



Practical Implications of the Ambidexterity Concepts

Nina Gusenleitner

Johannes Kepler Universität Linz

Abstract

Scientific publications treating the topic of ambidexterity have experienced a great increase in number since the last twenty years. However, the implications for managers to achieve ambidexterity in practice remain a largely neglected field of research. This thesis aims at bridging the rigor-relevance gap regarding the concept of ambidexterity by systematically reviewing findings from academic and practitioner literature in order to provide practical implications for managers to reconcile exploration and exploitation and to, thus, achieve ambidexterity in practice.

Keywords: Ambidexterity, Practical implications, Exploitation, Rigor-relevance gap

1. Introduction

1.1. Defining the problem and its relevance

In recent years, the discussion about the compatibility of scientific rigor and practical relevance has seemed to gain increasing interest. According to Shapiro et al. (2007), the concept of “getting lost before translation” highlights this problem when referring to the difficulty of connecting scientific findings to practice. This means that the results from scientific research cannot be ‘translated’ into concrete practical implications for managers due to the fact that researchers and practitioners operate in separate social systems which do not allow cooperation and collaborative research between these two parties (Kieser and Leiner, 2009).

The concept of ambidexterity will be discussed in view of the tendency described above. Ambidexterity is used to explain the capability to change in an organization and includes the balance and linkage of exploration and exploitation. Exploitation can be described as the use, replication and refinement of existing knowledge, whereas exploration is concerned with innovation and the development of new knowledge (Turner et al., 2013). In other words, ambidexterity is the capability to use existing competencies and to develop new competencies simultaneously. The extent to which publications from academic journals and practitioner literature offer practical implications for managers remains unclear.

The topic of ambidexterity is of increasing interest since the last two decades. According to Raisch and Birkinshaw

(2008) Raisch and Birkinshaw, “[o]rganizational ambidexterity is currently taking shape as a research paradigm in organizational theory” (Raisch and Birkinshaw, 2008, p. 396). Although there is empirical and theoretical evidence that organizational success can be achieved by means of ambidexterity, there is a lack of understanding concerning the resources which are needed to be ambidextrous and how this can be implemented in practice (Turner et al., 2013). Similarly, O’Reilly and Tushman (2011) argue that “what is missing is a clear articulation of those specific managerial actions that facilitate the simultaneous pursuit of exploration and exploitation” (O’Reilly and Tushman, 2011, p. 8). Birkinshaw and Gupta (2013) address this issue by stating that “if we are to really make a progress on how ambidexterity is achieved, we need much more insight into the nature of managerial capability” (Birkinshaw and Gupta, 2013, p. 293). More precisely, there is a need to clarify the way in which organizations make their decisions, who gets involved in these decisions, how these decisions are implemented, and what these decisions consist of (Birkinshaw and Gupta, 2013).

Research on ambidexterity has focused primarily on the performance effects of structural (e.g., He and Wong, 2004; Lubatkin et al., 2006) or contextual (e.g., Gibson and Birkinshaw, 2004; Adler et al., 1999) ambidextrous organization designs. Additionally, the role of leaders with regard to ambidexterity has been examined by a variety of scholars (e.g., Smith and Tushman, 2005; Jansen et al., 2008). However, the mechanisms for achieving ambidexterity have been largely neglected. This predominant focus on the ambidex-

terity – performance linkage can be attributed to March (1991) who was the first to distinguish between exploration and exploitation and stated that a combination of these two is essential to ensure the survival of an organization. Birkinshaw and Gupta (2013) bring up an interesting argument concerning the correlation of ambidexterity and performance. They state that if firms engage in both, explorative and exploitative activities, then those firms must, by some degree, outperform those who engage in solely one of those activities. In line with this proposition, Gibson and Gupta (2013) propose that if firms focusing on only one of those activities outperform those focusing on both there must be an incorrect specification of the problem.

In short, what constitutes a major gap in the research of ambidexterity are practical implications for managers which provide mechanisms for achieving ambidexterity in practice and which specify what is needed for the coupling of exploration and exploitation, given that the specialization in only one of these domains is not enough to achieve superior performance. Although prior research on the ambidexterity concept revealed that balancing high levels of exploration and exploitation simultaneously has benefits for a firm's performance (Gibson and Birkinshaw, 2004; He and Wong, 2004), few studies have considered the scientific examination of the drivers of ambidexterity. As it appears to be that the simultaneous pursuit of exploration and exploitation is difficult to achieve in practice, it is surprising that the ambidexterity research lacks the examination of these mechanism that facilitate the achievement of ambidexterity. Building on these findings, the next section will thus try to define a research question with regard to the lack of understanding of how ambidexterity can be achieved in practice.

1.2. Defining a research question

Given that the drivers of ambidexterity remain largely unexplored, the aim of this thesis is to derive practical implications regarding the concept of ambidexterity from scientific publications. The following question should therefore be answered:

Which practical implications for managers can be found in academic and practitioner literature to achieve ambidexterity in practice?

In other words, this thesis aims at providing a summary of mechanisms that should help managers to achieve ambidexterity in an organization. The systematic review of articles from academic journals and practitioner literature should provide a selection of practical implications for managers. The differentiated consideration of the results obtained from either the academic or the practitioner literature should furthermore emphasize differences in how ambidexterity can be achieved in practice. Taylor et al., in 2013(a), have conducted a similar systematic review to investigate the mechanisms for achieving ambidexterity at multiple organizational levels. However, this thesis' aim is not to examine the impact of different mechanisms for achieving ambidexterity on

various organizational levels, but on the management which should then be able to take actions accordingly.

Central to the scientific handling of this diploma thesis is the problem of a lack of rigor and relevance in the management field (see e.g., Shapiro et al., 2007; Kieser and Leiner, 2009; Hodgkinson and Rousseau, 2009). Therefore, the main challenge is to investigate whether there are practical implications concerning the ambidexterity concept, or not. If no practical implications can be derived from the prevailing literature and when the theoretical examination of the topic remains dominant, the existence of the rigor-relevance gap concerning the topic of ambidexterity can be approved.

Prior research has primarily focused on examining the antecedents, moderators, and performance outcomes of ambidexterity. Especially, structural, contextual, and leadership-based solutions have seemed to be the major mechanisms for implementing ambidexterity in an organization. This study, however, will take on a different approach in which the management is considered to have an overarching function in implementing different measures for achieving ambidexterity in practice. The systematic review of articles from academic journals and from practitioner literature (i.e., Harvard Business Review, MIT Sloan Management Review, and California Management Review) should help to derive practical implications for managers concerning ambidexterity in order to bridge the rigor-relevance gap.

1.3. Structure of the thesis

This thesis is divided into four main sections, namely a review of the conceptual background concerning ambidexterity, the methodology used for the answering of the research question, the presentation and interpretation of the findings, and the discussion.

First of all, this thesis will analyze the conceptual background on the topic of ambidexterity. With respect to this, a discussion about the rigor-relevance gap in management research will give an introduction of the problematic which is concerned with the connection of scientific findings to practical implications. Specifically, this will help to explain why there exists a rigor-relevance gap concerning the concept of ambidexterity which, in turn, highlights the lack of research regarding the practical implications for achieving ambidexterity in practice. Secondly, the origins and the development of ambidexterity will be described. The analysis of different literature streams should provide an insight into how and under which theoretical lens the topic of ambidexterity has been tackled so far. Furthermore, the different conceptualizations of exploration and exploitation will help to generate a deeper understanding of the matter. Also, the effect of ambidexterity on organizational performance and different environmental factors influencing ambidexterity will be examined. In addition to this, the two main types of ambidexterity and its mechanisms will be explained: structural and contextual ambidexterity. Lastly, an overview of ambidextrous leadership will be given in this section in order to describe the function of leaders and managers in the achievement and development of ambidexterity.

Secondly, this thesis provides an overview of the methodological proceeding for the answering of the research question. It will be explained why a systematic literature review is the most appropriate method and what the different steps were in conducting the review. Additionally, the process of inductive category-building and coding, which are both essential for the qualitative analysis of content, will be described. The results of this literature work will be presented in the appendices. Specifically, the appendices include all selected text modules concerning the practical implications of ambidexterity which were obtained from the review of academic and practitioner literature, as well as their corresponding assignment to a category.

Thirdly, the findings obtained from the systematic literature review will be presented in the results section. It will be shown which practical implications concerning the concept of ambidexterity could be derived from academic and practitioner literature. This section is divided into three main categories. Firstly, the findings pertaining to the measures which take place directly at the top management team level will be described and interpreted. These include why managers need to recognize and resolve paradoxical tensions regarding exploration and exploitation, why there is a need for managers to develop an ambidexterity-oriented strategy, why ambidextrous leaders and specific constellations and characteristics of top management teams can facilitate ambidexterity, and which formal and informal mechanisms managers can use to enhance ambidexterity in an organization. Secondly, it will be explained which measures managers can implement within their organization in order to achieve ambidexterity. Particularly, these include structural and contextual arrangements, as well as human resource practices which should facilitate the achievement of ambidexterity in an organization. Lastly, the results section will provide an overview of different moderators and other external factors which influence the attainment of ambidexterity. These are more or less out of scope for decision-making and can often only be marginally influenced by managerial actions. Specifically, it will be shown how ambidexterity can be managed in consideration of the availability of organizational resources, of different environmental factors, and of specific organizational network characteristics. Additionally, it will be explained how ambidexterity can be facilitated through absorptive capacity and dynamic capabilities. The results obtained from either the academic or the practitioner literature will be evaluated separately in order to enable a differentiated appraisal of the results. This should help to assess similarities and differences regarding the practical implications for achieving ambidexterity.

Lastly, in the discussion, the results of this study will be connected to the ambidexterity literature. It will be elaborated whether the research question of this thesis could be answered or not, thus stating if the rigor-relevance concerning the concept of ambidexterity could be bridged or not. The results will be critically discussed and should contribute to the enlargement of the existing knowledge base.

2. Conceptual background

In the last years, the construct of ambidexterity has gained increasing interest and the studies covering this topic have experienced a large increase in number. This led to a multitude of different approaches and a diversity of views held on ambidexterity. It is thus necessary to give an overview of the previous findings on ambidexterity, to comment on the research and to integrate contradictions with regard to the versatility of the concept. Therefore, this section has the aim to review the research done on ambidexterity so far. To do so, conceptual papers as well as leading articles concerning the topic will be reviewed, synthesized, and analyzed. The processing of the current state of research should serve as a base for the specification of the research question. The later answering of the research question should show which practical implications can be derived from the ambidexterity literature.

The section on the conceptual background will give an overview of the roots of the ambidexterity concept and the associated learning modes, exploration and exploitation. To do so, landmark articles, such as the one of Duncan in 1976 and March (1991), will be discussed as they were the first to introduce the notions of ambidexterity, exploration, and exploitation. In addition to this, the examination of leading articles from the mid-nineties to 2004 (e.g., Tushman and O'Reilly, 1996; Gibson and Birkinshaw, 2004; He and Wong, 2004) will help to define the ambidexterity concept and to put its different aspects into a theoretical framing. Review articles (e.g., Raisch and Birkinshaw, 2008; Turner et al., 2013) will be used to connect the findings, to filter out contradictions, and to give additional inputs on certain ideas. But first of all, the discussion about the rigor-relevance gap in management research will explicate the problem of translating the scientific findings of the concept of ambidexterity into practical implications for managers. These findings will be revisited in the end of this section in order to show why the definition of practical implications concerning ambidexterity still constitutes a major gap in this field of research.

2.1. The rigor-relevance gap in management research

The rigor-relevance debate in management research gives rise to the questions if and how the rigor-relevance gap can be bridged. Central to this debate is the struggle of connecting scientific findings to practical situations, of connecting scientific rigor to practical relevance. In order to explain this topic, two opposing articles will be discussed. The first article assumes that the rigor-relevance gap in management research is unbridgeable (Kieser and Leiner, 2009), while the second article suggests that the rigor-relevance gap can be overcome (Hodgkinson and Rousseau, 2009).

Assuming that the rigor-relevance gap is unbridgeable, then Shapiro et al. (2007) notion of getting lost "before translation" applies. This means that the results gained from scientific research are unconnectable to and, thus, untranslatable for practice. According to Kieser and Leiner (2009) this problem does not only arise from different languages and

styles in the scientific community, but also from different logics, meaning different ways in defining and managing problems. They base this assumption on Luhmann's system theory which implies that social systems are autopoietic. Autopoietic means that communication elements of one system cannot be integrated into the communication of other systems because the systems are autonomous and isolated from one another.

Despite these seemingly unbridgeable communication problems, some authors suggest that the cooperation between practitioners and management researchers can help the problem. However, Kieser and Leiner (2009) counter this assumption by stating that social systems can only irritate each other in such a way that the other systems are coerced to respond. From this irritation, however, there might arise inspiration. Inspiration in this sense means that bilingual or bi-competent facilitators should provide descriptions of practical situations for researchers so that they can deduce relevant science concepts and should deliver interpretations that practitioners might consider inspiring (Kieser and Leiner, 2009). Although Kieser and Leiner do not regard collaboration as a solution to bridging the rigor-relevance gap, they note that "[o]nly with training in theory and methodology can practitioners collaboratively produce scientific knowledge with researchers" (Kieser and Leiner, 2009, p. 528). However, they criticize that it is doubtful whether the training of practitioners would lead to better research that is also perceived as useful by practitioners who did not participate in the research collaboration.

In contrast to the article of Kieser and Leiner (2009), Hodgkinson and Rousseau claim that bridging the rigor-relevance gap in management is indeed possible and that "such bridging is increasing; and, as such, increasingly normal, encouraged, and legitimated" (Kieser and Leiner, 2009, p. 535). While Kieser and Leiner (2009) argue that science is overused, too specialized, and not suitable for solving realistic management problems, Hodgkinson and Rousseau (2009) counter these assumptions by claiming that management education often relies on cases with little use of scientific principles, that it is provided by non-researchers, and that it can, if it is appropriately science-based, be a basis for successful management.

Furthermore, Hodgkinson and Rousseau (2009) state that Kieser and Leiner (2009) grounding, the system theory, lacks empirical support. They disagree with the assumption that all systems are autopoietic and suggest that collaborations between researchers and practitioners can be developed with the support of an appropriate training in theory and research methods. In turn, these collaborations can lead to both, high quality scholarship and social usefulness. The knowledge transfer between scholars and practitioners is enabled by dissemination, practice, reflection, and "in the form of knowledge artefacts such as psychometric tests, scenario planning tools, and management science algorithms" (Hodgkinson and Rousseau, 2009, p. 539). Hodgkinson and Rousseau (2009) do also not agree with Kieser and Leiner (2009) concern that the processes of the prime institution

would be undermined due to the different objectives that academic and practitioner institutions pursue. They rather suggest that the growing interest in converging scientific rigor and practical relevance leads to a higher level of triangulation of the results which, in turn, promotes a deeper understanding of different phenomena in an organization.

Despite these differences concerning the question of whether the rigor-relevance gap in management is bridgeable or not, both Kieser and Leiner (2009) and Hodgkinson and Rousseau (2009) agree that practitioners and researchers often use fundamentally different categories to describe certain phenomena of their institution. Accordingly, the language is not the only problematic in translating findings from science into practice and vice versa. Moreover, researchers as well as practitioners both "need opportunities to act in ways that bring them in new perspectives and competencies which they in turn use to attain their goals more effectively" (Hodgkinson and Rousseau, 2009, p. 543). Only by changing their perspectives, scholars and practitioners can collaborate with each other and build closer ties between research and practice.

Linking these insights of the rigor-relevance gap to ambidexterity gives rise to a multitude of different leverage points. Ambidexterity is an abstract, impalpable concept. Some firms might act ambidextrous without even knowing it, or even without knowing what ambidexterity is. In other words, practitioners or managers might not be aware of the ambidexterity concept but their organization might still be ambidextrous. The intangibility of ambidexterity might therefore hamper the formulation of concrete implications for practitioners. The following sections will elucidate different views of approaching the concept of ambidexterity and explain its moderators, performance outcomes, and antecedents. The theoretical framing of ambidexterity will serve as a base for narrowing down the topic in order to highlight the necessity of defining implications for achieving ambidexterity in practice which still constitutes a major gap in this field of research.

2.2. *The origins and the development of ambidexterity*

The roots of ambidexterity can be found in the work of Duncan in the year 1976. Duncan was basically the first to deploy the term organizational ambidexterity and highlights the importance of dual structures. Dual structures can be achieved by "monodextrous" units that spatially separate exploratory from exploitative activities (Duncan, 1976; as cited in Raisch and Birkinshaw, 2008). Dual structures can be related to the concept of structural ambidexterity, meaning the spatial separation of exploration and exploitation. McDonough and Leifer (1983) present a "counter-concept" which involves the implementation of "parallel structures". Parallel structures can be related to the concept of contextual ambidexterity, whereby people can switch between exploitative and explorative activities and do not solely focus on one of the two activities (McDonough and Leifer, 1983).

The work of March (1991) is considered to be another pioneering article in the examination of ambidexterity. Con-

sidering the stream of organizational learning, March used the terms exploration and exploitation to explain that the balance of these two is essential for a system to survive and grow. Exploration can be related to terms, such as “search, variation, risk taking, experimentation, discovery, or innovation”, whereas exploitation comprises elements like “refinement, production, efficiency, selection, and implementation” (March, 1991, p.71). March (1991) highlights the importance of establishing a balance between exploration and exploitation for two reasons. Firstly, the extensive use of exploration (failure trap) should not outplay exploitation, because high investments in innovation may not lead to long term gains when the focus lies on the exploration of new alternatives without the true improvement of competencies (pp. 71-72). Secondly, and conversely, the exclusive use of exploitation (success trap) may lead to inertia and the inability to adapt to changing environments when experimentation is neglected due to the success experienced through the refinement of skills in the course of exploitation (pp. 71-72). The long-term success of an organization can thus be assured by the appropriate use of exploitation to guarantee viability and the simultaneous use of exploration to guarantee success in the future (March, 1991).

2.2.1. Examining ambidexterity through different literature streams

One difficulty of connecting different elements and variables of organizational ambidexterity with each other lies in the multitude of research streams under which the concept of organizational ambidexterity is explored (Raisch and Birkinshaw, 2008). Since 1996, when various authors (e.g., Tushman and O'Reilly, 1996; Adler et al., 1999; Gibson and Birkinshaw, 2004; He and Wong, 2004) have contributed to the conceptualization of the ambidexterity concept, research has switched its focus. The proliferation of articles on ambidexterity since 2005 has led to a more specific examination of the topic, including issues such as the consequences, antecedents, or moderators of ambidexterity. Raisch and Birkinshaw (2008) screen the concept of ambidexterity through five different literature streams: organizational learning, technological innovation, organizational adaptation, strategic management, and organizational design. The main findings gathered from examining ambidexterity through various literature streams will be explained below with the aim of providing an overview of how differently the topic of ambidexterity has been tackled so far.

Organizational learning

Concerning the research stream of *organizational learning*, Raisch and Birkinshaw (2008) adduce March (1991) in which he explains in how far and in which way learning can be related to either exploitation or exploration. In general, organizational learning is based on routines (Güttel and Konlechner, 2009). Exploring and exploiting organizational knowledge results in learning which is embedded in organizational routines. Tushman and O'Reilly (1996) state that organizational learning is necessary to achieve congruence

between the organizational strategy, structure, culture, and people and the (positive) changes in the market.

Technological innovation

Raisch and Birkinshaw (2008) have found that when considering the research stream of *technological innovation* two types of innovation seem to be predominant. Firstly, the authors refer to incremental innovation which involves small changes and alternations in existing products and concepts. Smith and Tushman (2005) relate incremental innovation to exploitative activities which are used to respond to existing customer demands. Secondly, Raisch and Birkinshaw (2008) identified radical innovation as the other dominant type of technological innovation where change is fundamental and involves the replacement of existing products or business concepts with new ones. Smith and Tushman (2005) relate this type of innovation to explorative activities in order to meet the needs of novel customers. Tushman and O'Reilly (1996) highlight the technology cycle which involves the proliferation of a dominant design, the substitution of this design through competition, and lastly the proliferation of a new standard. From this cycle, the authors derive that organizations and managers must steadily adapt and realign their strategies in view of the fundamentally changing technologies.

Organizational adaptation

With regard to the literature stream of *organizational adaptation*, Raisch and Birkinshaw (2008) found that a majority of researchers highlight the necessity of a balance between continuity and change. In this context, Tushman and O'Reilly (1996) argue that the pursuit of exploitative activities during evolutionary change and the emphasis on exploration during revolutionary and radical change is essential for an organization to be successful. In other words, organizations and managers have to be able to implement incremental and revolutionary change, meaning they have to be ambidextrous to be successful in the long run. Tushman and O'Reilly (1996) explain that the achievement of ambidexterity requires strong organizational and managerial skills to establish oneself in a mature market (exploitation) as well as to innovate in products (exploration). According to the authors, exploitation includes factors, such as “cost, efficiency, and incremental innovation”, whereas exploration comprises things like “radical innovation, speed, and flexibility” (p.11). Tushman and O'Reilly (1996) state that organizations who manage to adapt to changing environmental conditions during periods of change are most likely to be successful. They base this assumption on the Darwinian evolutionary theory and the adjunctive processes of variation, selection, and retention. Raisch and Birkinshaw (2008) also mention other concepts related to organizational adaptation, such as organizational identity, absorptive capacity, and organizational routines. The authors conclude that the main finding of the constructs mentioned above implies that a multitude of (too radical) change activities lead to organizational chaos, whereas to little change actions lead to inertia. Therefore, an organization constantly needs to

adapt its explorative and exploitative activities with regard to changes in the environment.

Strategic management and dynamic capabilities

In order to examine the findings on ambidexterity in the research stream of *strategic management*, Raisch and Birkinshaw (2008) refer to the internal ecology model of strategy making by Burgelman (1991, 2002). According to this model, there are two processes which can be related to either exploration or exploitation. The first process is the induced strategic process which focusses on the use of already existing knowledge and can therefore be related to exploitation. The second process is the autonomous strategic process including the creation of new skills and competencies which can be related to exploration. Similar to many other scholar's findings, Burgelman (1991) argues that organizational success can be achieved through a balance between the two processes of exploration and exploitation.

Dynamic capabilities of a firm are closely linked to the concept of ambidexterity and have its roots in the strategic management domain. Therefore, the topic of dynamic capabilities and its connection with ambidexterity will be briefly addressed in this section. Various scholars (e.g., He and Wong, 2004; O'Reilly and Tushman, 2008) refer to the notion of dynamic capabilities when trying to explain the balance between exploration and exploitation. The linkage of dynamic capabilities and ambidexterity has also been stressed by other researchers which discuss meta-capabilities (Gibson and Birkinshaw, 2004) or meta-routines (Adler et al., 1999) in this regard. Teece, Pisano, and Shuen define dynamic capabilities as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997, p. 516). O'Reilly and Tushman (2008) conceptually describe the connection between dynamic capabilities and ambidexterity basing their assumptions on the findings of Teece (2007), who stresses "orchestration processes" which include learning, reconfiguration, coordination, and integration. According to O'Reilly and Tushman (2008), ambidexterity can be defined as an organization's core dynamic capability because of the concurrent integration of exploration and exploitation. However, this alone does not constitute a competitive advantage yet. It is the configuration of resources which, in turn, may result in a competitive advantage. O'Reilly and Tushman also stress that "the ability of senior managers to seize opportunities through the orchestration and integration of both new and existing assets to overcome inertia and path dependencies is at the core of dynamic capabilities" (O'Reilly and Tushman, 2008, p. 187). To conclude, dynamic capabilities enable a firm to exploit existing competencies and to simultaneously explore new competencies as well as to reconfigure organizational resources in order to seize existing and emerging opportunities (O'Reilly and Tushman, 2008). Ambidexterity is thus a dynamic capability as the simultaneous pursuit and reconfiguration of exploration and exploitation processes allows firms to adapt to changing environments.

Organization design

Regarding *organization design*, Raisch and Birkinshaw (2008) emphasize prior research (e.g., Burns & Stalker, 1961) concerning organizational features which should enable exploration and exploitation. The two most predominant solutions with regard to organization design seem to be the implementation of either mechanistic or organic structures in order to facilitate ambidexterity (Burns & Stalker, 1962; as cited in Raisch and Birkinshaw, 2008). Mechanistic structures involve elements, such as "standardization, centralization, and hierarchy" in order to enable efficiency (exploitation) (p. 380). Organic structures provide "high levels of decentralization and autonomy" to encourage flexibility (exploration) (p. 380). The examination of ambidexterity through diverse literature streams led to a multitude of different conceptualizations of the concept. This constitutes a problem in that there is no common understanding of how ambidexterity should be defined, as well as how exploration and exploitation interact with each other. Of course this problematic makes it even more difficult to understand the already abstract concept of ambidexterity. The section below will provide insights into how ambidexterity, or exploration and exploitation, have been conceptualized so far. This should contribute to the specification of this thesis' problem and research question.

2.3. Conceptualizing ambidexterity

In general, organizational ambidexterity refers to a firm's ability to pursue two different, or even contrasting, things simultaneously. Tushman and O'Reilly define organizational ambidexterity as "the ability to simultaneously pursue both incremental and discontinuous innovation [...] from hosting multiple contradictory structures, processes, and cultures within the same firm" (Tushman and O'Reilly, 1996, p. 24). This assertion is equally in line with March (1991) proposition that a balance between exploration and exploitation is essential to assure a firm's survival. In other words, for an organization to act ambidextrously there needs to be an alignment between its current procedures and its ability to adjust to changing environmental conditions (Gibson and Birkinshaw, 2004).

