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**The relationships between workplace e-learning and dynamic
capabilities**

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A thesis submitted in fulfilment of the requirements for the degree of

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Abstract

The dynamic capabilities school of thought has emerged from notions that organisational performance is increasingly temporary without the ability to adapt to a changing business environment. Central to the dynamic capabilities concept are the knowledge and learning that underpin an organisation's capabilities and competitive advantage. However, when organisations attempt to stimulate learning, they risk solidifying capabilities into *best practices* that becomes rigid and overly-formalised. The challenge for organisations is to develop learning mechanisms which allow accrued experience to transform with shifting environmental conditions.

In this PhD thesis I investigate how one of these learning mechanisms – online or e-learning – can be used to develop organisational-level learning and dynamic capabilities. I define dynamic capabilities as higher-order activities to create or reconfigure resources and operating routines to accommodate changing environments. Also of interest are the contextual factors that influence strategic choices when developing and evaluating e-learning. The overarching research question is: *What relationships exist between workplace e-learning processes and dynamic capabilities?* The thesis is presented as a series of three academic essays. The first essay conceptualises how dynamic capabilities may be developed and proposes specific aspects of e-learning strategy and practices that are likely to support the development of dynamic capabilities. The essay provides a model of how dynamic capabilities are created and shows where e-learning may fit in this process. A list of propositions is also provided that suggest which e-learning processes may contribute to dynamic capabilities by supporting adaptation and innovation activities. The main contribution made in this essay is to explain specifically how a learning practice might contribute to the development of dynamic capabilities.

The second essay discusses the results of an exploratory qualitative study investigating e-learning practices across a range of theoretically-disparate organisations. Interview data was collected and analysed using the Gioia approach to thematic analysis. The findings show how organisations operating in more dynamic contexts use and evaluate their e-learning to support innovative and adaptive processes. This essay contributes by demonstrating that learning approaches designed to achieve more strategic, rather than operational, objectives are most prevalent in dynamic situations. The third essay broadens the focus and explores the relationship between organisational culture and dynamic capabilities. The findings show that an adaptive culture is integral to an organisation's ability to build flexible, yet efficient,

operational processes. This essay contributes to the literature by describing the impact of culture and dynamism on learning practices. I show how an organisation's online learning strategy and practices are embedded in a complex configuration of internal factors (e.g., culture, strategy, structure) and the external situation (e.g., technology, competition, stability).

Overall, this thesis contributes to theory by providing a deeper understanding of the microfoundations of dynamic capabilities at a micro process level. The empirical studies showed how the level of dynamic capability can profoundly influence the goals and practice of an organisation's learning strategy. The theoretical implication of these findings is that they provide further support for the co-dependence of organisational learning and dynamic capabilities. Organisational learning has been considered an antecedent, a dimension, or consequence of dynamic capabilities, but I suggest that they are almost too indistinct to separate in such a way. Another contribution made by this thesis is to provide evidence, at a microfoundational level, that organisations' adaptive processes are strongly related to environmental dynamism. Further, this thesis shows empirically that an organisation's cultural type and level of dynamic capabilities are interrelated. The remaining contributions made by the thesis are practical. It shows firstly how, by dividing e-learning technology and processes into their ambidexterity components, practitioners can balance the need for efficient competency development with support of organisation-level learning. The implication for e-learning, and for deliberate learning in general, is to propose benefits beyond the efficient exploitation of current knowledge, by showing how learning activities may enhance innovation and adaptation. Lastly, the thesis demonstrates an impact of organisational culture on learning evaluation strategies and practices.

Preface and Acknowledgements

I am extremely grateful for the support I had in pursuing this research, and the intellectual and personal growth that arose from it. This thesis has tremendously benefited from my supervisor Rod McNaughton, without him this thesis would never have been possible or completed. I would also like to thank my co-supervisor Barbara Plester for her encouraging comments, guidance, and support throughout the journey. Both supervisors brought unique but complementary skills and views to the work and I am eternally grateful to them for the way in which they challenged me and for their generous insights and encouragement along the way.

I also wish to thank my partner, Prue, for supporting me in every way throughout these years of study. She has been extremely tolerant and patient throughout. Lastly, I would like to thank all the friends and family who told me to get a real job. Just the encouragement I needed.

This project has been a fascinating, difficult, and ultimately, very satisfying journey. I have already forgotten the costs and will only remember the benefits.

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This doctoral thesis was edited by Helga Arlington editing services, according to the University of Auckland Third Party Editing and Proofreading of Theses and Dissertations Guidelines.

Table of Contents

Contents

Abstract.....	i
Preface and Acknowledgements	iii
Copyright Permissions.....	iv
A note on formatting and style	iv
Table of Contents	v
List of Tables	vii
List of Figures.....	viii
Co-authorship Forms.....	ix
1. Introduction	1
1.1 Outline of the Thesis	2
1.2 Research Goals	3
1.2.1 Essay One.....	4
1.2.2 Essay Two.....	5
1.2.3 Essay Three	6
1.3 Supportive Literature Review	7
1.3.1 Dynamic Capabilities and Their Development	9
1.3.2 Dynamic Capabilities and Organisational Learning	17
1.3.3 Dynamic Capabilities and Deliberate Learning	23
1.3.4 Employee Learning and Development.....	25
1.3.5 Workplace E-learning	28
1.3.6 Summary and Significance	31
1.4 Overview of Method	33
1.4.1 Essay One.....	33
1.4.2 Essay Two.....	34
1.4.3 Essay Three.....	38
1.5 Contributions to Knowledge	40
2. Essay One: Can the Development of Dynamic Capabilities be Supported Using Workplace E-learning processes?	44
2.1 Introduction	45
2.2 What Are Dynamic Capabilities?.....	46
2.3 How Are Dynamic Capabilities Developed?	49
2.4 Workplace E-learning and Dynamic Capability	51
2.5 How Workplace E-learning can Reflect and Support the Development of Dynamic Capabilities.....	54
2.5.1 E-learning Adoption.....	54
2.5.2 E-learning Content	57
2.5.3 E-learning Evaluation	60
2.6 Discussion	61
2.7 Conclusion.....	64
3. Essay Two: Integrating a Dynamic Capabilities Framework into Workplace E- learning Process Evaluations	66
3.1 Introduction	67
3.2 Theoretical Background	69

3.2.1	Dynamic Capabilities	69
3.2.2	E-learning Process Effectiveness	71
3.3	Method	74
3.4	Analysis.....	79
3.5	Findings.....	83
3.5.1	E-learning Adoption.....	83
3.5.2	E-learning Content	84
3.5.3	E-learning Evaluation	86
3.6	Discussion	87
3.6.1	Strategic Adoption Triggers.....	87
3.6.2	Content Alignment and Integration.....	88
3.6.3	Responsive Programme Evaluation	90
3.7	Conclusion.....	92
4.	Essay Three: The Impact of Organisational Culture and Dynamic Capabilities on Learning Evaluation: An Interpretive Analysis.....	95
4.1	Introduction	96
4.2	Theoretical Foundation	97
4.2.1	Organisational Culture and Change	97
4.2.2	Organisational Culture and Dynamic Capabilities.....	99
4.2.3	The Competing Values Framework	100
4.2.4	New Conceptions of Learning Effectiveness	102
4.3	Method	104
4.3.1	Sample.....	104
4.3.2	Data Collection	106
4.4	Analysis.....	107
4.4.1	Gioia Methodology	107
4.4.2	Latent Content Analysis.....	109
4.5	Findings.....	112
4.5.1	Gioia Methodology	112
4.5.2	Dynamic Capabilities and Cultural Type.....	115
4.5.3	Impact on Learning Effectiveness Criteria	116
4.6	Discussion	118
4.7	Conclusion.....	120
5.	Summary and Conclusion	124
5.1	Summary of Findings	124
5.1.1	Essay One.....	124
5.1.2	Essay Two.....	126
5.1.3	Essay Three.....	127
5.2	Contributions.....	129
5.3	Limitations	131
5.4	Future Research.....	133
6.	Appendices.....	134
Appendix A:	Example Dynamic Capabilities Measures – Quantitative	134
Appendix B:	Example Dynamic Capabilities Measures – Qualitative	139
Appendix C:	Interview Protocol	142
Appendix D:	Modifications to Zahra et al’s (2006) model	144
Appendix E:	NVivo Classifications – Essay 2	145
Appendix F:	NVivo Queries – Essay 3.....	154
7.	References.....	156

