potential for reasoning about the role of IT at the organisational capability level and hence its role in any adaptation of that capability, whether exogenously or endogenously induced. This is a key implication for understanding the role of IT in organisational agility.

We represent this idea in Figure 2 below.

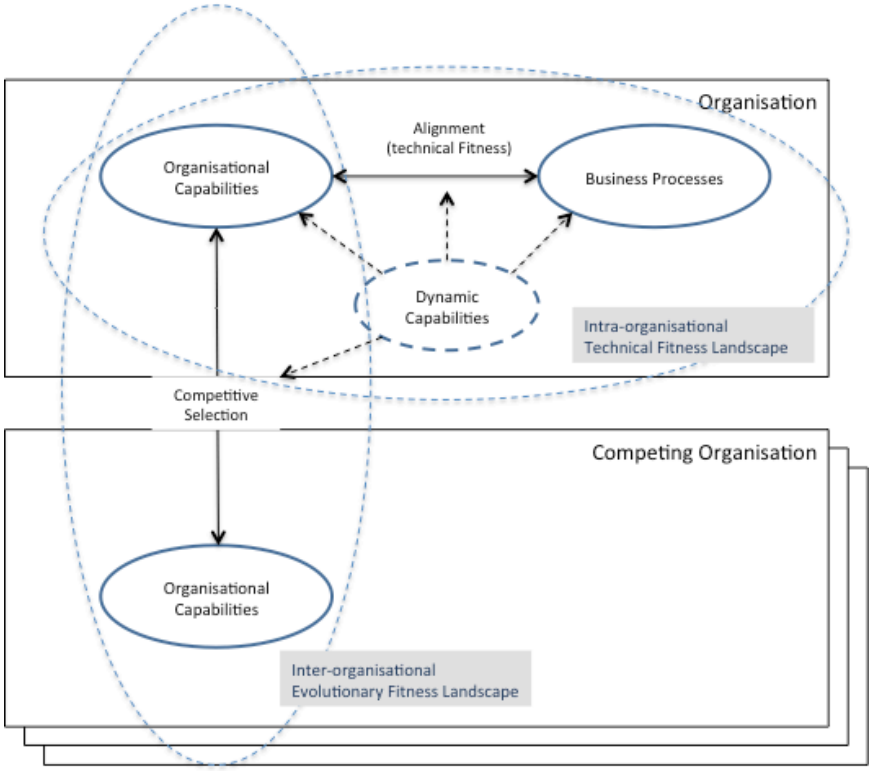

Figure 2 - Relationships between organisational building blocks

For architectural context, the diagram also depicts the dynamic capabilities operating at a meta-level and across the layers in the model. These relationships correspond to the DC capacities of sensing, shaping and seizing opportunities offered by the rapidly changing environments [48] in terms of the "orchestration" of the organisational building blocks. Further treatment of DCs is outside the scope of this paper.

In passing, we note there is a parallel here with the Strategic Alignment Model's (SAM) [26, 49] concept of strategic fit and functional integration, which respectively take external and internal views of organisational alignment. There are however important differences in the two models. The model in Figure 2 is instrincally dynamic, whereas the SAM's concept of "fit" essentially static where any change is intentionally driven (e.g. by management during the course of a strategic planning exercise). A second difference is how idea of strategic alignment is represented. The building block view of the organization taken in Figure 2 shows the "levers" that strategies can operate on rather than strategy itself. Thus strategy settings can operate on these building blocks, e.g. in terms of the value propositions that organisational capabilities present to the marketplace, or the efficiency of business processes. What our model says is that strategies (be they business or IT) need to recognise the connectedness of the two fitness landscapes: that one implicates the other.

Of course, there will be many business processes that exist just to keep the organisational running rather than acting as competitive differentiators. These would include the "commoditised" back-office functions that all organisations possess. Nevertheless, the analysis of process goals and their alignment to organisational capabilities, this model suggests, is worthwhile for any business process.

We contrast this approach with that of Trkman [39], who provides a contingency theory-based approach to understanding the fit between the business processes and the needs of the business environment. This basically says understand your organisation's specific contingencies and align your BPM program to them. We argue that using organisational capabilities as a context provides a clearer, granular way of conceiving of the business' strategic requirements and hence how business processes should be aligned as building blocks of these capabilities.

Conceptual Model

At the core of our theoretical framework, to support our objective of granular reasoning about the role of technology in organisational agility, we are seeking to develop a new conceptual model that provides an integrated view of the preceding constructs. We place our conceptualisation of business process at the centre of this model, which we represent in Figure 3. Our framework's conceptual model builds on the fundamental relationships represented in Figure 2. The numbered labels on the diagram are explained below.