The coupling of exploration and exploitation is vital for a firm to be ambidextrous. However, exploration and exploitation are still two different, and often contradictory, constructs which need a different approach respectively (O'Reilly and Tushman, 2013). He and Wong put this assumption forward by claiming that "exploration and exploitation require substantially different structures, processes, strategies, capabilities, and cultures to pursue and may have different impacts on firm adaptation and performance" (He and Wong, 2004, p. 481). The authors link exploration to "organic structures, loosely coupled systems, path breaking, improvisation, autonomy and chaos, and emerging markets and technologies", whereas exploitation is linked with "mechanistic structures, tightly coupled systems, path dependence, routinization, control and bureaucracy, and stable markets and technologies" (p. 481).

Since March's pioneering article of 1991, the terms of exploration and exploitation have been reused by many other scholars in the fields of, for example, technological innovation, organizational learning, organizational design, or organizational adaptation (Gupta et al., 2006). However, the definitions and conceptualizations of these two dimensions seem to be inconsistent. Gupta et al. note that "[t]here appears to be a consensus around the view that exploration refers to learning and knowledge (i.e., the pursuit and acquisition of new knowledge). However, a similar consensus is lacking on the question of whether exploitation refers solely to the use of past knowledge or whether it also refers to the pursuit and acquisition of new knowledge, [...]" (Gupta et al., 2006, p. 693). They infer that, based on March (1991), there is at least some learning involved in every activity and that it is therefore logical to differentiate exploration and exploitation by considering the amount or type of learning rather than if learning is existent or not.

This leads to the conclusion that the terms exploration and exploitation are not used consistently by scholars when describing the concept of ambidexterity. Gibson and Birkinshaw (2004), for example, speak of alignment and adaptability when referring to the two activities of exploration and exploitation, Adler et al. (1999) use the terms efficiency and flexibility, and Tiwana (2008) refers to the two dimensions as strong ties and bridging ties. Others again speak of explorative and exploitative knowledge sharing (e.g., Im and Rai, 2008), centrifugal and centripetal forces (e.g., Shermata, 2000), or incremental and discontinuous innovation (e.g., O'Reilly and Tushman, 2004; Tushman and O'Reilly, 1996). The terms exploration and exploitation, however, have achieved the greatest popularity in scholarly articles and this terminology will therefore be retained in this thesis.

2.3.1. Different dimensions of ambidexterity

Apart from the different designations of exploration and exploitation, their conceptualization also varies. Once, exploration and exploitation are seen as orthogonal, another time they are described as two poles on a continuum (Gupta et al., 2006). The conceptualization of orthogonality or continuity is linked to two different mechanisms, either punctuated equilibrium or ambidexterity, with which a balance between exploration and exploitation can be achieved. Punctuated equilibrium is the better solution when exploration and exploitation are conceptualized as two mutually exclusive ends of a continuum. Ambidexterity should be used when exploration and exploitation are viewed orthogonal. The explicit differentiation of these ambidexterity dimensions should offer greater precision to the conceptualization and operationalization of the construct, and provide a basis on which to analyze the practical implications for managers for achieving ambidexterity in practice.

Distinguishing continuity from orthogonality

Gupta et al. (2006) explain that exploration and exploitation are likely to be mutually exclusive, meaning conceptualized as two ends of a continuum, when they compete for

scarce resources. However, organizational resources are not always finite and the availability of external resources can help the constraint of scarce internal resources (Gupta et al., 2006). Figure 1 depicts exploration and exploitation as two ends of a continuum. The U-shaped curve implies that whenever one of the two activities is pursued at a high level, the other one can only be pursued at lower levels. On the other hand, Figure 1 illustrates exploration and exploitation as orthogonal which means that high levels of either exploration or exploitation in one domain may simultaneously be present with high levels of exploration or exploitation in the other domain. Orthogonal thus means that exploration and exploitation are not competing with each other but that the two can coexist. As an example of the conceptualization of exploration and exploitation as orthogonal, Gupta et al. (2006) mention the case of Cisco where the product R&D is connected with manufacturing, sales, and service via relatively standardized interfaces. This loose coupling of the domains of exploration and exploitation makes it possible to simultaneously achieve both and thus exploration and exploitation can be described orthogonal. The scarcity of resources is, unlike in the conception of exploration and exploitation as two poles of a continuum, of no interest when speaking of orthogonality (Gupta et al., 2006).

Furthermore, the level of analysis, meaning whether ambidexterity is analyzed on the organizational, the business unit, or the individual level, determine the conceptualization of the balance between exploration and exploitation (Gupta et al., 2006). Accordingly, Gupta et al. (2006) note that the simultaneous pursuit of exploration and exploitation might be easier for a group or an organization than it is for an individual. On individual levels, it may be more difficult to simultaneously pursue both activities because individuals might not have the appropriate change routines, the possibility of labor division, and a management which controls the allocation of resources and reacts to necessities of change (Gupta et al., 2006). The conclusion from this is that, within a single domain (i.e. an individual or a subsystem), exploration and exploitation will probably be conceptualized as two poles on a continuum, thus being mutually exclusive. Across different, loosely coupled domains (i.e. multiple individuals or subsystems), on the other hand, exploration and exploitation will be orthogonal.

In conclusion, Gupta et al. (2006) argue that the relationship between exploration and exploitation depends on whether the two compete for scarce resources and on the level of analysis, meaning a single or multiple domains. For researchers this implies that they need to choose between continuity and orthogonality based on these two factors. When the premise is continuity, then "the correct test for the beneficial effects of balance would be to test for an inverted U-shaped relationship between the degree of exploration (or exploitation) and organizational performance" (p. 697). When orthogonality is the premise, then "the correct test for the beneficial effects of balance would be to test for a positive interaction effect of the two types of learning on organizational performance" (p. 697).

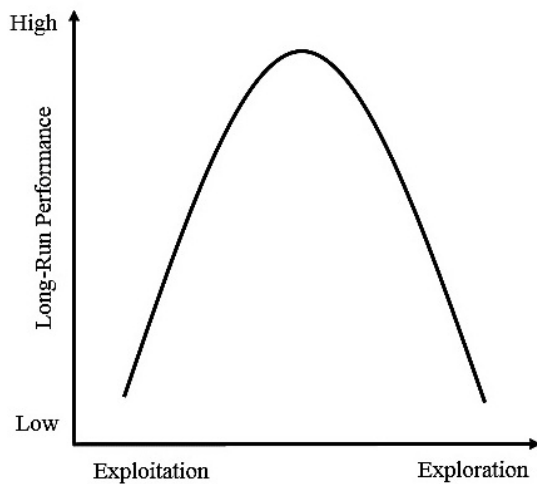
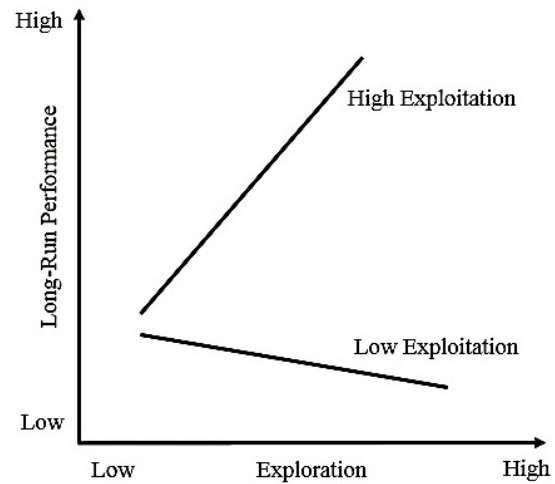
Exploration and exploitation as two ends of a continuum**Exploration and exploitation as orthogonal**

Figure 1: Conceptualizations of exploration and exploitation and its effect on performance (adopted from Gupta et al., 2006, p. 697).

Distinguishing ambidexterity from punctuated equilibrium

General agreement exist on the need for balance between exploration and exploitation. The discussion about how organizations should pursue exploration and exploitation remains open and is treated differently by various scholars (e.g., Junni et al., 2013; Burgelman, 2002; Gupta et al., 2006; Smith and Tushman, 2005; Tushman and O'Reilly, 1996). Gupta et al. (2006) identify two mechanisms that should help to achieve this balance: ambidexterity and punctuated equilibrium. While ambidexterity includes the simultaneous pursuit of exploration and exploitation, these two domains are pursued sequentially within punctuated equilibrium.

As already mentioned earlier, ambidexterity can be defined as the ability of pursuing exploration and exploitation simultaneously. There are two main types of organizational ambidexterity: contextual and structural ambidexterity. Contextual ambidexterity includes the simultaneous pursuit of exploration and exploitation within a subsystem (i.e. an individual or business unit) (see Adler et al., 1999; Gibson and Birkinshaw, 2004). Gibson and Birkinshaw define contextual ambidexterity as "the behavioral capacity to demonstrate alignment and adaptability across an entire business unit" (Gibson and Birkinshaw, 2004, p. 209). Structural ambidexterity includes the simultaneous pursuit of exploration and exploitation across different subsystems, meaning across individuals, business units, or even organizations (Tushman and O'Reilly, 1996). Tushman and O'Reilly describe structural ambidexterity as the "ability to simultaneously pursue both incremental and discontinuous innovation that result from [...] hosting multiple contradictory structures, processes, and cultures, within the same firm" (Tushman and O'Reilly, 1996, p. 24). Although explorative and exploitative units operate separately, they still assure a simultaneous pursuit of both activities within an organization.

Punctuated equilibrium is the second possible mecha-

nism for balancing exploration and exploitation. Contrary to structural or contextual ambidexterity which both involve the simultaneous pursuit of exploration and exploitation, the punctuated equilibrium approach follows a cyclical or sequential pursuit of the two domains within a subsystem. This suggests that periods of exploration (revolutionary change) alternate with periods of exploitation (evolutionary change) (Burgelman, 2002). Thus, punctuated equilibrium involves the "cycling between long periods of exploitation and short bursts of exploration" (Gupta et al., 2006, p. 698) which implies that the focus is sequentially distributed to the divergent goals of either explorative or exploitative activities. The idea of temporal separation roots in the assumption that "the mindsets and organizational routines needed for exploration are radically different from those needed for exploitation, making a simultaneous pursuit of both all but impossible" (Gupta et al., 2006, p. 695).

Showing that ambidexterity and punctuated equilibrium both are viable, yet different mechanisms for achieving a balance between exploration and exploitation, Gupta et al. (2006) raise the question of whether these two mechanisms can be substituted with one another or whether their implementation depends on the environmental or organizational context. They argue that "[i]f one is analyzing exploration and exploitation within a single domain (i.e., an individual OR a subsystem), and exploration and exploitation are rightly conceptualized as the mutually exclusive ends of a continuum, ambidexterity is simply not an option, and the individual or subsystem must resort to punctuated equilibrium. [...] In contrast, [...] if one is analyzing exploration and exploitation in multiple, loosely connected domains, the two become orthogonal tasks, and it becomes entirely feasible (and perhaps desirable) to pursue ambidexterity" (Gupta et al., 2006, p. 698). In conclusion, this means

that tightly coupled systems would require punctuated equilibrium rather than ambidexterity. However, if individuals or subsystems are loosely coupled with each other, ambidexterity would provide the best possibility for long-term adaptation across the single domains.

A variety of authors (e.g., Simsek et al., 2009; Raisch and Birkinshaw, 2008) consider punctuated equilibrium as one type of ambidexterity. In this thesis, however, ambidexterity will exclusively be conceptualized as the simultaneous pursuit of exploration and exploitation within or across individuals and/or subunits. Approaches concerning “sequential ambidexterity”, meaning the temporal switching between explorative and exploitative activities, will therefore be neglected.

2.3.2. Why a balance is necessary for achieving ambidexterity

The activities required for ambidexterity, exploration and exploitation, each compete for the same and/or scarce resources which requires a trade-off between these two (Simsek et al., 2009; Turner et al., 2013; He and Wong, 2004). Birkinshaw and Gupta suggest that “a central part of what firms do is manage the tensions that exist between competing objectives; that is, they seek to achieve some form of ambidexterity” (Birkinshaw and Gupta, 2013, p. 290). More precisely, managerial competence is needed to make trade-offs and to allocate resources according to competing demands (Birkinshaw and Gupta, 2013). So, with regard to ambidexterity, managers need to make trade-offs between the competing domains of exploration and exploitation and have to decide which resources are needed to pursue each of the two activities. The possible synergistic effect between exploration and exploitation requires managers to handle the balance between the two (He and Wong, 2004).

Given the basic conflicts and tensions which occur through the simultaneous use of exploration and exploitation, Gupta et al. (2006) refer to March (1991) assumption that exploration and exploitation are fundamentally incompatible and therefore firms are susceptible to being trapped in either a success or a failure trap. A success trap emerges when exploitation leads to success in the early stages and when this success seduces a firm to exploit even more in this seemingly successful area (Gupta et al., 2006). Contrary to the success trap, a failure trap arises when exploration leads to failure and when firms try to overcome this failure by exploring even more, meaning to reinforce innovation (Gupta et al., 2006). This implies that new ideas are replaced by other innovations without being fully developed and thus do not contribute to the organizational performance. He and Wong (2004) explain the success and the failure trap in more detail. On the one hand, if firms engage in experimentation and innovation (exploration) they risk not being able to improve and refine existing competencies (failure trap). On the other hand, when firms try to adapt to given environmental conditions (exploitation) they risk being inert and not able to respond to changing environments and new opportunities (success trap). In addition to this, failed explorative activities may lead to losses in a firm’s successful

routines in existing fields which cannot be compensated with the experimentation set into operation.

Tushman and O’Reilly state that long-term success can be achieved through the “alignment of strategy, structure, people, and culture” during periods of evolutionary change (Tushman and O’Reilly, 1996, p. 11). When organizations go through periods of revolutionary change, the alignment of these factors needs to undergo a shift at the same time (Tushman and O’Reilly, 1996). However, as organizations grow, their structures and systems solidify and it gets more difficult to implement change. Tushman and O’Reilly (1996) call this phenomenon the “success syndrome”, which was earlier discussed as success trap, and distinguish between two types of inertia which impede change actions: structural and cultural inertia. Structural inertia emerges from existing interdependencies and complexities in an organization, whereas cultural inertia results from the age and success of an organization which inhibits the alternation of institutionalized norms and values (Tushman and O’Reilly, 1996). The success syndrome can thus be explained by a situation of success in a stable market which is disrupted by a shift in the market. This leads, through cultural or structural inertia, to the failure to adapt to new conditions. In other words, the extensive focus on exploitation of existing competencies at the expense of exploration of new alternatives will lead to a success trap. The performance of an organization will thus suffer in the long run when inertia inhibits an organization to adapt to changing environments (Smith and Tushman, 2005).

In addition to the short-term alignment of strategy, structure, and culture managers may need to “cannibalize” their own business by destroying the established alignment in order to adapt to changing competitive markets or technologies (Tushman and O’Reilly, 1996). Due to the quickly changing environmental demands, He and Wong (2004) similarly argue that there needs to be a “counterbalance” between exploration and exploitation. This implies that firms should not try to create an equilibrium, but should rather focus on the disruption of the balance between exploration and exploitation. In sum, this means that exploration and exploitation need to be reconciled so that one activity is not overwhelmed by the other.

Approaches to managing ambidexterity

As just mentioned above, exploration and exploitation are two different and sometimes even contradictory agendas which need to be balanced and managed efficiently to ensure the long-term success of a firm. Birkinshaw and Gupta (2013) provide suggestions on how firms can position themselves in order to invest in appropriate amounts necessary for exploration and exploitation and, thus, to make trade-offs between these two agendas. They illustrate different approaches to managing ambidexterity with the help of a curve (see Figure 2), which is based on Porter’s (1996; as cited in Birkinshaw and Gupta, 2013) *efficiency frontier*.

According to Figure 2, firms are likely to place themselves somewhere on the curve, the efficiency frontier, in order to invest in exploration and exploitation. When firms want to

The efficiency frontier

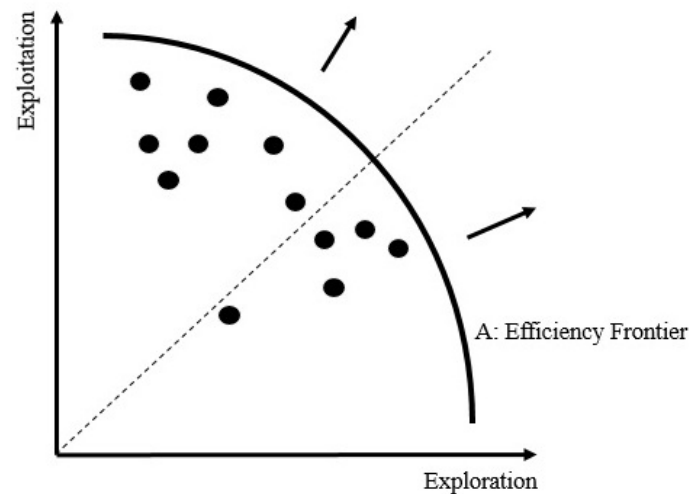


Figure 2: Different approaches to managing ambidexterity (adopted from Birkinshaw and Gupta, 2013, p. 295).

achieve ambidexterity, there are three types of choices they are facing (Birkinshaw and Gupta, 2013). The first choice is the decision on where to sit on the efficiency frontier. Birkinshaw and Gupta (2013) argue that although all positions on the efficiency frontier may be of equal value, there may be some superior positions due to certain circumstances which a firm is facing. The second choice concerns the reaching of the efficiency frontier. Managerial capability is needed to reach the efficiency frontier and some firms may be better in reconciling exploration and exploitation than others (Birkinshaw and Gupta, 2013). The third choice relates to the pushing out of the efficiency frontier, meaning to move the curve up to the right. Firms which are able to push out the efficiency frontier display greater rates of ambidexterity as they are able to reconcile exploration and exploitation on a higher level through the development of new technologies and innovations (Birkinshaw and Gupta, 2013).

Pertaining to the ambidexterity – performance linkage, Birkinshaw and Gupta (2013) connect their conceptualizations shown in Figure 2 to the empirical findings of other scholars (e.g., Lin et al., 2007; Rothaermel and Alexandre, 2009). They conclude that whenever ambidexterity is measured or operationalized as the product or the sum of exploration and exploitation, the firms lying closest to the efficiency frontier are the ones who perform higher, “and therefore [...] ambidexterity matters” (p. 295). On the other hand, studies which conceptualize ambidexterity as the balance between exploration and exploitation argue that the best position is somewhere on the diagonal shown in Figure 2, meaning somewhere on the bottom-left to the top-right (Birkinshaw and Gupta, 2013).

2.4. Performance outcomes and moderators of ambidexterity

Two main domains of the prior research on ambidexterity have been the examination of the performance outcomes

and moderators. Specifically, the effect of ambidexterity on the organizational performance as well as the moderating effect of environmental factors on ambidexterity have been analyzed by a variety of authors. The major outcomes of these findings will be presented in this section.

2.4.1. The ambidexterity – performance relationship

The exploration of the ambidexterity – performance relationship has been widely explored by different researchers (e.g., He and Wong, 2004; Gibson and Birkinshaw, 2004; Cao et al., 2009; Lubatkin et al., 2006). There is theoretical and empirical evidence that the coupling of exploration and exploitation, meaning to be ambidextrous, has a positive effect on a firm’s performance. However, there are only few empirical findings that show the influence of the joint use of exploration and exploitation on organizational performance (He and Wong, 2004). He and Wong (2004) utter the basic assumption that explorative organizations’ performance is rather variable and fluctuant due to the experimentation involved. Exploitative firms, on the other hand, can generate a more stable performance as their outcomes are more predictable and certain.

Concerning the effect of ambidexterity on a firm’s performance, Raisch and Birkinshaw (2008) came to the conclusion that the relationship between ambidexterity and performance cannot yet be fully approved. Although the amount of studies concerning organizational ambidexterity is increasing, there is still little research to test the ambidexterity – performance relationship, which can partly be attributed to the lack of consensus of how exploration and exploitation should be conceptualized. Prior empirical tests in this field (e.g., He and Wong, 2004; Gibson and Birkinshaw, 2004; Lubatkin et al., 2006) showed only limited evidence for the ambidexterity – performance relationship. According to March (1991), firms may run risk to perform poorly in either ex-

ploration or exploitation when these two activities cannot be brought into accordance with each other and thus lack balance. In addition to March's assumption that organizational performance is poor when there is no balance between exploration and exploitation, Tushman and O'Reilly (1996) suggest that the simultaneous handling of exploration and exploitation activities increases the chance of reaching greater performance than firms focusing on only one of the two activities. So, although there is still little empirical evidence on the effect of ambidexterity on performance, there is a consensus among the assumption that firms capable of simultaneously pursuing exploration and exploitation achieve superior organizational performance.

2.4.2. Environmental factors influencing ambidexterity

Environmental factors can have an influence on organizational ambidexterity. Especially the level of dynamism and competitiveness are being discussed in the literature. Jansen et al. (2006) provide an empirically supported finding for the direct effect of environmental factors on ambidexterity. The authors state that environmental dynamism and competitiveness can oblige firms to increasingly engage in exploitation and exploration and, therefore, act ambidextrously. Raisch and Birkinshaw (2008) also environmental factors have a moderating effect on the ambidexterity – performance relationship. Jansen et al. (2006) found empirical support that the pursuit of exploration is more effective in dynamic environmental conditions, whereas the pursuit of exploitation is more effective in competitive and rival environments. Raisch and Birkinshaw (2008) emphasize that becoming ambidextrous in instable environments is “more of a necessity” than a key factor which leads to greater short-term performance. Tushman and O'Reilly (1996) have found that the spatial separation of exploration and exploitation serves as one way to cope with environments of long-term stability which are interrupted by occasional periods of discontinuous change. O'Reilly and Tushman (2008) additionally state that when there are slower rates of change in the environment (incremental change), ambidexterity may be pursued sequentially, whereas in rapidly changing environments (discontinuous change) ambidexterity should be pursued simultaneously. In sum, these findings show that environmental factors influence ambidexterity. The results section of this thesis will provide greater insights into the relationship between environmental moderators and ambidexterity.

2.5. Antecedents of ambidexterity

In prior research on ambidexterity, three types of mechanisms for achieving ambidexterity are predominantly discussed: structural and contextual, and leadership-based solutions. In the prevailing literature, structural ambidexterity is mainly divided into either the spatial or the temporal separation of exploration and exploitation. Contextual ambidexterity, on the other hand, refers to the contextual integration of exploration and exploitation. Both types, apart from the subtype temporal separation, generally imply that exploration

and exploitation can be pursued simultaneously. Leadership-based solutions are the third major type for achieving ambidexterity and highlight how senior managers, as key leaders in an organization, are inevitably involved in creating and fostering ambidexterity in an organization (Raisch and Birkinshaw, 2008). This section will explain structural and contextual ambidexterity, as well as leadership-based solutions for ambidexterity in more detail and describe some of the main mechanisms of how each can be achieved and managed.

2.5.1. Structural ambidexterity

Ambidexterity in an organizations can be achieved by means of structural solutions, meaning that explorative and exploitative activities are pursued in separate organizational units (Raisch and Birkinshaw, 2008). The two predominant concepts of structural solutions are the use of spatial separation and of temporal separation. Spatial separation is the more prevalent concept, having its roots in Duncan's work of 1976 who emphasizes the implementation of dual structures which involve the creation of separate units that are responsible for either explorative or exploitative activities in an organization (see Tushman and O'Reilly, 1996; Smith and Tushman, 2005). Contrary to the concept of spatial separation, temporal separation involves the use of parallel structures (e.g., McDonough and Leifer, 1983) and comprises the ability to temporally switch between exploration and exploitation.

Temporal separation implies that ambidexterity occurs sequentially, meaning that a single business units focusses on exploration the one day, and on exploitation the next day (Adler et al., 1999; McDonough and Leifer, 1983). According to the phase of innovation which an organization faces, it temporally switches and adapts its processes (O'Reilly and Tushman, 2008). Raisch and Birkinshaw (2008) highlight the primary and secondary structures (see Adler et al., 1999) which define parallel structures. Accordingly, primary structures involve mainly exploitative activities for routine tasks and for the maintenance of stability and efficiency. Secondary, or supplementary structures, involve mainly explorative activities for non-routine tasks and for innovation in order to enable efficiency and flexibility. Temporal separation allows to meet the competing demands of exploration and exploitation within the same business unit, making the coordination costs which occur in spatial separation nearly redundant (Gibson and Birkinshaw, 2004). However, according to Gibson and Birkinshaw (2004), both spatial and temporal separation still require unit managers who make decisions on how to divide up the time and groups in order to manage the trade-off between exploration and exploitation.

O'Reilly and Tushman (2008) claim that the mechanisms for temporal separation, meaning the sequential pursuit of the two activities, are quite different to the mechanisms of spatial separation as “the challenge is transforming one internally consistent strategy and organizational alignment (e.g., a focus on efficiency or exploitation) to another” (O'Reilly and Tushman, 2008, p. 193). The authors also argue that the notion of temporal sequencing of exploration and exploita-

tion is not always achievable due to the complexity and the pace of change in markets and technologies. Therefore, they suggest that spatial separation is the more feasible solution. According to them, spatial separation includes the simultaneous pursuit of exploration and exploitation with the implementation of separate subunits, business models, and alignments for each of the two dimensions. However, O'Reilly and Tushman (2008) also claim that "ambidexterity, in this conceptualization, entails not only separate structural subunits for exploration and exploitation but also different competencies, systems, incentives, processes and cultures – each internally aligned" (O'Reilly and Tushman, 2008, p. 193). According to Smith and Tushman (2005) this alignment across subunits can be achieved by means of a common strategic intent, shared assets, and an overarching set of values. Therefore, the top management team (TMT) has a vital function in integrating structurally separated units which are either involved in exploration or exploitation (O'Reilly and Tushman, 2008; Smith and Tushman, 2005).