List of Tables

Table 1.1	Examples of Contemporary E-learning Definitions	4
Table 1.2	Selected Empirical Research on Dynamic Capabilities Effectiveness Contingencies	13
Table 1.3	Selected Empirical Research Measuring the Impact of Organisational Learning on Performance	22
Table 3.1	Participant Organisation Descriptive Data	75
Table 3.2	Representative Operational and Dynamic Emphasis Quotations by Theoretical Category	78
Table 3.3	Representative Supporting Data for Each Theoretical Subcategory	81
Table 3.4	E-learning Adoption Quotes	84
Table 3.5	E-learning Content Quotes.....	85
Table 3.6	E-learning Evaluation Quotes	86
Table 4.1	Participant Organisations Descriptive Data.....	105
Table 4.2	Representative Examples of Quotes Classified by Competing Values Framework Culture Type	111
Table 4.3	Representative Operational and Dynamic Emphasis Quotations by Functional Theme.....	112
Table 4.4	Learning Evaluation Example Quotes	118
Table 6.1	Selected Dynamic Capabilities Quantitative Measures	134
Table 6.2	Selected Qualitative Dynamic Capabilities Measures	139
Table 6.3	Modifications made to Zahra et al's (2006) model.....	144
Table 6.4	NVivo Classifications Used in Essays 2 and 3	145
Table 6.5	Respondent Organisation by Dynamic/Operational Emphasis.....	154
Table 6.6	Respondent Organisation by Culture Type.....	155

List of Figures

Figure 1.1 Outline of the Thesis	2
Figure 2.1 A Simplified Model of Capability Development	50
Figure 3.1 Percentage of Dynamic to Operational-Type Statements by Organisation.....	79
Figure 3.2 Data Structure Overview	82
Figure 3.3 Parallels Between Dynamic Capabilities Microfoundations and E-learning Processes	92
Figure 4.1 The Competing Values Framework.....	101
Figure 4.2 Gioia Methodology Data Structure Overview.....	109
Figure 4.3 Percentage of Dynamic to Market and Hierarchy-Type Statements by Organisation	115

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Nature of contribution by PhD candidate	Lead Author
Extent of contribution by PhD candidate (%)	80%

CO-AUTHORS

Name	Nature of Contribution
Rod McNaughton	Helped to position the paper within the existing body of literature, articulate the research problem and set it within a theoretical framework. Advised on the writing style, helping to improve the language and logical structure of the paper. Advised on the publication process.

Certification by Co-Authors

The undersigned hereby certify that:

- ❖ the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and
- ❖ that the candidate wrote all or the majority of the text.

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Chapter 3 includes a publication co-authored with Rod McNaughton (Essay 2).

Integrating a Dynamic Capabilities Framework into Workplace E-learning Process Evaluations. Unconditionally accepted on the 13th February 2018 by Knowledge and Process Management.

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Extent of contribution by PhD candidate (%)	85%

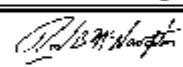
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Name	Nature of Contribution
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Rod B McNaughton		23 February 2018

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Chapter 4 includes a publication co-authored with Barbara Plester (Essay 3).

The impact of organisational culture and dynamic capabilities on learning evaluation: An interpretive analysis. Submitted to Journal for review.

Nature of contribution by PhD candidate	Lead Author
Extent of contribution by PhD candidate (%)	85%

CO-AUTHORS

Name	Nature of Contribution
Barbara Plester	Theoretical discussions, suggestions for literature and methodology.

Certification by Co-Authors

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- ❖ that the candidate wrote all or the majority of the text.

Name	Signature	Date
BARBARA PLESTER	<i>[Handwritten Signature]</i>	06.10.17

*“The thing about a revolutionary technology is that it changes everything.
That’s why we call it revolutionary”*

Tim Hartford (2017)

1. Introduction

My interest in online learning stemmed from a previous role in customer service management that had process and training responsibility across a national branch network. I soon decided that most service problems could be minimised with effective training. A distributed network meant that maintaining a centralised online knowledge-base of best-practice procedural and product information was cost-effective. Parts of this knowledge-base progressively became what can be termed *e-learning* with some integrated interactivity, quizzes, and assessment. The system appeared successful. Following this experience, I believed that investment in learning and development would solve many organisational problems, and this was best done online. At the beginning of my PhD one of the first articles I read documented the success of an e-learning system at Kodak (Gold, 2003). I chose to ignore its implications that successful operational practices might have insignificant impact on organisation-level outcomes. Kodak’s management, culture, and rigid bureaucratic structure hindered adaptation to digital photography (Lucas & Goh, 2009). Subsequent reading presented the broad issues faced by organisations attempting to accelerate employee learning – those of coping with shifting business models, skill obsolescence, and justifying learning investment. These are important issues, as deliberate learning activities and strategies are increasingly criticised for not keeping up with dynamic institutional needs or proving a contribution to organisational performance (Beer, Finnström, & Schrader, 2016). On reflection, the online learning at my previous role solved only specific operational issues, was expensive to administer, was not universally accepted, and had no evaluation criteria. In effect, it was not strategically applied.

Conceptually, the issue is not that online learning does not help organisations solve problems, it is that the real problems are not properly clarified. For this reason, I chose the organisation-level theoretical framework of dynamic capabilities to base my research. Ultimately, learning to do things right is of no value if they are not the right things (Teece, 2007a).

1.1 Outline of the Thesis

The thesis is structured as shown in Figure 1.1. This chapter (Chapter 1) outlines the research goals, provides a literature review of the main constructs and topics of interest – dynamic capabilities, organisational learning, deliberate learning, employee learning, and e-learning – then summarises their inter-relationships and significance for this thesis. This is followed by supplementary information regarding the methodology used in each essay and the justification for each choice. The chapter ends with a brief overview of the contributions made by each essay and the thesis as a whole. Chapter 2 presents Essay One, which is a conceptual paper that discusses how an organisation’s e-learning processes might support the development of dynamic capabilities. Chapter 3 presents Essay Two, an interview-based study that examines the e-learning and evaluation processes used by a variety of large organisations, selected to represent a range of low to high dynamic capabilities. Chapter 4 presents Essay Three, which uses additional data and analytical techniques to discover how the organisations’ cultural and environmental contexts influence the way they evaluate their deliberate learning activities. In Chapter 5, I provide a summary of the research, contributions, limitations, and recommendations for future study.

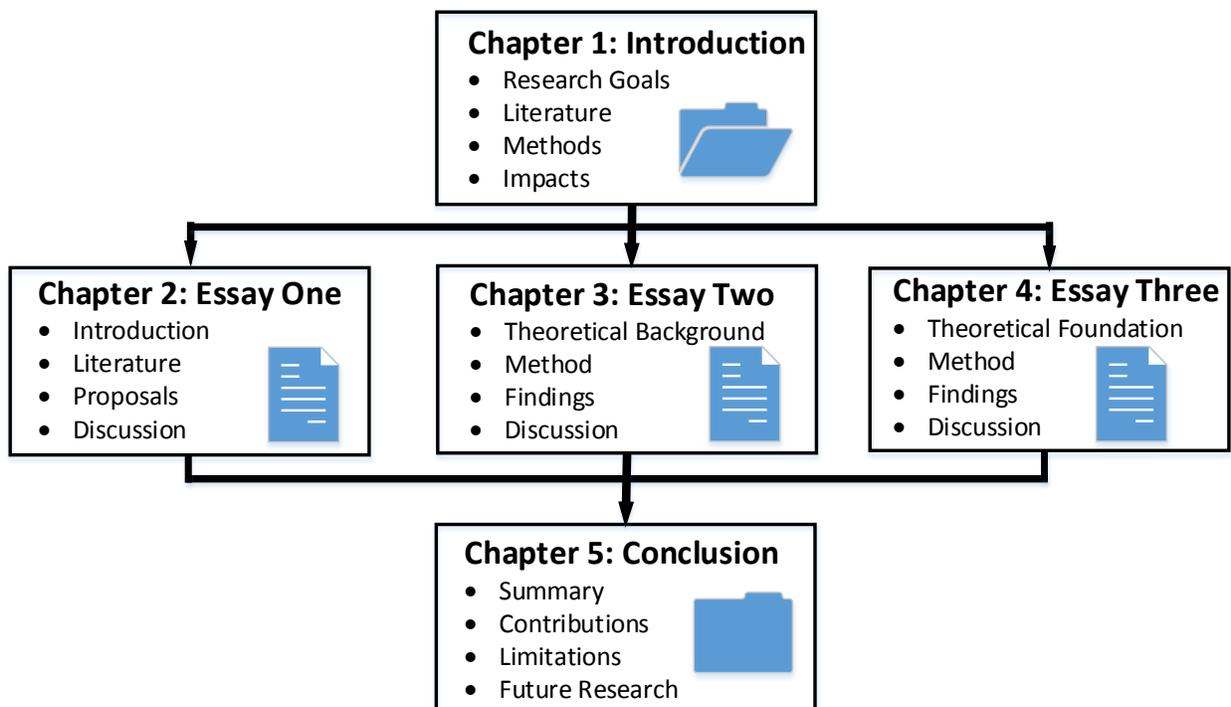


Figure 1.1 Outline of the Thesis

1.2 Research Goals

The overall research goal for this thesis concerns the ways workplace e-learning contributes to an organisation's innovative and adaptive capabilities. I used the dynamic capabilities concept as a foundation because of its synergies with organisational learning, adaptation, and innovation. However, I soon discovered that a particular learning tool, no matter how strategically it is used, determines little about its contribution to wider organisational outcomes. What is more revealing are the contextual circumstances and organisational features that instruct why and what technologies are adopted, define how they are used, and directs what constitutes achievement. I discuss the research goals of each essay below.