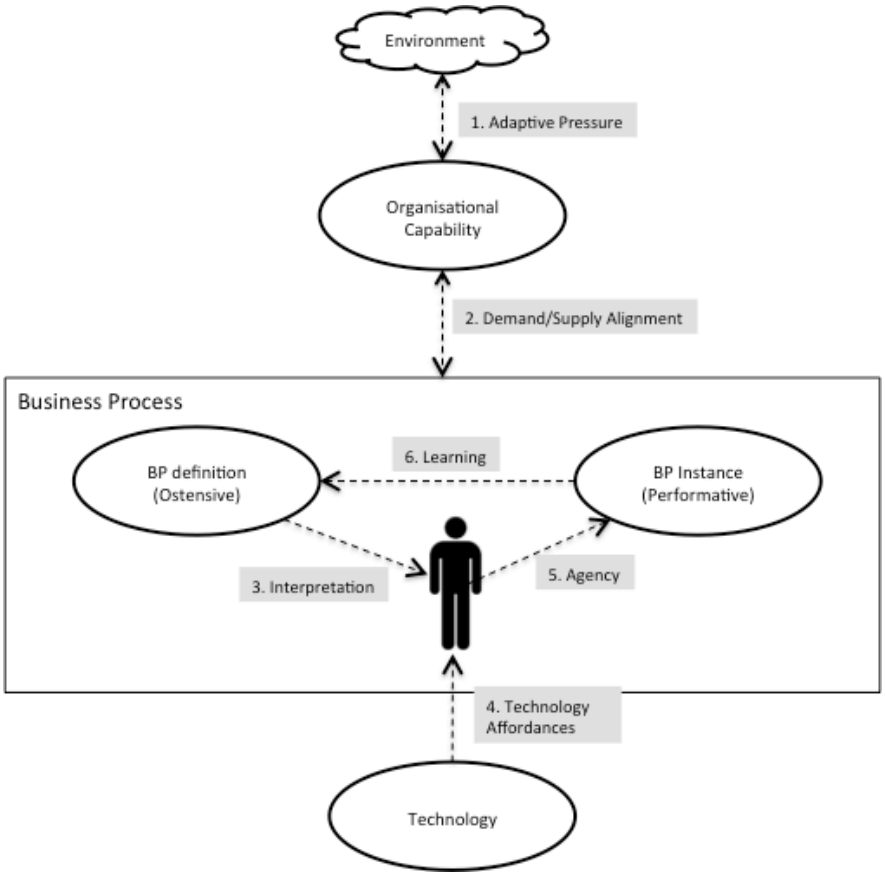

Figure 3 – Framework Conceptual Model

1. Adaptive Pressure. This relationship represents the requirement for "evolutionary fitness" [47] on the part of the organisation's capabilities. The environment exerts pressure for the organisation to adapt its portfolio of

organisational capabilities. The organisation responds to meet this adaptive pressure by detecting the need to change and then redesigning or redeploying its resources, including business processes, to achieve the necessary outcome. In a commercial environment, a capability such as "manufacture cars" has an evolutionary fitness that is a function of the market demand and the competitors' products. For a non-commercial business, the adaptive imperative may come from a regulatory change, for example.

2. Demand/Supply Alignment. This is the central organisational alignment relationship whereby the external demand pressure for a given capability is met (or not) by the supply side: or in other words the ability of the organisation's business processes to deliver such a capability. This relationship determines the "technical fitness" of the capability. So for the "manufacture cars" capability, this represents the knowledge, skills, tacit knowledge, and resources bound up in the business processes that can deliver that capability as an outcome. Technical fitness is decoupled from evolutionary fitness in this model, reflecting an independent set of drivers that are endogenous to the organisation. For example, technical fitness could be measured in terms of efficiency or cost per unit output [47].

3. Interpretation. This is the interpretation required on the part of the human agent of the ostensive business process in order to actually perform it. Following Feldman and Pentland's application of this concept to organisational routines [10] this structural, idealised, aspect of the business process is interpreted each time it is performed based on the context. This creates the opportunity for variation and allows contextual flexibility [7, 10].

4. Technology Affordances. This represents the socio-technical relationship whereby the features available in the technology are interpreted by the user into a set of "affordances" [2]. These affordances are the product of the user's particular goals, experience and skills providing a unique context for how the technology features (as designed) are perceived as part of the business process [28]. In this conceptualisation it is the affordance that is internal to the business process as it represents the useful, applied technology that is actually engaged in supporting the business process. The technology itself is external, and hence represented outside the process box, meaning that it, per se, contributes nothing to the process. In line with Leonardi [11], the value of the technology only emerges when there is imbrication with human agency.

5. Agency. This recognises the human agency that actually causes the business processes to be performed. Agency in this sense is "something that produces an effect" [19] or in other words action.

6. Learning. This is a feedback loop whereby the ostensive aspect of the business process is realigned based on the performative experience. "Learned" is used in a wide sense here: it not only refers to an intentional activity but also it is the necessary by-product of performative-ostensive relationship. So in this latter

sense, it is inevitable that the practice will induce a drift away from the process-as-designed This is consistent with the Feldman and Pentland's original characterisation of routines [7] and their more recent work on modelling this experiential learning [50].

Case Study

To evaluate and further develop our theoretical framework we are using a qualitative case study approach, using as our subject, organisations that exist in dynamic, competitive business environments. In this section we present one such case study to illustrate the theoretical concepts and relationships discussed so far, and evaluate the work to date.

