Managerial Ambidexterity and the Cultural Toolkit in Project Delivery

Abstract

Research has established that ambidextrous organizations can successfully outperform their non-ambidextrous counterparts through exploitative and exploratory activities. However, there remains a scarcity of research on how managers orchestrate ambidexterity at the operational level, particularly in project delivery. Drawing on 55 qualitative interviews with middle managers on two engineering projects, we examine how managerial ambidexterity is enacted at the project level. We find that middle managers enable their own exploitative, exploratory and ambidextrous behaviors by invoking a repertoire of values selected from their organization's cultural toolkit, which serve as cultural resources for action. We discuss how the cultural toolkit perspective can inform the relationship between managerial actions in day-to-day operations and organizational ambidexterity. Implications for theory and practice are presented.

Keywords: ambidexterity, projects, culture, cultural toolkit, engineering, case study

1. Introduction

March (1991) suggests that central to organizational survival is the ability to *exploit* current capabilities and assets in a profitable way, and simultaneously *explore* new technologies, markets, and customers to capture existing as well as new opportunities. An ambidextrous approach, therefore, requires harmonization and reconciliation of these two opposing activities (Pellegrinelli et al., 2015; Turner et al., 2015). The importance of ambidexterity is particularly pertinent to high technology organizations that are confronted with the dual demands of exploring new products/processes while simultaneously exploiting existing products/processes (Chandrasekaran et al., 2012). Wang and Rafiq (2014) argue that such firms operate in dynamic environments and are often left with no choice but to consolidate existing businesses while simultaneously finding new opportunities. Balancing the conflicting demands of explore and exploit, then, becomes more relevant in high technology organizations that are unable to temporally separate the search for new markets and processes from their existing markets and processes.

Since extant research on organizational ambidexterity has typically focused on the macro level (Turner and Lee-Kelley, 2012), there is limited conceptual and empirical investigation of exploration and exploitation at the level of the manager (Raisch and Birkinshaw, 2008). At this level, Mom et al. (2007, 2009) describe exploration activities as searching, discovering, creating and experimenting with new opportunities, and exploitation activities as selecting, implementing, improving and refining existing certainties. While there is a growing recognition of the managerial role in driving ambidexterity, most studies target senior managers on the assumption that these individuals are in a position to direct the necessary balancing act between disparate organizational activities (e.g. O'Reilly and Tushman, 2004). Yet it is middle managers who must reconcile the practicalities of day to day operations and the concerns and needs of frontline staff, with the strategic choices and

priorities set by senior management (Burgess et al., 2015). Therefore, there are growing calls for in-depth investigations of managers' exploration and exploitation activities (Mom et al., 2007; Nosella et al., 2012; Gupta et al., 2006; Raisch and Birkinshaw, 2008) and "to investigate how ambidexterity really emerges from the context" (Nosella et al., 2012: 460).

In this paper, drawing on concepts from the scholarship on organizational culture, we seek to explain *how* ambidexterity is enacted by managers within projects, as called for by Eriksson (2013) and Turner et al. (2015, 2016). The project context is an apt setting for explaining how ambidexterity emerges, given that "projects represent a prominent organizational form within which both exploitation and exploration occur and are therefore highly suitable as a context for study" (Turner et al., 2016; 201). This context is also well-aligned with calls for ambidexterity studies to incorporate the role of culture at multiple levels (e.g. Junni et al., 2015). Moreover, we seek to further explore the relationships between the activities of managers and organizational ambidexterity, as called for by Burgess et al. (2015) and Turner et al. (2016).

The paper is structured as follows: first, a review of the ambidexterity literature is presented. Next, the theoretical relationship between organizational culture and ambidexterity is reviewed, before elaborating on the cultural nuances that might exist at the project level. The research setting is then introduced and research methods presented. The findings are followed by a discussion of their theoretical and practical implications and the development of a set of propositions.

2. Ambidexterity

Traditionally, exploration and exploitation are seen to be in conflict (Duncan, 1976) and can be reconciled through structural differentiation or an ambidextrous structure (Simsek et al., 2009). Here separate divisions of the firm utilize different rules, norms, and incentives for

competing explorative or exploitative endeavours: “exploration is associated with organic structures, loosely coupled systems, path breaking, improvisation, autonomy and chaos, and emerging markets and technologies” while “exploitation is associated with mechanistic structures, tightly coupled systems, path dependence, routinization, control and bureaucracy, and stable markets and technologies” (He and Wong, 2004: 481). Dual architectures then separate strategic and structural supports into dedicated units, which individually address only one side (e.g. the radical end of incremental-radical innovation) of the ambidexterity thesis (Andriopoulos and Lewis, 2010). This structural separation of organizational tasks into different units is suggested to help ambidextrous organizations address paradoxical demands (Gilbert, 2005). Underlying this view of ambidexterity is the implicit assumption that exploitation (i.e. incremental outcomes) and exploration (i.e. radical outcomes) are analytical opposites[1].

In contrast, the behavioral approach described as harmonic (Simsek et al., 2009) or contextual (Gibson and Birkinshaw, 2004) ambidexterity considers exploration and exploitation as complementary. This view proposes that a single business unit may be a meaningful level at which to examine ambidexterity (Simsek, 2009) where individual managers balance exploit and explore simultaneously. Since managers must think and act ambidextrously, conceptually harmonic ambidexterity must be intertwined in on-going operating and strategic activities (Simsek et al., 2009), highlighting the relevance of the project context. The behavioral stream of ambidexterity research recognizes that, provided with a favourable context, individuals are indirectly pushed towards organizing their working time so as to integrate both exploration and exploitation in the course of their daily tasks (Gibson and Birkinshaw, 2004). This stream of research has focused on the behavioral mechanisms that enable organizations to address competing demands in the same unit

[1] We thank Reviewer 2 for this insight

(Raisch et al., 2009) and is typically grounded in the literature on organizational context and culture. The advantage of harmonic ambidexterity over traditional structural differentiation lies in the avoidance of coordination costs incurred by structurally separating activities (Simsek et al., 2009) and is suggested as a necessity for firms that operate in highly competitive and dynamic environments (Wang and Rafiq, 2014).

The contextual approach to ambidexterity also opens up the possibility that incremental exploitative actions may cumulatively and over time generate radical innovation outcomes (Revellino and Mouritsen, 2015). As Henderson and Clark (1990) have observed, even incremental innovations may result in radical consequences for firms' competitiveness. Thus, the contextual perspective of ambidexterity, which emphasizes complementarity and a continuum view of exploitation (incremental outcomes) and exploration (radical outcomes) is better positioned to explain seemingly contrasting outcomes within a project rather than the structural perspective, which is based on the logic of mutual exclusivity. Indeed as Cardinal (2001) emphasizes, though it is commonly accepted that incremental and radical innovation should be managed differently—the logic that the structural ambidexterity perspective adheres to—input and output controls at the project level drive may both forms of innovation, in line with studies of contextual ambidexterity (e.g. Gibson and Birkinshaw, 2004).

2.1. Ambidexterity: activities versus outcomes

Studies that have examined structural or behavioral approaches typically fall under one of two schools of ambidexterity research: activity or outcome (please see Appendix A for an illustrative list). Research that examines the joint pursuit or achievement of seemingly opposing activities within an organizational setting falls under what we refer to as the 'activities' school of thought, i.e. the orchestration of exploitation-related and exploration-related activities (see Raisch and Birkinshaw, 2008; Jansen et al., 2008; Gibson and

Birkinshaw, 2004). For example, Gibson and Birkinshaw (2004) investigate the behavioral capacity to simultaneously demonstrate alignment and adaptability across an entire business unit, while Turner and Lee-Kelley (2012) examine how managers achieve a balance between exploitation and exploration in their activities. In contrast, there are a number of studies that have examined ambidexterity as a performance-oriented outcome (see Lin and McDonough, 2011; Grover et al., 2007). The 'outcomes' school of thought refers to the actual accomplishment of two seemingly opposing and contradictory strategic outcomes such as incremental/radical innovation and sustainability/high profits. Rather than interpreting the benefits attributed to ambidexterity using a single factor such as profitability or market share (which may be achieved through a trade-off of exploitation or exploration), such studies of outcomes examine the actual achievement of contradictory objectives (Turner et al., 2012). In our classification of ambidexterity as outcome we are concerned about the underlying characteristics of those outcomes as opposed to their consequences for competitiveness and/or performance. Also, while acknowledging that design-level planning distinctions between ambidextrous outcomes (e.g. between incremental innovation and radical innovation) may be difficult to enact, we agree with Henderson and Clark's (1990: 11) note about the inherently different characteristics of the observed outcomes:

> "Radical innovation establishes a new dominant design and, hence, a new set of core design concepts embodied in components that are linked together in a new architecture. Incremental innovation refines and extends an established design. Improvement occurs in individual components, but the underlying core de- sign concepts, and the links between them, remain the same".