Throughout this thesis I refer to e-learning processes, strategy, and practices, sometimes in the same context. To clarify, I define e-learning processes as the strategies and practices used to develop and evaluate online learning content. There is no widely supported definition of e-learning itself (Callan, Johnston, & Poulsen, 2015), but I define e-learning as computer technology used to deliver learning material to users by means of any electronic communication, collaboration, or knowledge transfer media (Y. M. Cheng, 2011; B.-C. Lee, Yoon, & Lee, 2009). This encompasses a range of applications and processes such as computer-assisted learning, web-based training, and digital collaboration (Patel, 2010). These definitions are not contemporary but still provide suitable boundaries for use in this thesis. More current definitions either use the same terminology, lack specificity, or are not process focused (see Table 1.1 for examples). The inclusion of 2.0 to the e-learning definition simply means incorporating Web 2.0 collaborative functionality. Callan (2015) discusses how e-learning should not be defined as an isolated factor in its own right as there is very little pure e-learning in education and training. Rather, it is most commonly part of a blended learning experience within other forms of delivery. Thus, e-learning was chosen as a relatively identifiable aspect of an organisations' operations that provide an isolated and observable representation of its wider learning processes. I also depict e-learning as one tool that potentially moderates the strength of the relationship between organisational knowledge and learning but has no direct impact on dynamic capabilities (see Figure 2.1).

Table 1.1 Examples of Contemporary E-learning Definitions

Source	Definition	Issues
Cidral, Oliveira, Di Felice, & Aparicio (2018)	E-learning is a web-based learning ecosystem integrating several stakeholders with technology and processes.	Weak boundary limits.
Heery and Noon (2017)	E-learning is the acquisition of competencies, knowledge, and skills through electronic media, such as the Internet or a company Intranet.	Too broad and outcome rather than process focused.
B. Cheng et al.(2014)	E-learning refers to the use of computer and network technologies, primarily over or through the Internet, to deliver information and instruction to individuals.	Too general and asynchronous.
Yuen (2014)	The term e-learning 2.0 was coined in response to a critical assessment of the traditional vision of e-learning and its ‘transmission of knowledge’ paradigm. In contrast, e-learning 2.0 takes a ‘small pieces, loosely joined’ approach that combines the use of discrete but complementary tools and Web services - such as blogs, Wikis, and other social software - to support the creation of ad-hoc learning communities.	Does not fully define e-learning, just the collaborative aspect, which is already mentioned.
Wu and Zhang (2014)	E-Learning 2.0 transforms the learning experience by providing valuable interactive tools, such as forums, blogs, chats, blackboards, and newsgroups, which can be used to interact with other users with similar interests and obtain or disseminate knowledge anytime, anywhere.	As above.
Y. H. Lee, Hsieh, & Chen (2013)	E-learning generally refers to the use of computer network technology, primarily over an intranet or through the Internet, to deliver information and instruction to individuals	Too general and asynchronous.

1.2.1 Essay One

For workplace e-learning to be effective it ultimately needs to contribute to the overall goals of the organisation. Much research has been conducted on e-learning effectiveness at an operational level, measuring improvements to employee knowledge and skills (H.-J. Chen, 2010; Reynolds, Becker, & Fleming, 2014) – most finding results similar to classroom-delivered training (e.g., Mamaqi, 2015). However, like other knowledge processes, an organisation’s online learning strategy sits within a complex web of conditions, enablers, and outcome expectation (Kozlowski & Bell, 2006; Wilden, Devinney, & Dowling, 2016). If used creatively, the introduction and use of any technology potentially offers productive advantages beyond the characteristics of the tool itself. Sometimes the new systems will simply replace aspects of current operational practices, and sometimes they require a complete transformation (Bresnahan, Brynjolfsson, & Hitt, 2002; Ravichandran, 2018). Many aspects of e-learning possess purely operational advantages over traditional forms of employee training. For example, learning material delivered online can be more cost-effective, consistent, and centrally managed (H.-J. Chen, 2010; Reynolds et al., 2014;

Waight & Stewart, 2005). My interest, however, is in discovering how organisations use e-learning for more strategic purposes. Sometimes this may be through the use of characteristics of the technology, such as integrated social media, networking, and knowledge management tools (Garcia-Penalvo, Colomo-Palacios, & Lytras, 2012). In other instances it may be through innovation-supporting strategies, such as, superior pedagogical approaches, integration with strategic human resource management, or rapid development approaches (Boxall, 1992; DeRouin, Fritzsche, & Salas, 2005; Kozlowski & Bell, 2006).

There are two research goals of Essay One. The first goal is to clarify the mechanisms involved in the co-evolution of organisational-level learning and dynamic capabilities and suggest where e-learning fits in a derived model (Zahra, Sapienza, & Davidsson, 2006). The second goal of this essay is to propose specific aspects of e-learning strategy and practices that are likely to support the development of dynamic capabilities. Two questions are addressed: *What is the role of organisational learning in the development of dynamic capabilities, and how may dynamic capabilities be supported by an organisation's e-learning processes?*

1.2.2 Essay Two

This essay is an exploratory study to investigate the soundness of Essay One's propositions. By comparing e-learning practices across a range of organisations I expect to observe microfoundational patterns relating to the trade-off between developing specific or dynamic capabilities (Ambrosini & Bowman, 2009; Drnevich & Kriauciunas, 2011). It is proposed in Essay One that there are specific strategic, technological, and pedagogical approaches to e-learning that will support innovation and adaptation. From the literature, it can reasonably be assumed that in order to develop dynamic capabilities, learning mechanisms must remain flexible (Callan et al., 2015; Teece, 2014a). Essay Two introduces the idea that the trade-off between the efficiency of maintaining tightly-controlled learning and the effectiveness of flexible learning approaches is highly contextual (J. P. Davis, Eisenhardt, & Bingham, 2009; D. Li & Liu, 2012; Wilhelm, Schlömer, & Maurer, 2015). For example, previous research has demonstrated that higher levels of environmental turbulence (Romme, Zollo, & Berendsy, 2010), non-routine tasks (Vaast & Levina, 2006), and ill-structured problems (Haas & Hansen, 2005) reduce the benefits of codifying knowledge. In those situations, concept-based e-learning may be more effective than skill-specific e-learning. Concept-based e-learning aims to equip employees with the knowledge and skills to

function autonomously and respond to changes in the work environment (Michalski, 2014; Seijts & Latham, 2005). These broader goals are often more difficult to measure and therefore a multidimensional (affective, cognitive, and/or behavioural) and qualitative approaches to learning evaluation may also be required (Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012). I therefore propose that organisations that adapt to dynamic environments will adopt flexible approaches to e-learning development and evaluation.

In Essay Two, the following specific questions are explored: *How do organisations use their e-learning processes to accommodate dynamic capabilities? How do organisations evaluate the ability of these processes to accommodate dynamic capabilities? And, are there fundamental differences in how organisations use e-learning processes to accommodate dynamic capabilities?*

1.2.3 Essay Three

Essay Three develops further the ideas identified in Essay Two that learning processes emerge from a complex configuration of contextual circumstances and organisational features. The primary objective of Essay Three is to explore the general environmental circumstances and organisational characteristics that are likely to influence aspects of an organisation's deliberate learning activities. Of particular interest are the ways change-inducing contexts are likely to influence learning evaluation strategies and practices. Evaluation practices are important indicators of an organisation's cultural traditions as they demonstrate what learning outcomes are valued, how this should be measured, and how the organisation responds to these outcomes (Alvesson, 2013; Henri, 2006). The broadening of focus to include external and internal context stems from the discovery that the relationship between dynamic capabilities and e-learning processes is considerably more complex and non-linear than originally proposed. This required a fundamental shift from a replication logic to abductive reasoning (Dubois & Gadde, 2014).