Methodology

Rationale

We place our research within the paradigm of design science [51] where we are seeking to design, build and evaluate a purposeful artefact, the "framework", to address a hitherto unsolved problem. We have presented, thus far, a theoretical artefact based on integrating a number of extant theories in a novel way. In formulating our approach for evaluating and further developing this framework, we note the significant human dimension that exists in our conceptual model, where there are potentially complex socio-technical interactions. We have therefore selected an interpretive approach using case studies to discover these nuanced interactions using insights afforded by rich data. In this we are guided by Eisenhardt [52, 53], Yin [54].

Whereas our ultimate research aim is to enrich and validate our framework over the course of multiple cases, in this paper, our scope is aimed at what Siggelkow [55] calls "illustration" using a single case study. As argued by Siggelkow, this serves not only to improve understanding but also helps to validate the conceptual arguments that have been made up to this point. Whereas a single case study is a valid approach for demonstrating the *existence* of phenomena, we expect to strengthen the generality of our findings over the course of several case study iterations [54].

A *theoretical* sampling approach, one that chooses cases based on their potential to illuminate and extend the logic represented in our initial model, is appropriate for case study work of this kind [53]. We have therefore selected a case study organisation that fits our research context in that: it is large; it does business in a dynamic, competitive environment; it has an array of service offerings (organisational capabilities) and associated human-centric business processes; and is a significant user of IT to enable those processes. This combination of circumstances creates a good candidate for displaying most if not all of the conceptual relationships suggested in our model.

Data Collection

The primary means of data collection was via semi-structured or focused interview [56]. Public documents such as the annual report and corporate website were also used for background fact checking. For the interviews, a guide set of open style questions designed to probe the research problem space were used [54]. At the same time a conversational style eliciting detailed responses and opinions was encouraged. To gain multiple perspectives and reduce any "political" bias, interviews were conducted across three broad levels in the organisational hierarchy: the executive, operations[1] management and operational staff, and across two organisationally distinct lines of business. A representative from the CIO's office was also included. The questioning for each management level was tailored, but also retained a degree of overlap across levels. After eight (8) one hour interviews, consisting of at least two at each management level, we had the plurality of perspectives that we sought.

Analysis Approach

NVivo10 software was used as the platform to code and analyse the source data. The coding approach suggested by Miles et al. [57] was followed, consisting of a first cycle of "descriptive" coding, followed by a second "pattern" coding cycle, leading to the identification of a number of themes. We then used a combination of Yin's [54] pattern matching and explanation building analysis techniques as our main theory-building approach. Pattern matching uses our conceptual model in a predictive sense to match what was observed in the case study to what was expected. Explanation building takes observed phenomena and develops the theoretical constructs as explanations. These two analytic processes are interleaved to provide a build-validate cycle. In our case study this entailed firstly, mapping emergent themes into the framework conceptual model to identifying the existence of the posited relationships; and secondly, to use the richness of the empirical data to further characterise these relationships. Further iterations of this cycle will therefore provide an evidence-based refinement of the construct definitions or, indeed, additional constructs.

Research Setting

The case study organisation is a multi-national supplier of IT services to both public and private sector organisations. The ABC company[2] operates in over 70 countries around the world and has more than 80,000 staff. The firm was established in the US and is considered to be a tier one provider of a broad range of IT services, ranging from infrastructure outsourcing through to systems integration and consulting. The focus of the research was on the Australian operating company, which conducts business across

[1] Here "operations" refers to those parts of the business involved with delivery of the core organisational capabilities, as opposed to "back office" functions such as HR, finance and administration.

[2] A pseudonym.

the Asia-Pacific region. The local company retains some level of independence from the US parent, with the latter setting profitability targets to be achieved through an annual budgeting cycle, and the local company having some autonomy in setting business strategy to meet the targets. The local CEO is a level 2 report in the overall corporate structure.

According to Gartner [58], the global IT services industry was worth approximately one trillion US dollars in 2014 and is showing an annual growth rate of 5%. Emerging markets are dominated by China, India and other Asian countries, with the US, Western Europe (and Australia) seen as mature markets. Gartner research [59] also suggests the IT services industry is in the midst of several transformative trends that move away from the traditional focus, on the part of an IT outsourcer, of efficiency and cost-reduction, to one of more directly enabling business outcomes for their customers. Together with an increasing expectation that new IT solutions can be rapidly deployed without the usual lengthy IT-procurement cycle, there is an increased imperative for IT service providers to have agility in the marketplace.

IT enablement via Cloud services is seen as the biggest transformative factor, that at once lends agility, but at the same time creates a need to overhaul traditional go-to-market strategies on the part of the service providers, such as, for example, moving to alternate pricing models [e.g. 60, 61]. As a significant player in the growing Cloud services market, ABC is grappling with how its ingrained "legacy" oriented business processes can be adapted or re-directed to meet the needs of these new organisational capabilities.

Operationalisation of Concepts

Table 1 shows example instances of the Framework concepts drawn from the case study organisation. These are discussed below.