Within structural ambidexterity, the way in which explorative and exploitative units are configured and organized is seemingly different from each other. On the one hand, units which are involved in exploration are said to be small, decentralized, and with loose processes (Benner and Tushman, 2003; Tushman and O'Reilly, 1996). On the other hand, units which are involved in exploitation are said to be larger, more decentralized, and with tight processes (Benner and Tushman, 2003; Tushman and O'Reilly, 1996). Now, given that exploration and exploitation are separated by means of structurally differentiated units, should these different units be integrated and how can this be done? Raisch and Birkinshaw (2008) have found that some researchers emphasize the creation of "loosely coupled organizations in which the explorative units are strongly buffered against the exploitative units" (Raisch and Birkinshaw, 2008, p. 390). Contrary to this, Tushman and O'Reilly (1996), for example, argue in favor of organizational configurations that combine tight and loose coupling. This means that an ambidextrous organization can be created by tightly coupling multiple loosely coupled subunits with each other (O'Reilly and Tushman, 2004). Hereby, the explorative and the exploitative units are spatially and culturally separated and are managed by the use of different incentive systems and managerial teams. Additionally, the top management teams, which are responsible for the coordination and the development of a strong, overarching organizational culture enable the strategic integration of the different units.

2.5.2. Contextual ambidexterity

Since the focus of prior studies lied primarily on the examination of structural ambidexterity, contextual ambidexterity seems to be a neglected field of research (Raisch and Birkinshaw, 2008). This section will therefore give a definition of contextual ambidexterity and describe its mechanisms. Gibson and Birkinshaw (2004) were the first authors to investigate the antecedents, the consequences and mediating role of contextual ambidexterity in a survey of 4,195 individual in

41 business units. Therefore, their study will serve as a base for the explanation of contextual ambidexterity.

Gibson and Birkinshaw define contextual ambidexterity as "the behavioral capacity to simultaneously demonstrate alignment and adaptability across an entire business unit" (Gibson and Birkinshaw, 2004, p. 209). Alignment (exploitation) is characterized by the coherence among all different processes and activities in a business unit which are working into the direction of a common goal and is oriented towards the improvement of the performance in the short term (Gibson and Birkinshaw, 2004). Adaptability (exploration) includes the reconfiguring of these different activities in a business unit in order to quickly react to changing conditions in the task environment and is oriented towards the improvement of the performance in the long term (Gibson and Birkinshaw, 2004). The buildup of a business unit context allows individuals in an organization to undertake their own judgments concerning the division of their time when it comes to the handling of the conflicting demands of alignment and adaptability (Gibson and Birkinshaw, 2004). In other words, ambidexterity can be achieved "by building a set of processes or systems that enable and encourage individuals to make their own judgments about how to divide their time between conflicting demands for alignment and adaptability" (p. 211). Similarly, Güttel and Konlechner (2009) define contextual ambidexterity as the ability of employees to switch between explorative and exploitative activities in line with their own judgments.

Gibson and Birkinshaw (2004) argue that contextual separation is, contrary to structural separation, more efficient as it eases the adaptation of an entire business unit. When applying a structural separation model, only separate units are in charge of the adaptation to new tasks which emerge as a result of changing environmental demands. In addition to this, contextually ambidextrous business units provide a more flexible and dynamic context which enables individuals to decide which part of their time they want to spend on either alignment-oriented or adaption-oriented activities (Gibson and Birkinshaw, 2004). This means that the development of an ambidextrous context in business units promotes ambidextrous behavior on the individual level that is aligned and adaptable (Gibson and Birkinshaw, 2004). Contextual ambidexterity can therefore be defined as "an interplay of system capacities – for alignment and adaptability – that simultaneously permeate an entire business unit" (Gibson and Birkinshaw, 2004, p. 211). Güttel and Konlechner (2009) state that the main advantage of contextually ambidextrous organization designs, compared to structurally ambidextrous designs, is the facilitated and faster knowledge transfer between exploratory and exploitative activities in order to develop innovative and applicable solutions. In other words, the use of project teams facilitates the diffusion of knowledge across various learning domains in contextually ambidextrous organizations, unlike structurally ambidextrous organizations where the TMT is responsible for the transfer of knowledge from exploratory to exploitative areas (Güttel and Konlechner, 2009). Therefore, the top management teams

in contextual ambidextrous arrangements are not responsible for coordinating the integration across different units, but for the creation of a supportive business-unit context (Raisch and Birkinshaw, 2008). Compared to structural ambidexterity, Güttel and Konlechner (2009) state that within a contextually ambidextrous organization design, the employees possess a broad background knowledge which enhances their understanding of the demands in different domains so that “newly generated knowledge from the scientific community can be applied faster, more comprehensively and with a better fit to the client’s needs in the business environment” (p. 167).

Having mentioned the main advantages of contextual ambidexterity, Gibson and Birkinshaw (2004) claim that there is a lack of understanding of how contextual ambidexterity is achieved, meaning its antecedents, and which consequences contextual ambidexterity has on business unit performance. Gibson and Birkinshaw (2004) summarize some prior recommendations for supporting contextual ambidexterity including the use of meta-routines and job-enrichment schemes, the use of leaders with complex behavioral repertoires, and the creation of a shared vision. However, as these suggestions are not comprehensive enough to cover all aspects of contextual ambidexterity, they additionally refer to the work of Ghoshal and Bartlett (1994; as cited in Gibson and Birkinshaw, 2004) who state that context is characterized by four behavior-framing attributes, namely discipline, stretch, support, and trust. According to Gibson and Birkinshaw (2004), organization context is related to the concepts of structural context, organization culture, and organization climate. The authors describe structural context as the development of administrative and comparatively tangible mechanisms that strengthen specific employee behaviors. Organizational culture is described as a construct which includes underlying beliefs and values of individuals in an organization. Lastly, organization climate is referred to as the presence of organizational stimuli or environmental characteristics which are assumed to influence the behaviors and attitudes of individuals. Ghoshal and Bartlett (1994; as cited in Gibson and Birkinshaw, 2004) define context as the systems, processes, and beliefs that shape behaviors on the individual level. Ideally, the context provides the possibility for individuals to decide themselves how they want to divide their time between explorative and exploitative activities. However, the creation of a supportive organization context is not enough to reach superior performance: only when the supportive context creates the capacity to achieve ambidexterity, superior performance can be reached (Gibson and Birkinshaw, 2004).

Gibson and Birkinshaw (2004) extend the concept of the four attributes by Ghoshal and Bartlett (1994) to suggest that a context is necessary for the development of a supportive environment that encourages individuals to undertake certain activities in order to achieve outcomes. More specifically, this means that the establishment of a supportive context which includes the four behavior-framing attributes, discipline, stretch, support, and trust, enables individuals to engage in alignment-oriented (exploitation) and adaptability-oriented

(exploration) activities (Gibson and Birkinshaw, 2004). The results of Gibson and Birkinshaw (2004) show that the simultaneous pursuit of both activities eventuates in contextual ambidexterity which, in turn, reinforces the performance. This finding is in line with other scholars’ assumptions (e.g., He and Wong, 2004) that ambidexterity has a positive effect on a firm’s performance. Their hypothesis stating that the more a business unit context is characterized by an interaction of stretch, discipline, support, and trust, the higher the level of ambidexterity was also supported. Gibson and Birkinshaw (2004) have also found that there was a strong, positive correlation between alignment and adaptability, suggesting that business units are able to achieve both behaviors simultaneously.

2.5.3. *Ambidextrous leadership*

Senior managers, as key leaders in an organization, are inevitably involved in developing and strengthening ambidexterity in an organization (Raisch and Birkinshaw, 2008). While some studies (e.g., Gibson and Birkinshaw, 2004; Smith and Tushman, 2005) treat the top management team as a supporting factor in the implementation of ambidexterity, others (e.g., Lubatkin et al., 2006) consider leadership processes as an independent antecedent of ambidexterity. According to Raisch and Birkinshaw (2008), the latter conceptualization of leadership-based antecedents often relates to hierarchical management levels. Pertaining to this, Floyd and Lane (2000) suggest that exploration is pursued in the operating levels where managers experiment with new solutions to emerging demands, and that exploitation is pursued at the top management level where the promising solutions from the operating level are selected and deployed.

In contrast to this structural separation by the use of hierarchical levels, there is also the notion of managers who simultaneously carry out exploration and exploitation, thus following a contextual ambidexterity approach (e.g., Rosing et al., 2011). Smith (2006) refers to TMTs that shift their resources between existing products and new products to equally and simultaneously support exploration and exploitation. Similarly, Volberda et al. (2001) state that the top management manages the simultaneous pursuit of exploration and exploitation by introducing new competencies to some units while deploying existing and well-established competencies in others. In this context, Beckman (2006) also highlights the importance of the founding team composition, and especially the members’ earlier company affiliations, as an antecedent of explorative and exploitative behavior. She found empirical evidence that firms in which the founding teams had both diverse and common prior company affiliations showed higher levels of ambidexterity.

Ambidextrous leaderships is the ability to promote ambidexterity among employees and to display a variety of leadership behaviors, depending on the situation (Rosing et al., 2011). Rosing et al. (2011) describe ambidextrous leadership with regard to innovation. The authors state that there are two processes involved in innovation, namely creativity (exploration) and implementation (exploitation). As the two

activities, exploration and exploitation, are very different to each other and sometimes even opposing, the challenge is to flexibly switch between them (Rosing et al., 2011). This implies that “teams involved in innovation need to show exploration and exploitation in an unpredictably alternating sequence” (Rosing et al., 2011, p. 966). This assumption is rooted in the contextual ambidexterity approach, meaning that teams or business units are not structurally separated in order to pursue either exploration or exploitation but that they inevitably engage in both domains. Also, with regard to ambidextrous leadership, it is supposed that exploration and exploitation are not mutually exclusive, but can occur simultaneously. Rosing et al. therefore propose that “it is necessary not only to be able to balance exploration and exploitation, but to be able to integrate exploration and exploitation and flexibly switch between both as the situation requires” (Rosing et al., 2011, p. 966).

According to Rosing et al. (2011), ambidextrous leadership comprises three elements, namely opening leader behavior, closing leader behaviors, and the temporal flexibility to switch between both depending on the situation. Opening leader behavior is related to fostering exploration among followers. It includes the breaking up of established routines as well as the thinking in new directions. Leaders who display an “open” behavior give space for independent thinking and acting, encourage their followers to experiment and to approach things differently, and promote (risky) efforts with the aim of changing existing routines. Closing leader behavior is related to fostering exploitation among followers. It includes rationalization in order to reduce variance and to support the implementation of routines. Leaders who display a “closed” behavior set guidelines, are in charge of correcting certain actions, and supervise the achievement of goals.

In addition to this, Rosing et al. (2011) explain that both opening and closing leader behaviors can be performed actively or passively. Actively means that leaders themselves pursue explorative or exploitative activities. Passively, on the other hand, refers to the degree of promoting explorative or exploitative behaviors among the leaders' followers and giving them room for working independently. When a leader displays an open leader behavior, this may for example manifest itself in actively introducing new ideas and in passively encouraging error learning. When a leader displays a closed leader behavior, this may manifest itself in actively taking corrective actions or structuring tasks and in passively controlling the adherence to goals. In conclusion, Rosing et al. (2011) highlight the importance of being able to have a repertoire of both closing and opening leader behavior although these two are very different from each other. Lubatkin et al. (2006) similarly found that top management team behavioral integration positively correlated with firm performance and that this correlation was mediated by ambidexterity. The term “behavioral integration” refers to the degree of a top management team's wholeness and unity of effort and is determined by the level of the team's collaborative behavior, the quantity and quality of information exchanged, and the degree of joint decision making (Lubatkin

et al., 2006).

With regard to ambidextrous leadership, Rosing et al. (2011) also mention that there might be multiple leaders in a team who are responsible for promoting exploration and exploitation among their followers. However, this requires coordination with regard to when opening or closing behaviors need to be displayed by the different leaders within a team. Additionally, Rosing et al. (2011) state that a team's culture or climate may have an impact on leadership behaviors. For example, when a team ensures controlled goal achievement and high standards of performance, then a transformational leadership style leads to a high innovative performance (Rosing et al., 2011). Tushman et al. (2011) claim that great leaders manage the tensions between new innovations (exploration) and core products (exploitation) by developing an overarching vision, by holding tension at the top meaning that decisions need to be made at the senior-executive level, and by embracing inconsistency in different business units.

2.6. Conclusions

The examination of the conceptual background served as a basis for the appraisal of the mechanisms through which ambidexterity can be achieved and to show how exploration and exploitation can be reconciled in practice. However, the findings of prior research on ambidexterity have not always been congruent and sometimes show contradictory results. First of all, the concept of ambidexterity has been examined through a variety of literature streams which leads to a multitude of different approaches on how to tackle this topic. The different literature streams which were explained included organizational learning, technological innovation, organizational adaptation, strategic management, and organizational design.

Secondly, there is the question of how ambidexterity, and more specifically exploration and exploitation, should be conceptualized. Accordingly, there are two different possibilities: continuity and orthogonality. While conceptualizing exploration and exploitation as two ends of continuum, thus being mutually exclusive, orthogonality implies that high levels of either exploration or exploitation in one domain may simultaneously be present with high levels of exploration or exploitation in the other domain. Building on these two different conceptualizations the question arises of whether to pursue a punctuated equilibrium approach or ambidexterity. On the one hand, punctuated equilibrium includes a sequential or cyclical pursuit of exploration and exploitation. On the other hand, ambidexterity involves the simultaneous pursuit of the two domains. According to this, punctuated equilibrium seems to be the better solution when exploration and exploitation are conceptualized as two ends of a continuum. Ambidexterity is the better solution when exploration and exploitation are orthogonal. Due to the fact that the punctuated equilibrium approach presumes that exploration and exploitation are pursued sequentially and not simultaneously, practical implications regarding this conceptualization will be neglected in the later parts of this thesis.

Thirdly, there are two main types of ambidexterity: structural and contextual ambidexterity. Structural ambidexterity works by spatially separating business units which enables specialization in both exploration and exploitation. Contextual ambidexterity involves the contextual integration of individuals or subsystems who simultaneously pursue exploration and exploitation. While the role of the top management team in structural ambidexterity is the cross-linkage and communication across the different specialized business units, the top management team in contextual ambidexterity is responsible for the creation of a contextual framework (e.g. a context characterized by a combination of stretch, discipline, support, and trust). Apart from structural and contextual solutions of achieving and managing ambidexterity, leadership-based solutions are a third mechanism in order to strengthen ambidexterity in an organization. Leadership-based solutions mainly refer to certain characteristics of leaders or top management teams which should facilitate ambidexterity. Ambidextrous leadership can therefore be regarded as another antecedent of ambidexterity.

Fourthly, the level of analysis for ambidexterity is still ambiguously treated in the literature. Research so far mainly considers ambidexterity on the individual, the business unit, and the organizational level. Concerning the studying of the ambidexterity-performance linkage, most researchers analyzed this relationship on the organizational level (e.g., He and Wong, 2004). The organizational level of analysis is, together with the business unit level, generally used to examine structural ambidexterity (e.g., Tushman and O'Reilly, 1996; Benner and Tushman, 2003; Lubatkin et al., 2006; Jansen et al., 2008, 2009). Studies focusing on contextual ambidexterity mainly analyzed the individual or the business unit levels (e.g., Gibson and Birkinshaw, 2004; Güttel and Konlechner, 2009). According to these findings, the level of analysis is related to the type of ambidexterity that is examined.

Lastly, the discussion about the rigor-relevance debate delivered important findings concerning the core difficulties related to the research question. As this thesis aims at providing practical implications for managers concerning the concept of ambidexterity, the translation of scientific findings into practical implications can be regarded as a main challenge. The following sections of this thesis will thus try to elaborate an appropriate method for bridging the rigor-relevance gap concerning the topic of ambidexterity and its practical implications. The aim is to derive implications for managers from academic as well as practitioner literature for achieving ambidexterity in practice. Contrary to prior studies, which strictly separated structural, contextual, or leadership-based solutions, this thesis sees management as an overarching element with which ambidexterity can be achieved. In other words, the top management team has an all-embracing role in recognizing the need for ambidexterity in an organization and in implementing appropriate actions for the coupling of exploration and exploitation. This largely untreated area of ambidexterity research, thus, requires further examination and analysis. The aim of this thesis is, therefore, to provide an overview of the major findings

regarding the practical implications for managers which can be found in academic and practitioner literature for achieving ambidexterity in practice. The next section will explain the methodological proceeding with regard to this purpose.

3. Research strategy and method

In order to define a relevant research question the existing literature with regard to the thesis' topic was examined. This was done in the above section 2, the analysis of the conceptual background. The aim of this literature study was to get an overview of the current state of research in the field in order to enable the specification of the research question with the intention of enlarging the prevailing knowledge base (Tranfield et al., 2003). The scoping of the literature concerning the topic of ambidexterity revealed that there are multiple organizational levels in which there are different processes and mechanisms for coupling exploration and exploitation (i.e. structural, contextual, and leadership-based solutions). The management has an overarching function in implementing these mechanisms. The proposed research question which will be treated in the following parts of this thesis is the following:

Which practical implications for managers can be found in academic and practitioner literature for achieving ambidexterity in practice?

In order to answer this research question and thus to fill the research gap, a systematic literature review offers an applicable methodology for the assessment of the current knowledge concerning ambidexterity. Specifically, it will be examined which practical implications can be derived from academic literature as well as practitioner literature regarding the concept of ambidexterity. The results obtained from the academic and the practitioner literature will be analyzed and interpreted separately. This should allow a differentiated evaluation of the findings concerning the practical implications of the ambidexterity concept. While the results obtained from the practitioner literature might be more practice-oriented, those obtained from the academic literature are supposed to be more general and scientific. This assumption is leaned on the debate of the rigor-relevance gap in management research. As already mentioned earlier, the rigor-relevance discussion is about the question of whether scientific research can be connected to practice (and vice versa) or not (see Kieser and Leiner, 2009; Hodgkinson and Rousseau, 2009). Therefore, if this thesis succeeds in deriving relevant practical implications regarding the concept of ambidexterity, the rigor-relevance gap can be considered bridgeable.

3.1. Why a systematic review?

The topic "Practical Implications of the Ambidexterity Concept" will use a systematic review method in order to clarify the question of the extent to which practical implications for managers or practitioners can be found in the existing literature on ambidexterity. The work of Tranfield

et al. (2003) will be used to explain how evidence-informed research can be conducted by means of a systematic review. In the field of management, the endeavor of conducting a systematic review is liable to several problems, such as the heterogeneity of studies and the adjunctive amount of different research questions addressed in these studies, making it difficult to synthesize and to associate the findings with each other (Tranfield et al., 2003). A systematic review should identify key scientific findings with regard to the research question. Tranfield et al. (2003) argue that a meta-analysis, contrary to a systematic review, uses a statistical procedure to synthesize the findings from a broad range of studies which is not always appropriate in the field of management. They reason this by stating that in management research only few studies address the same research question or measure certain phenomena in the same way, making it difficult to use a meta-analytic approach. A systematic literature review, however, allows a transparent, reproducible, comprehensive, and unbiased search.

A systematic review should furthermore help to solve the problem of bridging rigor and relevance in the management field. Hodgkinson et al. (2001) classify applied social sciences into four categories: "Popularist Science", "Pedantic Science", "Puerile Science", and "Pragmatic Science" (see figure 3). "Popularist Science" is classified as research that is high on practical relevance, but low on methodological rigor. "Pedantic Science", on the other hand, is research that is high on rigor but low on relevance. "Puerile Science" is research that is neither relevant nor rigorous. "Pragmatic Science" is the only research which displays both rigor and relevance on a high level. With regard to this, Tranfield et al. (2013) state that a "systematic review can be argued to lie at the heart of a 'pragmatic' management research, which aims to serve both academic and practitioner literature" (p. 220).

The main problem regarding the rigor-relevance discussion is to investigate whether there are practical implications concerning the ambidexterity concept or not. If no practical implications can be derived from the prevailing literature (i.e. when the theoretical examination of the topic remains dominant), the existence of the rigor-relevance gap concerning the topic of ambidexterity can be approved. The systematic review of academic journals and practitioner reviews should help to investigate the rigor-relevance debate concerning ambidexterity. The assumption hereby is to possibly deduct more concrete implications for managers from practitioner literature (i.e., in Harvard Business Review, MIT Sloan Management Review, and California Management Review) and more abstract and general instructions from academic journals.

The following sections will describe the different stages of conducting a systematic literature review. The work of Tranfield et al. (2003) will provide the theoretical basis. The authors have established three main stages: planning the review, conducting the review, and reporting and dissemination. Planning the review includes the conduct of scoping studies and the setup of a review protocol which documents information on the various articles. The phase of conducting

a review includes the definition of a search strategy, the creation of data extraction forms which contain specific information about the selected studies, and the synthesis of the data. For the data synthesis, the process of categorization and the qualitative (and quantitative) analysis of the content are described with reference to the work of Mayring (2015). Lastly, the phase of reporting and dissemination will concern the conclusions and recommendations for practitioners derived from the systematic literature review.

3.2. Planning the review

The first stage of the systematic review process is to plan the review. This was done by conducting scoping studies with the aim of getting an overview of the relevance and the size of the existing literature in order to narrow down the topic. The section about the conceptual background above considered different perspectives of the ambidexterity concept and showed how this topic was approached by other researchers. The analysis of the conceptual background not only gave an overview of the theoretical findings, but also included the practical and methodological history in the field of ambidexterity. Tranfield et al. (2003) note that a review protocol should be set up in form of a plan which documents the single steps taken. This plan ensures objectivity and also serves as a point of reference when writing the thesis. The recording of the results was done in an excel file which includes columns presenting the formal aspects including the name of the author(s), the year of publication, the title of the paper, the name of the publishing journal, the research focus of the paper, the theoretical lens, its approach to ambidexterity (i.e. structural or contextual), the level of analysis (i.e. individual, group, organization), the methodology used, and the key findings.

3.3. Conducting the review

The second stage concerns the actual conduct of the systematic review which includes the systematic search with keywords and search terms, the selection of studies based on the scoping study conducted for the conceptualization of the theoretical background of ambidexterity, and the synthesis of the data (Tranfield et al., 2003). Again, the processes of searching should be reported in a review protocol including a full listing of all articles in order to ensure the later replication of the study (Tranfield et al., 2003). In order to allow a differentiated analysis of the results obtained from either the academic or the practitioner literature, these findings will be evaluated separately. Two independent searches were conducted for the selection of practical implications concerning ambidexterity from academic and practitioner literature. The first search included the selection of the 40 most cited articles from academic journals treating ambidexterity. The second search concerned the identification of studies in practitioner literature which treated the topic of ambidexterity.

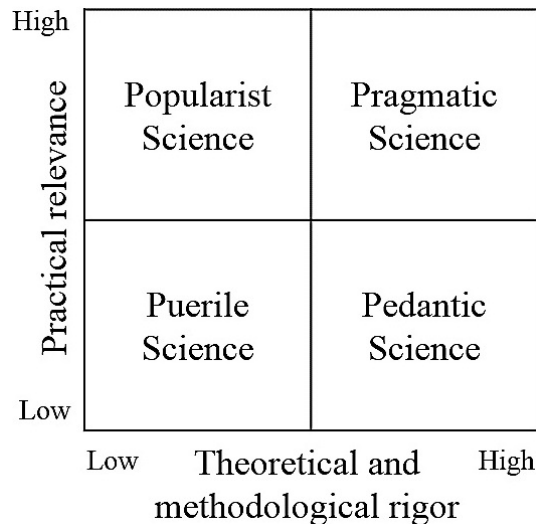


Figure 3: Characterization of applied social science (adopted from Hodgkinson et al., 2001, p. 42).

3.3.1. Search strategy: selection of studies and data extraction

For the answering of the research question, the 40 most cited articles concerning the topic of ambidexterity were selected for the later evaluation. The search was restricted to the 40 most cited articles from academic journals only in order to represent the most influential studies concerning the concept of ambidexterity. The database Web of Science was used for this search. The criteria of search were the following: ‘ambidext*’ (restricted to topic) was used as the search term; the selected time span reached from 1996 to 2014; the research categories were set to ‘Management’ and ‘Business’; the results were sorted from the amount of times cited from highest to lowest. With this search, 414 results (on 05.06.2015) were obtained. The search criteria were documented in a review protocol. According to Tranfield et al. (2003) only those studies that meet all the inclusion criteria should be incorporated into the review. Apart from the time span (articles published from 1996 to 2014) and a VHB-JOURQUAL3 ranking of C or better, the only other inclusion criterion required that the selected article treated ambidexterity in some way.

A second search was conducted using EBSCOhost in order to find articles published in practitioner literature which were possibly neglected in the search of the 40 most cited articles. Again, the search term ‘ambidext*’ was used to show results which include this term in the title. Furthermore, the search was restricted to articles published in three practitioner reviews, namely in California Management Review, Harvard Business Review, and MIT Sloan Management Review. This search led to six results. Three of the studies overlapped with the results from the search of the 40 most cited articles. This was compensated by not including these results in the 40 most cited articles. Due to the limited number of results obtained in the search for studies in practitioner literature, no further inclusion or exclusion criteria were specified.

Tranfield et al. (2003) note that the selected studies should be evaluated according to their internal validity and

the degree to which its design, method, and analysis have minimized errors and biases. Due to the fact that the first search, meaning the search for the 40 most cited articles referring to the topic of ambidexterity, was limited to those studies who showed the most frequent citations by other authors, the evaluation of the studies’ internal validity was neglected. It was assumed that the most commonly cited articles equally represent the most influential ones. Concerning the second search, the search for studies in practitioner literature, the results were limited in number, making the appraisal of the articles’ internal validity dispensable.

A further step of conducting a systematic review is the process of data extraction and monitoring (Tranfield et al., 2003). Data-extraction forms aim at reducing human error and bias and include general information, i.e. the name(s) of the author(s), the publishing year, and the name of the journal), a brief synthesis of the key results of the paper, and the number of citations of each article. Table 1 and 2 present the results of the selected articles from the academic and the practitioner literature and should also serve as a data-repository for the later analysis of the data.