2.2. Managerial ambidexterity

The conceptual confusion and a lack of agreement over what exactly the ambidexterity concept means and how it can be achieved has persisted (Turner et al., 2012) with scarce research examining activities at the managerial level (Nosella et al., 2012). Some recent studies have sought to address this knowledge void and have focused attention on managerial ambidexterity. For instance Mom et al. (2015) attribute variation in managerial ambidexterity to differences in organizational and functional tenure. Havermans et al. (2015) suggest that project managers and line managers will only achieve ambidexterity through interaction with team members and as a result of their dynamic interpretations of the environment; while Burgess et al. (2015) identify that ambidextrous managers rely on professional legitimacy, social capital, and a holistic professional orientation in enacting exploitation and exploration.

Nevertheless, it is recognized that further research is needed to establish the link between managers' efforts to integrate exploration and exploitation activities and their contribution to ambidexterity at the organizational level (Burgess et al., 2015). From a theoretical standpoint, there remains a lack of research which examines how cultural forces within the organization may influence the realization of ambidexterity at different levels of the organization and/or unit (Turner et al., 2012; Junni et al., 2015) and the impact such ambidextrous activities at the operational level might have on organizations' quest for ambidextrous outcomes (Hodgkinson et al., 2014).

3. Organizational culture and ambidexterity

Organizational culture is defined as the "…basic assumptions and beliefs that are shared by members of an organization that operate unconsciously and define in a basic taken-for-granted fashion an organization's view of itself and its environment" (Schein, 2004: 6). Organizational culture, then, "…can be a mechanism that can infuse values such as uncertainty tolerance, openness to challenges, and trust that will not only enable the

alignment of ‘inconsistencies’, but also turn ‘inconsistencies into consistencies’ by making them part of organizational routines” (Lin and McDonough, 2011: 498). There are a number of studies illustrating how organizational culture can support ambidexterity, for example, Gibson and Birkinshaw (2004) argue that when a supportive organizational context is created individuals engage in ambidextrous activities. Wang and Rafiq (2014) focus on two sets of organizational values and norms–organizational diversity and shared vision–necessary for exploitation and exploration competences, while Kostopoulos et al. (2015) demonstrate the positive role of intellectual capital for unit level ambidextrous activities. In extending the inference that context matters to the achievement of ambidextrous outcomes, Lin and McDonough (2011) examine a specific type of culture–knowledge-sharing–that enables the attainment of exploitation and exploration simultaneously; Zimmermann et al. (2015) highlight the need to establish a culture of trust to evoke ambidextrous alliances. Further initial insights have suggested that cultural implementation mechanisms including innovation orientation and cost orientation can partially explain the relationship between ambidextrous decisions (activity) and innovation ambidexterity (outcomes) (Kortmann, 2015).

While recent research has provided insights on favorable cultural characteristics for ambidexterity (both as activity or/and outcome), it has defined organizational culture as something which is holistic (Lin and McDonough, 2011). Though valid, such a view implicitly assumes homogeneity of the organization and therefore supports the anchoring of organizational culture and ambidexterity analyses at the macro level, e.g. corporate/organizational culture. An alternative and more pragmatic view of the relationship between ambidexterity and culture at the project level sees culture as providing a toolkit of resources for managers to draw on, rather than as a unified belief system. This perspective suggests that individuals may invoke values and beliefs that are not only manifest and visible

in the organization's cultural universe, but also those that may be latent and hidden (Swidler, 1986) in the process of engaging in exploitative, exploratory and ambidextrous behaviors.

3.1. Culture: a 'toolkit' perspective

Culture has been described as something which is stable, all-encompassing, and which when internalized can constrain individual thought and action (Giorgi et al., 2015); thus emphasizing the importance of cultural values in shaping the behaviors of actors (see Schein, 1992). Weber and Dacin (2011) describe this particular lens as the 'first wave' of cultural analysis. Over time, the study of organizational culture has become less concerned with understanding models of culture as constraint, i.e. either internalized by individuals or imposed on them by members of their immediate social group (see Canato et al., 2013; Rindova et al. 2011; Leonardi, 2011), and more focused on how organizational members' are able to exploit and use the values and beliefs of an organizational culture for their own purposes. Weber and Dacin (2011) describe this cultural construction of organizational life as the 'second wave' of cultural analysis. In other words, this wave of cultural research examines how situated individuals access and deploy different cultural tools found in an organization's cultural toolkit.

A key figure in the cultural 'toolkit' argument is Ann Swidler (1986), who has analysed the failings of cultural explanations based on 'values directly driving behavior' and offered an alternative model. She suggests that the use of traditional models in the 'first wave' to understand culture's effect on action is profoundly misleading because it assumes that culture shapes action by supplying ultimate ends or values towards which action is directed; making values the central causal element of culture. Instead she (Swidler 1986: 276) urges for a superior and more intuitive plausible alternative stating "if values have little explanatory power, why expect culture to play any causal role in human action? Why not

explain action as the result of interests and structural constraints, with only a rational, interest-maximizing actor to link the two?". In other words, culture influences action not by providing the ultimate values towards which action is oriented, but influences it by shaping a repertoire or toolkit of habits, skills and styles from which individuals construct strategies of action (Swidler, 1986).

The cultural toolkit of an organization is a grab bag of norms, beliefs, values, frames, rituals, ceremonies, gossip, stories, jargon, rhetoric, humour, justifications and routines that organization members use to shape their actions as they engage in organizational activities (see Swidler, 1986; Weber, 2005; Kellogg, 2011; Leonardi, 2011). This toolkit supplies actors with the means (the tools) for solving practical problems and for navigating the environment, which Weber (2005) describes as the 'supply-side' of culture. These cultural resources can be analysed at the level of the repertoire, i.e. the entirety of cultural material at the disposal of individual actors or collectives, and there is no presumption that actors' toolkits are necessarily internally coherent or systematic (Weber, 2005). This shifts the focus towards individual choice and cultural resources but acknowledges that actors will have only a bounded set of diverse resources to solve the different problems of everyday organizational life. Hence, individual actors may use different resources without concern about inconsistencies and/or contradictions with others. Thus, we adopt this perspective of organizational culture to investigate how managerial ambidexterity emerges and the relationship between its origins and organizational outcomes. Through our case analysis, we argue that as an organizational culture develops over time, some of the cultural assumptions and values are more manifest and visible, which managers draw on frequently in their everyday work. At the same time, there could be other assumptions and values that are relegated to the background and stay latent and hidden. We suggest that in engaging with

exploitative-exploratory action managers invoke both the manifest-visible values as well as the latent-hidden values.

4. Research setting

This study was conducted at the European engineering firm GEN.COM (a pseudonym). GEN.COM is one of the largest independent manufacturers of turbogenerators worldwide and has operated for over 100 years. Alongside the manufacture of turbogenerators and transformers, the company also produces voltage regulators and excitation power controllers. Some of the generator products they currently manufacture include 2 and 4 pole air cooled turbogenerators, and hydrogen and combined cooled generators. These are used to power combined cycle plants, power stations, offshore platforms, LNG terminals, and pipeline power supply. This study is embedded within two projects: the APEX project in the transformer division and the DEXTROUS project in the generator division (see project timelines in Appendix B).

4.1. The APEX project

The APEX Project was originally focused on the sole improvement of the 132 kV transmission transformers. The main reason for the project was to improve the competitiveness of the transformer business segment and save the segment from collapse. Feedback from customers suggested that both the 132kV and 33kV transformers were too expensive, too heavy and inefficient. The transformer business segment was faced with severe competition prior to the commencement of the project. The increase in competition alongside other economic related issues necessitated the need for the APEX project to make transformers smaller, cheaper, and the organization more competitive in turn.

4.2. The DEXTROUS project

The objective of the DEXTROUS project was to ensure that new versions of products were market ready within a 20 year timeframe. The DEXTROUS project had to be evolutionary. Thus, the project focused on developing the existing product range to keep the organization one-step ahead of the competition. The DEXTROUS product range was developed in the early 1970s and the DEXTROUS project was tasked with its further development. The first phase involved environmental scanning, the second involved product investigation and upgrade, while the third phase involved generator prototype development.

5. Research methodology

Consistent with the identified need for more qualitative research to understand how ambidexterity works in projects (Pellegrinelli et al., 2015), we sought to get a closer meaning of the social processes in the research context as well as to understand first-hand the meanings which respondents attributed to their behaviors, i.e. the main aim was to understand how ambidexterity emerges and the relationship between its origins and organizational outcomes. A case study approach was adopted because of the exploratory nature of the research question. 55 semi-structured interviews were conducted with middle managers across the organization (see Appendix C). All interviews were recorded and transcribed verbatim. The first author also conducted participant observation for six months, attending monthly team briefs, weekly meetings, workshops, and was present at informal interactions between middle managers and senior managers. Organizational documents (e.g. strategy documents, standing instructions, internal project meeting minutes relating to the APEX and DEXTROUS projects, etc.) were also reviewed.