Table 1 - Concept Instances

Organisational Capability	**Business Process**	**Actor**	**Technology**
• Provide Managed Application Services	• Deliver applications support services • Manage application support work • Govern application support processes	• Support Engineer • Support Manager • Support Team Lead	• General IT tools • Specific IT tools • Improvised IT tools
• Provide IT Consulting Services	• Deliver IT Consulting Services • Plan and Allocate Consulting Resources • Sell IT Consulting Services	• Bid Manager • IT Consultant • Operations Manager	

Organisational Capabilities

Two of ABC's core "lines of service", Managed Application Services and IT Consulting Services, were chosen as the source of the nominated organisational capabilities. Together these form a significant part of ABC'S overall business.

An initial observation is that these capabilities could be decomposed into finer grained components. The granularity of the organisational capability is key to this analysis. As suggested by Figure 2, the capability is a *unit of competition*. This is consistent with the resource-based view of the organisation in which capabilities and how they evolve is the basis of competitive advantage [62]. So, the competitive edge of ABC may be determined by a particular class of Managed Application Services, such as the provision "Applications as a Service", for example. In which case, one would want to proceed with the analysis at that level of granularity.

Business Processes

As with any large corporation, there are a number of business processes that determine work practices within the company. At ABC, these processes are formalised to a varying degree and also have a variable degree of automated support. Broadly there are two groups. Firstly, the delivery processes, being those processes that underpin the delivery of ABC's capabilities (i.e. its service offerings) to its customers. These include sales processes, methodologies supporting the implementation of IT solutions and the associated delivery management processes. An important attribute of these delivery processes is that they are people-centric: in other words, the provision of IT services is largely a human activity supported by various technological tools. This is in contrast to, for example, a manufacturing company in which the production of "widgets" has a large fully automated component.

The second class of business process are the "back office" processes that basically exist to run the company, such as HR, finance and administration. The delivery or "operational" processes are the primary focus of this study, as they exist to support the competitive differentiator capabilities and hence have a significant bearing on organisational agility.

In Table 1 we have shown three core operational business processes associated with each organisational capability. Following Figure 3, we can regard these processes as having the delivery of the respective organisational capability as a *goal,* or, more generally, that each capability has a set of *aligned* business processes that are responsible for delivering it. These processes represent a significant part of *how* ABC delivers its core organisational capabilities, and therefore are implicated in the agility requirements for these capabilities.

Actors

Human-centric business processes have actors that provide the agency for action and achievement of outcomes. The major actors for the business processes have been

nominated (as organizational roles) in Table 1. As we have stated, in our business process ontology, the actors are purposeful, situated and also have experience and history. It is the actors who are responsible for the duality of the ostensive and performative aspects of the business process depicted in our model (Figure 3).

Technology

Table 1 identifies three classes of Information Technology associated with the enablement of the business processes, with specific instances of these given in Table 2. The purpose of this classification is to highlight the use of generic vs. specific tools, in other words, where the (specific) tool has been *designed* for the process as against the (generic) tool that has been *adapted* by the user. We also identify where technology solutions have been improvised in response to the perception that existing tools are inadequate. These aspects are again prompted by our theoretical model.

Table 2 - Technology classifications

Class	**Examples**	**Business processes or work type supported**	**User Base**[3]
Specific IT tools	• Salesforce.com • Remedy 7 • MKS Integrity • Sparx Enterprise Architect • HP Quality Centre • Java SDK	• Opportunity management • Service request management • System lifecycle management • System architecture modelling • Software development	(O, OM)
General IT tools	• MS Office • MS Windows native file system • Lotus Notes • Lotus Sametime • Jive • Webex • Atlassian Confluence • Alfresco content management • Sharepoint	• Documentation – formal and ad hoc • Data analysis tasks • Presentations to customers • Knowledge management • Corporate communications – formal and ad hoc • Remote team working • Virtual communities • Training course delivery • Sharing of documents across virtual teams • Procedure and methodology libraries • Historical project repositories	(E,OM,O)
Improvised Tools	• Request management system • Resource planning system	• Delivery management • Bid management	(OM,O)

[3] Respondent abbreviations: E- Executive; OM-Operations Management; O-Operations staff

Class	Examples	Business processes or work type supported	User Base[3]
	• Estimation Model • Pricing Model		

Analysis

In this section we present a discussion of the empirical data organised by the themes that emerged from the coding exercise. For each theme we provide sample evidentiary quotations from the respondents and then go on to discuss the application of the framework conceptual model in the build-validate cycle previously described.

Competitive Differentiation

ABC's differentiates itself on niche capability as well as completeness of offerings. The business environment is driving change in ABC's capability "profile". For the Managed Application Services area, the development of "smart" (e.g. utility) pricing models was one response to a market that is moving towards a more commoditised approach to buying IT services.