Organisational scholars often refer to the association between dynamic capabilities and culture, although usually in very general terms (e.g., Nonaka, Hirose, & Takeda, 2016; Teece, 2014b). Organisations regarded as having high dynamic capabilities are often also characterised as having adaptive cultures (Alvesson, 2013; Costanza, Blacksmith, Coats, Severt, & DeCostanza, 2016). Adaptive cultures are usually associated with more flexible or organic structures (Costanza

et al., 2016; Wilden, Gudergan, Nielsen, & Lings, 2013), decentralised decision-making (Teece, 2007a), risk-tolerance (Cheung, Wong, & Lam, 2012), local and employee autonomy (Wilden et al., 2013), and other mechanisms that support innovation (Chatman, Caldwell, O'Reilly, & Doerr, 2014). These cultures are maintained by systems of social controls, policies, and procedures that allow rapid changes to operational processes (Costanza et al., 2016; Ostroff, Kinicki, & Muhammad, 2013). Zollo and Winter (2002) propose that dynamic capabilities emerge from the coevolution of three different knowledge mechanisms: tacit experience accumulation, explicit knowledge articulation, and codification activities. Where a particular workplace learning activity sits on this continuum will depend on a variety of factors integral to the task, technology, and learning goals (Salas et al., 2012). I propose that the broader consideration of organisational culture also has a significant impact on the nature of deliberate learning activities and how they are valued.

The specific question addressed in Essay Three is: *How do organisations' environmental and cultural contexts influence the way they evaluate their e-learning activities?*

1.3 Supportive Literature Review

This thesis is primarily concerned with how organisations use their online learning activities to stimulate organisational-level learning and dynamic capabilities. Early research into organisational learning focused on productive functions where output is measurable on a learning curve (Argote, 2011, 2012). Preoccupation with this form of learning risks an overly internal focus where knowledge growth is incremental and bound by existing best-practice. Although there are productive benefits from formalising knowledge transfer through deliberate learning practices, contemporary researchers recognise that this way of learning is often detrimental when new business models are required (C. A. O'Reilly & Tushman, 2008; Pitelis & Teece, 2010). Furthermore, while the use of codified tacit knowledge in formal learning systems can be beneficial, many contingent caveats exist (Romme et al., 2010; Zollo & Singh, 2004; Zollo & Winter, 2002). Formal learning activities risk solidifying accumulated knowledge into institutional *truths* that become increasingly difficult to change as the need arises (Romme et al., 2010). A high degree of codified knowledge eventually becomes an implicit form of control (Vaast & Levina, 2006) and can be unfavourable in dynamic environments where the rate of knowledge and skill

obsolescence is high (Haas & Hansen, 2005; Kim, 2008). Further, features of the organisation often interfere with the benefits of formalising knowledge-sharing. For example, structured learning may be less beneficial for teams seeking a differentiation strategy (Haas & Hansen, 2005), where there is little trust in the sources of knowledge (Raab, Ambos, & Tallman, 2014), or where overly formal hierarchical governance is used (Andersson, Buckley, & Dellestrand, 2015).

As a learning strategy needs compatibility with wider organisational objectives I use dynamic capabilities as a conceptual framework. The dynamic capabilities concept is used to explain sustained competitive advantage (e.g., Kalali & Heidari, 2016; D. Li & Liu, 2012; Schilke, 2014; Vanpoucke, Vereecke, & Wetzels, 2014), and accommodates the increasingly rugged landscape in which organisations operate in (Levinthal, 1997; Stubbart & Knight, 2006). The framework is particularly relevant to knowledge-based processes because they are readily manipulated, reconfigured and integrated in systems and processes, which leads to the creation of new capabilities (Cepeda & Vera, 2007). Recent advancements in information technologies and knowledge management practices have given organisations unprecedented opportunities for knowledge-sharing. Efficient knowledge sharing eventually drives organisational learning processes which allows adaptation to changing competitive environments (Schneckenberg, Truong, & Mazloomi, 2015). But to make this connection clearer, more research is required to better understand how lower-level entities and processes lead to the generation of organisation-level capabilities (Argote & Miron-Spektor, 2011; Lancioni & Chandran, 2009). This area of research is consistent with the microfoundations explanation (Felin, Foss, & Ployhart, 2015).

Microfoundational thinking focuses on how individual actions and micro processes lead to collective outcomes and impact organisational-level phenomena (Barney & Felin, 2013; Felin et al., 2015; Foss & Lindenberg, 2013). The microfoundations view aims to gain a better understanding of "... the creation and development, and the reproduction and management of collective constructs such as routines and capabilities" (Felin, Foss, Heimeriks, & Madsen, 2012, p. 1353). Note that the microfoundations view does not deny top-down causality (Linder & Foss, 2018). For example, institutions may exert a causal influence on employee's behaviours, but the collective results are the combined effect of these behaviours. Thus, microfoundational explanations are multilevel but privilege the micro level. Specifically, the microfoundations argument involves the strong claim that the effects of macro entities are always fully mediated

through micro mechanisms and actors (Felin et al., 2015). I use this argument throughout the thesis to link the micro-level process of e-learning to the organisational-level construct of dynamic capabilities.

In the following section I summarise and synthesise the relevant literature on dynamic capabilities and the other major topics of this thesis.

1.3.1 Dynamic Capabilities and Their Development

Dynamic capabilities has become a central construct¹ to explain the heterogeneity in long-term organisational performance and survival (Teece, Pisano, & Shuen, 1997). Acting as an important source of innovative change and adaptation within organisations, dynamic capabilities relate to how operational routines are modified or created through learning (Helfat & Winter, 2011; Nelson & Winter, 1982). Their impact on performance is indirect and mediated through the value of the new operational capabilities they create (Teece, 2007a; Wilden et al., 2013; Zahra et al., 2006). Dynamic capabilities exist on multiple levels within organisations with much of the research indicating the importance of individual managers to orchestrate assets to new configurations (Adner & Helfat, 2003; Helfat & Martin, 2015; Teece, 2007a). Empirical work at this level concentrates on managers' characteristics such as cognitive, social, and human capital to affect change (e.g., Helfat & Martin, 2015; Helfat & Peteraf, 2015). Many of the processes of dynamic capabilities are visible at this level – search for resources and capabilities, selection of opportunities, and the deployment and reconfiguring of current resources and capabilities (Wilden et al., 2016). All these individual-level processes need to fit within, and to some extent contribute to, the organisation's overall strategic orientation. Furthermore, aspects of individual dynamic capabilities are entrepreneurial in nature which are activated through creative actions (MacLean, MacIntosh, & Seidl, 2015; Teece, 2007a, 2012, 2014a).

The majority of the empirical evidence on the development of critical operating capabilities driving productivity, quality, manufacturing flexibility, and research and development

¹ Dynamic capabilities are also known as a framework (e.g., Augier & Teece, 2009; Wilden, Devinney, & Dowling, 2016), a view (e.g., Arend & Bromiley, 2009; Galvin, Rice, & Liao, 2014), an approach (e.g., El Akreimi, Perrigot, & Piot-Lepetit, 2015; Kindström, Kowalkowski, & Sandberg, 2013), a perspective (e.g., Fischer, Gebauer, Gregory, Ren, & Elgar Fleisch, 2010) and a theory (e.g., Garicano & Wu, 2012; Laaksonen & Peltoniemi, 2016).

performance indicates that *management matters* (Pisano, 2016). For example, based on their analysis of data collected from 5850 firms across 17 countries, Bloom and Van Reenan (2007, 2010) concluded that firms with *better* management practices have better performance across a wide range of measures. Other empirical studies indicate that the reason firms differ in their ability to adapt their capabilities to major environmental upheavals is at least partly rooted in management behaviours and practices (e.g., C. A. O'Reilly, Harreld, & Tushman, 2009; C. A. O'Reilly & Tushman, 2008). But individual managers' ability to reconfigure an organisation's assets to suit new business models is not unlimited (Pisano, 2016). The organisation's values, culture, and collective ability to implement major operational changes are also integral to the strength or weakness of an organisation's dynamic capabilities (Teece, Peteraf, & Leih, 2016). These organisational characteristics act *both* as boundaries to entrepreneurial vision and as enabling assets for experimentation (Foss & Klein, 2005). Expressed another way, "the firm without entrepreneurs finding full expression isn't going to be dynamically capable; the entrepreneur without the "platform" of a well-structured firm isn't going to be able to accomplish much" (Teece et al., 2016, p. 20).