5.1. Data analysis

The data was analysed by travelling back and forth between the qualitative data and the emerging structure of theoretical arguments (e.g. Zimmerman et al., 2015). This process involved three major steps: (1) the first step involved creating provisional categories and first-order codes. We identified statements which the respondents made regarding their behaviors via open coding and identified commonalities in the statements which allowed the formation of the first order codes; (2) the second step integrated the first-order codes and created theoretical categories. Codes from the data were further consolidated and summarized to reflect each theme; (3) the third step involved delimiting theory by aggregating theoretical dimensions. We looked for dimensions fundamental to these categories in an attempt to understand how different categories fitted together into a coherent picture. Further, we linked the different experiences and ideas together, while allowing for the merging of interrelated examples, to arrive at the values invoked by managers.

6. Research findings

On both the Apex and Dextrous projects some managers demonstrated higher levels of exploration than exploitation, while others were noticeably more engaged in exploitative behaviors. A minority of managers demonstrated high levels of both exploratory *and* exploitative behaviors in their activities. In the following analysis covering the Apex and Dextrous projects we draw on both our observations of managerial action as well as the interview data. These illustrations also complement the project timelines in Appendix B. Specifically, we elaborate on the manifest-visible and latent-hidden values found in the organizational cultural toolkit that managers invoked and used in the process of undertaking exploitative, explorative and ambidextrous practices.

6.1. Managers' exploitation: an illustration

The first phase of the APEX project included an improvement to the core design of the transformer product and the removal of leg plates. The motivation behind this activity was to realize the strategic objective of achieving a 25% return on sales by the transformer business unit. Another motivation was to modernize and enhance the performance of the transformer product. We observed that middle managers guided this activity by reducing the quantity of steel to be used in the manufacturing of the product, which brought down the overall cost. We noticed that managers undertook a similar cost-reduction driven activity to re-design a tap changer, achieving 100,000 hours of operations without maintenance.

In the first phase of the DEXTROUS project we observed managers engaging with customer forums, conducting competitor reviews and Design Failure Mode and Effects Analysis (DFMEA), all of which fed into the project's time-line and road map. The aim of these activities was to highlight the key design areas of risk and help focus the early stages of the project. In light of the information garnered the initial project plan was adjusted and some of the intended radical initiatives were dropped in favor of making small improvements to the existing processes and the refinement of the generator product using their current capabilities.

6.2. Cultural resources and exploitative behaviors

Commitment to improving product and process efficiency: Leonardi (2011) identifies increased effectiveness of organizational processes as a shared value, while Rindova et al. (2011) identify improved efficiency and high quality of manufacturing as a historical cultural resource. Middle managers invoked their commitment to improving product efficiency and process effectiveness during facilitation of exploitative activities in phase 1 of both projects. They also noted that this commitment was a highly manifest and visible cultural value of GEN.COM, which every manager was aware of. They appreciated the principles of continuous advancement and valorized activities focused on upgrading current competencies,

processes and products. They spoke about the need to constantly improve their performance and generate new incremental adjustments and standards to improve their generator and transformer products, i.e. exploitative behavior. For example, an Engineering Resource Manager on the APEX project commented that:

> Whether you are a director, manager, team leader, operator or administrator, we have a culture which allows all processes, no matter how big or small, to be subject to review and improvement (e.g. how we manufacture, how we manage customers, how we sell, how we train and up-skill our workforce, how we design and engineer our products and so on).

Middle managers who demonstrated alignment to the strategic plans of the project guided the process of its implementation accordingly and favoured the advancement of processes and ultimately the attainment of maximum efficiency. Correspondingly, on the DEXTROUS project, middle managers drew on the organization's stated commitment to improving product and process efficiency when enacting exploitative behaviors, with some managers stating that this cultural value was "embedded in our routines and processes". A Mechanical Engineer noted:

> Our culture embraces improvements and we strive to continuously improve our products.

Cautious incrementalism: The interview data revealed that managers picked on *cautious incrementalism* to shape their exploitative behaviors. They explained that taking cautious and incremental steps when delivering projects was a well-known and visible cultural value at GEN.COM. Comments made by middle managers suggested that this value was at play in both projects. As an example, the Chief Electrical Engineer on the APEX project commented:

> …as willing as certain managers might be to do different things, the timing it takes everyone to get on board is long. The time it takes to make things happen is long, it moves slower than most businesses I have seen. The sense of urgency is also not always naturally there. I can say that our business is relatively stable, and it's a bit difficult rocking the boat.

Thus, middle managers guided the refinement process in ways that did not cause any unnecessary disruption to the production process through cautious minor modifications. Moreover, middle managers used phrases like "if it is not broken, don't fix it" and "that's how we've always done it" during informal conversations. These can be described as some of the norms and standards which were widely shared among managers. The comments of an Operations Manager illustrate how middle managers on the APEX project picked on cautious incrementalism as an enabler of behavior:

> We have a very mature product. It was designed when I first came here in the 70's and slowly we have improved those transformers over that period of time. We have taken small but significant steps. We have learnt by taking those small steps.

Cautious incrementalism was claimed by managers on the DEXTROUS project too as a worthwhile value, as highlighted by a Project Manager:

> We are very weary of improvisation because if you don't know the result of what you are doing, potentially, you might have generators that will fail. Our current product is reliable, so I tend to be very cautious. Small changes are part of the project, but big changes may be negative.

In short, cautious incrementalism served as a valuable cultural resource and was used by managers to shape and enable their exploitative behaviors. This cautious incrementalism was also consistent with the wider corporate culture of the organization. Cautious incrementalism

in this context is similar to notions of ‘carefulness’ described as an action style by Weber (2005).

6.3. Managers’ exploration: an illustration

As the APEX project continued, a major customer requested that radical changes be made to the transformer products. For instance, one major radical change proposed was the vacuum filling of transformer tanks. This unexpected request necessitated that managers brainstorm and share new ideas/knowledge and completely reconsider and redesign their value offering. In this process of unlearning and integration of new knowledge managers took a strategic decision to change their radiator supplier, which resulted in a fundamentally new product. During this non-routine exploratory activity, managers demonstrated high levels of innovativeness by encouraging their teams to seek new solutions, reconsider existing processes, and integrate new discoveries with existing processes.

On the DEXTROUS project, a number of novel design initiatives were generated to improve the vibration and noise levels of generators. This particular concern was raised by customers in response to the rapidly changing regulatory compliance requirements for GEN.COM and its customers. During our participant observation period, the legal threshold for vibration and noise became increasingly stringent due to new environmental legislation. We noticed that in a bid to ensure that each frame-size (in which generators are positioned) was fully optimized to reduce vibration and noise, managers radically challenged design margins and the established logic that was driving production processes. Managers were receptive to new ideas and sought to interpret and communicate these through novel simulations and prototypes that often contradicted the business as usual philosophy. We found that managers drew on two particular cultural values in their enactment of exploratory activities and behaviors.

6.4. Cultural resources and exploratory behaviors

Knowledge transfer and proactive collaboration: Middle managers on the APEX project highlighted how they supported, encouraged and motivated their teams to achieve some of the radical objectives of the project. A Mechanical Design Engineer on the APEX project commented:

> Each individual on my team and within the entire business continuously engaged in knowledge transfer activities. The culture made people to impart and develop their knowledge and experience for the good of the company.

This quote suggests that managers invoked the particular cultural value of continuously transferring knowledge and ideas to advance products and processes. Similarly, during team meetings, middle managers spoke casually but repeatedly about realizing the importance of knowledge transfer and how they scanned the environment and applied new methods. These managers commented that they responded to and acted upon divergent feedback for improvement which they received either internally or from customers. On the APEX project, for instance, a Continuous Improvement Manager asserted:

> I learnt something new every day from these guys, and every day was a school day.

Some of the interviewed managers spoke about how they drew inspiration from an often less used idea (or value) at GEN.COM of proactive collaboration. They commented on how they provided leadership and ensured that communication across the factory, especially with teams they worked directly with, was seamless. They commented on how they redefined team objectives as well as re-coordinated activities when the project had to be radically adapted. As an example, an Operations Manager who contributed to the APEX project observed:

> More than ever before, we now have a culture where teams work together to iron out difficult issues.

Another Operations Manager (Transformer) suggested that:

> We sit around and resolve issues. If you don't work as a team, you are going nowhere, and I mean the whole organization, not just individual departments. So we work for one another, not against one another.

Correspondingly, on the DEXTROUS project, middle managers commented that proactive collaboration was a latent and less visible cultural value within the organizational toolkit, which they worked hard to draw upon and use as a resource during the three phases of the project. Some of the middle managers realized that collaborating with other managers and employees from different departments, even those not on the project, was very important in order to operationalize "new ways of thinking" and "new ways of doing". As a Project Manager asserted:

> We were too departmental in our thinking and people only used to fight for their areas. But overtime, this has changed. This habit of working together has assisted us a lot on the project.