3.3.2. Analysis of the data: qualitative content analysis and categorization

According to Tranfield et al. (2003) “research synthesis are methods for summarizing, integrating, and, where possible, cumulating the findings of different studies on a topic or research question” (p. 217). The result of this data synthesis where the different findings on a specific topic are cumulated, is to generate a deeper understanding and to achieve a level of conceptual and theoretical development. In this thesis, the aim is to derive practical implication for managers concerning the topic of ambidexterity. The analysis of the content requires a categorization in depth and width, which means that the content from the studies needs to be filtered out analytically with the help of categories. The analysis of qualitative data includes four main steps: the determination and

Table 1: Data extraction form of the 40 most cited articles from academic literature

Author(s) & Year	Methodology	Key issues & findings	Nb. of citations
Voss et al. (2008)	Survey of non-profit professional theaters in US	The authors examine how slack resources (financial, operational, customer relational, and human resource) interact with environmental threat appraisal to influence exploration and exploitation. Operational and HR slack are positively related to exploitation. When the environment is perceived as more threatening, financial and customer relational slack are positively (or less negatively) related to exploration.	101
Uotila et al. (2009)	Survey of 279 S&P 500 manufacturing firms	The study set out to empirically test the relationship between a firm's exploration and exploitation and its market-based performance. There is a curvilinear relationship between the relative amount of exploration and financial performance. Also, this relationship was found to be more pronounced in R&D intensive industries.	100
Tiwana (2008)	Survey of 42 innovation-seeking project alliances	The author examines the tensions and complementarities between bridging ties and strong ties in influencing ambidexterity of innovation alliances. A high level of knowledge integration among the collaborator in an alliance is positively related to alliance ambidexterity. Strong ties complement bridging ties in facilitating knowledge integration.	89
Taylor and Helfat (2009)	Case study of technological transitions at IBM	The authors conceptualize organizational linkages between the new technology and existing assets during transitions.	55
Smith and Tushman (2005)	Theoretical study	The authors examined decision processes in top management teams to manage the strategic and information processing contradictions associated with balancing exploration and exploitation. Achieving ambidexterity requires a paradoxical cognition among senior managers which can be cultivated by following either a leader-centric (team interactions, supportive coaching) or a team-centric (shared mental models) approach.	256
Smith and Lewis (2011)	Survey of studies focusing on organizational paradox	The authors present a dynamic equilibrium model of organizing, which depicts how cyclical responses to paradoxical tensions enable sustainability—peak performance in the present that enables success in the future. This review and the model provide the foundation of a theory of paradox.	111
Simsek et al. (2009)	Conceptual paper	The authors identify four archetypes of ambidexterity, using a temporal (simultaneous vs. Sequential) and a structural (independent vs. Interdependent) dimensions. The identified types of ambidexterity include harmonic, cyclical, partitional, and reciprocal ambidexterity. The theoretical grounding, the antecedents, and the outcomes of each type are described.	53
Simsek (2009)	Conceptual paper	The authors review previous research on the conceptualization, antecedents, and consequences of ambidexterity. They investigate the relationship between network centrality/diversity and organizational ambidexterity; also the moderating effects of dual structures, behavioral context, TMT behavioral integration, environmental dynamism and complexity are considered.	77

(Continued)

Table 1—continued

Author(s) & Year	Methodology	Key issues & findings	Nb. of citations
Sidhu et al. (2007)	Cross-sectional survey in manufacturing industries	The authors conceptualize exploration and exploitation in terms of a nonlocal-local search continuum in three-dimensional supply, demand, and geographic space. Boundary spanning supply-side search is found to be positively associated with innovation in more-dynamic environments typical of the entrepreneurial regime phase of technology evolution. Boundary-spanning demand-side search is found to be favorably associated with innovation in less-dynamic environments. Spatial boundary-spanning search seems to contribute to innovation in more- as well as less-dynamic environments.	75
Sheremata (2000)	Theoretical paper	The author finds that ambidexterity in new product development projects increases the likelihood that project teams will find high-quality solutions to problems quickly and efficiently while maintaining balance among their goals. Ambidexterity is, in turn, positively related to the attainment of development schedule, cost, and product quality goals.	137
Rothaermel and Alexandre (2009)	Survey of the manufacturing sector in the US	The authors examine four possible combinations of exploration and exploitation, based on the technological boundary (new or known knowledge) and the organizational boundary (internal or external sourcing). They found that an inverted U-shaped relationship exists between a firm's total technology sourcing mix (of known and new technology) and its performance; and a firm's absorptive capacity moderates the inverted U-shaped relationship between a firm's total technology sourcing mix (of known and new technology) and firm performance in such a fashion that the positive effect of ambidexterity in technology sourcing on firm performance is stronger when the firm possesses higher levels of absorptive capacity.	104
Raisch et al. (2009)	Theoretical study	The authors explored four fundamental tensions related to organizational ambidexterity, including differentiation versus integration, individual versus organizational, static versus dynamic, and internal versus external. Research on organizational ambidexterity shows that some individuals, groups, and organizations are successful in the long run. The authors provide important insights into the strategies, structures, and processes that allow them to balance and harmonize seemingly contradictory requirements.	226
Raisch and Birkinshaw (2008)	Review article	The authors show that ambidexterity spans various (disconnected) research fields and highlight research done on antecedents (structural, contextual, leadership-based), the ambidexterity-performance linkage, environmental factors and other moderators.	262
O'Reilly and Tushman (2008)	Theory paper	The authors identify a set of propositions that suggest how ambidexterity acts as a dynamic capability. They suggest that efficiency and innovation need not be strategic tradeoffs and highlight the substantive role of senior teams in building dynamic capabilities.	149

(Continued)

Table 1—continued

Author(s) & Year	Methodology	Key issues & findings	Nb. of citations
Mom et al. (2009)	Survey of 716 managers in 5 large firms	Findings regarding the formal structural mechanisms indicate that a manager's decision-making authority positively relates to this manager's ambidexterity, whereas formalization of a manager's tasks has no significant relationship with this manager's ambidexterity. Regarding the personal coordination mechanisms, findings indicate that both the participation of a manager in cross-functional interfaces and the connectedness of a manager to other organization members positively relate to this manager's ambidexterity. Furthermore, results show positive interaction effects between the formal structural and personal coordination mechanisms on managers' ambidexterity.	69
Luo and Rui (2009)	Survey of multiple case studies from Chinese firms	The authors conceptualize ambidexterity as a multidimensional term comprising co-evolution, co-competence, co-opetition, and co-orientation. They show how emerging market multinational enterprises (EM MNEs) use these four dimensions to compete against other firms in the market.	50
Lubatkin et al. (2006)	Survey of CEOs and TMT members from 139 SMEs	TMT behavioral integration is positively associated with the ambidextrous orientation of SMEs. Behaviorally integrated TMTs (collaboration, joint decision-making, information exchange) are better able to handle the informational contradictions and conflicts associated with ambidexterity. Ambidextrous orientation is positively related to relative firm performance (growth and profitability) among SMEs.	221
Lin et al. (2007)	Archival study of 5 US industries and computer simulation model	The authors examine the boundary conditions under which ambidexterity improves firm performance. Firm size, environmental uncertainty, and network centrality weaken the effect of ambidexterity on performance; also, the impact of ambidexterity on performance is stronger in the early years of network formation. A high degree of structural holes in Interfirm networks negatively moderates the impact of alliance ambidexterity on firm performance.	68
Lichtenthaler and Lichtenthaler (2009)	Theoretical study	The authors identify six 'knowledge capacities' as a firm's critical capabilities of managing internal and external knowledge in open innovation processes: inventive, absorptive, transformative, connective, innovative, and desorptive capacity. A thorough analysis of the knowledge capacities and knowledge management capacity reveals which capacities are well developed and where a firm has deficits.	109
Kaplan and Henderson (2005)	Theoretical study	The authors use the problems experienced by established firms attempting to create new businesses to focus attention on the forces that shape and constrain the development of new incentive systems.	61
Kang and Snell (2009)	Theoretical study	The authors find that refined interpolation (combination of specialist human capital, cooperative social capital, and organic organizational capital) and disciplined extrapolation (generalist HC, entrepreneurial SC, and mechanistic OC) facilitate ambidextrous learning.	76

(Continued)

Table 1—continued

Author(s) & Year	Methodology	Key issues & findings	Nb. of citations
Jansen et al. (2006)	Survey of 283 organizational units of a large European financial services firm	Results indicate that centralization negatively affects exploratory innovation, whereas formalization positively influences exploitative innovation. Interestingly, connectedness within units appears to be an important antecedent of both exploratory and exploitative innovation. Furthermore, the findings reveal that pursuing exploratory innovation is more effective in dynamic environments, whereas pursuing exploitative innovation is more beneficial to a unit's financial performance in more competitive environments.	324
Jansen et al. (2009)	Random company sample (4.000 firms, 230 replied)	The authors find that the direct effect of structural differentiation on ambidexterity operates through informal senior team (i.e., senior team social integration) and formal organizational (i.e., cross-functional interfaces) integration mechanisms.	109
Jansen et al. (2008)	Survey of 305 senior team members and 89 executive directors at Dutch autonomous branches of a large European financial services firm	The authors examine the relationship between senior team attributes and organizational ambidexterity. Senior team shared vision and senior team contingency rewards are positively related to ambidexterity. Transformational leadership behavior positively moderates the impact of senior team social integration and negatively moderates the effect of contingency rewards on ambidexterity.	71
Im and Rai (2008)	Online survey of customers and vendors of a company in the US logistics industry	The authors examine the impact of exploitative and explorative knowledge sharing in interorganizational relationships on relationship quality. Long-term relationships with a simultaneous emphasis on exploitative and explorative knowledge sharing experienced lower intra-group variance-to-mean performance than those that focus primarily on explorative knowledge sharing.	70
Hotho and Champion (2011)	Case study of a SME in the computer games industry	The authors examine changing people management practices as the case company undergoes industry-typical strategic change to embark on explorative innovation and it seeks to argue that maintaining an organizational context conducive to innovation over time risks turning into a contest between management and employees, as both parties interpret organizational pressures from their different perspectives.	81
Helfat and Winter (2011)	Theoretical study	The authors state that it is impossible to draw a bright line between dynamic and operational capabilities because: 1) change is always occurring to at least some extent; 2) we cannot distinguish dynamic from operational capabilities based on whether they support what is perceived as radical versus non-radical change, or new versus existing businesses; and 3) some capabilities can be used for both operational and dynamic purposes.	50
He and Wong (2004)	Survey of 206 manufacturing firms in Singapore and Malaysia	The authors find that the interaction between explorative and exploitative innovation strategies is positively related to sales growth rate and that the relative imbalance between the two is negatively related to sales growth rate.	525

(Continued)

Table 1—continued

Author(s) & Year	Methodology	Key issues & findings	Nb. of citations
Gupta et al. (2006)	Conceptual paper	The authors examine the meaning of exploration and exploitation, whether they are two poles on a continuum or orthogonal and how a balance between these two should be achieved - via ambidexterity or punctuated equilibrium.	469
Gulati and Puranam (2009)	Survey of the networking company Cisco	The authors explain how inconsistencies between formal and informal organization arising from reorganization can help create ambidextrous organizations. Compensatory fit is when, under some conditions, the informal organization can compensate for the formal organization by motivating a distinct but valuable form of employee behavior that the formal organization does not emphasize, and vice versa.	49
Gibson and Birkinshaw (2004)	Survey of 4,195 employees in 41 business units of 10 multinational firms	The authors investigated the concept of contextual ambidexterity on business unit level. They found that a context characterized by a combination of discipline, support, stretch, and trust facilitates contextual ambidexterity which subsequently leads to superior performance. Also, contextual ambidexterity mediates the relationship between these four contextual features and performance.	506
Eisenhardt et al. (2010)	Theoretical study	The authors state that, regarding structure, balancing efficiency and flexibility comes, counterintuitively, from unbalancing in favor of flexibility. Regarding environment, environmental dynamism is a multidimensional construct that can be unpacked into dimensions such as ambiguity and unpredictability. Regarding cognition, effective leaders can manage the cognitive contradiction inherent in balancing efficiency and flexibility by relying on higher-order thinking and expertise.	59
Dess and Lumpkin (2005)	Theoretical study	Firms that want to engage in successful corporate entrepreneurship need to have an entrepreneurial orientation. There are five dimensions of entrepreneurial orientation: autonomy, innovativeness, proactiveness, competitive aggressiveness, and risk-taking.	79
O'Connor and DeMartino (2006)	Longitudinal study of 12 large multinational firms	The authors investigate how large organizations can foster radical innovations internally and caution that the structural separation approach may be insufficient to develop longer-term organizational capability. They identify that a model of discovery–incubation–acceleration is beneficial in supporting commercialization.	67
Cao et al. (2009)	Survey in 3 high-tech parks in China	The authors describe two dimensions of ambidexterity: the balance and the combined dimension. Small firms with little resources benefit from a trade-off, a balance, between exploration and exploitation. Large firms operating in environments which provide sufficient resources, benefit from simultaneously combining high levels of exploration and exploitation respectively.	118
Benner and Tushman (2003)	Theoretical study	Ambidextrous organizations composed of multiple tightly coupled subunits are loosely coupled with each other. Strategic integration of the subsystems is facilitated by (heterogeneous) senior teams who promote common aspirations.	695

(Continued)

Table 1—continued

Author(s) & Year	Methodology	Key issues & findings	Nb. of citations
Beckman (2006)	Survey of 170 US high-tech firms; Multi-method design	The founding team's prior company affiliations (common vs. diverse) affect the pursuit of exploratory and exploitative strategies. The simultaneous pursuit of exploration and exploitation requires TMTs to draw on member's common and unique affiliations.	116
Andriopoulos and Lewis (2009)	Comparative case study of 5 ambidextrous firms leading the product design industry	The authors examine how executives embrace the paradoxes of strategic intent, customer orientation, and personal drivers through a combination of integration (contextual) and differentiation (structural). Three factors interact to reinforce and sustain organizational ambidexterity: a multilevel approach, complementary tactics, and learning synergies.	136
Ambos et al. (2008)	Survey of 207 academic research projects	The authors examine how the capacity of two activities (academic rigor and commercialization) can simultaneously be developed at organizational and individual level.	52
Adler et al. (1999)	Case study of the Toyota Production System	Four kinds of organizational mechanisms that can help shift the tradeoff between efficiency and flexibility: meta-routines, enrichment, switching, and partitioning. Key features of context include trust and training.	316

examination of the source material, the process of inductive category-building, coding and revision of the categories, and the analysis and interpretation of the category system. The following instructions for the systematical proceeding of the content analysis, and especially for the process of categorization, are based on the work of Mayring (2015). According to Mayring (2015), the category system is the main instrument of a content analysis and should correspond to the general quality criteria, namely reliability (i.e. reproducibility and accuracy) and validity.

Determination and examination of the source material

The determination of the source material is the first phase in conducting a qualitative content analysis (Mayring, 2015). First of all, the material which will be used in the content analysis needs to be defined. For this thesis, the material includes the 40 most cited articles in academic journals and six studies from practitioner literature concerning the topic of ambidexterity. As a second step, it needs to be determined how and by whom the source material was produced. The material, meaning the 46 studies in total, were selected according to the search strategy mentioned above. Thirdly, it is essential to determine the characteristics of the material and in which form it is available. In this thesis, the material is available in written form and was stored both electronically and in hard copy. The electronic administration of the literature was done with the help of 'Citavi'. The second phase of a qualitative analysis of the content is to determine what one wants to analyze from the source material (Mayring, 2015). In this literature work, the research question serves as the basis for the interpretation of the material. The point of origin

is therefore the investigation of practical implications concerning the concept of ambidexterity which can be derived from academic and practitioner literature.

The examination of the material was done by screening the literature and highlighting practical implications which were relevant for the topic of ambidexterity in the text. The results of the examination of the content were again documented in an excel file. The information included in this document were general information (i.e. name(s) of the author(s) and the publication year), and the text modules referring to the practical implications of the ambidexterity concept. Additionally, a description of the text modules was also included whenever necessary. The wording of the relevant text modules (and the descriptions) was directly adopted from the original text. In order to ensure that the text modules can easily be set into context, the excel file includes a page number of each. The results of this documentation can be found in appendices A, B, and C. The adoption of the original wording should allow to derive categories in which the different text modules can be categorized. This will be explained in more detail in the next section.

Inductive category-building

The third phase of a qualitative content analysis concerns the selection of concrete techniques of analysis (Mayring, 2015). For this thesis, the process of inductive category-building was considered most appropriate. The question that arises is whether a deductive or an inductive definition of the categories is more appropriate for the analysis of the content? For this thesis, a mixture of both inductive and deductive building of categories was used. Deductive means that

Table 2: Data extraction form of the selected articles from practitioner literature

Author(s) & Year	Methodology	Key issues & findings	Nb. of citations
Tushman et al. (2011)	In-depth study of 12 top-management teams in major companies	The authors state that firms thrive when senior managers embrace the tension between new and old and foster a state of constant creative conflict at the top. There are three principles to achieving ambidexterity: develop an overarching identity, hold tension at the top, and embrace inconsistency.	13
Tushman and O'Reilly (1996)	Field research in multinational firms	The authors state that as organizations go through periods of evolutionary or revolutionary change, they need to align their competencies, strategies, structures, cultures, and leadership skills. Structural (autonomous business units), cultural (loose-tight culture), and management (ambidextrous managers, coherent vision) factors facilitate the simultaneous pursuit of incremental and discontinuous innovation and change.	637
O'Reilly et al. (2009)	Case study	The authors propose a theoretical explanation of how organizational adaptation (variation, selection, retention) can occur and provided a qualitative illustration for how this might work in practice (IBM). They conclude that a combination of a clear strategic intent, guaranteed funding, senior-level sponsorship, entrepreneurial leaders, and an aligned organization were required for the venture to succeed.	31
O'Reilly and Tushman (2011)	Semi-structured interviews with senior managers in 15 firms	The authors show that the most-successful ambidextrous designs had leaders who developed a clear vision and common identity, built senior teams that were committed to the ambidextrous strategy and were incented to both explore and exploit, employed distinct and aligned subunits to focus on either exploration or exploitation, and built teams that could deal with the resource allocations and conflicts associated with exploration and exploitation.	35
O'Reilly and Tushman (2004)	Theoretical study	The authors examined the characteristics of firms that have been successful at balancing exploration and exploitation by creating organizationally distinct units that are tightly integrated at the senior executive level. Ambidextrous organizations need ambidextrous senior teams (executives with the ability to understand the needs of different businesses, articulate a clear and compelling vision, and demonstrate commitment to ambidexterity).	337
Birkinshaw and Gibson (2004)	Survey of 4,195 individuals across 41 business units in 10 multinational companies	The authors identified four ambidextrous behaviors in individuals and five pathways for executives who want to build an ambidextrous organization. There are two dimensions of organizational context: performance management (stretch and discipline) and social support (support and trust).	102

specific categories have already been defined while screening the literature or have been derived from the current state of research (Mayring, 2015). As mentioned earlier, the management has a vital and overarching function in implementing mechanisms for the achievement of ambidexterity. Therefore, three main categories were (deductively) defined as follows: measures at the top management team level, measures affecting the implementation within the organization,

and moderators and other external factors. Measures at the TMT level include all actions that are implemented directly at this level, such as paradoxical cognition, strategy-making, or TMT-constellations. This category also includes personal characteristics of leaders or leadership styles which should facilitate ambidexterity. The second category, meaning the mechanisms which affect the actual implementation of ambidexterity within the remaining organization, include struc-

tural and contextual arrangements, as well as human resource practices. The third category refers to moderators and other external factors affecting the achievement of ambidexterity, which are more or less out of scope for decision-making and which can only marginally be controlled by managers. Subcategories which were classified into the corresponding main category were derived inductively. Inductive means that the categories do not refer to any of the earlier theory of the topic but are derived directly from the material and specific text modules (Mayring, 2015). Any text module that referred to a practical implication of ambidexterity fulfilled the criterion of selection and was assigned to a main and a sub-category for the later analysis.

Coding and revision of the category system

Coding refers to the attribution of different text modules to a defined category. Mayring (2015) explains the process of coding as follows. As soon as the criterion of selection, taking account of the level of abstraction, has been fulfilled by one text module in the material, the first category can be defined by more or less adopting its wording when formulating a term or sentence to label the new category. When a second text module fulfills the criterion of selection it can be decided whether the text module fits the already existing category (subsumption) or whether a new category needs to be defined. After the sighting of the material from 10-50% it needs to be decided whether the criterion of selection has been well defined and aids in building categories which help to answer the research question. If this is not the case, the analysis of the material needs to be repeated from the very beginning. Otherwise, the process can be continued.

Analysis and interpretation of the category system

The result of the process of inductive category-building is a system of categories on a specific topic which are connected to particular text modules. However, in the process of inductive category-building, it is not only necessary to classify certain text modules into the corresponding category, but it is also important to explain what is meant with the selected text module. The analysis and interpretation of the category system has the aim of making connections between the individual subcategories and can be conducted in three different ways (Mayring, 2015). Firstly, the whole category system can be interpreted with regard to the research question. Secondly, inductive main categories can be built with the help of a synthesizing content analysis. Deductive main categories can be built from insights gained from the theory. The approach of building deductive main categories was used in this thesis. Table 3 illustrates and summarizes the individual steps of building inductive categories in the process of a qualitative content analysis within this study.

3.4. Reporting and dissemination of the data

The last stage of a systematic literature review is the reporting and the dissemination of the results where practical recommendations are derived from the theoretical evidence (Tranfield et al., 2003). Tranfield et al. (2003) highlight that

a good systematic review should enable practitioners to better understand the research by summarizing comprehensive primary research papers. In this thesis, the established category system was used to link the different themes with each other and to show contradictions as well as similarities. The justification and grounding of the conclusions was affiliated to the core contributions of the original material. Getting evidence into practice is the last point when writing a systematic literature review (Tranfield et al., 2003). This means that the insights and the conclusions which were gained from the systematic review need to be turned into guidelines for practice. The aim was therefore to create a reliable base of knowledge for practitioners by accumulating and synthesizing knowledge from a number of studies. The reporting and dissemination of the data can be found in the discussion of this thesis. In the discussion, the results of the systematic literature review will be connected to the literature in order to enlarge the existing knowledge base.

4. Results

This thesis conceptualizes ambidexterity as the simultaneous pursuit of exploration and exploitation. The analysis of the 40 most cited articles concerning the ambidexterity literature as well as six articles from practitioner literature reveal that there exist a variety of different solutions and mechanisms which can help to achieve ambidexterity in practice. An overarching element of every of these solutions is the role of the top management team (TMT). The results section is divided into three main categories, namely the measures at the TMT level needed to achieve ambidexterity, the actions which the TMT can take in order to achieve ambidexterity in their organizations, and the moderators and external factors affecting the pursuit of exploration and exploitation. Measures at the TMT level refer to those actions which directly concern the TMT and include factors such as the TMT constellation, leadership styles, strategic decisions and specific characteristics of leaders which are helpful for achieving ambidexterity. Approaches at the organizational level include different structural and contextual arrangements as well as human resource practices which should be implemented by managers in order to facilitate ambidexterity.

Lastly, the moderators and external factors are those elements which are more or less out of scope for decision-making and can only marginally be influenced by managers. These include environmental factors, the availability of resources, and certain characteristics of organizational networks which affect the strategies for pursuing ambidexterity. Other factors such as dynamic capabilities and the absorptive capacity of an organization will also be discussed in this regard. In order to ensure a differentiated exposition of the findings of the 40 most cited articles and the selected practitioner literature concerning the topic of ambidexterity, the results will be presented separately. This differentiated consideration should highlight possible differences concerning the solutions and mechanisms to achieve ambidexterity.

Table 3: Steps of a Qualitative Analysis of Content

(adopted from Mayring, 2015, pp. 62, 86).

<p>1. Determination of the material Analysis of how the material was produced Characteristics of the material Direction of the analysis Theoretical differentiation of the research question</p> <p>2. Procedure of the analysis Determination of the procedure of the analysis (inductive category-building) Working through the material Selection of text modules pertaining to practical implications of ambidexterity Determination and definition of categories</p> <p>3. Coding and revision of the category system Coding of the text modules Subsumption or new building of categories Revision of the categories after examining about 50% of the material Final perusing of the material</p> <p>4. Analysis and interpretation of the category system Analysis with the help of the category system Summary of the results Interpretation into the direction of the research question</p>

4.1. *Implementing measures at the TMT level to achieve ambidexterity*

As key leaders in an organization, senior executives play a major role in developing and strengthening ambidexterity (Raisch and Birkinshaw, 2008). Volberda et al. argue that “top management explicitly manages the balance of exploration and exploitation by bringing in new competencies to some units while utilizing well-developed competencies in others” (Volberda et al., 2001, p. 165). This section has the aim to provide a summary of the key mechanisms which are necessary to be implemented directly at the top management team level in order to achieve ambidexterity. First of all, these include the cognition of paradoxes which arise when balancing the conflicting and often contradictory agendas of exploration and exploitation, and the definition of a strategy which highlights the importance of ambidexterity. Secondly, different team constellations have an influence on how ambidexterity is managed at the TMT level. Therefore, different constellations of teams and their characteristics will be discussed. Thirdly, different characteristics of leaders and leadership styles which affect the achievement of ambidexterity will be analyzed. Lastly, it will be explained how formal structural and personal coordination mechanisms at the top management team level can affect ambidexterity.

4.1.1. *Recognize and resolve paradox*

The main task of managers and top management teams in an ambidextrous organization is to balance its short-term performance and its long-term adaptability (Smith and Tushman, 2005). This requires trade-offs regarding the alloca-

tion of resources as well as strategic decisions concerning negotiations between the existing and the new products in order to ensure the success of both agendas (Smith and Tushman, 2005). According to Smith and Tushman (2005) decisions can be made with regard to the distribution of resources between the existing product and the innovation and with regard to the recognition of opportunities and synergies arising from exploration and exploitation. “Exploration and exploitation require fundamentally different and inconsistent organizational architectures and competencies” (Smith and Tushman, 2005, p. 525). For the alignment and management of these different architectures, a top management team which can host these inconsistencies is needed (He and Wong, 2004). In order to balance the strategic decisions and to reduce or allow the coexistence of inconsistencies, the TMT needs to recognize and use this conflict (Smith and Tushman, 2005; Eisenhardt et al., 2010). Balanced decision making can thus be enabled by paradoxical cognition which is not only the acceptance of the presence of contradictory agendas, but also the embracing of contradictions and conflict (Smith and Tushman, 2005). The role of managers is therefore to support opposing forces and take advantage of the tensions between exploration and exploitation (Smith and Lewis, 2011).