> *"Application support is generally seen as pretty boring but it's fairly high cost as well so customers are interested making sure it's a reasonable cost, but also price predictability. Utility pricing. Flexibility around that" (E)*
>
> *"...and that does actually move towards an agility thing, because we're now pricing services per application, based on their complexity, which is based on things like number of instances, number of interfaces, technology and so forth. Customers have the ability with that to say I'm going to switch that application off, I don't want that supported any more, and we'll adjust the price, downwards in that case. Or I want to add a few applications, and we adjust the price up" (E)*

Another market differentiator is domain expertise and the ability to deploy this globally:

> *"Our expertise around a lot of the applications in particular domains like mining. Our expertise in particular applications can be replicated to other clients so we've got domain expertise. I think domain expertise is becoming more important as businesses are owning IT more." (E)*
>
> *"That is one of the draw cards on this particular bid that I'm working on, we've got this global expertise that we can bring to bear." (O)*

In terms of the Framework conceptual model, these factors relate to the organisational capabilities being deployed by the organisation and how they are subject to the adaptive pressures in the business environment that determine the relevancy and therefore the value proposition represented by those capabilities (link number 1 in Figure 3). Thus the question is prompted: given these environmental pressures, what new or changed capabilities do we need to deploy to be successful? This mapping says: what is the competitive edge represented by our response (to develop and deploy new capability X)? This is part of developing the value proposition for a new capability. More generally, through the lens of an evolutionary paradigm, one could view this as *deliberate variation* [33] in which only "valid" new capabilities are considered.

Organisational Inertia

On the one hand, ABC recognises a need to adapt to competitive forces in its marketplace, but on the other hand, it suffers from organisational inertia and a "disconnect" between the sales and delivery organisations.

> *"They can talk the talk and have certainly had some very good sales with some customers. But there is a gap and I think as we move to IT as a service, there is a gap between existing services, and the big picture that the CTO or others or customers would be looking at." (E)*
>
> *"Yes so I think we're slow and we have a lot of inertia and a great example that would be Cloud, where we talked about it for ages, we did do some things but they were very timid movements and they were rooted, in my mind, in our traditional legacy world" (OM)*
>
> *"I don't think these offerings provide anything other than a nice sales catalogue with which to get us into the customer. If they were repeatable processes, then that's great, we can have a go-to-market with that. But everything just feels like generic consulting: you do a business architecture, then do some development. We're just rebadging the work we do all the time into a different offering." (O)*

The view was that the marketing division was quick to identify the need and even to articulate new service offerings, but as far as the delivery organisation was concerned this was hype and ignored the significant organisational inertia that exists.

This is an example of tension in the demand/supply relationship (number 2 in Figure 3), where a need to deploy new capability has been identified, but there is a gap in the organisation's ability to deliver that capability via its current business processes. This Framework link is key to understanding the dynamic between externally derived competitive pressures and the organisation's ability to mobilise its resources (business processes, technology and staff) and deliver them. The Framework models this as the intersection of two evolutionary fitness landscapes. The questions prompted at this level are: given we need to deploy this new capability to compete, what are the internal requirements on the organisation to mobilise or change the existing resource base? And, what other capabilities are potentially affected? From the perspective of the *adaptive tension* [63] that exists across these two landscapes, does the organisation have the *requisite internal variety* [64, 65] in terms of resource mix (processes, people, technologies) to meet the external variety of the business environment as manifested in new capability requirements?

Capability Co-Creation

ABC noted the value of innovating new capabilities in conjunction with partner organisations, based on synergies between the existing capabilities in each firm.

> *"I really do think it's a huge strategic advantage for [ABC] because none of our competitors are doing anywhere near that alliance and partnering that we have been able to achieve in a very short time...that'll give us an advantage, to utilise that investment [the partner] put in there, to bring to our clients solutions that we wouldn't have been able to do ourselves" (E)*

An example in ABC's case is partnering with a Cloud infrastructure company to create a joint offering of a "Secure Business Cloud". Relating to the Framework, this phenomenon points to a higher order "sensing" capability (actually a dynamic capability, per Teece, [48]) whereby the existing organisational capability landscape (as depicted in Figure 2) is monitored for opportunities for synergies between organisations. The implication is that to be successful, these new "synergistic" capabilities need to have the foundation of business processes across the partner organisations that can actually deliver them. The question is prompted: how are these processes to be integrated?

Process Constraints

We use the word "constraint" here to mean an inhibitor of the ability to adapt a current business process to new capability requirements. Examples of these in ABC's case are: tensions between the local operating regions and the global corporate entity that restrict the degree to which a process can be standardised across regions; the intrinsic complexity of the business processes; and, bureaucracy, meaning that the processes impose onerous compliance conditions.

> *"There is more than enough complexity and we keep inventing more. I find it very complex - for example, all of these reviews we have for submitting bids. We've prepared the bid and then there're all these different types of reviews that have to be done before we can submit. A lot of other organisations don't have these reviews." (E)*
>
> *"The other thing is the difference between Australia and America where in America if someone doesn't do something they just fire them, but that doesn't apply in Australia where people have different behaviours." (OM)*
>
> *"I have a level of confusion because there're so many lines of service involved as to who I have to keep informed, and who has to sign things off" (O)*

In the Framework, we draw a distinction between the process-as-defined and process-as-perceived (and therefore as practiced). The process constraints identified for ABC go to both of these aspects. We can regard attempts at standardisation of process as management intent to define a particular ostensive form, which may also impose certain compliance requirements. The *complexity* of the process may be either an actual attribute of the ostensive process, or a perception on the part of an actor, the latter reflecting the experience, training and other contextual issues.

From a process design point of view, there is a process-actor alignment required that consists of two perspectives: Firstly, a top down perspective - the purpose and expectations regarding the ostensive process being communicated, e.g. by management; and, secondly, a bottom-up perspective - the motivation and context of the actors involved.