Receptiveness to change: When the trajectory of the projects changed, managers drew on receptiveness to change as a cultural value to enable exploratory actions. From the narrative of one of the Operations Managers:

> We have two major customers. When they decided very late that they wanted to change something on the machine, we were quite receptive to that. Our culture is quite flexible and we have processes that can allow for modification and re-specifications. I also try and encourage my team to be welcoming of these customer changes and requests.

Similarly, a DEXTROUS Electrical Engineer noted that *receptiveness to change* was a key cultural value:

> Creating an atmosphere that change is a good thing and that nobody will be punished for trying to change things has actually had a real influence on the continuous generation of new ideas on the project and across the factory.

Further observation of middle managers revealed that some drew on this principle of receptiveness to change and had a welcoming attitude towards new ideas. This acceptance and encouragement of change was more noticeable on the DEXTROUS project, possibly because of the evolutionary objectives set out for this project. From informal conversation and formal team meetings, it was evident that managers took the time to listen to the ideas and suggestions of their team members and the shop floor operators. Some of these suggestions were also successfully incorporated into the process and product innovation activities.

6.5. Managers' ambidexterity: an illustration

In the third phase of both projects, there was on-going innovation, fine-tuning of the adjusted processes as well as activities focused on ensuring consistency and stability in the production process. In other words, managers were seen to work with contradictions. One major action taken on the DEXTROUS project was the subsequent upgrade of the insulation system. This had two purposes: (1) product refinement for greater efficiency and value extraction from the product line (i.e. exploitation) and (2) to enter the higher megawatt sector, a new related market identified through customer survey data (i.e. exploration).

In the third phase of the APEX project, managers allowed their teams to use their own judgement as regards dividing their time between the contrasting activities they were working

on. One manager explicitly quantified this through purposely allowing a 5% reduction in the efficiency of his team, to allow them time to engage in searching for novel solutions and new opportunities. Consequently, they orchestrated paradoxical organizational activities such as standardization related activities and continuous experimentation with the aim to keep customers' operations running with maximum efficiency and effectiveness.

6.6. Cultural resources and ambidextrous behaviors

Delivering service excellence to customers: One of the cultural values that managers invoked to shape their ambidextrous behaviors was more of a broad statement of strategic intent: *delivering service excellence to customers*. This value was one of the three working philosophies documented in the organization's handbook (given to all employees), which exalts "service to our customers". This working philosophy encourages employees to deliver service excellence to customers at all points during the production and customer interface process. It also encourages employees to put customers first in decision-making, which requires the reconciliation of trade-offs. A number of comments from managers on the APEX project suggested that they drew on this value of 'service excellence' and justified several operational decisions with reference to this value. For example, an Engineering Resource Manager noted:

> I think a lot of balancing efficiency and flexibility is based on balancing the needs of the business and striving to satisfy our customers. We are always there to support the business to get the machines out of the door and to the door steps of the customers in the right time.

A Continuous Improvement Manager linked his ambidextrous approaches to the organization's commitment (or cultural value) to deliver service excellence to customers:

> My core values are drawn from my love for putting people first and in this case our customers always come first.

Likewise, a Lean Engineer commented that:

> The customer is very much king here, so we put them first. We always try to satisfy them. I work for the customer.

Interview data from the DEXTROUS project also revealed that managers repeatedly invoked 'delivering service excellence to customers' to explain their ambidextrous actions. An Operations Manager explained that satisfying the customers was of paramount importance across the organization. He noted:

> Customer comments are taken on board very strongly….The core value we all share is satisfying the customers.

As another Operations Manager put it:

> Our core value is customer satisfaction. We want our dealings with our customers to be that of a seamless transition, from the sale of product, through to the aftermarket lifecycle care that the aftermarket function delivers.

In summary, drawing on the 'delivering service excellence to customers' value, managers drove the business to meet the needs of the customers as well as going beyond what was required to meet customer needs. They also demonstrated professionalism in their dealings with both internal and external customers. During informal conversations, managers noted how they tried to always meet what they had promised, which often required managing

divergent inputs into the project from both internal and external stakeholders that were in conflict, e.g. the desire for flexibility from customers versus the push for efficiency gains by senior management.

Maintaining a reputable brand: Middle managers also explained their ambidextrous activities with reference to GEN.COM's emphasis on *maintaining a reputable brand*. As a Lean Engineer on the APEX project put it:

> In the gas turbine world, we are very much like the Rolls Royce. We are not the cheapest, but we have a very well designed and quality product. In all we do, we always want to maintain this standard that we are known for.

Managers explained that maintaining a reputable brand meant focusing on both heritage and innovation which are inherently contradictory, with the former entrenched in the past and the latter focused on the future. Managers drew on the idea (value) of 'maintaining a reputable brand' to both exploit their current value offerings whilst simultaneously pursuing innovation (exploration) to sustain their market leading position. According to an Operations Manager:

> Presently, our products are one of the best brands for quality, delivery and performance in the world. That does not mean to say we would be there in that category in the next 10 years. We need to maintain our standard.

The 'quality' which managers referred to was not just about the quality of the product, but also about the quality of response to customer concerns, the ability to provide technical expertise and the delivery of a high performance product through superior design and

engineering. Overall, managers explained that ‘maintaining a reputable brand’ was on top of their mind when they undertook ambidextrous actions.

7. Discussion

The above findings illustrate how middle managers draw on different cultural resources found in the ‘organizational culture’ toolkit (Swidler, 1986) for developing their own strategies of action in project delivery. We now present the key insights garnered and develop propositions based on the study’s aims: (a) to explain how ambidexterity is enacted by managers within projects and (b) to explore the relationships between managerial activity and organizational ambidexterity.

One way by which an organization can exploit its current capabilities and assets is through the refinement and improvement of processes, products and capabilities, i.e. engaging in exploitative activities. The findings of this study are in line with O’Reilly and Tushman’s (2004) observation that the scope of exploitation is cost reduction and profit maximization. The strategic intent sought reduction in the cost of production (i.e. cutting out waste and inefficiencies thus improving internal efficiencies), improvement in lead time (thus improving customer satisfaction), improvement in order levels (negating a dwindling market share), as well as a maximization of profit for GEN.COM, particularly on the APEX project. Managers who aligned themselves to the strategic plans of the projects, guided refinement activities and had a very clear understanding of what was important to the customers and to the organization, such as reliable products and improved internal processes. In enabling and shaping their exploitative behaviors, managers drew on the cultural values of *improving product and process efficiency* and *cautious incrementalism*, both of which were manifest and highly visible aspects of the corporate cultural rhetoric focused on incremental refinement of existing products.

Proposition 1. Managerial selection of manifest-visible cultural values leads to a focus on exploitative project activities aligned to dominant organizational norms.

In contrast, exploration involves the generation of new knowledge through knowledge search and experimentation to advance existing frontiers of best practice (Burgess et al., 2015). Building on a case study of the space industry, Lenfle (2016) observed that exploration-oriented activities may require managers to deviate significantly from the dominant model of project management practised in firms. At GEN.COM, some managers demonstrated innovativeness by undertaking exploration-oriented activity and departing from the paths which had been already charted by the senior managers' intent. Whilst working within the framework of the broader organizational culture these managers demonstrated significant autonomy and enacted explorative behaviors in line with the unfolding needs of their projects. Particularly on the DEXTROUS project, which was relatively less structured and somewhat 'floating' (Lenfle , 2016) in terms of its objectives, they encouraged their teams to seek new solutions, reconsider existing processes and integrate new knowledge for the development of new capabilities. Overall, managers that undertook exploration-oriented activities routinely generated imaginative alternatives and were willing to experiment. Their subsequent behaviors helped meet the changing needs of customers and the market, which otherwise would not have been accomplished under a purely strategic intent-led exploitative-oriented action. As noted in section 6.5, in enacting exploratory activities managers drew on the cultural values of *knowledge transfer and proactive collaboration* and *receptiveness to change*. Interestingly, we found in our analysis of managerial action and interviews that these cultural values were not always an easily discernible aspect of the larger organizational culture. In other words they were latent and remained less visible (or hidden) in the cultural toolkit and managers invoked them when undertaking and justifying radical-exploratory

behaviors. Theoretically, this argument about the latent-hidden aspect of organizational culture makes intuitive sense since an aspirational value such as *receptiveness to change* is often difficult to embed in the everyday life of an organization given the more commonly seen *resistance to change.*

Proposition 2. Managerial selection of latent-hidden cultural values leads to the pursuit of explorative project activities that may diverge from dominant organizational norms.

Research suggests that ambidextrous managers must manage contradictions and conflicting goals and engage in paradoxical thinking (e.g. Gibson and Birkinshaw, 2004). However, Gupta et al. (2006) argue that it is challenging for an individual to excel at both exploit and explore, which explains why a number of managers either demonstrated exploitative *or* explorative behaviors, but not both. However, as noted by Raisch et al. (2009) and Burgess et al. (2015), some managers were able to take on contradictory tasks. Specifically, a number of middle managers were able to both align to the objectives of their respective projects as well as engage in divergent activities, often in response to customer re-specifications and environmental change. Although these middle managers found these multiple activities daunting, they were able to manage these conflicting demands and enact ambidexterity by drawing on the broad values of *delivering service excellence* and *maintaining a reputable brand* from the organizational cultural toolkit. We would argue that one of the major advantages of embedding broadly-defined values into an organizational culture is that they allow actors to engage in a diverse (and inherently contradictory) range of actions without necessarily having to find themselves in conflict with culture-specific norms. In other words, organizational values that are broad aspirational statements with universal appeal (e.g. delivering service excellence) rather than specific coded instructions for behavior

could give actors the interpretive flexibility to enact a spectrum of activities in the name of the said macro-values.