Two main elements of coping with paradoxical tensions are acceptance and resolution (Smith and Lewis, 2011). The acceptance of paradox reduces the anxiety and stress which is associated with tensions and thus facilitates the implementation of resolution strategies (Smith and Lewis, 2011). The resolution of paradoxical tensions refers to the finding of so-

lutions on how to manage paradox. This can be done either through separating and choosing between the different tensions that occur or through seeking synergies that integrate contradictory agendas, such as exploration and exploitation, in order to foster sustainability (Smith and Lewis, 2011). To summarize the above, the management of paradox requires a senior leadership that tolerates and accepts the contradictions arising from multiple different agendas and that is able to resolve these tensions in order to increase the likelihood of ambidexterity (O'Reilly and Tushman, 2008). In other words, senior teams need to "recognize and translate different, ambiguous, and conflicting expectations into workable strategies" in order to "create integrative and synergetic value among exploratory and exploitative activities and to achieve organizational ambidexterity" (Jansen et al., 2008, p. 985). Eisenhardt et al. (2010) suggest three cognitive solutions for balancing exploration and exploitation: abstraction, cognitive variety, and interruption. Abstraction implies that managers need to think abstractly in order to develop a common understanding of seemingly different opportunities. Cognitive variety can be defined as the multitude of different mental templates which help to generate a greater pool of solutions to accept and solve problems. Lastly, interruption facilitates exploration because a pause in the processes encourages rethinking, and also supports exploitation because a change in direction can assure to not waste time with non-working strategies.

Furthermore, the definition of distinct goals for exploration and exploitation can help to create paradoxical frames in order to enable positive conflict (Smith and Tushman, 2005). As a result, paradoxical frames do not only lead to reduced threat and anxiety, but they also enable teams to seize possible dualities and synergies between exploration and exploitation which, in turn, leads to greater performance (Smith and Tushman, 2005). Specifically, the management of contradictions which exist when pursuing both exploration and exploitation can be facilitated by two contrasting cognitive processes, namely differentiation and integration (Smith and Tushman, 2005). Differentiation at the top management level includes the clarification of differences regarding the strategy and organizational architectures, whereas integration involves the recognition of possible synergies between exploration and exploitation and between the strategy and organizational architectures (Smith and Tushman, 2005). Andriopoulos and Lewis (2009) similarly claim that a mix of both integration and differentiation tactics is necessary to cope with the paradoxes concerning exploration and exploitation. Firms need to manage these paradoxes at multiple levels which also requires that the different levels interact in order to enhance ambidextrous practices (Andriopoulos and Lewis, 2009).

Im and Rai (2008) have found that ontological commitment in an inter-organizational relationship positively influences explorative and exploitative knowledge sharing in the relationship. Ontological commitment refers to the ability of partnering firms to use digital boundary objects, meaning the usage of different information by differentiated

units, to transfer, or to span, knowledge across boundaries (Im and Rai, 2008). Therefore, ontological commitment not only facilitates negotiation, but also help to create a common meaning of diverse interests, and thus to reconcile exploration and exploitation (Im and Rai, 2008). To be more precise, "the reliance on digital boundary objects should enable knowledge sharing by establishing standards for representation and transfer of data, facilitating interpretation of information, and promoting mutual discovery" (Im and Rai, 2008, p. 1285). In general, this means that managers need to identify potential benefits from contradictory forces and find synergies between them. The recognition, acceptance, and resolution of these tensions allows managers to develop strategies for balancing exploration and exploitation and, thus, to achieve ambidexterity.

Findings from practitioner literature

In practitioner literature, the awareness of paradox is also considered as one of the most important aspects for balancing the two contradictory activities of exploration and exploitation and, as consequence, for achieving ambidexterity. Tushman et al. (2011) argue that senior managers need to embrace the tensions between new and old, the tension between the operating units and the core business at the top of the organization, which is enabled by a state of constant creative conflict at the top management level. Furthermore, managers need to embrace the inconsistencies which arise from hosting multiple, often conflicting, strategic agendas which are needed for exploration and exploitation (Tushman et al., 2011). This also involves the allocation and shifting of resources (e.g., financial resources and talent) between the innovation units and the core businesses, which requires the senior leaders to be "consistently inconsistent" (Tushman et al., 2011). Moreover, managers need to be able to reconfigure assets whenever there are changes in the competitive environment (O'Reilly and Tushman, 2011). This means that senior leaders not only need to sense these changes in technology, competition, and customer demands, but they also need to be able to respond to these changes in an efficient way (O'Reilly and Tushman, 2011). Additionally, senior teams have to enable both variety and local adaptation as well as collective action and strategic coherence (O'Reilly and Tushman, 2004). Tushman and O'Reilly (1996) highlight the importance of an alignment among strategy, structure, people, and culture. This means that the success of an organization is dependent on the leader's ability to increase alignment among strategy, structure, people, and culture during periods of incremental change which are disrupted by periods of discontinuous change which requires a simultaneous shift in the alignment of strategy, structure, people, and culture (Tushman and O'Reilly, 1996).

Conclusions

In general, both, findings from academic and practitioner literature, reveal that the cognition and management of paradoxes regarding exploration and exploitation are necessary for achieving ambidexterity in practice. Paradoxical cognition can, therefore, be regarded as the first step in imple-

menting ambidexterity in an organization. Certainly, it is the tasks of the top management team to be aware of the tensions that arise from balancing exploration and exploitation and to accordingly take appropriate actions to resolve these tensions. Therefore, managers need to evaluate how to achieve a balance between exploration and exploitation and make strategic decisions regarding the achievement of ambidexterity. The strategic elements of decisions regarding the implementation of ambidexterity in an organization will be explained in the next section.

4.1.2. *Develop an ambidexterity-oriented strategy*

One of the most important aspects for the coordination of exploration and exploitation is the implementation of an ambidexterity-oriented strategy. Such a strategy should be characterized by the presence of a shared vision among senior managers, as well as a common culture (Gibson and Birkinshaw, 2004; Jansen et al., 2008). Jansen et al. (2008) found empirical support that a senior team shared vision increases the achievement of organizational ambidexterity. Accordingly, a management's shared vision adds to the collective understanding of how senior team members might resolve the contrasting agendas of exploratory and exploitative activities and embodies common goals and shared values that provide for a common strategic intent which facilitates the reconciliation of contradictory agendas (Jansen et al., 2008). Additionally, shared values and common goals can help to overcome the problems arising from structural differentiation in ambidextrous organizations (Jansen et al., 2008). Simsek (2009) also notes that separate units responsible for exploration and exploitation are held together by a common strategic intent and an overarching set of values. This, in turn, enables the integration of exploration and exploitation at the top management team level (Andriopoulos and Lewis, 2009; Simsek, 2009).

O'Reilly and Tushman (2008) describe how sensing, seizing, and reconfiguring include important strategic decisions for the achievement of ambidexterity. First of all, sensing of opportunities involves scanning, searching, and exploration. This requires resources, routines and strategy-making processes that are linked to variation, resources that are used for competitive strategies and for sensing changes in the technological environment, as well as forums which give room for discussions of emerging chances (O'Reilly and Tushman, 2008). Apart from this, sensing also demands an open culture that promotes discussion, the commitment of financial and time resources by senior executives to enable long-term thinking, and a TMT that strengthens a long-term mindset and encourages exploration (O'Reilly and Tushman, 2008). Additionally, O'Reilly and Tushman argue that "to promote ambidexterity requires a senior management team that facilitates learning, challenges the status quo, accepts failure, and provides for the integration and transfer of knowledge, even as the exploitive subunit emphasizes the opposite" (2008, p. 190). Secondly, the seizing of opportunities is concerned with making appropriate strategic decisions and the execution of these strategies. Seizing thus demands "leaders

who can craft a vision and strategy, ensure the proper organizational alignments (whether it is for exploitation or exploration), assemble complementary assets, and decide on resource allocation and timing" (2008, p. 191). This means that the TMT needs to have shared expectations concerning the strategic intent which should align the business model and the strategy (O'Reilly and Tushman, 2008). Thirdly, reconfiguring refers to the reallocation of resources from the mature businesses in the direction of new and emerging growth opportunities (O'Reilly and Tushman, 2008). Aside from structural decisions regarding the design of organizational systems and incentives in different units as well as the staffing of these separate units, senior leaders need to develop "processes by which these units are integrated in a value-enhancing way" (2008, p. 191). Reconfiguring therefore demands that leaders constantly realign their business along with the changes in the market in order to profit from ambidexterity (O'Reilly and Tushman, 2008).

In summary, the separate units for exploration and exploitation, which each consist of different competencies, systems, incentives, processes, and cultures, are internally aligned and held together by "a common strategic intent, an overarching set of values, and targeted structural linking mechanisms to leverage shared assets" (O'Reilly and Tushman, 2008, p. 193). There should be a clear consensus among the members of the TMT about the strategic intent, justifying the importance of ambidexterity (O'Reilly and Tushman, 2008). In order to enable ambidexterity in an organization, managers should communicate this strategy relentlessly and implement a common-fate incentive system (O'Reilly and Tushman, 2008). The articulation of a shared vision and a common set of values promote the establishment of a common identity which, in turn, fosters ambidexterity (O'Reilly and Tushman, 2008).

Additionally, when managers stimulate their firms to engage in corporate entrepreneurship, they need to have an entrepreneurial orientation (Dess and Lumpkin, 2005). Corporate entrepreneurship should have two major goals, namely the sensing and seizing of novel venture opportunities as well as strategic renewal. Entrepreneurial orientation can be defined as the strategy-making practices that firms utilize to sense and introduce corporate ventures. Dess and Lumpkin (2005) suggest that autonomy, innovativeness, proactiveness, competitive aggressiveness, and risk-taking are important determinants of a firm's entrepreneurial performance. Autonomy refers to independent actions by individuals or teams that are directed towards the vision of the organization. Innovativeness describes the willingness to experiment and to develop and introduce new products and services. Proactiveness can be defined as an aspirational perspective of an organization which is needed to anticipate future demands and to seize emerging opportunities. Competitive aggressiveness is aimed at the improvement of a firm's position in the marketplace and involves intense efforts to outperform other competitors. Lastly, risk-taking refers to the degree to which firms make decisions and take actions without being able to anticipate the possible consequences. These differ-

ent elements of entrepreneurial orientation can be integrated into the strategy for achieving ambidexterity and can act as guidelines for the whole organization to act ambidextrously.

Taylor and Helfat (2009) highlight the importance of organizational linkages to connect actors across different organizational units during period of technological transitions through communication and coordination. While coordination involves collaborative decision-making and planning for the allocation of resources, communication refers to the participation in discussions and meetings. The top management can enable middle managers to perform linking activities which have the aim to foster ambidexterity by “enabling firms to transition to a new technology while utilizing and adapting valuable preexisting capabilities that can be critical to the success of a transition” (Taylor and Helfat, 2009, p. 718). These managerial influences affecting the willingness of middle managers to carry out the organizational linking activities include economic, structural, social, and cognitive influences (Taylor and Helfat, 2009). An organization’s cognition includes shared assumptions and understanding which can be found in the values, norms, and culture of an organization (Taylor and Helfat, 2009). In sum, this means that strategic decision-making involves the collaboration and interaction of the different members of the management teams in order to find solutions on how to balance exploration and exploitation in an organization.

Findings from practitioner literature

An overarching identity is key to achieving ambidexterity (Tushman et al., 2011). Tushman et al. (2011) argue that it is necessary for the TMT to develop strategic aspirations for the future and to create an emotionally compelling identity which is, at the same time, broad enough to give direction for the future. An overarching and compelling identity facilitates the simultaneous pursuit of opposing strategies, namely the exploitation of existing products and the exploration of new opportunities (Tushman et al., 2011). A common identity is supported by the articulation of a common vision and values across explorative and exploitative units (O’Reilly and Tushman, 2011). This, in turn, enhances trust, cooperation, and an aspirational point of view (O’Reilly and Tushman, 2011).

Furthermore, a compelling strategic intent, justifying the importance of both exploration and exploitation, facilitates the achievement of ambidexterity (O’Reilly and Tushman, 2011). A compelling strategic intent helps to avoid the success trap in that the short-term profits from exploration are not outweighed by long-term gains from exploitation activities (O’Reilly and Tushman, 2011). The senior team explicitly owns the strategy for achieving exploration and exploitation within the business units and have to relentlessly communicate this strategy across the entire organization in order to enhance cooperation and to avoid unproductive conflict (O’Reilly and Tushman, 2011). A common-fate reward system can help to implement a compelling strategy (O’Reilly and Tushman, 2011). Moreover, O’Reilly and Tushman (2004) claim that ambidextrous senior teams and leaders need to be committed to ambidexterity in order to

be able to relentlessly communicate the vision. A clear and compelling vision provide direction towards the achievement of exploration and exploitation and highlights the need for ambidexterity and its benefits for all members of the organization (O’Reilly and Tushman, 2004).

In an ambidextrous firm, it is essential to create a culture that is simultaneously tight and loose (Tushman and O’Reilly, 1996). The tight aspect of a culture manifests itself in broadly shared norms which are needed for innovation, like for example autonomy, initiative, risk taking, and openness (Tushman and O’Reilly, 1996). The loose aspect of a corporate culture refers to the ways in which these shared norms are expressed and is dependent on the kind of innovation which is required (Tushman and O’Reilly, 1996). This means that organizations deploy multiple cultures, meaning subcultures in different business units, which are held together by a common overall culture (Tushman and O’Reilly, 1996). An overarching corporate culture facilitates the integration of the various subcultures, enhances information- and resource-sharing, enables consistency, and supports the creation of trust and predictability within a firm (Tushman and O’Reilly, 1996). Lastly, a tight-loose culture is encouraged by supportive leaders and a common vision who both support changes when they are needed (Tushman and O’Reilly, 1996).

From the above, it can be argued that a culture which is characterized by a shared set of cultural norms and values is vital for the management of paradox and, thus, for the alignment of exploration and exploitation. Tushman and O’Reilly (1996) exemplify this in the case of Apple where the employees who shared the same expectations about innovation, commitment, and speed, meaning who fit the values and who endorsed the cultural norms of the firm, stayed within the organization. However, although not all members of an organization need to act ambidextrously themselves, senior leaders that show resistance towards operating ambidextrously need to be dismissed (O’Reilly and Tushman, 2004). Additionally, Tushman and O’Reilly (1996) found that some firms, e.g., Nordstrom, derive their competitive advantage from a culture which is shared throughout the whole organization and which the competition can only imitate with difficulty. Furthermore, a social control system which allows the coordination of non-routine tasks during periods of change helps to establish a culture of shared norms and values (Tushman and O’Reilly, 1996).

O’Reilly et al. (2009) explain how ambidexterity relates to the establishment, the implementation, and the maintenance of new emerging business opportunities. Pertaining to this, the first phase is variation, meaning the establishment of a new idea or business opportunity. This includes the solicitation of a new idea from within or without the company, its socialization among senior executives and customers, and the assessment of the idea. The second phase is selection, meaning the implementation of the new idea. Frequent meetings of senior executives, a dedicated “A-Team Leadership”, and the monitoring of progress are part of this phase. The last phase, retention, includes the moving from a future business to a growth business. The transition from a new idea into a

profitable business is heavily dependent on a strong leadership, a clear articulation of the strategy, early success in the market, as well as an aligned organization. O'Reilly et al. (2009) show that senior leaders need to continually reconfigure assets and sense the emergence of new business opportunities in order to be ambidextrous.

Conclusions

In sum, the development of an ambidexterity-oriented strategy includes the presence of a shared vision and a common culture. Again the results obtained from the academic and the practitioner literature are quite similar. While articles from academic literature primarily focus on the definition of shared values and goals which are embodied in an overarching vision, articles in practitioner literature highlight the importance of both, a compelling strategic intent and a common culture, which should facilitate the reconciliation of exploration and exploitation. It is again the responsibility of the top management team to collaboratively develop a strategy that is directed towards the achievement of ambidexterity and that highlights its importance. The strategic vision and culture need to be communicated to all members of an organization in order to establish common norms and values which enable the balance of exploration and exploitation and, as a consequence, the achievement of ambidexterity.

4.1.3. Ambidextrous leaders

There are certain characteristics which a leader needs to display in order to manage paradox and to, in turn, balance exploration and exploitation to achieve ambidexterity. Smith and Lewis (2011) state that two of these characteristics are cognitive and behavioral complexity as well as emotional equanimity. Raisch and Birkinshaw (2008) also suggest that leaders with complex behavioral repertoires are especially needed within contextual ambidexterity. These characteristics should help to accept paradoxical tensions and to take account of both/and possibilities (Smith and Lewis, 2011). O'Reilly and Tushman (2008) also argue that for the alignment of competencies, structures, and cultures to pursue either exploration or exploitation, a senior leadership team with the cognitive and behavioral flexibility to develop and nurture both is required. Effective leaders are therefore able to demonstrate complex behavioral repertoires that concurrently promote "consistency, stability, and control, as well as passion, courage, and wonder" (Gibson and Birkinshaw, 2004, p. 215).

Supportive and flexible leaders can be seen as key facilitators of organizational ambidexterity (Gibson and Birkinshaw, 2004). Jansen et al. (2008) state that in ambidextrous organizations, leadership behavior has an impact on the effectiveness of the senior team. This means that strategic executives may act more or less directive in integrating the paradoxical activities of exploration and exploitation (Jansen et al., 2008). Smith and Tushman (2005), for example, suggest that senior leader should designate different members of the senior team to pursue either explorative or exploitative activities, encourage them to be aware of the tensions, and to ease

the discussion about possible synergies between the contrasting agendas.

Ambidextrous managers are also capable of fulfilling multiple roles at a time related to, for instance, the execution of both routine and nonroutine tasks (Adler et al., 1999), the carrying out of both creative and collective actions (Sheremata, 2000), or the conducting of tasks outside the narrow confines of their own job (Adler et al., 1999). In addition, ambidextrous managers are capable of both refining and renewing their knowledge, skills, and expertise (Sheremata, 2000). Hotho and Champion argue that "encouraging innovation requires a managerial mindset characterised by a positive, celebratory attitude towards innovation, combined with tolerance for failure, encouragement of open debate, and a prioritisation of innovation and change over stability and routine" (Hotho and Champion, 2011, p. 34). Therefore, a managerial mindset is based upon elements, such as flexibility, responsiveness to change, and room for creative thinking (Hotho and Champion, 2011).

Furthermore, managers can themselves display personal ambidexterity through the pursuit of both exploration and exploitation (Raisch et al., 2009). However, the level of personal ambidexterity is dependent on factors such as personal characteristics or organizational contexts in which a manager operates (Raisch et al., 2009). In general, Raisch et al. (2009) claim that the cumulative personal ambidexterity of an organization's members influences the ambidexterity of the whole organization, but that this is not the only determining factor.

Different leadership styles may also affect the achievement of ambidexterity. A transformational leadership style is, for instance, recommended by Hotho and Champion (2011) to enhance explorative innovation among employees. Jansen et al. (2008) also found that transformational leaders are necessary when it comes to encouraging critical debate and open discussion about conflicting demands among socially integrated teams. This means that transformational leaders are leaders that are respected and trusted, leaders with which followers can identify, leaders that are capable of motivating their followers to aspire to greater goals, and leaders that articulate a compelling vision (Jansen et al., 2008). Jansen et al. (2008) found empirical support that transformational leadership positively moderates the impact of senior team social integration on organizational ambidexterity, meaning that the relationship between senior team social integration and organizational is strengthened through the presence of transformational leadership. This is because socially integrated senior teams which are guided by a transformational leader are better able to reconcile tensions and to discuss conflicting task issues concerning exploration and exploitation (Jansen et al., 2008).

Findings from practitioner literature

The findings from the practitioner literature also reveal that leaders have a key function in achieving ambidexterity in an organization; or, as O'Reilly and Tushman state, "ambidextrous organizations need ambidextrous senior teams

and managers” (O’Reilly and Tushman, 2004, p. 81). Accordingly, there are some specific characteristics which leaders need to display in order to facilitate ambidexterity. Generally speaking, ambidextrous managers are sensitive to and understand the needs of their business (O’Reilly and Tushman, 2004). This requires them to “combine the attributes of rigorous cost cutters and free-thinking entrepreneurs while maintaining the objectivity required to make difficult trade-offs” (O’Reilly and Tushman, 2004, p. 81). Tushman and O’Reilly (1996) describe ambidextrous leaders as those who revere the past but who, at the same time, have the willingness to continually change in order to meet future demands. Furthermore, the senior team has the ability to ensure that the entire organization has the willingness to learn from its competitive environment through the reinforcement of core organizational values such as autonomy, teamwork, responsibility, and innovation (Tushman and O’Reilly, 1996). Lower level managers often act restrained but also have to embody the culture in order to provide solutions directed at the interest of the organization (Tushman and O’Reilly, 1996). Although leaders have great autonomy in their actions, they are expected to deliver high performance in order to not be replaced (Tushman and O’Reilly, 1996).

Conclusions

From the above, it can be argued that certain characteristics of leaders influence the achievement of ambidexterity in an organization. Both, findings from practitioner and academic literature, suggest that leaders who are cognitively and behaviorally flexible and able to respond to the conflicting demands of exploration and exploitation are better able to implement ambidexterity. Therefore, a leader who is ambidextrous him or herself is likely to positively affect the achievement of ambidexterity in an organization because he or she is more capable of supporting other members of the senior team as well as other employees in the organization to act ambidextrously. Findings from the academic literature reveal that, in addition to this, a transformational leadership style might positively influence the achievement of ambidexterity because transformational leaders can motivate their followers to reconcile and discuss the tensions concerning exploration and exploitation.

4.1.4. Team constellations

The top management team has an important function in aligning contradictory agendas, such as exploration and exploitation. There are several elements which influence a TMT’s effectiveness in achieving ambidexterity. Specifically, these concern not only certain characteristics of team, such as if a team is behaviorally integrated or if its members share common or diverse prior company affiliations, but also different constellations of a team which should facilitate the achievement of ambidexterity. This section will therefore provide a summary of the main elements which influence the composition of the senior team to be more efficient in the development of ambidexterity in an organization.

Behavioral integration

Lubatkin et al. (2006) regard a behaviorally integrated top management team as one of the major prerequisites for achieving ambidexterity in an organization. They found empirical evidence that behavioral integration positively influences both exploration and exploitation. Behavioral integration refers to a TMT construct that includes the level of a senior team’s wholeness and unity of effort (Lubatkin et al., 2006). Behavioral integration depends on the level of the team’s collaborative behavior, the quantity and quality of information exchanged, and the emphasis on joint decision-making. Therefore, if the top management team is behaviorally integrated, it gives senior managers the possibility to resolve conflicts, to communicate openly, and to develop a set of shared expectations and values which consequently facilitate ambidexterity (Lubatkin et al., 2006). Behavioral integration also leads to greater information sharing between the members of a team which is one critical factor needed for exploration and the discovery of new opportunities (Lubatkin et al., 2006). However, what might be necessary to enhance the behavioral integration among TMT members is a CEO who has the ability to select, motivate, evaluate, and coach the members of the TMT (Lubatkin et al., 2006).

Additionally, the level of a TMT’s behavioral integration has a direct influence on how the team members manage contradictory knowledge processes related to exploration and exploitation, in that a greater integration increases the likelihood of simultaneously pursuing both activities (Lubatkin et al., 2006). While exploration involves a bottom-up learning process which requires that senior executives let go of old routines and move towards new opportunities, exploitation involves a top-down learning process which requires managers to institutionalize the routines that help to improve existing competencies (Lubatkin et al., 2006).

Pertaining to this, Jansen et al. (2009) do not refer to behavioral integration of the top management team, but to senior team social integration. Social integration refers to a team member’s satisfaction in and attraction to the group as well as to the social interaction in a team which should increase collaborative problem solving and negotiation (Jansen et al., 2009; Jansen et al., 2008). While Jansen et al. (2008) could not find empirical support for that senior team social integration increases the achievement of organizational ambidexterity, Jansen et al. (2009) found empirical support for their hypothesis that senior team social integration mediates the relationship between structural differentiation and ambidexterity. They claim that “senior social team integration contributes to the mobilization and integration of operational capabilities at differentiated units to arrive at new combination of exploratory and exploitative activities” (Jansen et al., 2009, p. 801).

Common and diverse prior company affiliations

There are a variety of team constellations that help to manage the paradoxical tensions regarding exploration and exploitation, and thus to achieve ambidexterity. Beckman (2006) empirically studied the effect of the founding team composition on ambidexterity and found that the found-

ing team composition, and especially the team member's prior company affiliations, are important antecedents of exploratory and exploitative behaviors. More specifically, founding teams with common prior company affiliations rather display exploitative behaviors, while founding teams with diverse prior company affiliations rather display exploratory behaviors (Beckman, 2006). While common prior company affiliations include joint work experiences that foster a shared language and culture, as well as trust and mutual understanding among team members, diverse prior company affiliations offer more diverse networks and broader knowledge which are beneficial for innovation (Beckman, 2006). Teams who have both common and diverse prior company affiliations should have a common understanding to transfer knowledge and exclusive points of view to facilitate change and experimentation, thus displaying greater performance (Beckman, 2006). Therefore, a team whose members have both common and diverse prior company affiliations are more likely to simultaneously engage in exploration and exploitation and to, in turn, foster ambidexterity.