Process Flexibility

Notwithstanding the process constraints, the nature of ABC's business relies on flexible processes in practice. This flexibility is not necessarily related to the adaptation required to deliver *new* capability, it is can be merely part of delivering the status quo:

"So there has to be an appropriate level of timing, and an appropriate level of agreed outputs, appropriate level of detail, and appropriate level of variance. You have to know what you can achieve in that time frame. And that's possibly a step that is missing right at the beginning to understand exactly what you're going to deliver within the timeframe you're allowed and then how much risk to apply to it." (O)

The Managed Application Services part of the business is more process-driven than consulting, however, there is a tension between process formality and the cost of compliance checking:

"The problem that the rest of the globe had was they did a truckload of [process] deployments, some very intensive deployments, but then they couldn't sustain it because the compliance checking routines were very, very labour intensive. So it felt by the wayside." (OM)

In the Framework, the notion of compliance concerns the relationship between the ostensive and performative aspects of the business process. In the "translation" of ostensive to performative, the interpretative step on the part of the actor is key.

"you simplify that, distil it into a form of 'what are the key things that I really need to do and in doing that I will really be compliant I will satisfy the process, not just say I'll be compliant but I will satisfy the intent and the outcome of the process'. "(OM)

"It feels like better education about the objectives would enable everybody to focus on the right things throughout that very fluid [process]." (O)

The perception here is that shared understanding of the objectives or goal of the business process is perhaps more important than a rote set of instructions. There is also a recognition that context is a big factor, and this drives flexibility.

"You do have to have structure so that you get things signed etc, but it is such a fluid process, people have to be proactive and reactive" (O)

Building "context-awareness" into business processes has been approached from several angles in the literature. Besides the actor contextualisation represented in affordance theory and the organisational routines, that we have incorporated into our model, others have approached it as from a process design perspective [45], and as a modelling discipline [46]. Activity Theory [66] is another approach that has found some popularity in understanding contextualised behaviour, and been applied to organisational learning [67] and human-computer interaction [68], among other areas. Activity theory defines activities in terms of Subject (the Actor) and Object (the objective of the business process) and Community (the other actors in the process). The idea that the community shares the objective of the activity in some way but also has heterogeneous individual perspectives on it, is a core tenet of activity theory and one that could be further explored to enrich this part of the Framework.

Technology Constraints

Constraints operate on technology providing their designed function in support of business processes. Several shortcomings or limitations to the way IT supports the

business were pointed out across all organisational levels. These issues were a combination of gaps in process enablement and operational problems with existing IT.

> *"What does get lost from the CIOs office is a lot of the technology and systems are rolled out with a view that everyone is an office worker, doing office type work so word-processing and e-mail. So we have had problems in the past and recently actually with refresh of laptops were the new model of laptop which was approved is actually lower resolution than it was before, or the processing power is less than it was before" (E)*

> *"There was a celebratory e-mail that came out that said we have implemented salesforce.com in 63 days and they we're claiming a world record. What they implemented was a piece of crap" (OM)*

> *"So you want to roll-out this new tool, well you can't because half the laptops are running an old operating system. Then the thing flounders because the lump is too hard to digest." (OM)*

Two overall trends were evident. Firstly, the centralisation of IT systems (as part of a strategy of standardisation) has meant a move to offshore hosting, in turn leading to latency problems. Secondly, the workforce has experienced an increase in mobility which has led to more remote working, with a new range of issues around portability of devices, access to networks and software. The changes in requirements have not always been picked up by the global CIO office.

Constraints such as these affect the affordances [2] that technology presents to the human actor, and hence motivate workarounds on the part of the user, including the improvisation of ad hoc IT solutions, when the affordance perceived does not fit the user's intention.

Technology Workarounds

Improvisation of local solutions, to work around constraints in business processes, or limitations in other systems, was a common finding. In these cases, tools already available (such as Excel or other programming environments) were being used as the basis of new business systems.

> *"We will improvise, we'll do what we need to do, we've got a business to run. We can't say 'well I didn't have the tools, I can't do my job'. That doesn't carry as an excuse to well." (E)*

> *"You build your own agility through the use of Microsoft office products." (OM)*

> *"If we had an edict that said turn off all local [ad hoc] systems then local management wouldn't have a clue what is going on in the business." (OM)*

> *"the issue I see is that the [corporate] decision on these tools is taking so long to implement that teams in the regions just don't have time to wait, so they just implement their own [ad hoc system]." (O)*

The improvisation of new IT systems, as found in the case study, relates to the technology affordance perspective in our framework. The IT user's perceptions about the gap between their desired action and the IT system's capability to support it (the affordance), leads to improvisation either in building new tools or implementing some

workaround in the process. This resonates with the idea that the way humans and technology are *imbricated* provides flexibility in the process [11]. The framework posits that these workarounds actually comprise the business process-as-performed, which in turn, via the "learning" loop back to the ostensive business process (link 6 in Figure 3), becomes part of the organisational "memory" of how things are done. This idea is consistent with what was reported in the case study.