Thus, by invoking two generic and broad values from the organizational cultural toolkit, managers at GEN.COM were able to take both a long-term orientation through exploratory activities whilst executing short-term objectives through exploitative activities during the implementation of both projects. Managers who demonstrated ambidextrous behaviors could also be described as 'generalists' or 'hybrid' consistent with those employees found to behave ambidextrously (see Birkinshaw and Gibson, 2004; Burgess et al., 2015). Such managers may not be experts in specific fields but very knowledgeable on a very wide range of organizational activities and processes. Thus, these middle managers were more likely to engage in paradoxical activities at the project level by making quick decisions under pressure and being willing to act without approval from senior management, all the while validating their actions through their specific selection of the values of delivering service excellence and maintaining a reputable brand. The case study suggests that such managers are hands-on managers who appreciate the consequences associated with not making a decision on time, experts at networking, and influencing customers and employees both horizontally and laterally though the organization.

Proposition 3. In the absence of specific coded instructions for behavior broadly-defined cultural values facilitate exploitative and explorative activities, enabling managers to respond to the divergent needs of projects.

The link between managerial integration of exploration and exploitation activities to organizational ambidexterity needs to be understood in relation to organizations' strategic intent, or the cultural doctrines espoused at the corporate level. For instance, a top-down

approach to the development and execution of projects, as seen at the case organization, is favoured in the invoking of the values of *improving product and process efficiency* and *cautious incrementalism* which are used to create alignment to organizational intent. However, such cultural homogeneity between the centre and project team (i.e. a strong corporate culture) may in effect be a barrier to ambidextrous project activities. Encouraging practices at the project-level that only adhere to a rigid logic could limit the pursuit of exploratory outcomes. Put differently it might lead managers to invoke only highly visible cultural tools that strongly espouse current organizational logic. Such managers may seek to maintain organizational status quo and learn within narrowly defined parameters, leading to a greater volume of exploitative-activities and, thus, non-ambidextrous outcomes.

In contrast, heterogeneous cultural systems incorporate less obvious values (e.g. receptiveness to change), which managers draw on to change prescribed intent and improve project delivery effectiveness. It is crucial that such values are a part of the cultural toolkit, even if they are latent and hidden, since it opens up the possibility that managers will select them when needed. Such latent-hidden values serve as cultural tools facilitating unintended exploratory-oriented activities that generate more ambidextrous outcomes for the organization. In other words, managers can change the original intent of a project (legitimatized based on the cultural tools selected) thereby changing the outcome from that which senior management anticipated. Such tools used to facilitate cultural opposition appear central to improving responsiveness in competitive environments that would not otherwise occur though exploitative activities alone (e.g. for entering new markets). This illustrates the counterintuitive nature of the findings and shows how better understanding of managerial exploitative and explorative activities can help to establish the origins of ambidextrous organizational outcomes (Laureiro-Martinez et al., 2015). We propose that:

Proposition 4. Manifest-visible cultural tools are selected by managers to ensure alignment between organizational doctrines and project level activities, but latent-hidden cultural tools are used by some managers as mechanisms for exploratory activities and consequentially, ambidextrous outcomes.

8. Implications for theory

The activities of managers at the project level can be severely constrained by the learned pattern of response that is structurally and cognitively reinforced by organizational culture, as supported by the extant ambidexterity literature (see Gibson and Birkinshaw, 2004; Lin and McDonough, 2011; Wang and Rafiq, 2014). But if variation in individual managerial ambidexterity can exist within the same context, this means that other contextual factors are at play which may not be sufficiently captured by examining organizational culture in its abstraction. For instance, Junni et al. (2015) suggest that some level of cultural diversity is needed for ambidexterity. They posit that emphasizing unity at the firm level while allowing units and groups to have different subcultures is a means to meet the cultural paradox of ambidexterity. Upon reflecting on how organizations can design a culture that supports differences and unity simultaneously, this case study explains how ambidexterity is enacted by managers through the cultural tools adopted during project delivery and the anticipated consequences for organizational ambidexterity, extending recent research at the project level (e.g., Lee-Kelley, 2017). Specifically the findings complement Swidler's (1986) suggestion that individuals creatively select from a repertoire of cultural tools and then construct strategies of action, rather than being cultural tropes who just enact dominant organizational values.

The value of emphasizing cultural unity at the firm level is clear in theory, but cultural unity at the organizational level can act as a barrier to the simultaneous attainment of

ambidexterity activity in projects and ambidextrous outcomes for organizations. For instance, organizational unity can to varying degrees supress specific cultural values, beliefs, and norms by establishing and reinforcing reliable organizational systems that promote firm routines. In turn, these norms and routines create an illusion of stability in the organizational structure reducing the perceived need for adaptability (Sydow and Koch, 2009). Such firm routines that become repeated patterns of response reinforced through structural embeddedness and repeated use (Gilbert, 2005) can result in routine rigidity or inertia, i.e. an organizational culture that encourages practices that only adhere to a rigid logic and culturally learned patterns of response. This environment can create an imbalance between exploitation and exploration during project delivery by moving toward reducing inconsistencies leading to reduced ambidextrous outcomes.

We therefore argue that organizational latitude for ambidextrous activity is strongly influenced by the latent values that are often understood informally alongside the espoused strategic intent, which more formally"…determines the extent to which the firm wants to proactively fulfil two disparate, risky, and difficult-to-manage objectives" (Luo and Rui, 2009: 67). Thus, careful managerial nurturing of latent-hidden values could spur a fundamental "rethinking" of "innovation and design" (Midler et al., 2017) at the project-level and help develop products for different markets.

Our study supports suggestions that organizational ambidexterity should not necessarily be depicted as the equal accomplishment of both exploitation and exploration (Burgess et al., 2015), as this is likely to be more nuanced in practice. To advance the ambidexterity literature and to better appreciate its significance for project success and competitive strategy, there is a need for future research to link ambidexterity as activity and ambidexterity as outcome. Reconciling these two levels of ambidexterity research through

project-based studies will offer a purposeful investigation of the cultural paradox that exists between managers' ambidextrous activities and the competitive advantage of firms.

9. Conclusion

Prior research has proposed that contextual characteristics can help managers facilitate and sustain ambidexterity. While such characteristics are important antecedents of ambidexterity, studies have yet to examine how organizational culture as a multilevel phenomenon impacts both managers' realization of exploitative and explorative activities as well as the achievement of organizational ambidextrous outcomes. By examining organizational culture as a toolkit of valuable resources available to managers we add an important project-level perspective to the ambidexterity literature, which has thus far assumed that with a favourable context at the macro level, ambidexterity will follow.

Positioning our study in the project context, we respond to calls for further research to refine ambidexterity theory by examining subunit conditions (e.g. Burgess et al., 2015; Birkinshaw and Gupta, 2013; Mom et al., 2007, 2009; Nosella et al., 2012; Turner et al., 2012, 2015). We find that organizational culture is not homogeneous but rather heterogeneous for individual members, whereby managers have a degree of liberty and choice in their use of cultural resources for specific behaviors. Managers orchestrate their ambidextrous action through invoking cultural values and using them as resources to shape their actions at the project level. We propose a set of relationships between cultural tools, project-based activities and firm level outcomes to direct future research investigations into the cultural paradox of ambidexterity.

10. References

Andriopoulos, C., and Lewis, M. W. (2010). Managing innovation paradoxes: Ambidexterity lessons from leading product design companies. *Long Range Planning*, 43(1), 104-22.

Benner, M. J. and Tushman, M. L. (2003). Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Reviews*, 28(2), 238–256.

Birkinshaw, J. and Gupta, K. (2013). Clarifying the distinctive contribution of ambidexterity to the field of organization studies. *Academy of Management Perspectives*, 27(4), 287–298.

Birkinshaw, J. and Gibson, C. (2004). Building ambidexterity into an organization. *MIT Sloan Management Review*, 45(4), 47-55.

Blindenbach-Driessen, F., and Ende, J. (2014). The locus of innovation: The effect of a separate innovation unit on exploration, exploitation, and ambidexterity in manufacturing and service firms. *Journal of Product Innovation Management*, 31(5), 1089-1105.

Boumgarden, P., Nickerson, J., and Zenger, T.R. (2012). Sailing into the wind: Exploring the relationships among ambidexterity, vacillation, and organizational performance. *Strategic Management Journal*, 33(6), 587-610

Burgess, N., Strauss, K., Currie, G., and Wood, G. (2015). Organizational ambidexterity and the hybrid middle manager: The case of patient safety in UK hospitals. *Human Resource Management*, 54, 87-109.