Leadercentric and teamcentric teams

Leadercentric and teamcentric teams are two possible team constellations that should facilitate the integration of strategic contradictions (Smith and Tushman, 2005). In leadercentric teams, it is the responsibility of the leader of a top management team to integrate exploration and exploitation (Smith and Tushman, 2005). Specifically, in leadercentric teams, it is the task of the leader to resolve paradoxical tensions which exist in top management teams whose members are assigned to different roles and goals, depending on whether they pursue explorative or exploitative activities. The leader is usually backed by supportive integrators, meaning one or more members of the TMT who bring in their expertise and skills and therefore help the leader to make balanced decisions. Moreover, extensive leader-member interactions should facilitate the exchange of knowledge between the leaders and the members of the TMT on order to better resolve the tensions existing between explorative and exploitative units. It is the leader's task in leadercentric teams to coach the team members to reinforce the differentiation between the strategic agendas of exploration and exploitation.

In teamcentric teams, a group of senior executives collaboratively integrate the contradictory agendas (Smith and Tushman, 2005). Because the members of teamcentric teams are responsible for different tasks concerning exploration and exploitation, it is necessary that the team is designed as a real team in which the members create paradoxical frames which provide them with shared mental models to develop a collective understanding of the paradoxical tensions and to enable them to clearly allocate the interdependent tasks. Furthermore, teamcentric teams should assign different roles, goals, and rewards at the product level as well as at the organizational level. While responsibilities at the product level should enhance the development of distinct and specific roles and information for either exploration or exploitation, responsibili-

ties at the organizational level motivate members of teamcentric teams to consider the overarching strategic agendas necessary for integration. Teamcentric teams also benefit from frequent and high-quality team interactions in which team members benefit from the knowledge exchange with others. Teamcentric leaders have the responsibility to coach their members so that they actively handle conflict by focusing on both, their tasks at the product level as well as overarching issues at the organizational level. Lastly, Smith and Tushman (2005) suggest that a more democratic leadership style might be beneficial to teamcentric team, while a more authoritarian leadership style is more appropriate within leadercentric teams. In any case, Jansen et al. (2008) argue that strategic leadership can foster a senior team's effectiveness in ambidextrous organizations when senior leaders are promoted to work as a team.

Findings from practitioner literature

The findings from the practitioner literature also reveal that the top management team is responsible for making important strategic decision regarding the achievement of ambidexterity. Tushman et al. (2011) introduce two different approaches of how a team of leaders can be organized in order to enable the alignment of the innovation units and the core business at the top of the organization, namely hub and spoke teams and ring-team models. A hub and spoke team is characterized by a CEO who is placed at the center of the wheel. The business unit leaders surround this wheel heavily rely on the CEO who manages each spoke separately and communicate only with him, not with other business unit leaders. An inner circle consisting of two to three individuals serves as a point of interaction with the business unit leaders. The resolution of explorative and exploitative strategies is the task of the CEO. In a ring-team model, on the other hand, decisions are made collectively together with the business unit leaders and the CEO. A ring-team model requires high communication, transparency, and collaboration in order to make decisions on how to allocate resources and make trade-offs between the present and the future. Both solutions enable the alignment of explorative and exploitative units at the top management level where the strategic decision are made.

Conclusions

This section shows that the constellation of a top management team affects the reconciliation of exploration and exploitation and that certain compositions of a TMT can lead to the facilitation of the achievement of ambidexterity. The findings from the academic literature show that certain characteristics of team, such as the behavioral integration of a TMT or the presence of common or diverse prior company affiliations, positively influence ambidextrous behavior. Regarding the more formal constellations of a team, which concern primarily its structure, both academic and practitioner literature provide interesting insights. While the academic literature suggests the use of teamcentric or leadercentric team constellations, the practitioner literature calls for hub and spoke or ring-team models as possibilities to facilitate ambidexterity.

Both approaches exhibit strong similarities with each other. Teamcentric teams can be compared with ring-team model constellations, as all team members collaboratively work together and display high levels of interaction and knowledge exchange. Leadercentric teams, on the other hand, can be compared with hub and spoke teams. Here, the leader is responsible for resolving paradoxical tensions and team members communicate and collaborate little with each other, but much with the leader. Apparently, both, teamcentric teams (or ring-team models) and leadercentric (or hub and spoke models), seem to be effective solutions in managing contradictory tasks, such as the alignment of exploration and exploitation. Consequently, the constellation which should preferably be implemented in an organization is likely to be dependent on different factors, such as the characteristics of the leader and his or her and leadership style, the organization's culture and vision, or other structural factors which may affect the constellation of the top management team.

4.1.5. Formal structural mechanisms and personal coordination mechanisms

There are certain formal and informal (personal) mechanisms which leaders can use to facilitate the achievement of ambidexterity in an organization or unit. While formal structural mechanisms include the level of a manager's decision-making authority, the centralization of decision-making, or the formalization of tasks within a business unit, personal coordination mechanisms refer to a manager's participation in cross-functional interfaces, or his or her connectedness to other members of the organization. How these mechanisms can be implemented in order to facilitate ambidexterity in an organization will be explained in this section. Also, it will be shown how different formal and informal mechanisms interact with each other to influence ambidexterity.

Formal structural mechanisms

One formal structural mechanism, namely the level of decision-making authority that a manager, affects the achievement of ambidexterity (Raisch et al., 2009). Raisch et al. (2009) claim that when an organizational context provides senior executives with decision-making authority, then this might result in higher levels of sense-making and cognitive processes that help to integrate exploratory and exploitative activities. Mom et al. (2009) have also found that a manager's decision-making authority positively relates to ambidexterity, because increased decision-making authority enhances a manager's self-control and ownership of tasks and decisions which, in turn, allows the manager to respond to different opportunities and to pursue a variety of different objectives. Jansen et al. (2009) also found empirical support that the higher a unit's centralization of decision making, the lower its level of exploratory innovation. Centralization of decision making refers to the level of authority and the concentration of decision making within a particular location of an organization (Jansen et al., 2009). However, centralization hinders individuals to sense and seize new and emerging opportunities which is detrimental

to the requirements of exploration, including the solving of nonroutine problems (Jansen et al., 2009). The hypothesis that a unit's centralization in decision making positively influences exploitation could not be supported by Jansen et al. (2009).

Another formal structural mechanism is formalization (see Mom et al., 2009; Jansen et al., 2009). Jansen et al. (2009) found empirical support that the higher a unit's formalization, the higher its level of exploitative behavior. Formalization refers to the extent to which rules, procedures, and communications are formalized or documented (Khandwalla, 1977; as cited in Jansen et al., 2009). Formalization facilitates the codification of best practices which, in turn, leads to a more efficient exploitation and application of these practices (Jansen et al., 2009). Sheremata (2000) suggests that decentralized problem solving, reach in problem solving (i.e., the radius in which new ideas and information are searched inside or outside of organizational boundaries), and free flow of information are centrifugal forces that should facilitate exploration because they increase the likelihood that solutions will be found as well as the quality of solutions.

Personal coordination mechanisms

A manager's participation in cross-functional interfaces can be regarded as a personal coordination mechanism to achieve ambidexterity (Mom et al., 2009). Mom et al. (2009) found that the participation of a manager in cross-functional interfaces and his or her connectedness to other members of an organization is positively related to ambidexterity. Adler et al. (1999) state that cross-functional interfaces increase the trust between managers and enhances the ability to resolve conflicts concerning different needs, interests, and objectives of separate differentiated units. In addition to this, the participation in cross-functional interfaces allows managers to exchange knowledge which, as a consequences, enables them to renew and refine their existing knowledge base (Mom et al., 2009). Jansen et al. (2009) also found that cross-functional interfaces mediate the relationship between structural differentiation and ambidexterity. Cross-functional interfaces include platforms that facilitate knowledge exchange across explorative and exploitative units and help to build understanding and cooperation (Jansen et al., 2009).

Connectedness of a manager can be described as the extent to which a manager deploys networks of direct personal contacts to other members of other hierarchical levels or business units (Mom et al., 2009). Again, a manager with a large network of direct contacts has the possibility to acquire new knowledge through the exchange with other organizational members and can increase the trust and cooperation within the network (Mom et al., 2009). Dense social relations can, therefore, strengthen the collaborative resolution of tensions (Jansen et al., 2009). Jansen et al. (2006) empirically found support that the higher a unit's connectedness among its members, the higher its level of exploitative innovation. Connectedness helps organizational members to share and combine knowledge and to improve existing

knowledge bases which, as a consequence, is beneficial for exploitation (Jansen et al., 2006). Sheremata (2000) claims that connectedness, project manager influence, and cross-functional team influence are centripetal forces which should facilitate exploitation, because they speed up the problem-solving process and increase the quality of tradeoff decisions.

Combining formal and personal coordination mechanisms

Mom et al. (2009) also found positive interaction effects between formal structural and personal coordination mechanisms. For instance, they found that there is a positive interaction effect between a manager's decision-making authority and participation in cross-functional interfaces by the manager, on this manager's ambidexterity. This means that when a manager has decision-making authority over how and which tasks he or she performs and when this is accompanied by the cooperation with other managers of different units and functions, then this will have a positive effect on this manager's ambidexterity. The same is true for the interaction effect between a manager's decision-making authority and the connectedness of the manager to other organization members. In other words, when a manager increases his network, meaning his connectedness to others, this help him or her to better sense different opportunities which, in combination with increased decision-making authority, leads to increased ambidexterity (Mom et al., 2009).

In general, Mom et al. (2009) found that formal structural mechanisms are especially important for a manager's ambidexterity when this manager functions at an operational level. Cross-functional interfaces, on the other hand, are more conducive to a manager's ambidexterity when this manager functions on a business unit level, rather than on an operational level (Mom et al., 2009). Jansen et al. (2009) state that at the corporate level, social integration should be supported among the members of the top management team in an ambidextrous organization. At lower hierarchical level, more formal cross-functional interfaces are a means to foster the exchange of knowledge across explorative and exploitative units (Jansen et al., 2009). Lastly, a formal hierarchical structure, together with horizontal relationships, foster a manager's ambidexterity (Mom et al., 2009).

Conclusions

The results show that managers can use formal and informal coordination mechanisms to facilitate ambidexterity. The two main formal structural mechanisms include a manager's level of decision-making authority and the formalization of tasks in a business. Both, a manager's level of decision-making authority and the formalization of tasks, positively influence ambidexterity. Informal, or personal, coordination mechanisms include a manager's participation in cross-functional interfaces and his or her connectedness to other members of the organization. Both mechanisms do not only facilitate the exchange of knowledge between organizational members, but also increase the trust between a manager and others. This, in turn, leads to the ability to better resolve paradoxical conflicts and to achieve ambidexterity. Moreover, the findings show that a manager's decision-making

authority positively interacts with the participation in cross-functional interfaces and the connectedness to other members of the organization. For managers, this means that when they succeed in having authority over decisions and when they deploy dense networks of direct personal contacts to other organizational members, they are more capable of acting ambidextrous themselves in order to implement measures to direct their organization towards ambidexterity.

4.2. Implementing organizational design solutions to achieve ambidexterity

The above section highlights that the role of leadership is to be aware of the paradoxical tensions existing between exploration and exploitation and to use the possibly synergies between them in order to achieve organizational ambidexterity (see Smith and Lewis, 2011). Furthermore, it was explained what leaders need to do by defining goals and strategies that help them make decisions. The question that arises from here is how leaders should operate within the organization to achieve ambidexterity? This section provides possible mechanisms and organizational design solutions that leaders can implement to support either certain structural or contextual arrangements, or specific human resource practices that should facilitate the implementation and development of ambidexterity.

4.2.1. Structural arrangements

As already mentioned earlier, structural (or partitional) ambidexterity has its roots in Duncan's work of 1967 who considers dual structures, one to initiate and one to execute, as viable options to ensure the long-term success of an organization (Simsek et al., 2009). According to Simsek (2009) and Jansen et al. (2009), the structural independence of the different units assures that exploitative and explorative activities do not 'stand in each other's way'. For example, through structural separation, the exploitative culture does not overwhelm the processes, structures, and cultures of the explorative units and the initiatives pursued in explorative units do not disrupt the exploitative activities in established units (Simsek, 2009). He and Wong (2004) argue that senior managers need to manage exploration and exploitation on a continuous basis, meaning simultaneously in a "steady-state perspective", for instance, through the implementation of a semi-structures design. Adler et al. (1999) refer to the creation of specialized units in order to engage in either routine or nonroutine tasks simultaneously as 'task partitioning'.

Specific features of explorative and exploitative units

Structural ambidexterity necessitates the creation of structurally independent units, each having its own strategies, structures, cultures, management teams, control and incentive systems (Benner and Tushman, 2003). While these two different logics are tightly coupled and integrated at the business unit level, they remain loosely coupled across different business units (Benner and Tushman, 2003). In other words, "within subunits the tasks, culture, individuals, and

organizational arrangements are consistent, but across subunits tasks and cultures are inconsistent and loosely coupled" (Benner and Tushman, 2003, p. 247). Within differentiation, the separate organizational units which are responsible for exploration are smaller, more decentralized, more flexible, and with loose processes and those responsible for exploitation are larger, less decentralized, and with tight processes (Benner and Tushman, 2003). Similar to the assertions of Benner and Tushman (2003), O'Reilly and Tushman note that the alignment of competencies, systems, structure, and culture to execute an explorative or exploitative strategy largely differ from one another. While exploitation necessitates "a short-term time perspective, efficiency, discipline, incremental improvement and continuous innovation", exploration demands "a longer time perspective, more autonomy, flexibility and risk taking and less formal systems and control" (O'Reilly and Tushman, 2008, p. 190).

Raisch et al. (2009) argue that organizations can implement structural solutions at different levels of an organization. Pertaining to this, a manufacturing plant may become ambidextrous by creating two distinct teams, one responsible for exploration and the other for exploitation (Raisch et al., 2009; Adler et al., 1999). A business unit may become ambidextrous by creating two subdivisions focusing on either exploration or exploitation (Raisch et al., 2009; Benner and Tushman, 2003). Lastly, a single team may become ambidextrous by giving each individual a distinct role (Raisch et al., 2009; Jansen et al., 2008). Organizations may also use structures to promote linking activities across different units (Taylor and Helfat, 2009). According to Taylor and Helfat (2009) structures have the aim to link and coordinate the activities of structurally interdependent units and involve rules, procedures, control systems, and coordination units.

Differentiation – integration tactics

Within structural ambidexterity, each unit operates independently. However, these differentiated units are organizationally interdependent with regard to the achievement of ambidexterity (Simsek et al., 2009). The coordination of exploration and exploitation therefore necessitates the integration at the top management team level (Benner and Tushman, 2003; Simsek et al., 2009). Structural differentiation, meaning the creation of subunits, allows organizations to explore and exploit. The top management team hereby serves as a point of integration to align these two contrasting domains (Smith and Tushman, 2005). Therefore, the organizational architecture requires highly differentiated units as well as top management team integration (Benner and Tushman, 2003; He and Wong, 2004; Gibson and Birkinshaw, 2004; Smith and Tushman, 2005). In other words, the coupling of exploration and exploitation can be achieved by the differentiation and integration of different explorative and exploitative projects (Andriopoulos and Lewis, 2009).

As dual structures can lead to difficulties in reconciling the explorative and exploitative activities of the individual units, strategic integration, and as a consequence organizational ambidexterity, can be reached by common aspirations

among the top management team (Simsek, 2009). The integration at the senior team level enables a balanced allocation of resources and creates a cross-fertilization across exploitative and explorative units (Jansen et al., 2008; Smith and Tushman, 2005). The senior executives play a major role in the integration processes, the remaining organizational members are more or less segregated from the contradictory challenges of achieving ambidexterity (Simsek, 2009). However, Raisch and Birkinshaw (2008) suggests to also use lower-level integration mechanisms in order to promote the knowledge flows across different units. Still, there is consensus among a majority of researchers (e.g., Raisch and Birkinshaw, 2008) that the strategic integration across units is best achieved through the coordination at the top management level and a strong and overarching corporate culture. Tiwana (2008) found empirical support that knowledge integration at the project level improves alliance ambidexterity in innovation-seeking project alliances. Additionally, while strong ties are needed to integrate knowledge, bridging ties are required to assimilate new and diverse knowledge (Tiwana, 2008). Ambidexterity can be facilitated when strong ties complement bridging ties (Tiwana, 2008). Regarding the differentiation-integration tension, Cao et al. (2009) found that ambidexterity can be strengthened by close interrelations between existing and new knowledge. Raisch et al. (2009) explain that a synergistic effect between the new and the existing knowledge can be attained by employing the existing resources more fully in order to obtain new capabilities and by allowing new knowledge to be more fully integrated into the existing resource base.

Balance by unbalancing

As already mentioned earlier, firms usually encounter a natural drift towards efficiency, i.e. exploitation (Eisenhardt et al., 2010). Therefore, He and Wong (2004) argue that there needs to be a "counterbalance" between exploration and exploitation in order to continually adapt to changes in the environment. Eisenhardt et al. (2010) suggest three different structural mechanisms that should help to avoid this drift and to balance exploration and exploitation through unbalancing to favor flexibility, i.e. exploration. First of all, "simple rule strategies" consisting of heuristics allow for a quicker solving of problems and facilitate improvisation, thus supporting exploration (Eisenhardt et al., 2010). Secondly, managers can use simplification cycling, meaning the continual addition of new experiences to the structure and the simultaneous removal of structure, to not increase the structure (Eisenhardt et al., 2011). Thirdly, "flexibility-injecting structures", such as temporary tasks, prototypes, or alliances should facilitate exploration (Eisenhardt et al., 2011). Another mechanism to disrupt current balances between exploration and exploitation is radical innovation (O'Connor and DeMartino, 2006). O'Connor and DeMartino (2006) suggest that radical innovation, through the development of entirely new business lines, can lead to the creation of new markets. Hereby, each division hosts a proper infrastructure for radical innovation which should facilitate the investment in high-

uncertainty as well as high-risk projects in order to outperform other firms (O'Connor and DeMartino, 2006).

Findings from practitioner literature

The findings from the practitioner literature also suggest that the creation of small, decentralized, and autonomous units is one structural solution to achieving ambidexterity (Tushman and O'Reilly, 1996). When units are small and autonomous, employees can take greater risks and feel responsible for their own results (Tushman and O'Reilly, 1996). Similarly, O'Reilly and Tushman (2011) argue in favor of separate but aligned organizational architectures (i.e. business models, structure, incentives, metrics, and cultures) for the units responsible for exploration and exploitation and an integration of these different units at the senior team level. Again, the senior team has the responsibility to resolve the conflicts and tensions that stem from the implementation of these separate alignments (O'Reilly and Tushman, 2011, 2004).

The structural separation of exploitative and explorative units, however, implies that these units require different approaches in various fields. O'Reilly and Tushman (2004) summarize the major differences. First of all, the main tasks in exploitative units concern operations, efficiency, and incremental innovation, whereas in explorative units they concern adaptability, new products, and discontinuous innovation. Secondly, regarding the required competencies, those in exploitative units are operational, while in explorative units they are entrepreneurial. Thirdly, there is a formal and mechanistic structure in exploitative units, whereas the structure in explorative units is adaptive and loose. Fourthly, in exploitative units, margins are controlled and productivity is rewarded, while in explorative units, milestones are controlled and growth is rewarded. Fifthly, while in exploitative units the culture emphasizes efficiency, low risk, quality, and customers, the culture in explorative units is directed towards risk taking, speed, flexibility, and experimentation. Lastly, concerning the role of leadership, in exploitative units it is more authoritative and top down, whereas in explorative units it is visionary and involved.

The findings from the practitioner literature, like those from the academic literature, suggest that organizations should 'balance by unbalancing'. In order to achieve a balance between exploration and exploitation, Tushman and O'Reilly (1996) argue that managers might need to "cannibalize" their own business. This means that there needs to be a disruption of the established alignment between exploration and exploitation in order to respond and adapt to changing environments. Therefore, old structures, processes, and systems which might have led to the short-term alignment of strategy, structure, and culture need to be destroyed and replaced with new ones when changes in the competitive environments require modifications within the organizational architectures.

Conclusions

It is widely acknowledged that the structural separation of differentiated business units operating in either explo-

ration or exploitation is a feasible solution for achieving ambidexterity. The top management team has a vital function in integrating these structurally separate units in order to assure the reconciliation of exploration and exploitation. Both, findings from practitioner and from academic literature support the mechanisms of differentiation and integration for the achievement of ambidexterity. Furthermore, the results from articles of the academic and the practitioner literature both reveal that the different units for exploration and exploitation need to be managed by implementing substantially different processes, structures, tasks, competencies, and cultures. Certainly, it is the responsibility of the top management team to implement these diverse elements and to make sure that the contrasting units and elements remain aligned with each other.

4.2.2. Contextual arrangements

While structural solutions involves the creation of separate units to pursue exploration and exploitation, contextual solutions allow the simultaneous pursuit of exploration and exploitation within the same unit (see Simsek et al., 2009). This type of ambidexterity requires "the creation of a context that promotes a behavioural orientation towards a combined capacity for both exploitation and exploration, one in which they can 'simultaneously flourish'" (Gibson and Birkinshaw, 2004, p. 209). Therefore, when contextual ambidexterity has successfully been implemented in organization, individuals in a business unit can generate value for existing customers and simultaneously are able to sense and react to changes in the task environment (Gibson and Birkinshaw, 2004). Through a context which equally emphasizes high performance (a combination of discipline and stretch) and social support (a combination of support and trust), ambidexterity is facilitated through the ability of individuals "to make integrative judgements as to how to best divide their time between the conflicting demands for alignment and adaptability" (Gibson and Birkinshaw, 2004, p. 211). Performance management is concerned with encouraging employees to voluntarily aim at high and ambitious goals, while social support ensures that employees establish these goals in the context of a cooperative work environment which is characterized by support and trust by others (Gibson and Birkinshaw, 2004).

How the four behavior-framing attributes, namely discipline, stretch, support, and trust, can be developed and reinforced by managers (see Ghoshal & Bartlett, 1994 in Gibson and Birkinshaw, 2004) will be explained now. First of all, the attribute of discipline can be defined as the voluntary attempt of individuals to meet all the expectations which arise from their explicit or implicit obligations. Discipline can be achieved by the "establishment of clear standards of behavior and performance, a system of open, candid, and rapid feedback, and consistency in the application of sanctions" (p. 213). Secondly, stretch can be described as the endeavor of individuals to orient themselves towards more ambitious goals than less ambitious ones. Stretch can be created by the "establishment of a shared ambition, the development of a

collective identity, and the ability to give personal meaning to the way in which individuals contribute to the overall purpose of an organization” (p. 213). Thirdly, the attribute of support refers to the instigation of individuals to lend assistance and encouragement to other members. Support can be developed by “[m]echanisms that allow actors to access the resources available to other actors, freedom of initiative at lower levels, and senior functionaries giving priority to providing guidance and help rather than to exercising authority” (p. 213). Fourthly, and lastly, trust induces individuals to mutually rely on each member’s commitments. Trust is established by “[f]airness and equity in a business unit’s decision process, involvement of individuals in decisions and activities affecting them, and staffing positions with people who possess and are seen to possess required capabilities” (p. 213).

According to Gibson and Birkinshaw (2004), the establishment of a high performance behavioral context necessitates managerial guidance concerning transparency in accessing resources, autonomy to take initiatives, and equity and fairness in decision-making processes. Simsek (2009) states that the behavioral context of organizational members is defined by a carefully selected set of systems and processes which enables individuals to perform both exploitative and exploratory activities.

Im and Rai (2008) state that contextual elements of the overall management system include systems, processes, and beliefs that align specific behavior, like for instance knowledge sharing, in an inter-organizational relationship. They claim that “contextual ambidexterity is the nonsubstitutable combination (i.e., interaction) of alignment and adaptability of the management system that includes service level arrangements, incentives, and planning and review meetings that govern a relationship” (Im and Rai, 2008, p. 1284). Accordingly, in a long-term inter-organizational relationship, contextual ambidexterity should foster both exploitative and explorative knowledge sharing (Im and Rai, 2008). The authors found empirical evidence that the greater the contextual ambidexterity in an inter-organizational relationship, the greater the exploitative and the explorative knowledge sharing in the relationship.

Findings from practitioner literature

Pertaining to contextual ambidexterity as the implementation of an organizational context including two dimensions, namely performance management (a combination of stretch and discipline) and social support (a combination of support and trust) Gibson and Birkinshaw (2004) present a counter-article in the MIT Sloan Management Review (see Birkinshaw and Gibson, 2004). As mentioned above, while performance management refers to the incitement of individuals to deliver high-quality results, social support aims at giving individuals security and room to accomplish their tasks. In their article in the practitioner review, Birkinshaw and Gibson (2004) provide more concrete guidelines for managers on how to build an ambidextrous organization with the help of context. First of all, managers need to diagnose the current position

of their organizational context in terms of performance management and social support. Secondly, managers should just focus on a few levers, but employ those consistently. Thirdly, managers should build understanding through a clear and consistent communication of the message throughout the organization. Fourthly, contextual ambidexterity and structural ambidexterity do not exclude one another, rather they are complements. While structural separation may be a good starting point for new initiatives, the integration with the mainstream organization should be conducted as quickly as possible through contextual ambidexterity. Lastly, contextual ambidexterity should be viewed as “driving leadership”, meaning that individuals make their own choices about how and where to focus their capacities through the creation of a supportive context (p. 55). In this way, leadership is not only displayed by the leaders themselves, but also by every other member of the organization. This assumption also leads to the prerequisite that an organization needs ambidextrous employees (see Birkinshaw and Gibson, 2004).

Birkinshaw and Gibson (2004) emphasize four attributes of ambidextrous individuals in an organization. Firstly, ambidextrous employees are proactive and can seize opportunities outside the confines of their job and consequently act in the broader interests of the organization. Secondly, they are cooperative and able to work with others to increase their efforts. Thirdly, ambidextrous employees have the capability to build internal linkages. Fourthly, and lastly, they are multitaskers able to do more than one task at a time. These characteristics allow employees not only to act spontaneously and independently, but also to quickly adapt to emerging opportunities and to take actions that are aligned with the overall strategy of the organization (Birkinshaw and Gibson, 2004).