> *"So I have all of these disparate tools: one that catches timesheets, one that I've developed that anticipates what people are going to be doing. And we're going to have to build something else that builds a comparison between the two… There's probably some corporate solution out there somewhere and it's probably $500 a seat and so I don't have any money and so I might think about it later. So I keep running my EXCEL spread sheet" (E)*
>
> *"We built our own [process] that manages resourcing across consulting. We've slowly built that out over a number of years. That started when we previously trialled Novient in Australia. Literally you could press the key and you'd go over half a day before anything came back. It was an abysmal rollout." (OM)*

Discussion

Our intention in this paper has been to firstly develop a theoretical framework that reconceptualises business processes (BP), informed by extant theories of organisational capabilities, routines and technology affordances, so as to achieve a finer grained understanding of organisational agility with special regard to the socio-technical relationships in the organisation; and secondly, to illustrate and build on this theory-informed framework by means of a case study of an exemplar organisation. The research has achieved the first milestone of illustrating and validating the theoretical model with one case study. We plan to conduct further case studies across different industries, so as to further validate the generalisation of the theoretical framework. We can, however, at this point take stock of what has been achieved with this first research milestone.

As a theory-building exercise, we class our framework primarily as *explanatory* rather than *predictive* [17]: we seek, in terms of our constructs and relationships, to better understand the phenomena we see in organisations. So in a concrete sense, what insights does our framework provide to the discipline of BP design, and what are the implications for management?

Looking at the design question, our model shows that there is an intrinsic tension between design and evolution of business processes. Our study supports the idea that business processes evolve through practice and in this the supporting technology is intrinsically part of the evolution process. So we might then ask what is directing this evolution. If we model the *design* intent (e.g. of management) as operating on the ostensive representation of the BP, then the evolutionary "drift" away from this, as we have said, is governed by the perceptions and interpretations placed on this representation, by the human actors that participate in the process. The drivers for these interpretations consist of a range of contextual factors: how the actors are

motivated, how they understand the objectives of the BP and the affordances that technology presents to them to support them in the process.

In Figure 4, we highlight the effect of the evolutionary drift (as we have called it) of the business processes, on the operational alignment of the organisation, measured in terms of organisational capability gap. The key point here is that there are two timescales operating: one is the top down design activity that seeks to align the business processes with the desired organisational capabilities. This is a deliberate, point in time, intervention such as when management embarks on a transformation initiative to reconfigure the business processes within the company to achieve a new strategic direction. The second is the evolution of this ostensive BP based on practice: this is continuous, business-as-usual, operations. How far and how fast the drift occurs, it is suggested, would be influenced by the contextualising factors we have discussed.

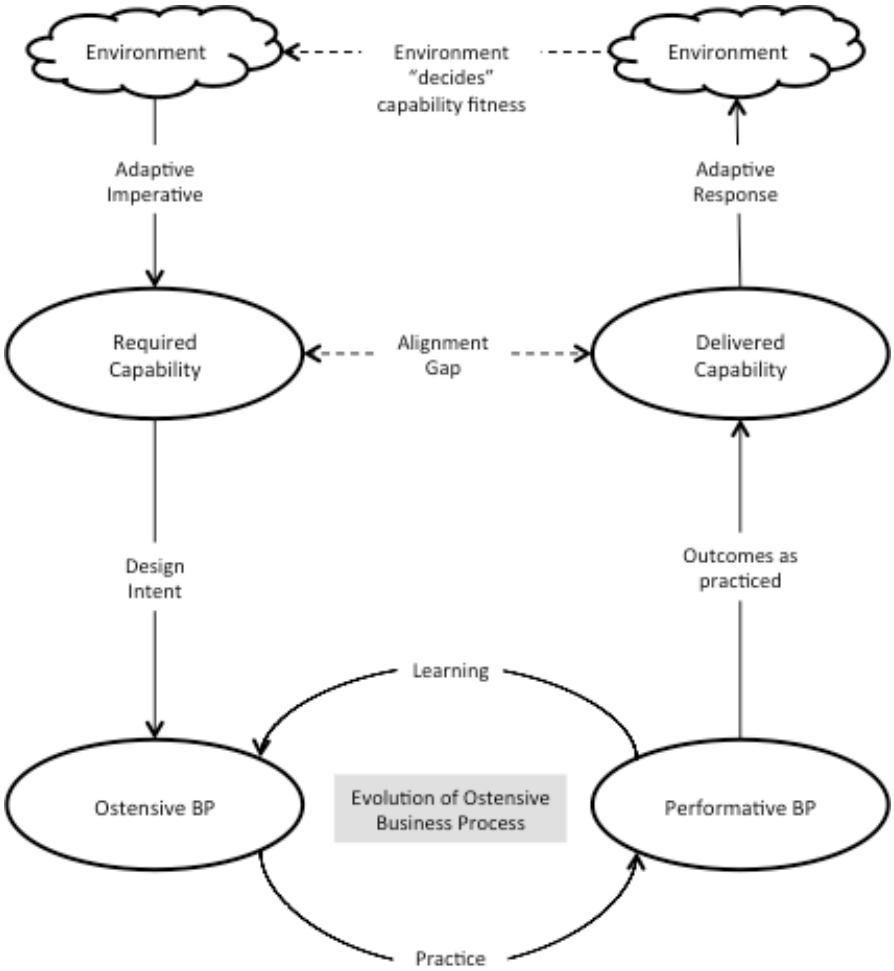

Figure 4 - Business Alignment Gap

So given the propensity for the business processes evolve through practice as described, what is the role for management in ensuring the business remains aligned to the organisation's commercial imperatives? The framework characterises the outcome of this drift in terms of a capability alignment gap in Figure 4. In discussing the "learning organisation", Morgan [6] highlights the need for a second order self-regulation capability that monitors the first level process (i.e. the evolution of BP in this case) and