Canato, A., Ravasi, D., and Phillips, N. (2013). Coerced practice implementation in cases of low cultural fit: Cultural change and practice adaptation during the implementation of Six Sigma at 3M. *Academy of Management Journal*, 56(6), 1724–1753.

Cao, Q., Simsek, Z., and Zhang, H. (2010). Modelling the joint impact of the CEO and the TMT on organizational ambidexterity. *Journal of Management Studies,* 47(7), 1272-1296.

Cardinal, L.B. (2001). Technological innovation in the pharmaceutical industry: the use of organizational control in managing research and development. *Organization Science*. 12(1), 19-36.

Chandrasekaran, A., Linderman, K. and Schroeder, R. (2012). Antecedents to ambidexterity competency in high technology organizations. *Journal of Operations Management*, 30(1), 134-151.

Chang, Y-Y. (2015). A multilevel examination of high-performance work systems and unit-level organisational ambidexterity. *Human Resource Management Journal*, 25(1), 79-101.

De Clercq, D., Thongpapanl, N., and Dimov, D. (2014). Contextual ambidexterity in SMEs: the roles of internal and external rivalry. *Small Business Economics*, 42(1), 191-205.

Duncan, R. B. (1976). The ambidextrous organization: designing dual structures for innovation. In R.H. Kilmann, L.R. Pondy, & D.P. Slevin (Eds.), *The Management of Organization: Strategy and Implementation Volume I*. (pp. 167-188). New York: Elsevier.

Eriksson, P.E. (2013). Exploration and exploitation in project-based organizations: Development and diffusion of knowledge at different organizational levels in construction companies. *International Journal of Project Management*, 31(3), 333-341.

Gibson, C. B. and Birkinshaw, J. (2004). The antecedents, consequences and mediating role of organizational ambidexterity. *Academy of Management Journal*, 47(2), 209–226.

Gilbert, C. G. (2005). Unbundling the structure of inertia: resource versus routine rigidity. *Academy of Management Journal,* 48(5), 741-763.

Giorgi, S., C. Lockwood, C., and Glynn, M. A. (2015). "The Many Faces of Culture: Making Sense of 30 Years of Research on Culture in Organization Studies." *The Academy of Management Annals,* 9 (1): 1-54.

Grover, V., Purvis, R.L., and Segars, A.H. (2007). Exploring ambidextrous innovation tendencies in the adoption of telecommunications technologies. *IEEE Transactions on Engineering Management*, 54(2), 268-285.

Gupta, A.K., Smith, K., and Shalley, C.E. (2006). The interplay between exploration and exploitation. *Academy of Management Journal,* 49(4), 693–706.

Halevi, Y.M., Carmeli, A., and Brueller, N.N. (2015). Ambidexterity in SBUs: TMT Behavioral Integration and Environmental Dynamism. *Human Resource Management,* 54(S1), s223-s238.

Havermans, L.A., Den Hartog, D.N., Keegan, A., and Uhl-Bien, M. (2015). Exploring the role of leadership in enabling contextual ambidexterity. *Human Resource Management,* 54(S1), s179-s200.

He, Z. L. and Wong, P. K. (2004). Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. *Organization Science,* 15(4), 481-494.

Heavey, C., Simsek, Z., and Fox, B.C. (2015). Managerial social networks and ambidexterity of SMEs: The moderating role of a proactive commitment to innovation. *Human Resource Managemen*t, 54(S1), S201–S221.

Henderson, R.M., and Clark, K.B. (1990). Architectural innovation: the reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35(1), 9-30.

Hodgkinson, I.R., Ravishankar, M.N., and Aitken-Fischer, M. (2014). A resource-advantage perspective on the orchestration of ambidexterity. *Service Industries Journal*, 34(15), 1234-1252.

Hughes, M., Martin, S.L., Morgan, R.E., and Robson, M.J. (2010). Realizing product-market advantage in high-technology international new ventures: the mediating role of ambidextrous innovation. *Journal of International Marketing*, 18(4), 1-21.

Jansen, J.J.P., George, G., Van den Bosch, F.A.J., and Volberda, H.W. (2008). Senior team attributes and organizational ambidexterity: the moderating role of transformational leadership. *Journal of Management Studies*, 45(5), 982-1007.

Jansen, J.J.P., Tempelaar, M.P., van den Bosch, F.A.J., and Volberda, H.W. (2009). Structural differentiation and ambidexterity: the mediating role of integration mechanisms. *Organization Science*, 20(4), 787-811.

Jansen, J. J. P., Simsek, Z., and Cao, Q. (2012). Ambidexterity and performance in multi-unit contexts: Cross-level moderating effects of structural and resource attributes. *Strategic Management Journal*, 33(11), 1286-1303.

Junni, P., Sarala, R. M., Tarba, S. Y., Liu, Y., and Cooper, C. L. (2015). Guest editors' introduction: The role of human resources and organizational factors in ambidexterity. *Human Resource Management*, 54(S1), s1-s28.

Kellogg, K. C. (2011). Hot lights and cold steel: Cultural and political toolkits for practice change in surgery. *Organisation Science*, 22(2), 482–502.

Kortmann, S. (2015). The Mediating Role of Strategic Orientations on the Relationship between Ambidexterity-Oriented Decisions and Innovative Ambidexterity. *Journal of Product Innovation Management*, 32(5), 666–684

Kostopoulos, K.C., Bozionelos, N., and Syrigos, E. (2015). Ambidexterity and unit performance: Intellectual capital antecedents and cross-level moderating effects of human resource practices. *Human Resource Management*, 54(S1), s111-s132.

Kouropalatis, Y., Hughes, P., and Morgan, R.E. (2012). Pursuing "flexible commitment" as strategic ambidexterity: an empirical justification in high technology firms. *European Journal of Marketing*, 46(10), 1389-1417.

Laureiro-Martinez, D., Brusoni, S., Canessa, N., and Zollo, M. (2015). Understanding the exploration-exploitation dilemma: An fMRI study of attention control and decision-making performance. *Strategic Management Journal*, 36(3), 319-338.

Lavie, D., Kang, J., and Rosenkopf, L. (2011). Balance within and across domains: the performance implications of exploration and exploitation in alliances. *Organization Science*, 22(6), 1517-1538.

Lee-Kelley, L. (2017). When 'knowing what' is not enough: Role of organised simulations for developing effective practice. *International Journal of Project Management*. DOI.org/10.1016/j.ijproman.2017.08.003.

Lenfle, S. (2016). Floating in space? On the strangeness of exploratory projects. *Project Management Journal*, 47(2), 47-61.

Leonardi, P. M. (2011). Innovation blindness: Culture, frames, and cross-boundary problem construction in the development of new technology concepts. *Organisation Science*, 22(2), 347–369.

Lin, H.E., and McDonough, E.F. (2011). Investigating the role of leadership and organizational culture in fostering innovation ambidexterity. *IEEE Transactions on Engineering Management*, 58: 497-509.

Lin, H.E., and McDonough, E.F. (2014). Cognitive Frames, Learning Mechanisms, and Innovation Ambidexterity. *Journal of Product Innovation Management*, 31(S1), 170-188.

Lubatkin, M. H., Simsek, Z., Ling, Y. and JVeiga, J. F. (2006). Ambidexterity and performance in small- to medium-sized firms: The pivotal role of top management team behavioral integration. *Journal of Management*, 32(5), 646–672.

Luo, Y., and Rui, H. (2009). An ambidexterity perspective toward multinational enterprises from emerging economies. *The Academy of Management Perspectives*, 23(4), 49-70.

March, J. G. (1991). Exploration and exploitation in organizational learning. *Organisation Science*, 2(1), 71–87.

Midler, C., Jullien, B., and Lung, Y. (2017). *Rethinking Innovation and Design for Emerging Markets: Inside the Renault Kwid Project*. CRC Press, Floirda, US.

Mom, T. J. M., van den Bosch, F. A. J. and Volberda, H. W. (2007). Investigating managers' exploration and exploitation activities: The influence of top-down, bottom-up, and horizontal knowledge inflows. *Journal of Management Studies*, 44(6), 910–931.

Mom, T.J.M., Van Den Bosch, F.A.J., and Volberda, H.W. (2009). Understanding variation in managers' ambidexterity: Investigating direct and interaction effects of formal structure and personal coordination mechanisms. *Organization Science*, 20(4), 812–828.

Mom, T.J.M., Fourné, S.P., and Jansen, J.J.P. (2015). Managers' work experience, ambidexterity, and performance: The contingency role of the work context. *Human Resource Management*, 54(S1), s133-s153.

Morgan, R.E., and Berthon, P. (2008). Market orientation, generative learning, innovation strategy and business performance inter-relationships in bioscience firms. *Journal of Management Studies*, 45(8), 1329-1353.