Dynamic capabilities research at the group and organisational levels of analysis, moves attention from cognitive models to routines and structures. At these collective levels, mechanisms for knowledge creation and sharing are critical to allow capability movement across levels (Wilden et al., 2016, p. 1035). Argote and Ren (2012) refer to these mechanisms as a transactive memory system which is developed to encode, store, and retrieve knowledge from different domains. Such systems are thought to improve performance as they facilitate quick and coordinated access to specialised expertise for collective tasks (Lewis & Herndon, 2011). These learning systems need to be flexible and decentralised enough to allow creative solutions to new problems that are not bound by the organisation's current knowledge base or established problem-solving heuristics (Teece, 2003). However, an organisation's capability strategy involves choices between deepening its existing capabilities or broadening its range to include new sets of capabilities (Pisano, 2016). The appropriateness of these choices are likely to be dependent upon how the organisation matches the internal characteristics with the external context in which it operates, or its *evolutionary fitness* (Helfat et al., 2007). This concept implies that performance is an outcome of an appropriate *fit* between dynamic capabilities and other internal factors and environmental conditions.

The literature identifies numerous factors that influence the efficacy of dynamic capabilities, such as, culture, structure, environmental conditions, and strategy (see

Table 1.2 for a summary of selected findings). For example, organisational cultures that are measurably creative, open, learning-orientated, and adaptive were found to have a positive influence on the performance outcomes of dynamic capabilities (Bock, Opsahl, George, & Gann, 2012; Chirico & Nordqvist, 2010; Hung, Yang, Lien, McLean, & Kuo, 2010; Ngo & Loi, 2008). Other studies find that, in general, organisations that use organic structures to delegate authority are more likely to be strategically flexible, creative, and dynamic (Bock et al., 2012; Foss, 2003; Karim, 2006; Wilden et al., 2013). Further, the balance of evidence into the value of dynamic capabilities suggests that they are more effective in more turbulent environments (Karna, Richter, & Riesenkampff, 2016; D. Li & Liu, 2012; Schilke, 2014; Wilden & Gudergan, 2015; Wilden et al., 2013; Wilhelm et al., 2015). However, the relationship between dynamic capabilities and strategy is more difficult to delineate as the two are interrelated. Teece (2017, p. 114) for example, states that “dynamic capabilities must be exercised in aid of a good strategy in order to be effective, and a strategy must be supported by strong dynamic capabilities to have a chance of succeeding.” What is more, capability development is also a strategy that is built around the concepts of search, choice, and commitments that support organisational goals (Pisano, 2016). Other authors discuss how capability and firm strategy co-evolve (e.g., Athreye, Kale, & Ramani, 2009) as strategy is emergent from internal capabilities and environmental opportunities (S. D. Green, Larsen, & Kao, 2008; Teece et al., 2016).

Wilden et al. (2016) argue that it is the *configuration* of these factors with dynamic capabilities that affects an organisation’s strategic posture and, hence, its subsequent performance. Configurations are defined as a number of specific and separate attributes that are collectively meaningful, tightly interdependent, and mutually supportive (D. Miller, 1981). This approach to dynamic capabilities extends the contingent view where optimal strategies, culture, and structure individually interact with the market environment to create competitive advantage, to the idea that they all operate together in a complex system. The configurational view of dynamic capabilities is also more suited to the concept of equifinality (Wilden et al., 2016). Equifinality posits that organisational achievement can follow multiple distinct paths and organisational forms (Doty, Glick, & Huber, 1993). Although competing firms face similar external contingencies, strategic choices to develop capability are shaped by different initial conditions (Doty et al., 1993; Gresov & Drazin, 1997). This helps to explain different strategic paths as well as heterogeneity in performance. I will illustrate this configurational view using the much-cited example of Danish

company, Oticon, which is described in the following paragraph. The Oticon example, while now dated, is one of the few examples where specific literatures relating the company's dynamic capabilities contingencies are available.

For decades Oticon, a Danish company that makes hearing-aids, had been a market leader in its industry but by the middle of the 1980's the company was ranked behind its two major competitors (Verona & Ravasi, 2003). The company's decline was due, at least in part, to reactive management, limited interaction between its three main functional areas, and growing competition from in-ear hearing-aid technologies (Larsen, 2002). A sharp devaluation of the US dollar against the Danish currency caused a major cash deficit. This resulted in the recruitment of a new CEO in 1988, Lars Kolind, who was given full responsibility of implementing changes (Larsen, 2002). After two years of sales and administration cost-cutting and rationalisations (which achieved a 20% saving), Kolind announced a package of radical initiatives (Larsen, 2002). The company moved from sequential product development organised by department, to one of projects run by cross-functional project teams. Its vision was a structure made up of a series of knowledge centres where jobs fit the individual person's capabilities and needs, combining and recombining skills in a flexible manner where they were most highly valued (Foss, 2003). Hot-desking was prevalent, hierarchies radically flattened, and recruitment changed to favour varied rather than specialist skills (Verona & Ravasi, 2003). Over the following years, the new product development schedule was cut by half and the innovation rate, measured by the proportion of sales from new products, more than doubled. Oticon was able to develop and release advanced products years ahead of their competitors (Verona & Ravasi, 2003). During this time, they were the first to release fully programmable digitalised hearing aids that have the ability to adjust sound automatically to users' preferences. Between 1988 and 1999, Oticon's revenue grew 445% and return on equity increased from -8.5% to 53.8% (Foss, 2003; Verona & Ravasi, 2003).

Table 1.2 Selected Empirical Research on Dynamic Capabilities Effectiveness Contingencies

Focus	Study	Main Findings
Culture	Bock, Opsahl, George, and Gann (2012)	Creative organisational culture is positively related to a firm's dynamic capability to change and adapt resources and activities (strategic flexibility). Business model innovation effort is positively moderates the relationship between creative culture and strategic flexibility.
	Chirico and Nordqvist (2010)	An open culture based on entrepreneurial orientation counteracts inertia so as to positively affect resource recombination processes. Closed business cultures tend not to encourage entrepreneurial activities and renewal, which leads to inertia.
	Hung, Yang, Lien, McLean, and Kuo (2010)	An organisational learning culture significantly affected performance, and its influence was mediated by dynamic capability. Organisational learning culture does not appear to deliver or create value directly.
Environment	Karna, Richter, and Riesenkampff (2016)	Both ordinary and dynamic capabilities positively affect the financial performance of firms, in both stable and changing environments. However, in changing environments the effect size of capabilities on performance is approximately 40% higher than it is in relatively stable environments.
	Wilhelm, Schlömer, and Maurer (2015)	Taking into account of the costs of dynamic capabilities, they pay off only in dynamic environments.
	Wilden and Gudergan (2015)	The positive effects of sensing and reconfiguring on technological and marketing capabilities, and thus their value, are stronger for firms operating in competitively turbulent environments.
	Schilke (2014)	Found evidence for an inverse U-shaped contingent effect of dynamic capabilities on competitive advantage. The effect is highest in moderately dynamic environments but lower under low and high levels of environmental dynamism.
	Wilden et al. (2013)	Competitive intensity requires the deployment of dynamic capabilities to sustain or improve performance, whereas dynamic capabilities may be redundant and inefficient for organisations facing little or no competition.
Structure	Wilden et al. (2013)	Organic structures positively moderate the relationship between dynamic capabilities and firm performance.
	Bock et al. (2012)	Delegation increases the probability of achieving strategic flexibility from 43 per cent to 80 per cent. Structural reconfiguration of existing activities has a negative effect on achieving strategic flexibility.
	Karim (2006)	This study highlights that firms' structures are dynamic and constantly evolving. Acquisitions serve to make organisations more flexible, creative, and dynamic by providing more modular pieces with which to experiment.
	Foss (2003)	The spaghetti organisational form at Oticon was designed to build a knowledge-sharing environments with the flexibility and creativity of a market-like project organisation with high dynamic capabilities.

Strategy	Athreye, Kale, and Ramani (2009)	Co-evolution of firm strategy and capability are determined by three main factors: the historical trajectory of the firm and existing capabilities, firm-specific managerial vision, and learning by observing the successes and failures of other compatriot firms.
	S. D. Green, Larsen, and Kao (2008)	Finds that strategy is emergent from internal capabilities and environmental opportunities and that strategising is a collective endeavour played out over a prolonged period, often by non-constant groups.
	Slater, Olson, and Hult (2006)	Find that a firm's strategic orientation moderates the relationship between strategy formation capability and performance.

Oticon's radical turnaround has been studied from many perspectives; such as, liberation management (Getz, 2009; Peters, 1992), hybrid organisations (Foss, 2003), career development (Larsen, 2002), and knowledge processes (Verona & Ravasi, 2003). I use this case to demonstrate the configuration of some contingencies of dynamic capabilities – structure, culture, environment, and entrepreneurship. Below I discuss how each of these factors influenced the company's capabilities.