understands when operating norms need to change. This idea is also articulated in the parlance of dynamic capabilities by Schreyogg and Kliesch-Eberl [31] who posit a similar capability monitoring function. Such a monitoring function operates at two levels. The first is essentially "are we doing the business process right?" Does the *practice* of the BP align with the *intent* of the BP. Internal process efficiency or audit functions such as six sigma focus on this perspective. The second monitoring level is "are we doing the right business process?" Are the business processes still relevant to what the organisation is strategically trying to achieve, at the organisational capability level. As we have seen, management can take a deliberate decision to reconfigure the business processes to meet a new strategic imperative, but the assumption with that is that management knows what the "right" capabilities are and therefore how to interpret a capability gap. Ultimately it is the environment that decides what capability "fitness" actually means. Hence the importance of what Teece [48] describes as "sensing" and "shaping" dynamic capabilities by which the organisation constantly scans the marketplace and seeks to understand what opportunities it has to exploit its existing capabilities and what new capabilities it needs to develop.

Conclusion and Further Work

At the outset, we stated that our research aim was to better understand "organisational wiring" and its role in organisational agility by means of a reconceptualization of "business process" (BP) as an organizational building block. In particular, we asked how the non-determinacy of human action could be accounted for and whether allied concepts drawn from organizational and management sciences could be used to augment the traditional IS perspective. Our conceptual framework as depicted in Figure 2 and, Figure 3, offers some contributions to BP theory in this respect. Firstly, it provides a richer ontology for the concept of BP by differentiating the process-as-designed from the process-as-performed and including the non-determinacy of the socio-technical elements. In this it leverages work on organisational routines [10], technology affordances [2, 11]. Secondly, it positions concept of BP within a broader organisational context that provides an opportunity to reason about alignment of processes to the overall strategic capability needs of the organisation. It presents a granular model of the organisation that draws a conceptual connection from the external organisational pressures to adapt, the alignment of BP to delivering the required capabilities, through to how technology is used within those processes. This aspect draws on the evolutionary theory of organizational capabilities [18]. This dynamic perspective provides a framing of organisational agility in terms of the tension between on the one hand, the top-down, management led, design of the ostensive BP; and on the other, the bottom-up practice-led evolution of this ostensive BP. The interplay between these elements goes to the ability and speed of the organisation to respond to an environment change: the essence of agility. We expect further work to uncover more on the contingencies involved in these relationships.

We also asked what the implications were for BP design. The model suggests that the representation of the ostensive BP – or the formal BP model – is only part of the story. There is an adaptive loop at play in Figure 3 (links 3, 5 and 6) whereby the ostensive

process is interpreted as it is used and then updated as the organisation "learns" from experience. This evolutionary drift of the ostensive BP, based on practice, is essential to understanding the concept of the "technical fitness" [47] or the internal (operational) alignment of the organisation.

If the task of the BP designer, on behalf of management, is achieving this internal alignment, there are two aspects to be considered. The first is the outcome or the organisational capability that the BP is intended to deliver. This represents a top down strategic goal for the organisation. In parallel, the designer must also understand the evolutionary potential of the BP and what the drivers are for this to take place: the skill level, experience and background of the participants and the affordances presented by the enabling technology.

In terms of the alignment of business and IT, one can draw a contrast with the classic enterprise architecture view of the world, represented, for example, by TOGAF [69] or Zachman [70]. These essentially define the organization in terms of deterministic objects that do not change over time. In this respect, the same critique that has been levelled at the Strategic Alignment Model [26] applies: namely that alignment is an evolutionary process rather than an end-state that is reached at a point in time [71, 72]. Our model naturally fits this perspective and moreover elucidates a mechanism for at least one component of this evolutionary behaviour. Indeed, co-evolutionary theories of the organisation, whereby organisational building blocks are understood and modelled in terms of "species" in co-evolutionary relationships, present a rich paradigm with which to explore this area. They have been applied at the organisational level [33], the capability level [33, 34] and at the process level [44]. Accommodation of these theories into our overall conceptual model is one avenue of research we are pursuing, as we seek to understand organisational adaptation to change in terms of these granular concepts.

The work we have presented has some limitations. Whereas a single case study can serve to validate some of the basic theoretical constructs [55], more data is required to tease out the contingencies at play and make useful generalisations. For example, what types of business processes show adaptive behaviour more than others? Under what circumstances? How can we design processes to be resilient to drifting away from their originally designed intent? Is there a level of process maturity where these competing forces are somehow in balance? Further case studies in different industry sectors are the subject of on-going research aiming to shed light on these questions.

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