Nosella, A., Cantarello, S. and Filippini, R. (2012). The intellectual structure of organisational ambidexterity: A bibliographic investigation into the state of the art. *Strategic Organisation,* 10(4), 450-465.

O'Reilly, C. A. and Tushman, M. L. (2004). The ambidextrous organization. *Harvard Business Review*, 82(4), 74–81.

Pellegrinelli, S., Murray-Webster, R., and Turner, N. (2015). Facilitating organizational ambidexterity through the complementary use of projects and programs. *International Journal of Project Management,* 33(1), 153-164.

Raisch, S., Birkinshaw, J., Gilbert, P. and Tushman, M.L. (2009). Organizational ambidexterity: Balancing exploitation and exploration for sustained performance. *Organization Science*, 20(4), 685–95.

Raisch, S. and Birkinshaw, J. (2008). Organizational ambidexterity: Antecedents, outcomes, and moderators. *Journal of Management*, 34, 375–409.

Revellino, S. and Mouritsen, J. (2015). Accounting as an engine: The performativity of calculative practices and the dynamics of innovation. *Management Accounting Research*, 28, 31-49.

Rindova, V. E., Dalpiaz, D. and Ravasi. (2011). A cultural quest: A study of organizational use of new cultural resources in strategy formation. *Organisation Science*, 22(2), 413–431.

Rothaermel, F.T., and Alexandre, M.T. (2009). Ambidexterity in technology sourcing: the moderating role of absorptive capacity. *Organization Science*, 20(4), 759-780.

Schein, E. H. (1992). *Organizational Culture and Leadership*, 2d ed., San Francisco: Jossey-Bass.

Siggelkow, N., and Levinthal, D.A. (2003). Temporarily divide to conquer: centralized, decentralized, and reintegrated organizational approaches to exploration and adaptation. *Organization Science*, 14(6), 650-669.

Simsek Z. (2009). Organisational ambidexterity: towards a multilevel understanding. *Journal of Management Studies*, 46(4), 597-624.

Simsek, Z., Heavey, C., Veiga, J.F. and Souder, D. (2009). A typology for aligning organizational ambidexterity's conceptualizations, antecedents and outcomes. *Journal of Management Studies*, 46(5), 864-894.

Stettner, U., and Lavie, D. (2014). Ambidexterity under scrutiny: Exploration and exploitation via internal organization, alliances, and acquisitions. *Strategic Management Journal*, 35(13), 1903-1929.

Swidler, A. (1986). Culture in action: Symbols and strategies. *American Sociology Review*, 51(2), 273–286.

Sydow, J., and Koch, J. (2009). Organizational path dependence: Opening the black box. *Academy of Management Review*, 34(4), 689-709.

Tiwana, A. (2008). Do bridging ties complement strong ties? An empirical examination of alliance ambidexterity. *Strategic Management Journal*, 29(3), 251-272.

Tushman, M. L. and O'Reilly, C. A. (1996). Ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review*, 38(4), 8–30.

Turner, N., Swart, J., Maylor, H., and Antonacopoulou, E. (2016). Making it happen: How managerial actions enable project-based ambidexterity. *Management Learning*, 47(2), 199-222.

Turner, N., and Lee-Kelley, L. (2012). Unpacking the theory on ambidexterity: An illustrative case on the managerial architectures, mechanisms and dynamics. *Management Learning*, 44(2), 179-196.

Turner, N., Maylor, H., and Swart, J. (2015). Ambidexterity in projects: An intellectual capital perspective. *International Journal of Project Management*, 33(1), 177-188.

Turner, N., Swart, J., and Maylor, H. (2012). Mechanisms for managing ambidexterity: A review and research agenda. *International Journal of Management Review*, 15(3), 317–332.

Wang, C. L. and Rafiq, M. (2014). Ambidextrous organizational culture, contextual ambidexterity and new product innovation: A comparative study of UK and Chinese high-tech firms. *British Journal of Management*, 25(1), 58-76.

Weber, K. (2005). A toolkit for analysing corporate cultural toolkits. *Poetics*, 33(3–4), 227–252.

Weber, K. and Dacin, M. T. (2011). The cultural construction of organizational life: Introduction to the special issue. *Organization Science*, 22(2), 287–298.

Wei, Z., Yi, Y., and Guo, H. (2014). Organizational learning ambidexterity, strategic flexibility, and new product development. *Journal of Product Innovation Management*, 31(4), 832-847.

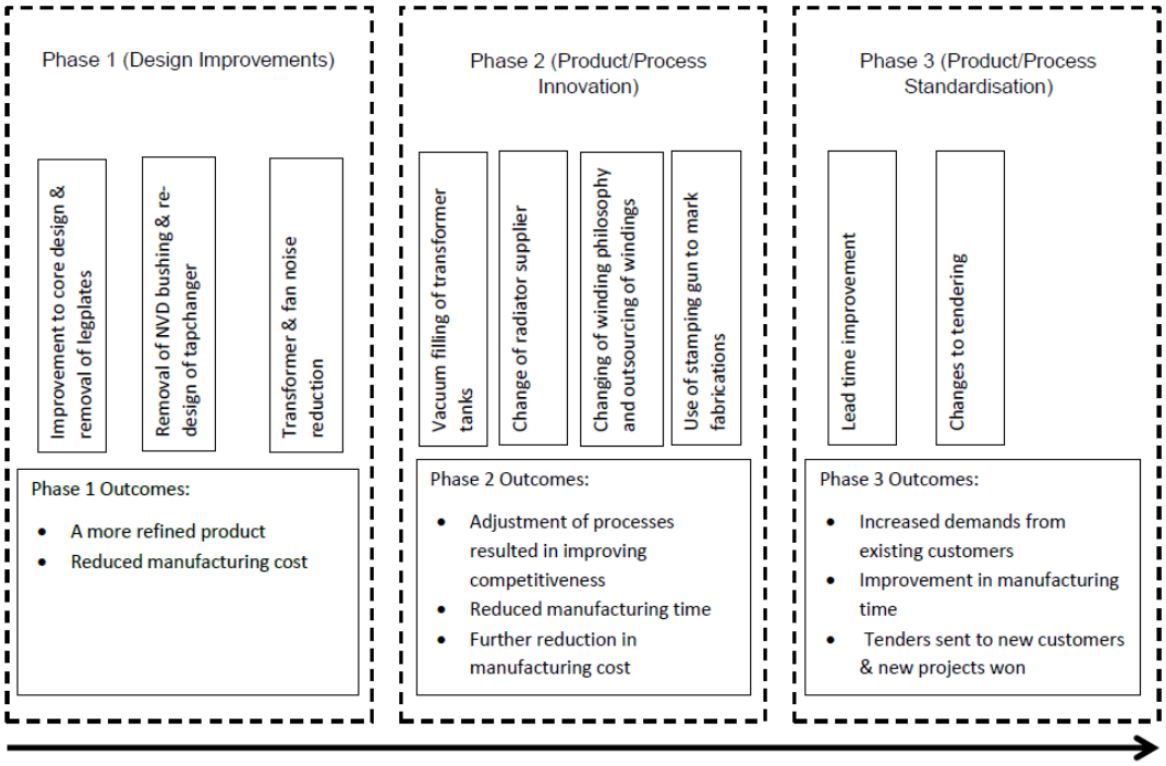
Zimmermann, A., Raisch, S., and Birkinshaw, J. (2015). How is ambidexterity initiated? The emergent charter definition process. *Organization Science*, 26(2), 1-21.