Conclusions

Compared to structural ambidexterity, the creation of a context which is characterized by four-behavior framing attributes, namely discipline, stretch, support, and trust is an alternative solution for achieving ambidexterity in an organization. Within contextual ambidexterity, the focus lies on the individual level, meaning that employees have the possibility to individually switch between explorative or exploitative activities, given that the context provides the necessary requirements. The findings retrieved from the practitioner literature reveal that, when pursuing a contextual ambidexterity approach, it not only requires ambidextrous leaders, but also ambidextrous employees who display certain characteristics in order to act ambidextrously. Furthermore, while the results obtained from the academic literature specifically highlight how managers can develop and reinforce the individual elements of the context, i.e., discipline, stretch, support, and trust, the findings from the practitioner literature provide more general implications which can be regarded as necessary prerequisites for building an ambidextrous organization with the help of context.

4.2.3. Human resource practices

Human resource practices are one means to facilitate the achievement of ambidexterity in an organization. Therefore, this section will give an overview of the main human resource practices which can be implemented in an organization to achieve ambidexterity. More specifically, it will be explained how job enrichment, training, incentives and rewards, as well as certain human resource practices for the development of intellectual capital can be used to foster ambidexterity in an organization. Job enrichment and training have the aim to enable employees to perform both, exploration and exploitation, at the same time. Incentives and contingency rewards are especially used among senior teams to enhance their cooperation in aligning these contradictory agendas. Lastly, the development of intellectual capital should help to acquire and integrate knowledge within an organization.

Job enrichment, training, and socialization

There are a variety of human resource (HR) practices which facilitate the simultaneous pursuit of exploration and exploitation. In contextual ambidexterity, one of these practices includes job enrichment (Adler et al., 1999). With the help of job enrichment programs, for example, employees are provided with training and experience in exploration and exploitation respectively, which enables them to perform both sets of activities (Simsek et al., 2009) and to become more innovative in their routine tasks (Adler et al., 1999; Gibson and Birkinshaw, 2004). Other organizational factors, such as socialization, recognition, or team-building practices are also suggested to affect individual's ability to think and act ambidextrously (Ghoshal and Bartlett, 1997; as cited in Raisch et al., 2009). Taylor and Helfat (2009) claim that social rewards, such as emotional support, attachment to a group, self-esteem, or social status have an effect on how well individuals are able to establish linkages across interdependent organizational units. Adler et al. (1999) state that two important contextual factors are training and trust. Training ensures that individuals have sufficient knowledge, skills, and abilities to engage in mechanisms such as job enrichment or task partitioning (Adler et al., 1999). Trust regarding the consistency of task completion by others and the trust in goal congruence especially facilitates the implementation of meta-routines and other mechanisms, such as job enrichment (Adler et al., 1999).

Incentives

Rewards and other incentives are another means to facilitate ambidexterity in an organization. Jansen et al. (2008), for example, empirically found that senior teams receiving team contingency rewards were better able to pursue ambidexterity. Kaplan and Henderson (2005) claim that, especially during technological periods of change, managers need to make decisions about what to reward. In order to effectively implement a new technology for instance, monetary compensation and salary-increasing promotions are a means to promote organizational linkages (Kaplan and Henderson, 2005; Taylor and Helfat, 2009). However, due to

the tight linkage between cognitive frames and incentives, a change in one must always be accompanied by a change in the other (Kaplan and Henderson, 2005). Jansen et al. (2009) suggest that senior team contingency rewards are motivational in that they help senior managers to participate in problem solving and decision making. Contingency rewards depend on the extent to which the team's outcomes have an effect on individual team members' benefits (Jansen et al., 2009; Jansen et al., 2008). Contingency rewards can be used to strengthen the cooperation among senior team members which are responsible for different explorative and exploitative activities, to create commitment to different goals, and to resolve tensions regarding the allocation of resources (Jansen et al., 2009; Jansen et al., 2008). Smith and Tushman (2005) claim that senior team contingency rewards can also drive leaders to surmount their direct interests and to reallocate resources in order to reach establish an integrative value across the units responsible for exploitation and exploration. In sum, Jansen et al. argue that "compensating senior team members for overall firm performance decreases the chance of interest asymmetries and encourages senior team members to seek opportunities for strategic synergies across inconsistent exploratory and exploitative organizational units" (Jansen et al., 2008, p. 999).

Hotho and Champion (2011) argue that extrinsic motivation incentives are rather counterproductive to the innovativeness and productivity of employees. Rather, managers should provide intrinsically motivating incentives, which allow employees to innovate and to learn new things (Hotho and Champion, 2011). Innovation and knowledge creation can furthermore be facilitated by "flexibility, networked flatter structures, self-organising teams and projects, devolved decision making and democratic lines of communication" (Hotho and Champion, 2011, p. 34). These measures should enable individuals to work autonomously and to create a sense of ownership for their work (Hotho and Champion, 2011). Moreover, feedback and rewards should be adjusted to the process of work, and not simply the results of the work (Hotho and Champion, 2011). The tolerance of failure and the encouragement of risk by managers should further engage employees in experimentation and innovation (Hotho and Champion, 2011).

Development and management of intellectual capital

Kang and Snell (2009) describe how different types of intellectual capital affect either exploration or exploitation and which human resource practices can be implemented to develop intellectual capital. As the authors provide very detailed human resource management practices, the main findings concerning intellectual capital (i.e. specialist and generalist human capital, cooperative and entrepreneurial social capital, and mechanistic and organic organizational capital), their effect on exploration and exploitation, and their implementation in practice will be described here.

To begin with, specialist human capital is more likely to focus on exploration because it includes domain-specific knowledge which can be used to acquire new knowledge

(Kang and Snell, 2009). Generalist human capital, on the other hand, is more likely to focus on exploitative learning because it deploys multiple knowledge domains (Kang and Snell, 2009). Cooperative social capital is likely to facilitate exploitation as it includes strong and dense network connections which enables the assimilation of knowledge (Kang and Snell, 2009). Entrepreneurial social capital facilitates explorative learning as a looser connected social system enhances a firm's flexibility which is needed to expand and acquire new knowledge (Kang and Snell, 2009). Mechanistic organizational capital should facilitate exploitation and includes standardized structures and processes and routines which enable coordination (Kang and Snell, 2009). Lastly, organic organizational capital should facilitate exploratory learning through simple routines, structures, and cultures which leave room for autonomy and experimentation (Kang and Snell, 2009).

Given the above assumptions, exploration is likely to be facilitated by an intellectual capital architecture including generalist human capital, entrepreneurial social capital, and organic organizational capital, whereas exploitation is likely to be supported by an intellectual capital architecture that includes specialist human capital, cooperative social capital, and mechanistic organizational capital (Kang and Snell, 2009). Aside from this, there also exist two hybrid forms which should support ambidextrous organizational learning: refined interpolation and disciplined extrapolation. Refined interpolation is a combination of specialist human capital, providing the expertise required for exploitative learning, cooperative social capital, which helps the specialists to share and integrate knowledge for deeper exploitation, and organic organizational capital, which promotes the continuous integration of diverse knowledge bases (Kang and Snell, 2009). Disciplined extrapolation combines generalist human capital and entrepreneurial social capital which facilitate exploration through the acquisition and sharing of knowledge and mechanistic organizational capital, which ensures that new knowledge bases can be integrated efficiently (Kang and Snell, 2009). The organizational capital hereby always has the purpose of transforming people-embodied knowledge (i.e. knowledge embodied in human or social capital) into organizational knowledge (Kang and Snell, 2009).

Having explained that different compositions of intellectual capital architectures can support ambidextrous organizational learning, the question arises how the different intellectual capital types can be managed with the help of human resource practices. Developing generalist human capital requires a 'skill-based development' including broad and multidimensional job designs, job rotations, recruiting based on potential, extensive training, with skill- or knowledge-based incentive systems (Kang and Snell, 2009, p. 79). For developing specialist human capital, a 'job- or function-based development' including narrow job designs, focused career development, recruitment based on the fit between persons and jobs, intensive training for the improvement of job-related skills, with incentive systems that focus on individuals' performance and effort in current jobs for com-

penetration is suggested by Kang and Snell (2009, p. 80). The development of cooperative social capital can be managed by internal labor market (ILM)-based systems including internal staffing/promotion, seniority-based compensation (including fixed bonus and egalitarian pay structure), socialization (e.g. mentoring, person-organization fit criteria for recruiting and promotion, extensive orientation, team structures, or multi-source feedback) (Kang and Snell, 2009, p. 80). For developing entrepreneurial social capital, market- or network-based employee relations systems including extensive external staffing that utilizes various external sources of HR, performance-based compensation (e.g. individual incentives, pay for reputation, hierarchical pay structure), and general development experiences (e.g. cross-training, training for interpersonal skill improvement, social events) may be appropriate HR practices (Kang and Snell, 2009, p. 80). The development of mechanistic organizational capital can be managed through performance/control systems targeted towards "error avoidance", behavior-based evaluation and rewards, specific behavioral appraisal systems (e.g. behavioral observation scales), and performance program that are imposed top-down (Kang and Snell, 2009, p. 81). For developing organic organizational capital, performance/control systems targeted towards "error embracing", the reduction of status barriers between managers and employees, employees' participation in problem-solving and decision-making, extensive transference of tasks and responsibilities to employees, providing chances to use personal initiatives, encouraging and implementing employee suggestions, and developmental performance appraisal can be used (Kang and Snell, 2009, p. 81).

Conclusions

This section provides a summary of the main human resource practices which can be implemented in order to facilitate ambidexterity. Managers can, for instance, implement certain trainings or job designs, such as job enrichment or task partitioning, to enhance ambidexterity among employees. These solutions should enable employees to better perform exploration and exploitation simultaneously. Furthermore, incentives and rewards can help to foster ambidexterity within an organization. Contingency rewards are especially used within senior teams to enhance trust and cooperation for the exchange of knowledge. This should help senior teams to align and reconcile the contrasting demands of exploration and exploitation. This section also gave an overview of the human resource practices which are important for the development of intellectual capital in an organization. Intellectual capital is an important intangible asset of an organization and can be divided into human, social, and organizational capital (Kang and Snell, 2009). 'Skill-based development' and 'job-/function-based development' can be used to develop generalist and specialist human capital, respectively. 'ILM-based systems' and 'market- or network-based employee relations systems' should facilitate the development of cooperative and entrepreneurial social capital. Lastly, performance/controls systems targeted

either towards 'error avoidance' or 'error embracing' can be used for the development of either mechanistic or organic organizational capital.

4.3. Moderators and external factors influencing the achievement of ambidexterity

This last section will provide a summary of moderators and external factors which influence the achievement and development of ambidexterity. These factors are more or less out of scope for decision-making and can often only be marginally controlled by managers. First of all, it will be explained how the availability of organizational resources affects the management of ambidexterity. Secondly, a variety of environmental factors will be introduced and suggestions of how managers can respond to these will be provided. Thirdly, the influence of different characteristics of an organization's network will be evaluated with regard to their effect on ambidexterity. Fourthly, it will be described how externalization and absorptive capacity can influence the management of ambidexterity. Lastly, it will be explained how dynamic capabilities and routines can help an organization to facilitate ambidexterity.

4.3.1. Manage ambidexterity in consideration of the availability of resources

Several authors have investigated the effect of resource endowment on ambidexterity (e.g., Voss et al., 2008; Cao et al., 2009). Voss et al. (2008) for example found empirical evidence for a positive relationship between organizational slack as well as human resource slack and product exploitation. Furthermore, they found that when an environment is perceived as more threatening, the relationship between financial slack and product exploration becomes more negative and the relationship between customer relational slack and product exploitation becomes less negative.

In general, structural ambidexterity, meaning the decoupling of organizational units (Benner and Tushman, 2003), should be pursued in larger firms with high levels of unabsorbed slack which operate in threatening environments (Voss et al., 2008). Similarly, Lubatkin et al. argue that small firms "lack the amount of slack resources and the kind of hierarchical administration systems that can help or impede larger firms in managing their contradictory knowledge processes and, thus, affect the attainment of ambidexterity" (Lubatkin et al., 2006, p. 647). Therefore, structural ambidexterity may be the more appropriate solution for large and diversified firms, whereas leadership-based ambidexterity may be more beneficial to smaller or more focused firms. Lubatkin et al. (2006) explain this by stating that there are fewer hierarchical levels in smaller firms which enables managers to engage in strategic and operational roles which require both exploration and exploitation.

Contextual ambidexterity, meaning "the behavioral capacity to simultaneously demonstrate alignment and adaptability across an entire business unit" (Gibson and Birkinshaw, 2004, p. 209), is the more appropriate solution for

smaller firms or for single business units in a large firm who may not have the resources available to deploy multiple sub-units and who operate in more stable environments (Voss et al., 2008). Raisch and Birkinshaw (2008) suggest that rich firms usually have the resources to both explore and exploit simultaneously, while firms with less resources may not be capable of implementing such a strategy and may therefore focus on a one-sided orientation on either exploration or exploitation. This argument is supported by Lin et al. (2007) who have found empirical evidence that large firms will tend to benefit more from an ambidextrous formation of exploratory and exploitative alliances, whereas a smaller firms will tend to benefit more from a focused formation of either exploratory or exploitative alliances. This can be explained by the fact that larger firms are exposed to relatively loose resource constraints which enables them to allocate large quantities of their resources to either explorative or exploitative activities (Lin et al., 2007).

Cao et al. (2009) found that whether a firm pursues a balance of a combined dimension should depend on the availability of resources. The balance dimension seeks to achieve ambidexterity through a relative balance between exploration and exploitation and is more beneficial to resource-constrained firms (Cao et al., 2009). In other words, small firms with little resources benefit from a trade-off between exploration and exploitation. The combined dimension seeks to achieve ambidexterity through the combined magnitude of exploration and exploitation and is more beneficial to firms with greater access to resources (Cao et al., 2009). In other words, large firms which operate in munificent environments and have access to internal and/or external resources benefit from combining high levels of exploration and exploitation simultaneously.

Conclusions

The results from the academic literature show that the availability of resources in an organization has an effect on which strategy should be pursued to best achieve ambidexterity in an organization. Pertaining to this, the structural separation of explorative and exploitative business units is the better solution for larger firms who possess high levels of unabsorbed slack. Contextual ambidexterity, on the other hand, may be the better strategy for smaller firms who might not have sufficient resources to enable the pursuit of exploration and exploitation in different subunits. Therefore, smaller firms should concentrate on implementing a strategy that focuses on the development of employees to simultaneously pursue exploration and exploitation within a business unit. In sum, this means that managers need to adjust their strategy for achieving ambidexterity towards the endowment of organizational resources that their firm possesses.

4.3.2. Manage ambidexterity in consideration of different environmental factors

The nature of the environment in which an organization operates may sometimes affect the choices made in strategic decisions regarding ambidexterity. Uotila et al. (2009)

for example found that the research and development intensity of the industry in which firms operate positively moderates the relationship between the relative amount of exploration orientation and the financial performance of the firm. Moreover, different levels of technological dynamism require a different balance of exploration and exploitation in order to enhance performance (Uotila et al., 2009). This implies that firms facing an environment with lower technological dynamism might concentrate their efforts towards exploitation, whereas high technological dynamism requires firms to pursue sufficient exploration in order to avoid inertia through an overemphasis on exploitation (Uotila et al., 2009).

Sidhu et al. (2007) explored the moderating effect of environmental dynamism on the relationship between nonlocal supply-side search, demand-side search, and spatial search and innovativeness, meaning the ability to successfully introduce new products and services. The authors found that environmental dynamism moderates the relationship between innovativeness and the amount of nonlocal supply-side search and demand-side, so that when there is low dynamism this relationship is positive and when there is high dynamism, the relationship is negative. Furthermore, environmental dynamism does not influence the positive relationship between greater spatial search and innovativeness. However, not only the amount of search matters, but also its context (Sidhu et al., 2007). More precisely, this implies that when firms operate in a highly dynamic context they should pursue supply-side and spatial-search exploration together with demand-side exploitation (Sidhu et al., 2007). When the environment is stable, firms benefit from combining demand-side and spatial search exploration with supply-side exploitation (Sidhu et al., 2007). In general, the greater the amounts of nonlocal supply-side, demand-side, and spatial search, the greater the innovativeness of the firm (Sidhu et al., 2007).

Additionally, Simsek (2009) suggests that environmental dynamism as well as environmental complexity both positively moderate the relationship between organizational ambidexterity and organizational performance. Environmental dynamism is characterized by the rate of change as well as the extent of instability in an environment (Dess & Beard, 1984; as cited in Jansen et al., 2009). In dynamic environments, acting ambidextrously enhances an organization's ability to quickly react to actions of competitors and to customer demands, while in stable environments it might be more beneficial to focus on either exploration or exploitation to sustain a competitive advantage (Simsek, 2009). In complex environments, organizational ambidexterity can be used to handle both explorative and exploitative activities in order to enhance performance (Simsek, 2009). Jansen et al. (2006) found empirical support that environmental dynamism positively moderates the relationship between exploratory innovation and financial performance, and that environmental dynamism negatively moderates the relationship between exploitative innovation and financial performance. Dynamism rapidly makes existing products and services obsolete, explaining the negative relationship with exploitation (Jansen et al., 2006). Furthermore, Jansen et al. (2006) found that

environmental competitiveness positively moderates the relationship between exploitative innovation and financial performance. Environmental competitiveness refers to the degree of competition in an external environment (Jansen et al., 2006). When a business is able to expand its current and existing products and services in a competitive environment, it can increase its customers' loyalty and hence defend its market position in order to increase its financial performance through exploitative innovation (Jansen et al., 2006).

In sum, Jansen et al. (2006) empirically found that in dynamic environments, it is more beneficial to pursue exploratory innovation, whereas in competitive environments, it is more beneficial to pursue exploitative innovation in order to enhance a unit's financial performance. Lin et al. (2007) have also found empirical support for their hypothesis that a firm with an ambidextrous formation of exploratory and exploitative alliances will tend to exhibit better performance in an uncertain environment, whereas a firm with a focused approach on either exploration or exploitation will tend to have better performance in a stable environment. An ambidextrous design therefore is able to strategically balance the different demands of exploration and exploitation which leads to enhanced performance in uncertain environments (Lin et al., 2007).

Eisenhardt et al. (2010) claim that leaders who are effective in balancing exploration and exploitation should avoid highly ambiguous environments and rather structure uncertain environments to their advantage. In highly unpredictable environments, managers should keep the structure minimal and undertake flexible adjustments of the structure as the situation requires (Eisenhardt et al., 2010). Furthermore, managers often face multiple environments. On the one hand, they have to manage for efficiency and exploitation in the existing market, and on the other, managers need to foster flexibility and exploration in their new and dynamic market (Eisenhardt et al., 2010).

Conclusions

The results obtained from the academic literature show that certain characteristics of the environment influence the strategies for pursuing either exploration, exploitation, or both. According to this, ambidexterity, meaning the simultaneous pursuit of exploration and exploitation, may positively influence a firm's performance when this firm operates in dynamic or complex environments. Contrary to this, in stable environments firms can also consider to implement a one-sided focus on either exploration or exploitation. In sum, managers need to be aware of changes in their environment and take actions accordingly. So, on the one hand, managers need to defend their competitive position in existing markets through exploitation and, on the other hand, they need to establish their position in emerging and dynamic markets through exploration.

4.3.3. Manage ambidexterity in consideration of different network characteristics

Networks, meaning the connections which organizations have to others, may affect organizational ambidexterity. For instance, Simsek (2009) examines how network centrality and diversity affect ambidexterity and how this relationship is influenced by a variety of other moderators. He proposes that network centrality, meaning the extent to which an organization is well connected to others in a network, has a curvilinear relationship with organizational ambidexterity. This means that a moderate level of network centrality, having neither too low nor too high levels of centrality, should have the most positive effects regarding ambidexterity (Simsek, 2009). Simsek (2009) furthermore suggests that this relationship can be strengthened when an organization deploys dual structures (structural ambidexterity), the creation of a behavioral context (contextual ambidexterity), or TMT behavioral integration which moderate this relationship. Lin et al. (2007) have also found empirical support for their hypothesis that a firm with a high degree of centrality in the alliance network will tend to have better performance if it adopts an ambidextrous formation of exploratory and exploitative alliances, whereas a focused formation of alliances will tend to bring better performance to firms with a low degree of centrality. This can be explained by the fact that central firms have more ties to other network members, which they can explore and exploit to their benefits (Lin et al., 2007).

Furthermore, network diversity, meaning the number of different social systems that are part of an organization's relationships, might positively influence ambidexterity (Simsek, 2009). A greater amount of novel information, heterogeneity in problem-solving, and greater access to resources can explain this positive relationship (Simsek, 2009). Again, a dual structure, the creation of a behavioral context, or TMT behavioral integration might positively moderate the relationship between network diversity and organizational performance (Simsek, 2009). Simsek (2009) further suggests that environmental complexity positively moderates the relationship between ambidexterity and network centrality and network diversity respectively. An environment is considered complex when an organization has to deal with a variety of heterogeneous actors and activities which are outside its boundaries of the organization's strategic decision-making (Simsek, 2009). This implies that environmental complexity requires higher levels of ambidexterity which can be achieved by network centrality and diversity because they reduce complexity and help to maintain an appropriate level of fit with the environment.

Furthermore, Lin et al. (2007) empirically found that a firm with a high degree of brokerage positions in the inter-firm network will tend to have better performance if it adopts a focused formation of either exploratory or exploitative alliances, whereas an ambidextrous formation of alliances will tend to bring better performance for firms with few structural holes. The degree of brokerage positions refers to the

ability of a firm to establish relationships with new alliance partners or, in other words, to "span the holes" (Lin et al., 2007). In addition to this, Lin et al. (2007) found empirical support that a firm with an ambidextrous formation of exploratory and exploitative alliances will tend to have better performance in early years of the network, whereas a firm with a focused formation of either exploratory or exploitative alliances will tend to have better performance in later years of the network. This means that when a firm operates in a network context that is rather new, firms have little experience which they can refer to, making a focused approach on either exploration or exploitation rather risky (Lin et al., 2007). Therefore, in a young network, firms will benefit when they take on an ambidextrous design (Lin et al., 2007).

Luo and Rui (2009) investigated the properties and dimensions of emerging market multi-national enterprises' (EM MNEs) ambidexterity. They found that co-orientation, co-competence, co-opetition, and co-evolution determine how good an EM MNE can balance two contrasting elements that occur at the same time. Co-orientation refers to the balance of seeking both short-term survival and long-term growth simultaneously. Co-competence occurs when EM MNEs simultaneously use both transactional and relational capabilities when they operate in international contexts. Co-opetition means that EM MNEs simultaneously compete and cooperate with international stakeholders. Lastly, co-evolution denotes that EM MNEs concurrently respond to and actively influence their external environment in both, their home and host countries. The collective implementation of these sets of systems and processes should help to facilitate ambidexterity in an organization.

Conclusions

The findings obtained from the academic literature reveal that different characteristics of an organization's network influence the strategies for achieving ambidexterity. The results show that managers should implement ambidexterity, meaning the simultaneous pursuit of exploration and exploitation, when their organization has a high degree of network centrality. On the other hand, a one-sided focus on either exploration or exploitation should be implemented when the firm has only low levels of network centrality. Furthermore, the results imply that when an organization has a more diverse network, then this positively influences ambidexterity. In general, network centrality and diversity foster ambidexterity when a firm is confronted with complex environments. The age of the network also influences ambidexterity, so that when firms operate in young and new networks, they benefit from an ambidextrous approach; whereas in older and already established networks, firms can also consider a one-sided focus on either exploration or exploitation. In sum, the results show that managers should orient their ambidexterity-strategy according to the specific characteristics of their organization's network.

4.3.4. Facilitate ambidexterity through externalization and absorptive capacity

Absorptive capacity can help a firm to manage the tensions which arise from simultaneously pursuing exploration and exploitation (Rothaermel and Alexandre, 2009). Absorptive capacity can be defined as a firm's ability to sense, gather and incorporate new knowledge and is enabled by the interaction of exploitative and explorative activities (Andriopoulos and Lewis, 2009). Absorptive capacity plays an important role whenever organizations try to resolve paradoxical tensions concerning the alignment of exploitation and exploration through externalization (Raisch et al., 2009). Externalization can, for example, be conducted in the form of outsourcing or by establishing alliances (Lavie and Rosenkopf, 2006) in order to externalize one or another activity. However, the externalization of either exploration or exploitation is not always easy. Benner and Tushman (2003) criticize that the strategic integration across independently operating firms may be a great challenge. Still, Raisch et al. (2009) argue that externally acquired knowledge may be conducive to the reconfiguration of established knowledge bases, in that ambidexterity does not only require internal and external knowledge processes, but also their integration across the boundaries of an organization.

Linking these findings to the literature on absorptive capacity, Cohen and Levinthal (1990; as cited in Raisch et al., 2009) argue that both external knowledge acquisition and internal knowledge processing are essential, however, there needs to be a balance so that the one is not overwhelmed by the other. Therefore, the ability to integrate internal and external knowledge bases, and thus to become ambidextrous, is largely dependent on a combination of external brokerage and internal absorptive capacity (Raisch et al., 2009). To conclude the findings on the internal-external tension, Rothaermel and Alexandre (2009) argue that ambidexterity in a firm's technology sourcing strategy not only relates to the trade-offs necessary to simultaneously pursue exploration and exploitation, but also form the trade-offs regarding the integration of internal and external technology sourcing. Rothaermel and Alexandre (2009) found empirical support that the absorptive capacity of a firm moderates the inverted U-shaped relationship between a firm's total technology sourcing mix (of existing and new technology) and firm performance so that the positive effect of ambidexterity in technology sourcing on performance is stronger when the firm possesses higher levels of absorptive capacity.