Structure – the primary benefit of Oticon's flat, project-based structure was that it removed interdepartmental barriers to knowledge integration. The organic architecture adopted by the company increased the speed and efficiency of transferring ideas and concepts across the organisation (Verona & Ravasi, 2003). In the 1970s the company had developed a separate psychoacoustic research and development unit that had an extensive research library, regularly worked with about 950 hearing-impaired customers, collaborated with local universities, and provided internships for PhD students. However, although the research centre produced important insights into the field, most of the knowledge lay underutilised. It was not until the formation of the project-based organisation that the market applications occurred (Verona & Ravasi, 2003). Foss (2003) highlights how the shift from a hierarchical structure to a flatter, more market-based structure allowed Oticon employees more autonomy and maximised information flows. The result was increased innovation and substantially improved use of existing capabilities (Felin et al., 2012; Foss, 2003).

Culture – Oticon developed an informal and open culture to encourage spontaneous initiatives of groups or individuals. The culture was open to innovative ideas being generated from dispersed individual contributions (Verona & Ravasi, 2003). Such cultures have been described as creative (Bock et al., 2012), adaptive (Ngo & Loi, 2008) or learning (Hung et al., 2010), and have been

considered an essential strategic resource or dynamic capability for knowledge generation (Leonard-Barton, 1992; Nonaka, 1994; Teece, 2017).

Environment – Oticon faced two major environmental challenges – the increased competitor activity and the emergent digital and in-ear technologies. These conditions required a change of business model in order both to increase product development cycles and to radically alter competitiveness. After the company regained market dominance and technological superiority many of the experimental internal changes made by Lars Kolind were reversed by the company after he resigned in 1998 (Getz, 2009). The reasons that Foss (2003) proposes for this breakdown, were problems of allocating competence, sacrificing specialisation advantages, coordination, knowledge sharing, and selective management intervention. I also suggest two capability-based reasons: the loss of the entrepreneurial leadership of Kolind to manage Oticon’s loose structure (Teece, 2017), and the relative change in market position that required less dramatic innovation (Henderson & Mitchell, 1997)².

Entrepreneurial leadership – there is little doubt that Oticon’s turnaround owes much to Kolind’s leadership and actions. Kolind realised that although the technical capability was already present at Oticon, structural rigidities inhibited commercial manoeuvrability. Kolind reset the organisational structure, vision, and allocated investment resources, which included moving 300 people to a, then-radical, open-plan head office. A total of fifteen new products were introduced following Kolind’s appointment, compared with none a few years prior (Foss, 2003). His contribution was not in adopting such strategies, but in having the vision to recognise that these changes were necessary to expedite innovative projects, and therefore improve lagging competitiveness.

The Oticon example illustrates how dynamic capabilities can be based on different organisational contexts (Howard-Grenville, 2005; Prieto, Revilla, & Rodriguez-Prado, 2009), mixes (Verona & Ravasi, 2003), or configurations (Wilden et al., 2016). The structure and culture that allows freedom of knowledge flows in competitively challenging times, may be inefficient at other times. I propose that other organisational processes that contribute to the development of

² Henderson and Mitchell (1997) discuss the heterogeneity between organisational capabilities, competition, strategy and performance – competition shapes capabilities, which in turn shapes competition.

dynamic capabilities, such as deliberate learning activities, are also subject to these configurational influences. Conceptual and empirical studies have shown that dynamic capabilities rest on knowledge processes (Easterby-Smith & Prieto, 2008; Verona & Ravasi, 2003; C. L. Wang & Ahmed, 2007; Zollo & Winter, 2002) that transform knowledge and learning into business value (Eisenhardt & Martin, 2000; Zahra et al., 2006). Wilden et al. (2016) conclude in their comprehensive review that the most persistent microfoundation of dynamic capabilities research is *learning*. Therefore, my thesis assumes that by observing how organisations generate, integrate, and reconfigure their knowledge stocks, insights can be gained about how they maintain operational advantage over their competitors. I also propose that managerial, structural, and cultural influences on operational activities firstly stimulate or inhibit knowledge processes (Prieto et al., 2009).

How dynamic capabilities emerge, develop, grow, or terminate over time mirrors the increased interest in process approaches in management more generally (Langley, Smallman, Tsoukas, & Van De Ven, 2013) and is highly consistent with the focus of dynamic capabilities on strategic change (Schilke, Hu, & Helfat, 2018). Studies concerned with the development of dynamic capabilities are usually qualitative (Newbert, 2007; Wilden et al., 2016) and are often closely linked to the impact of learning. For example, Bingham, Heimeriks, Schijven, and Gate's (2015) study of how dynamic capabilities are 'learned' found that multiple capability development projects are aided by the staged timing of three activities; initiating structure, generalising structure, and backward-chaining structure. Concurrent learning begins as organisations form a dedicated group to codify knowledge. The initiating structure is idiosyncratic to one phase of one process but then is quickly leveraged into multiple processes (generalising structure) and further elaborated to address additional phases (backward-chaining structure). Importantly, they found that codification of the project experience was most effective when it occurs in reverse chronological order. That is, starting with the implementation phase and working backward through the earlier phases, such as due diligence in the case of the acquisition capabilities in their study.

Bingham et al's (2015) finding has relevance in this thesis as e-learning generally involves the codification of tacit knowledge embedded in individual's experience about how to manage key activities (Zollo & Winter, 2002). Overall, theoretical and empirical studies suggest that dynamic

capabilities are learned from experience, and that similar, paced, and codified experience is particularly helpful (Bingham et al., 2015; Zollo & Singh, 2004). However, increasing levels of codification produce both positive and negative effects on the organisation's ability to adapt its operations (Romme et al., 2010). Positive effects have been connected to the development of higher levels of awareness about the root causes and contingencies affecting performance outcomes. Additionally, the articulation of knowledge and subsequent codification requires significant mindfulness about the effectiveness of learned processes and draws attention to contextual cues (Frigotto & Zamarian, 2015; Levinthal & Rerup, 2006). The negative aspects of knowledge codification include the associated high resource cost and organisational inertia caused by solidifying 'best practice' activities (Teece, 2007b).

Other process-oriented studies have also shed light on the role of timing (e.g., Fischer, Gebauer, Gregory, Ren, & Elgar Fleisch, 2010; Jenkins, 2010) suggesting that the development of dynamic capabilities may proceed through a series of typical stages (Schilke et al., 2018). At the highest level of abstraction these stages follow a cyclical process, such as Teece's (2007b) sensing, seizing, and reconfiguring of opportunities. At lower levels, this process is replicated as organisations develop new products, services, or operational processes to exploit these opportunities. At the micro process or individual level there will be a corresponding cyclical process as new knowledge and capabilities are acquired to accommodate the execution of new organisational tasks relating to the exploited opportunities, while obsolete knowledge and capabilities are discarded. This micro process is the primary subject of investigation throughout this thesis.

In the next section I discuss the links between dynamic capabilities and organisational learning theories.

1.3.2 Dynamic Capabilities and Organisational Learning

The literatures of organisational learning and dynamic capabilities have considerable overlap (Jiao, Wei, & Cui, 2010; Lichtenthaler, 2009). I will discuss the similarities between the concepts using the two core research streams of dynamic capabilities discussed by Wilden et al. (2016) – *microfoundations* and *enablers*. Research that focuses on *microfoundations* divides dynamic capabilities into core components, such as processes, learning, and routines. Research focusing on *enablers* concentrates on when and how capabilities such as, environment, structure, and culture

arise and have an impact. The unifying research streams generally attempt to comment on outcomes, such as innovation, performance, or competitive advantage (Barreto, 2010; Helfat & Martin, 2015; Wilden et al., 2016). Firstly, I begin the discussion from the microfoundations view.

Organisational learning is the process by which knowledge created by individuals is transformed into part of the organisation's knowledge system (Nonaka & Takeuchi, 1995)³. This process involves knowledge *acquisition*, knowledge *sharing*, and knowledge *utilisation* (Dibella, Nevis, & Gould, 1996; Huber, 1991). Teece's (2007a) microfoundations of dynamic capabilities – *sensing*, *seizing*, and *reconfiguring* – have significant components related to organisational learning. Sensing involves the search and exploration across technologies and markets in order to learn about customers, competitors, and the broader market environment (Day, 1994; Teece, 2007a). The underlying knowledge process at this stage of dynamic capabilities is *acquisition* (Prieto et al., 2009). Once a market opportunity is sensed, it must be addressed (*seizing*) through the commitment of resources to produce new products, services, or processes (Teece, 2007a). At this stage, knowledge needs to be *shared* throughout an organisation and *utilised*. Reconfiguring entails extending and modifying capabilities in response to changes in the market and technologies. These processes develop and improve through learning from repeated trials (and errors) (W. M. Cohen & Levinthal, 1990; Zahra & George, 2002). Knowledge is also shared and utilised at this stage, but learning involves the cognitive and behavioural changes needed to operate a fundamentally different business model. The more cycles of sensing, seizing, and reconfiguring that organisations engage in, the more their dynamic capabilities improve and become embedded in organisational memory (George, 2005; Wilden & Gudergan, 2015).