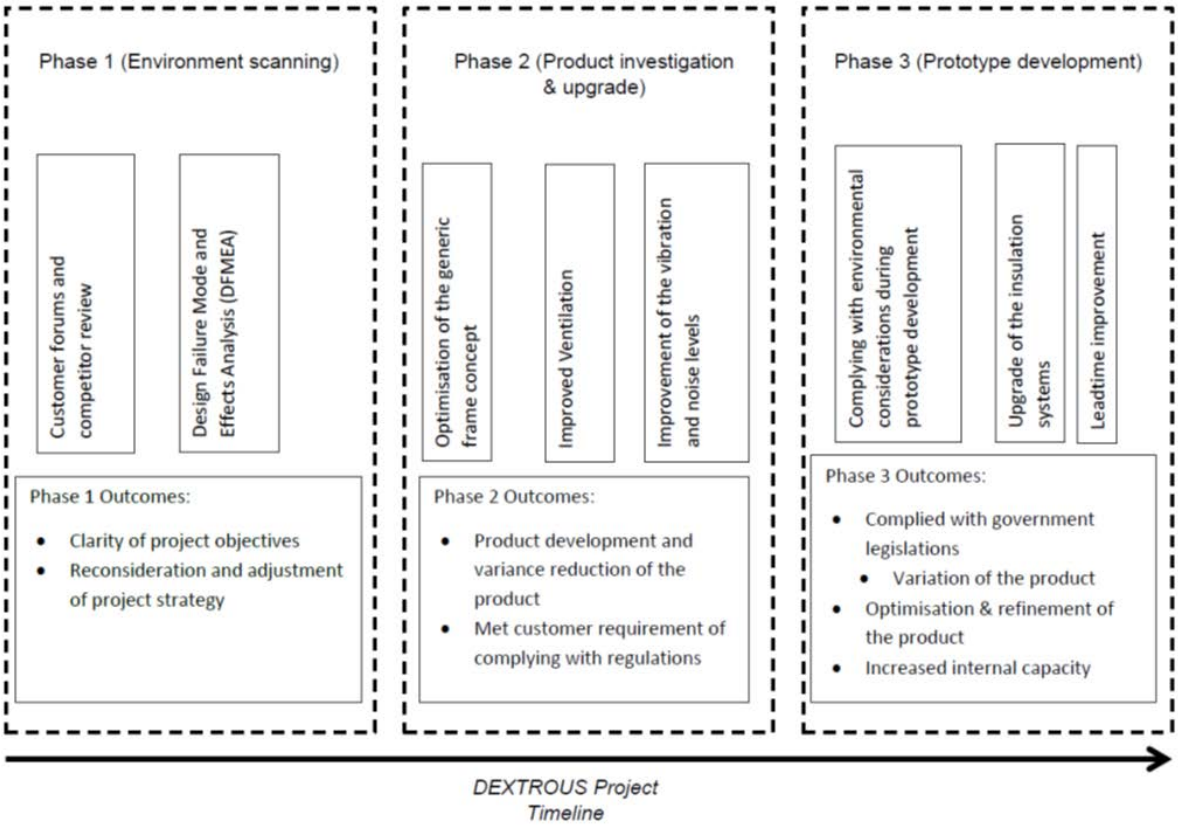
Appendix A. Ambidexterity as activity versus ambidexterity as outcome

Author(s)	Type	Research Setting	Method	Level of Analysis	Focus
Gibson & Birkinshaw (2004)	Harmonic	Multinational Firms (including Banking, Software, Engineering, Automotive).	Qualitative & Quantitative (interviews & survey)	Unit	Activities
Zimmermann et al. (2015)	Harmonic	Inter-firm alliances in the automotive industry	Qualitative (interviews)	Individual & Organization	Activities
Cao et al. (2010)	Harmonic	SMEs from high-tech parks in China.	Quantitative (survey)	Organization	Activities
Jansen et al. (2012)	Harmonic	Units within autonomous branches of a global financial services firm.	Quantitative (survey)	Unit	Activities
Lubatkin et al. (2006)	Harmonic	SMEs in one region of New England.	Quantitative (survey)	SMEs	Activities
Tiwana (2008)	Harmonic	Individual team participants in project alliances spanning various organizations.	Quantitative (survey)	Project	Activities
Hodgkinson et al. (2014)	Harmonic	European airline.	Qualitative (case study)	Individual	Activities
Hughes et al. (2010)	Harmonic	High-technology INVs in Mexico.	Quantitative (survey)	Organization	Outcomes
Wei et al. (2014)	Harmonic	Broad scope of industries and districts of China.	Quantitative (survey)	Organization	Activities
Rothaermel & Alexandre (2009)	Harmonic	US manufacturing sector	Quantitative (panel & survey)	Organization	Activities
De Clercq et al. (2014)	Harmonic	Canadian-based SMEs.	Quantitative (survey)	SMEs	Activities
Morgan & Berthon (2008)	Harmonic	Firms in the UK bioscience industry.	Quantitative (survey)	Organization	Outcomes
Kouropalatis et al. (2012)	Harmonic	High-tech marketing firms in the UK.	Quantitative (survey)	Organization	Activities
Lin & McDonough (2014)	Harmonic	Taiwanese companies operating in chemicals, pharmaceuticals, financial management, mechanical engineering, and electronic engineering sectors.	Quantitative (survey)	Organization	Outcomes
Chang (2015)	Harmonic	Banking firms in Taiwan.	Quantitative (survey)	Unit & Organization	Activities
Lin & McDonough (2011)	Harmonic	SBUs operating in chemicals, pharmaceuticals, finance, engineering.	Quantitative (survey)	Organization	Outcomes
Laureiro-Martinez et al. (2015)	Harmonic	Individuals with at least four years' experience of making managerial decisions.	Quantitative (experiment)	Individual	Activities
Patel et al. (2012)	Harmonic	Low-high tech small US manufacturing	Quantitative (survey)	Organization	Activities

		firms.			
Mom et al. (2015)	Harmonic	One service firm and one manufacturing firm.	Quantitative (survey)	Individual	Activities
Havermans et al. (2015)	Harmonic	Two project-based organizations.	Qualitative (interviews)	Individual	Activities
Burgess et al. (2015)	Harmonic	UK External Providers and Disseminators of Patient Safety Knowledge and hospitals	Qualitative (multilevel interviews)	Individual	Activities
Kostopoulos et al. (2015)	Harmonic	Business units operating within U.S. Fortune 500 companies.	Quantitative (survey & objective)	Unit	Activities
Halevi et al. (2015)	Harmonic	SBUs in both service and industrial sectors.	Quantitative (survey)	TMT & Unit	Activities
Heavey et al. (2015)	Harmonic	SMEs operating in technology-based industries.	Quantitative (survey)	TMT	Activities
Wang & Rafiq (2014)	Harmonic	UK and Chinese high-tech firms (including pharmaceutical, biotechnology, software).	Quantitative (survey)	Organization	Activities & Outcomes
Kortmann (2015)	Harmonic	US and Indian manufacturing firms.	Quantitative (survey)	TMT & Organization	Activities & Outcomes
Boumgarden et al. (2012)	Differentiation	HP and USAToday.com.	Qualitative (case analysis)	Organization	Outcomes
Lavie et al. (2011)	Differentiation	US-based firms in the software industry.	Quantitative (pooled time-series analysis)	Organization	Activities
Jansen et al. (2009)	Differentiation	Private firms with at least 25 employees.	Quantitative (survey)	Organization	Activities
Jansen et al. (2008)	Differentiation	Dutch branches of a large European financial services firm.	Quantitative (survey)	Organization	Activities
Blindenbach-Driessen & Ende (2014)	Differentiation	Dutch service and manufacturing firms larger than 100 employees.	Quantitative (survey)	Organization	Activities
Benner & Tushman (2003)	Differentiation	Firms in the photography and paint industries.	Quantitative (database & patent data)	Organization	Activities
He & Wong (2004)	Differentiation	Manufacturing firms in Singapore and the State of Penang in Malaysia.	Quantitative (survey)	Organization	Activities
Grover et al. (2007)	Differentiation	Telecoms in manufacturing, finance, government & education.	Quantitative (survey)	Organization	Outcomes
Siggelkow & Levinthal (2003)	Differentiation	Incumbent firms.	Quantitative (simulation)	Organization	Activities
Chandrasekarana et al. (2012)	Harmonic & Differentiation	R&D projects nested in US high tech business units.	Quantitative (survey)	Project & Unit	Activities
Stettner & Dovev (2014)	Harmonic & Differentiation	US-based software firms.	Quantitative (panel data)	Organization	Activities

Appendix B. Project Timelines





Appendix C. Interview respondents: position and years of employment

Senior Management Position	**Years of Employment**	**Number of Interviews**
Operations Director	3 Years	2
Aftermarket Director	1 Year	2
Engineering Director	15 Years	2
Finance Director	9 Years	1
Procurement Director	20 Years	2
Human Resources Director	4 Years	2
Continuous Improvement Director	3 Years	2
Project Director	15 Years	1
IT Systems Director	26 Years	1
Middle Management Position		
Operations Manager (Stator)	3 Years	3
Operations Manager (Rotor)	8 Years	2
Operations Manager (Manufacturing)	42 Years	2
Operations Manager (Engineering)	40 Years	2
Operations Manager (Transformer)	1 Year	2
DEXTROUS Project Manager	6 Years	2
DEXTROUS Electrical Engineer	21 Years	1
DEXTROUS Mechanical Engineer/ Optimus	6 Years	1
Engineering Resource Manager	2 Years	1
Chief Electrical Engineer	1 Year	1
Engineering Project Manager	10 Years	1
Mechanical Design Engineer	38 Years	1
Chief Mechanical Engineer	32 Years	1
Chief Insulation Engineer	22 Years	1
Aftermarket Engineering Manager	2 Years	1
Erection and Service Manager	25 Years	2
Tendering Manager	2 Years	1
Field Service Manager	48 Years	2
Aftermarket Commercial Manager	3 Years	1
Head of Aftermarket Projects	35 Years	1
LEAN Engineer	32 Years	1
LEAN Engineer	7 Years	1
Continuous Improvement Manager	26 Years	1
Capital Expenditure Manager	2 Years	1
Materials Controller	28 Years	1
Senior Commodity Buyer	17 Years	1
Learning and Development Manager	3 Years	1
Project Manager	5 Years	1
Health and Safety Manager	21 Years	1
Site Maintenance Manager	6 Years	1
	Total	= 55