Similarly, Lichtenthaler and Lichtenthaler (2009) propose that the alignment of both internal and external knowledge management processes might offer new avenues in the ambidexterity research, as so far the ambidexterity literature has primarily focused on the internal alignment of exploitation and exploitation (Raisch and Birkinshaw, 2008). More specifically, organizations do not only need to achieve an internal balance, but also have to develop their knowledge processes in that they can compete outside the boundaries of an organization (Lichtenthaler and Lichtenthaler, 2009). The

buildup of a knowledge management capacity can help to reconfigure and realign knowledge capacities (Lichtenthaler and Lichtenthaler, 2009).

Conclusions

The findings from the academic literature reveal that the absorptive capacity of an organization, meaning the ability to sense and integrate new knowledge, can help a firm to reconcile exploration and exploitation and to, thus, become ambidextrous. Absorptive capacity especially plays an important role when a firm tries to achieve ambidexterity through the externalization of either explorative or exploitative activities. This means that the ability to absorb and to incorporate the knowledge from the externalized activities is vital for a firm's success. In sum, managers need to develop a knowledge management capacity which enables their organization to not only reconcile exploration and exploitation within their company, but also to integrate the knowledge retrieved from outside the organization.

4.3.5. Facilitate ambidexterity through dynamic capabilities and routines

Dynamic capabilities are one way to cope with paradoxical tensions at the organizational level (Smith and Lewis, 2011) and it is necessary to develop a dynamic capability in order to initiate effective ways of achieving ambidexterity (Jansen et al., 2009). Dynamic capabilities involve processes, routines, and skills (Teece et al., 1997) that allow leaders to respond to changes in the environment which, as a consequence, enables the members of an organization to accept the paradoxical tensions which arise in dynamic environments (Smith and Lewis, 2011). In other words, ambidexterity can be regarded as a dynamic capability in that it involves the routines and processes through which an organization mobilizes, coordinates, and integrates different contradictory agendas and reallocates, combines, and reconfigures different sets of resources across explorative and exploitative units (Teece, 2007; Jansen et al., 2009). Or, as Helfat and Winter state, "ambidexterity relies in part on dynamic capabilities of top managers to perform targeted integration of emerging and mature businesses" (Helfat and Winter, 2011, p. 1248). However, ambidexterity can only become a dynamic capability if it is managed in a repeated fashion and includes the intentional allocation and reconfiguration of firm resources (O'Reilly and Tushman, 2008).

Moreover, as the necessity for exploration and exploitation may differ across different actions and over time, the reconciliation of differentiation and integration tactics may be an important dynamic capability for the development of ambidexterity (Raisch et al., 2009; Gulati and Puranam, 2009). Within independent units in which exploitation and exploration are balanced simultaneously, such as in contextual ambidexterity, meta-routines enable the coordination, synchronization and integration of these two agendas (Simsek et al., 2009; Adler et al., 1999). In other words, routines can help to integrate exploration and exploitation within a single domain (Simsek et al., 2009). Gibson and Birkinshaw (2004)

also highlight the need for meta-routines which should help to systematize the processes which are necessary for aligning exploration and exploitation. Meta-routines can be described as routines for systematically changing existing routines and are responsible for supporting the accomplishment of non-routine activities (Adler et al., 1999).

Findings from practitioner literature

The findings from the practitioner literature also reveal that learning plays an important role when implementing ambidexterity into an organization. Tushman and O'Reilly (1996) state that organizational learning is concerned with incorporating things that go well into an organization and to continually refine the business according to the feedback received from the market. Referring to ambidexterity, this means that its underlying processes are explicitly learned and managed by senior executives (O'Reilly et al., 2009). Ambidexterity therefore can be denoted a dynamic capability, as it involves a set of routines and processes which are repeatable and orchestrated by the top management team (O'Reilly et al., 2009). More specifically, O'Reilly and Tushman describe ambidexterity as a dynamic capability as follows: "As a dynamic capability, ambidexterity embodies a complex set of routines including decentralization, differentiation, targeted integration, and the ability of senior leadership to orchestrate the complex trade-offs that the simultaneous pursuit of exploration and exploitation requires" (O'Reilly and Tushman, 2011, p. 6).

Conclusions

Findings from both, the academic and the practitioner literature, show that an organization's dynamic capabilities can help to cope with the conflicting demands of exploration and exploitation. The academic literature shows that ambidexterity can be regarded as a dynamic capability when managers are able to continually allocate and reconfigure organizational assets in order to integrate emerging and existing businesses. Furthermore, meta-routines, which are part of dynamic capabilities, can help to integrate exploration and exploitation within the same business unit, to change existing routines, and to facilitate the pursuit of nonroutine activities. Findings from the practitioner literature, similarly, show that ambidexterity can be considered as a dynamic capability as it incorporates a set of routines which are responsible for aligning and integrating the differentiated units responsible for exploration and exploitation. Managers can, therefore, use dynamic capabilities in order to better host the contradictory demands of exploration and exploitation and to, consequently, enable their organization to act ambidextrously.

5. Discussion and avenues for future research

This study used a systematic literature review to show which practical implications for managers can be found in academic and practitioner literature to achieve ambidexterity in practice. It was assumed that the management has a vital and overarching function in implementing different

mechanisms which should facilitate the achievement of ambidexterity. The results showed that the management should function on three different levels. First, there exist measures which should be implemented directly at the top management level. Second, there are measures concerning the organizational design which should be taken by the management to achieve ambidexterity within the remaining organization. Last, there are moderators and other external factors which are more or less out of scope for decision-making and which can only marginally be influenced by managers. However, the top management can take account of these (sometimes hard to influence) factors and respond accordingly.

5.1. Revision of the implications at the TMT level

The results of this study show that at the top management level, managers need to make important decisions about the strategies and processes which should facilitate ambidexterity. However, this requires them to first be aware of the paradoxical tensions which exist when balancing two contradictory agendas, namely exploration and exploitation (Smith and Tushman, 2005; Smith and Lewis, 2011). In order to resolve these conflicts, managers need to constantly make trade-offs between exploration and exploitation and continually allocate and reallocate resources between the two (Smith and Tushman, 2005; O'Reilly and Tushman, 2011). This means that managers not only need to host the inconsistencies that arise from balancing exploration and exploitation, but also recognize and make use of the synergies between them (Smith and Tushman, 2005; Smith and Lewis, 2011).

Paradoxical cognition enables managers to make balanced decisions regarding the achievement of ambidexterity. What such strategic choices should include will be explained here. The results show that various authors (e.g., Gibson and Birkinshaw, 2004; Jansen et al., 2008; Simsek, 2009; O'Reilly and Tushman, 2008) highlight the importance of a shared vision among senior managers, as well as a common culture (Tushman and O'Reilly, 1996) in order to reconcile contradictory agendas. This implies that managers should collaboratively create a vision that emphasizes the need for ambidexterity in an organization. This vision should then be communicated to the other members of the organization in order to create a common overall culture and identity (O'Reilly and Tushman, 2008, 2011). Shared sets of norms, values, and goals help to align the contrasting elements of exploration and exploitation and, as a consequence, facilitate ambidexterity (Tushman et al., 2011; O'Reilly and Tushman, 2011). In sum, an overarching identity provides for a common strategic intent which aims at aligning separate units for exploration and exploitation which each involve different competencies, processes, systems, and cultures (O'Reilly and Tushman, 2011).

The recognition and resolution of paradoxical tensions and the creation of a common strategic intent can, therefore, be regarded as first steps into directing an organization towards becoming ambidextrous. However, these two steps require that managers display certain behaviors that enable them to become aware of these paradoxical conflicts and to

accordingly take appropriate actions. The results of this thesis show that managers need complex behavioral repertoires which provide them with the flexibility needed to align exploration and exploitation (Smith and Lewis, 2011; Raisch and Birkinshaw, 2008; O'Reilly and Tushman, 2008; Gibson and Birkinshaw, 2004). Furthermore, ambidextrous managers need to be fulfilling multiple roles at a time which are related to the pursuit of both explorative and exploitative activities (Adler et al., 1999; Smith and Lewis, 2011). A managerial mindset helps managers to flexibly respond to changes, to think innovatively, to tolerate failures, and to encourage risk-taking. Especially transformational leaders have the necessary requirements for encouraging critical debate and open discussion about the conflicting demands of exploration and exploitation (Hotho and Champion, 2011; Jansen et al., 2008). Furthermore, transformational leaders have a supportive function and the ability to motivate their followers to aspire goals which are directed towards becoming and acting ambidextrously (Hotho and Champion, 2011; Jansen et al., 2008; Tushman and O'Reilly, 1996).

In order to manage the paradoxical tensions regarding exploration and exploitation, results from the academic as well as the practitioner literature show that there also are certain characteristics and constellations of top management teams which should facilitate this task. First of all, a team which is behaviorally (Lubatkin et al., 2006) or socially (Jansen et al., 2009) integrated is better able to achieve ambidexterity in an organization. Behavioral integration allows team members to collaboratively work together and to exchange knowledge and information which gives them the possibility to resolve conflicts and to openly discuss new ideas and opportunities (Lubatkin et al., 2006; Jansen et al., 2009). Furthermore, the affiliations to prior companies play an important role in how managers cope with paradox (Beckman, 2006). The results show that top management teams whose members have both common and diverse prior company affiliations are better able to develop a common understanding and to transfer knowledge (Beckman, 2006). Common prior company affiliations foster a common culture and mutual trust and understanding among team members which are beneficial to exploitation (Beckman, 2006). Diverse prior company affiliations promote broader access to knowledge and networks and are therefore beneficial to exploration (Beckman, 2006). Lastly, both academic and practitioner literature reveal that there are two specific structural constellations of teams which should facilitate the integration of strategic contradictions regarding exploration and exploitation. The first constellation suggests that teams should be leader-centered, meaning that the leader has the responsibility to integrate exploration and exploitation by relying on heavy exchange with the other team members (Smith and Tushman, 2005; Tushman et al., 2011). The second constellation suggests that teams should be team-centered, meaning that the members collaboratively work together in order to integrate contradictory agendas (Smith and Tushman, 2005; Tushman et al., 2011). Both possibilities seem to be workable solutions and every organization needs to decide for themselves which approach they

want to adopt. Furthermore, the results show that managers can use formal and informal coordination mechanisms to facilitate ambidexterity. The two main formal structural mechanisms include a manager's level of decision-making authority (Raisch et al., 2009; Mom et al., 2009) and the formalization of tasks in a business unit (Mom et al., 2009; Jansen et al., 2009). The findings show that the higher a manager's decision-making authority, the better is he or she able to integrate explorative and exploitative activities (Raisch et al., 2009; Mom et al., 2009). Pertaining to formalization, the results suggest that the formalization of tasks enhances the level of exploitative behavior within a unit (Jansen et al., 2009). Both, a manager's level of decision-making authority and the formalization of tasks, positively influence ambidexterity. Informal, or personal, coordination mechanisms include a manager's participation in cross-functional interfaces and his or her connectedness to other members of the organization (Mom et al., 2009; Adler et al., 1999; Jansen et al., 2009). Both mechanisms do not only facilitate the exchange of knowledge between organizational members, but also increase the trust between a manager and others (Mom et al., 2009; Jansen et al., 2009). This, in turn, leads to the ability to better resolve paradoxical conflicts and to achieve ambidexterity (Mom et al., 2009; Jansen et al., 2009). Moreover, the results suggest that formal and informal coordination mechanisms positively correlate with each other. The findings show that a manager's decision-making authority positively interacts with the participation in cross-functional interfaces and the connectedness to other members of the organization (Mom et al., 2009). For managers, this means that when they succeed in having authority over decisions and when they deploy dense networks of direct personal contacts to other organizational members, they are more capable of acting ambidextrously themselves in order to implement measures to direct their organization towards ambidexterity (Mom et al., 2009; Jansen et al., 2009).

5.1.1. Avenues for future research

The revision of the results presented above give rise to multiple avenues for future research. First of all, it would be interesting to more specifically distinguish between the individual manager and the top management team as a whole. One leverage point could be, for instance, the more in depth analysis of a manager's individual behavior which enables him to act ambidextrously. Another leverage point could concern the dynamic and the culture of a group of senior leaders. Pertaining to this, it would be interesting to examine which factors influence the top management team to collaboratively work together to reconcile the contrasting demands of exploration and exploitation. Second, it might be interesting to also examine the role of lower level managers as the focus of prior research has primarily lied on the role of the top management team. Certainly, managers at lower hierarchical levels have the responsibility to implement the strategic decisions made at the top management level. Therefore, a deeper understanding of the functions and characteristics of the managers at the operating levels would lead to greater

insights into how ambidexterity can be achieved in practice.

5.2. Revision of the implications concerning organizational design

The measures which can be implemented directly at the top management team level serve as important prerequisites for applying organizational design measures within the remaining organization. The two main solutions in this regard include structural and contextual arrangements. In addition to this, human resource practices have a supportive function in implementing these structural and contextual solutions in order to achieve ambidexterity within the organization. This section has the aim to revisit the core findings concerning organizational design mechanisms, to highlight their importance for managers, and to provide avenues for future research pertaining to this subject.

As already mentioned earlier, structural ambidexterity involves the spatial separation of distinct and autonomous units responsible for either exploration or exploitation (Benner and Tushman, 2003; Simsek, 2009; Jansen et al., 2009; Tushman and O'Reilly, 1996). The structural separation of the units avoids that the processes, structure, and cultures of one unit are not overwhelmed by the other (Simsek, 2009). Following Benner and Tushman (2003) suggestion, then the tasks, the required competencies, the culture, and the structural arrangements (O'Reilly and Tushman, 2004) are constant, and therefore tightly coupled, within the subunit. However, across the different subunits responsible for either exploration or exploitation, these different elements are not consistent and only loosely coupled with each other (Benner and Tushman, 2003). This leads to the conclusion that each unit operates independently within structural ambidexterity. Still, these differentiated subunits are organizationally interdependent which requires their integration at the top management team level (Benner and Tushman, 2003; Simsek et al., 2009). For managers this, again, means to host the contradictions that arise from the deployment of differentiated units responsible for exploration and exploitation and to integrate them with regard to the vision, the goals, and the culture of the organization.

The second main mechanism for achieving ambidexterity is the creation of a context that allows the simultaneous pursuit of exploration and exploitation within the same business unit (Birkinshaw and Gibson, 2004; Gibson and Birkinshaw, 2004; Simsek et al., 2009). With regard to contextual ambidexterity, the implication for managers is to create a context which equally emphasizes high performance, through a combination of discipline and stretch, and social support, through a combination of trust and support (Gibson and Birkinshaw, 2004). Additionally, managers should be aware that contextual ambidexterity only works, when the members of the organization act and behave ambidextrously (Birkinshaw and Gibson, 2004). The ability to act ambidextrously gives individuals the capability to decide on how they want to divide their time between explorative and exploitative activities (Gibson and Birkinshaw, 2004).

Furthermore, the findings of the systematic review of the academic literature reveals that there are a variety of human resource practices which facilitate the achievement of ambidexterity. Specifically, these include certain job designs, such as job enrichment or task partitioning (Adler et al., 1999), and the training of the employees to enable them to work efficiently in an ambidextrous organization (Simsek et al., 2009). In addition to this, rewards and other incentives can enhance the ambidexterity among employees (Jansen et al., 2008; Jansen et al., 2009; Kaplan and Henderson, 2005). Especially the top management team benefits from senior team contingency rewards which have the aim to increase trust and collaboration (Jansen et al., 2008; Jansen et al., 2009; Smith and Tushman, 2005). In general, managers should advocate for intrinsically motivating incentives which should foster the creation of knowledge and provide a sense of ownership of the work (Hotho and Champion, 2011). Moreover, managers should be aware that with the development and the efficient management of intellectual capital within their organization, they can effectively direct the adoption of explorative or exploitative activities through either human, social, or organizational capital (Kang and Snell, 2009).

5.2.1. Avenues for future research

Structural and contextual ambidexterity have been widely discussed as antecedents of ambidexterity by researchers. What would be an interesting avenue for research is to examine structural and contextual as complementary solutions for achieving ambidexterity (see Birkinshaw and Gibson, 2004). The underlying assumption here is that the separate units responsible for either explorative or exploitative activities might not be well connected to the core business (Birkinshaw and Gibson, 2004). Viewing contextual ambidexterity as a complement to structural ambidexterity might therefore lead to new leverage points regarding the antecedents of ambidexterity. In addition to this, there is relatively little knowledge regarding the human resource practices which can facilitate the implementation and the development of ambidexterity. Therefore, future research would benefit from a more in depth examination of other possible HR practices which might foster ambidexterity. Although some researchers (e.g., Simsek et al., 2009; Adler et al., 1999) already approached the necessity of training and job enrichment programs to enable employees to perform both exploration and exploitation, it has not yet been examined which other job designs could possibly influence the ambidexterity of employees. For instance, it could be tested whether job rotation or job enlargement have an effect on employee's ambidexterity. Both of these job designs are directed towards motivating employees to extend their activities and capabilities. Consequently, job rotation and job enlargement can be regarded as an important HR practices for achieving ambidexterity because they not only require the creation of new knowledge and the application of existing knowledge, but also the recognition and resolution of paradoxes.

5.3. Revision of the external factors and moderators

The findings of this thesis show that some factors which influence ambidexterity can only be marginally be influenced by managers. These include the amount of resources that a firm possesses, certain environmental factors, different characteristics of the organization's network, the organization's absorptive capacity and its dynamic capabilities. However, managers can build awareness of these particularities and orient their ambidexterity strategy according to the special requirements of each of these factors. This section will critically revisit the single results obtained from the systematic literature review.

First of all, the findings pertaining to the availability of resources have specific implications regarding the strategy of ambidexterity which managers should deploy. More precisely, this means that managers should rather use a structurally ambidextrous design when their firm possesses high levels of organizational slack and a contextually ambidextrous design when their firms are rather small and do not possess sufficient resources to support structurally separate units for exploration and exploitation (Voss et al., 2008; Lubatkin et al., 2006, Raisch and Birkinshaw, 2008; Lin et al., 2007). Second, the results suggest that ambidexterity has a positive influence on a firm's performance when this firm operates in a complex or dynamic environment (Simsek, 2009, Jansen et al., 2006). Managers also need to be aware that environmental dynamism has a positive moderating effect on the relationship between exploration and financial performance (Jansen et al., 2006). This also implies that managers have to sense changes in new a dynamic markets through exploration and to foster exploitation in existing markets (Eisenhardt et al., 2010). Third, managers should consider the different characteristics of their organizational network when they implement an ambidexterity-oriented strategy. The results show that when an organization is central in a network, then managers should use an ambidextrous approach to fully reap the benefits arising from the connections to others in this network (Lin et al., 2007). Furthermore, the results indicate that the more diverse the network of an organization is, the more positive its effect on ambidexterity (Lin et al., 2007). Last, the findings imply that ambidexterity is beneficial to a firm when it operates in a rather young and new network (Lin et al., 2007). In the case of multinational enterprises in emerging markets, for example, co-orientation, co-competence, co-evolution, and co-opetition seem to be vital dimensions of ambidexterity through which organizations can establish their position in new networks (Luo and Rui, 2009). In sum, the results obtained from the academic literature suggest that the availability of resources, various environmental factors, as well as certain characteristics of an organization's network need to be considered by managers in order to direct their ambidexterity strategy towards the emerging needs of each of these particularities.

In addition to, the results suggest that organizations can make use of their absorptive capacity and their dynamic capabilities in order to facilitate and to support ambidexterity. Pertaining to absorptive capacity, for managers this implies

that they could consider the externalization of single activities of exploration or exploitation (Raisch et al., 2009; Lavie and Rosenkopf, 2006). In such a case, the absorptive capacity of an organization can be used to integrate the externally acquired knowledge and to reconfigure already established knowledge bases (Raisch and Birkinshaw, 2008; Raisch et al., 2009; Lichtenthaler and Lichtenthaler, 2009). Furthermore, managers can make use of the dynamic capabilities of their firm in that they help to continually allocate and reconfigure organizational assets to integrate new and existing businesses (Smith and Lewis, 2011; O'Reilly and Tushman, 2008; O'Reilly et al., 2009). Meta-routines, which are part of dynamic capabilities, can also be implemented by managers in order to enable employees to host the demands of both, explorative and exploitative activities (Simsek et al., 2009; Adler et al., 1999). In sum, the results obtained from the systematic review of the selected literature reveal that the absorptive capacity and the dynamic capabilities of an organization represent important facilitators of ambidexterity which should be considered by managers who want to achieve ambidexterity within their organization.

5.3.1. Avenues for future research

The effect of the availability of resources and the environmental factors on a firm's ambidexterity and its performance have already been examined empirically by a variety of researchers (e.g., Lubatkin et al., 2006; Jansen et al., 2006). Although managers only have a limited scope for decision-making regarding these aspects, one avenue for future research could be to analyze how managers can react when there are sudden changes in one of these domains. For instance, when a new and dynamic market, which emerges from the launch of a new innovation, turns into a stable and mature market, then it would be interesting to analyze how managers can use ambidexterity to adapt to these changes. Specifically, it would be important to consider the processes by which managers and top management teams sense changes in their environments and how ambidexterity can help them to respond to these changes in an efficient way. A second possible avenue for future research concerns the dynamic capabilities of a firm. O'Reilly and Tushman (2008) argue that dynamic capabilities need to be repeatable in order to be useful for managers and the entire organization. This implies that ambidexterity should also be a repeatable and controllable processes which not only emerges "contingently" through either external or internal changes within an organization. Therefore, it would be interesting to further examine how managers and top management teams can create sustainable routines for constantly aligning and reallocating resource assets that should help to reconcile exploration and exploitation and to, consequently, facilitate ambidexterity.

6. Conclusion

This study's aim was to derive practical implications for managers from academic articles and practitioner literature

concerning the concept of ambidexterity. The results obtained from the systematic literature review provide some basic principles which should help to achieve ambidexterity in an organization and to bridge the rigor-relevance regarding this topic. This section will summarize the main guidelines for managers regarding the achievement of ambidexterity. Additionally, some limitations of this study will be explained and it will be highlighted if and to which extent this study helped in bridging the rigor-relevance gap regarding ambidexterity.

6.1. Summary of results

There are some major prerequisites which are necessary for implementing ambidexterity in an organization. The starting point here is the top management which has a vital function in reconciling the contrasting and often conflicting demands of exploration and exploitation in order to achieve ambidexterity. First of all, managers need to recognize and resolve the paradoxical tensions that arise from these two contrasting agendas. Second, managers need to develop an ambidexterity-oriented strategy and communicate this strategy across the members of the whole organization. These processes can be facilitated by ambidextrous leaders with complex behavioral repertoires and specific constellations and characteristics of top management teams. Thirdly, managers should make use of both formal and informal (or personal) coordination mechanisms to foster not only their own ambidexterity, but also the ambidexterity within the remaining organization.

Once the management has succeeded in implementing the necessary measures at the top management team level, the rest of the organization can now be designed to act ambidextrously. Specifically, managers can use either structural or contextual mechanisms to do so. Structural solutions include the creation of spatially separated subunits which are each responsible for either exploration or exploitation. Contextual solutions involve the creation of a context which allows individuals to simultaneously pursue exploration and exploitation within the same unit. In addition to this, specific human resource practices have a supportive function in fostering ambidexterity among the members of an organization. These include primarily ambidexterity-oriented incentives, job enrichment and training, and the development of human, social, and organizational capital.

Lastly, managers need to respond to certain external factors and other moderators which might influence the achievement of ambidexterity. First of all, managers need to orient their strategy for achieving ambidexterity in consideration of the availability of the resources that the organization has. Second, managers have to be aware of certain environmental influences and take appropriate measures as the external environment requires. Third, certain characteristics of an organization's network can be used by managers to implement according actions for the reconciliation of exploration and exploitation. Fourth, organizations can make use of their absorptive capacity and their dynamic capabilities in order to further foster their ambidexterity.

6.2. Limitations

The implications and results of this study are subject to several limitations. One possible limitation concerns the methodological proceeding of this thesis. The 40 most cited articles treating the topic of ambidexterity were used to filter out practical implications for managers. Although this method contributed to selecting the most influential studies concerning ambidexterity, it was limited in that it did not include more recent articles. The 40 most cited articles mainly included papers from the years 2004 to 2009. Therefore, more recent studies, meaning those published after 2009 were, apart from a few exceptions, neglected. Due to the great proliferation of articles concerning ambidexterity in the last few years, it would therefore be interesting to also examine more recent articles with regard to this thesis' research question.

A second limitation is that it is unclear whether the practical implications derived from the academic and practitioner literature are taken up in practice or not. Although there are certain approaches which deliver already very concrete implications for managers on how to best achieve ambidexterity in their organization, it remains uncertain if these implications are really being implemented in practice. One reason for this is that although research on ambidexterity has largely increased over the last years, the construct of ambidexterity still lacks a concrete conceptualization and theorization. Although this study refers to different disciplines and theories of ambidexterity in order to integrate and extend the current understanding, many aspects of this construct remain unexplained and not understood. Therefore, more research regarding ambidexterity and the development of possibly common theories and conceptualizations of this construct would help to further explore the practical implications of ambidexterity.

With regard to the results obtained from the systematic review of articles from academic and from practitioner literature, it can be said that this thesis partly succeeded to bridge the rigor-relevance gap concerning the topic of ambidexterity. The results provide general principles for managers to achieve ambidexterity in an organization. However, the abstract nature of the construct of ambidexterity makes it difficult to define common conceptualizations and to operationalize this concept in practice. What might be useful in this regard is, for instance, the distinction into either abstract or concrete practical implications. Concrete solutions would then provide managers with very explicit and detailed implications on how to achieve ambidexterity in practice, which cannot be derived from abstract solutions. More concrete solutions would probably improve the extent to which the rigor-relevance gap is bridged and enable the deduction of more consistent results with regard to ambidexterity.

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