The first two capabilities, sensing and seizing, are also similar to March and colleagues' concepts of knowledge exploration and exploitation (Levinthal & March, 1993; Levitt & March, 1988; March, 1991). Adaptive systems require both exploration and exploitation activities that are embedded in the 'ambidexterity' literature (e.g., Junni, Sarala, Taras, & Tarba, 2013; C. A. O'Reilly & Tushman, 2008). Sensing activities, where knowledge is acquired and *explored*, generally need to be decentralised, whereas seizing activities which involve knowledge sharing, utilisation or *exploitation* can be more tightly controlled (Teece, 2007a). Reconfiguring

³ See Bontis, Crossan, and Hulland (2002) for a comprehensive list of definitions.

capabilities includes the redeployment and release of resources and capabilities, which also involves unlearning previously employed routines (Wilden & Gudergan, 2017). The knowledge processes underlying reconfiguring capabilities are related to double-loop and second-order learning because they are transformational (Ambrosini, Bowman, & Collier, 2009), and therefore different from operational capabilities (Cepeda & Vera, 2007) and single-loop learning processes (C. Argyris, 1977). Entrepreneurial firms that are able to respond to market opportunities by reconfiguring their capabilities are also more likely build effective knowledge dissemination within and between organisational functions (Ahuja & Lampert, 2001; Siguaw, Simpson, & Enz, 2006). A combination of entrepreneurial orientation and the established communications structures to disseminate new knowledge can even offset the inertial effect of organisation age or size (Sirén, Hakala, Wincent, & Grichnik, 2017; Zollo & Winter, 2002). Whereas sensing capabilities and knowledge creation can be an individual-level process, reconfiguring capabilities and knowledge dissemination are multi-level processes embedded in organisational systems, structure, culture, and history (Sirén et al., 2017). This concludes the microfoundational comparison and brings the discussion of similarities between concepts from the *enabler* perspective (Wilden et al., 2016).

Many of the same enablers that affect the efficacy of dynamic capabilities also impact organisational learning. These enablers include leadership (Aragón-Correa, García-Morales, & Cordón-Pozo, 2007; García-Morales, Jiménez-Barrionuevo, & Gutiérrez-Gutiérrez, 2012), culture (Real, Roldán, & Leal, 2014), structure (Mallén, Chiva, Alegre, & Guinot, 2015), and strategy (Santos-Vijande, Lopez-Sanchez, & Trespalacios, 2012). Many authors have asserted that there is a relationship between organisational learning and *leadership* style (e.g., Nadler & Tushman, 1990; Senge, 1990); particularly transformational leadership (e.g., Aragón-Correa et al., 2007; García-Morales et al., 2012). These associations have been explained by suggestions that transformational leaders are more collaborative (Cha, Kim, Lee, & Bachrach, 2015), participatory (Mesu, Sanders, & Van Riemsdijk, 2015; Poel, Stoker, & Zee, 2012), and encourage environments relevant for innovation (Gumusluoglu & Ilsev, 2009; Nadler & Tushman, 1990) and creativity (Henker, Sonnentag, & Unger, 2015; Tierney, Farmer, & Graen, 1999). The association between organisational learning and *culture* was investigated by Real et al. (2014). In particular, they measured the impact of entrepreneurial orientation (innovativeness, proactiveness, and risk-taking) and learning orientation (commitment to learning, shared vision, and open-mindedness) on

organisational learning, finding a very strong relationship. One plausible explanation for this finding is that firms with a strong entrepreneurial orientation will enter new markets aggressively and incur greater risks. This requires them to cope with more complex and changing environments which will necessitate learning (Dess et al., 2003) to build new competencies (Zahra, Nielsen, & Bogner, 1999). A collective entrepreneurial orientation leads managers to engage in new ideas and experimentation to solve business problems (Hult, Hurley, & Knight, 2004); qualities also associated with dynamic capabilities (Teece, 2014a, 2017).

Organisational *structure* also plays a fundamental role in an organisation's capacity to acquire and integrate new knowledge into their operations. Organic organisational structures, defined by flat hierarchies, low formalisation, and decentralisation of power and control (Burns & Stalker, 1961), are generally more effective at internal knowledge-sharing and social interaction (Fiol & Lyles, 1985; Martínez-León & Martínez-García, 2011; Nahm, Vonderembse, & Koufteros, 2003). Organic structures also cope better with unstable environments as they facilitate experimentation, risk-taking, participative decision-making, open dialogue, and interaction with the external environment (Burns & Stalker, 1961), all of which enable organisational learning (Mallén et al., 2015). Furthermore, these structures help to mediate other contributors to performance such as close proximity to industrial clusters (Camisón & Villar-López, 2012) or innovative climates (C.-J. Chen & Huang, 2007). Similar inferences have been made by authors discussing the mediating roles of organisational structure on dynamic capabilities (e.g., Mallén et al., 2015; Teece, 2007b; Wilden et al., 2013). Finally, organisational *strategy* is also considered a contributing factor to the value of both organisational learning and dynamic capabilities. For example, Santos-Vijande et al. (2012) investigated the impact that organisational learning has on organisations' ability to successfully pursue differentiation or cost-leadership strategies. While the authors found that organisational learning has a positive effect on both strategies, only a differentiation strategy relates positively to business performance. Similar results are shown in dynamic capabilities research (e.g., Hutzschenreuter & Israel, 2009), although it is generally recognised that the strategies evolve from both intended and emergent actions (B. S. Anderson, Covin, & Slevin, 2009).

Finally, similar to dynamic capabilities, organisational learning has been proposed as a fundamental strategic process underlying sustained performance (see Table 1.3). Organisations

with strategic capabilities manage to redirect organisational learning processes to obtain better *outcomes* (Chien & Tsai, 2012; Real et al., 2014; Santos-Vijande et al., 2012). Strategic or dynamic capabilities are regarded as the activities or actions that arise from organisational learning (Eriksson, 2014; Lichtenthaler, 2009). Specifically, links between knowledge stocks and learning are found to have a positive relationship with financial performance (Bontis, Crossan, & Hulland, 2002; DeCarolis & Deeds, 1999), particularly when competing in new markets (Santos-Vijande et al., 2012; Zahra, Ireland, & Hitt, 2000). However, like dynamic capabilities, most research indicates that organisational learning has only an indirect influence on performance (e.g., Chien & Tsai, 2012; N. A. Morgan, Vorhies, & Mason, 2009; Romme et al., 2010; E. Wang, Klein, & Jiang, 2007). While the relationship between dynamic capabilities and performance is mediated through changes to operational capabilities (e.g., Protogerou, Caloghirou, & Lioukas, 2012), the relationship between organisational learning and performance is mediated through innovation (e.g., Santos-Vijande et al., 2012). For example, García-Morales, Llorèns-Montes, & Verdú-Jover (2007) and Aragon Correa et al., (2007) showed that organisational learning affects an organisation's innovation, which in turn affects performance outcomes. Innovation is usually defined as the adoption of an idea or behaviour pertaining to a product, service, method, system, policy or program that is new to the adopting organisation (Damanpour & Gopalakrishnan, 2001, p. 47). However, deliberate learning mechanisms can have a negative impact on innovation. As organisations attempt to shape the way information is distributed and interpreted, they may create information *filters* that limit search spaces, distracting attention from emerging opportunities and new strategies (Berghman, Matthyssens, Streukens, & Vandenbempt, 2013). This issue is discussed further in the next section.

Table 1.3 Selected Empirical Research Measuring the Impact of Organisational Learning on Performance

Study	Relevant Findings
Aragón-Correa, García-Morales, & Cordon-Pozo (2007)	Found that both collective (organisational learning) and individual (transformational leadership) factors influence firms to develop and implement organisational innovation. Furthermore, transformational leadership has a significant influence on organisational learning and innovation, and subsequently, on organisational performance.
Bontis, Crossan, and Hulland (2002)	In a multi-level study of 32 organisations in the Canadian mutual fund industry, the authors found a positive relationship between stocks of learning at all levels and business performance. They also found that a misalignment between the stocks of learning at each level (senior-, middle-, and non-management) and the knowledge flows has a negative association with business performance.
Chien & Tsai (2012)	Found dynamic capabilities facilitate firm performance, which are driven by knowledge resources. Their findings also show that knowledge mechanisms significantly intervene between knowledge resources and dynamic capabilities.
DeCarolis and Deeds (1999)	Demonstrated that there is a positive relationship between flows (measured by munificent location and R&D intensity) and stocks of knowledge (measured by new products in research pipeline and publication citations) and organisational performance in the biotechnology sector.
García-Morales, Jiménez-Barrionuevo, & Gutiérrez-Gutiérrez (2012)	Results from survey data show that transformational leadership is closely related to and affects organisational learning and innovation. Organisational learning influences innovation, both of which are also related to performance.
García-Morales, Lloréns-Montes, & Verdú-Jover (2007)	The findings from the analysis of survey data show that supportive leadership and teamwork cohesion significantly affect both organisational learning and innovation. Organisational learning and technical and administrative innovation were also found to be positively related to performance
Real et al (2014)	Found a positive relationship between both entrepreneurial and learning orientations on perceived business performance. The authors also found that organisational learning mediates the relationship between a learning orientation and performance.
Santos-Vijande, Sanzo-Pérez, Álvarez-González, & Vázquez-Casielles (2005)	Gathering data from 401 Spanish firms, the authors found that organisational learning positively influences performance, both directly, and indirectly through innovation. Organisational performance (self-reported relative to competitors) is also directly affected by innovation.
Santos-Vijande et al (2012)	Find that organisational learning relates positively to differentiation and cost-leadership strategies as well as strategic flexibility. The authors also found that only a differentiation strategy leads to business performance, indicating that organisational learning is more effective when competing in new markets.
Schroeder, Bates, and Junttila (2002)	Developed resource-based hypotheses and showed a positive relationship between internal and external learning and manufacturing performance across 164 plants from six different countries. Internal and external learning relate specifically to the development of proprietary process and technology and therefore has nomological validity.
Zahra, Ireland, and Hitt (2000)	Showed a strong relationship between high-control foreign market entry (start-up and acquisition) and the breadth, depth, and speed of a firm's technological learning, especially if knowledge integration in formalised. There is also an association between breadth, depth, and speed of technological learning and the performance of these new ventures.

1.3.3 Dynamic Capabilities and Deliberate Learning

The idea that dynamic capabilities could be enhanced with deliberate learning activities was first addressed by Zollo and Winter (2002). They proposed that dynamic capabilities emerge from the co-evolution of tacit experience, explicit knowledge articulation, and codification activities. These three knowledge processes operate on a continuum requiring progressively greater investment of financial, temporal, and cognitive resources. The highest level of investment occurs when an organisation decides to codify knowledge into a document, manual, or online learning, for example. Returns on knowledge codification are also subject to several broad contingencies – environmental conditions, organisational features, and task features. Within the task features, Zollo and Winter (2002) hypothesised that tasks that occur infrequently, that are heterogeneous, and that have high degrees of causal ambiguity between the task and performance, will benefit more from explicit knowledge articulation and codification than from experience accumulation alone. Although these hypotheses appear counterintuitive, the authors explained that articulation and codification of knowledge reduces the generalisation errors inherent in tacit experience accumulation of heterogeneous tasks. Furthermore, the cognitive effort implicit in the articulation and codification of expert knowledge of infrequent tasks accelerates the learning curve throughout the organisation.

Zollo and Singh (2004) tested these hypotheses using a large sample of acquisitions in the U.S. commercial banking industry. They compared acquisition success, measured by subsequent return on assets, with levels of codification, which included; checklists, system conversion training manuals, training packages, and project management manuals. They found that a high level of post-acquisition knowledge codification was strongly associated with acquisition success. The authors concluded that firms develop collective competence not only by accumulating experience but by investing time and cognitive effort to better understand the causal linkages between actions and performance. The benefits of articulating and codifying learning are not just in the outputs (manuals, training material etc.), but in the positive learning spillovers from these activities (Zollo & Singh, 2004). For example, the managerial effort and cognitive processes involved in developing *know how* firstly requires an appreciation of *know why*, which is also what Teece (2017) may call a *signature* process for organisational learning. However, knowledge about the specific organisational mechanisms that enhance strategic learning is still relatively limited

(Barkema & Schijven, 2008; Berghman et al., 2013) as aspects of deliberate learning are counterproductive. Deliberate learning investments, especially knowledge codification, have high resource costs and the inertial properties of some learning processes can turn capabilities into rigidities (Leonard-Barton, 1992). Codified learning artefacts can eventually form *institutionalised truths*, which become increasingly difficult to challenge (Romme et al., 2010).

In order to illuminate the specific processes that lead to innovation capacity, Berghman et al. (2013) disaggregated deliberate learning into three distinct mechanisms to support the *recognition*, *assimilation*, or *exploitation* of opportunities. Mechanisms for *recognition* are activities designed to aid environmental scanning of customers, non-customers, technology, competitors, and their market. Mechanisms for *assimilation* are those designed to stimulate critical reflection and discussion about customers, market, and marketing approaches. Mechanisms for *exploitation* are aimed at supporting the adaptation of organisational structures, employee skills, procedures, and ways of working to support new offerings. Berghman et al. (2013) found that *assimilation* mechanisms are most important for improving innovation capacity, *exploitation* learning mechanisms are moderately related, while deliberate *recognition* activities were not significant. They also concluded that all three deliberate learning mechanisms build upon each other. That is, *recognition* mechanisms to explore new opportunities will only lead to effective renewal if they also lead to renewed understanding (*assimilation*) (Grégoire, Barr, & Shepherd, 2010). The collective critical reflections and discussions make sense of, and justify, mechanisms to change established patterns of internal organisation (*exploitation*) (Berghman et al., 2013). This implies that the articulation and codification processes involved in e-learning practices will support innovation capacity if they are integrated into assimilation mechanisms.

In the following section I discuss the benefits of deliberate employee learning and development activities, in general, and for organisational learning.

1.3.4 Employee Learning and Development

In 2015 it was estimated that globally organisations spent US\$350 billion on formal training⁴ (Beer et al., 2016). The outlay for training is made with the expectation of a return in the form of organisational performance or results. Estimates of the returns on this outlay are generally positive and substantial by most measures (e.g., Bilanakos, Green, Heywood, & Theodoropoulos, 2016; Travkin & Sharunina, 2016). For example, training has positive links to improved productivity (e.g., Colombo & Stanca, 2014; Hara, 2014; Liu & Lu, 2016), service (e.g., Dhar, 2015; Úbeda García, Cortes, Marco-Lajara, & Zaragoza-Saez, 2014) and customer satisfaction (e.g., Gelade & Ivery, 2003; Shen & Tang, 2018). Using a large European data set, Konings and Vanormelingen (2014) found that, on average, a trained worker was 32% more productive than an untrained worker. After allowing for the additional wages received by trained workers, organisations benefited from a 16% premium. Similarly, Bartell (1995, 2000) using the personnel records of a single company, was able to estimate the return on investment for training of between 5% and 50%. However, other studies and meta-analyses show that the association between learning investment and financial measures of firm performance is mixed (e.g., Percival, Cozzarin, & Formanek, 2013; Tharenou, Saks, & Moore, 2007). Part of the problem is that an organisation's training efforts only influence intermediate results such as productivity, quality, service, and employee turnover. Therefore investment in training habitually shows no immediate results on financial performance, as a substantial amount of time is necessary for returns to be realised (Muñoz Castellanos & Salinero Martín, 2011).

One indication of the long-term influence of training on organisation-level results is survival rate. This was studied by Collier, Green, Kim, & Peirson (2011), who compared firm survival rates with training investment. They collected training data from 1,434 privately owned UK workplaces that were in operation in 1998 and had at least 25 employees. After six years, 28% of the workplaces that did not provide training to their largest occupational group had closed down,

⁴ As the terms 'training', 'training and development', and 'learning and development' have evolved in the literature from the same foundation, I use the terms to mean the same thing - the systematic development of skills, concepts, or attitudes that result in improved performance in a job environment (Goldstein, 1993; Latham, 1988; Tharenou, Saks, & Moore, 2007). When referring to a particular employee learning and development study, I use the term used in that article.

compared to only 13% of those that did provide training. Furthermore, organisations that provided training to all, rather than only some of their employees, faced a closure rate of just 5% over the same period. However, while these observed differences in closure rates are substantial, there may be other explanations for these findings, such as other reasons for training investment that may also relate to firm longevity. Previous research has suggested various potential predictors of learning and development investment, including environmental conditions, organisational characteristics, employee characteristics, market domination, and manager characteristics (Bilanakos et al., 2016; Blume, Ford, Baldwin, & Huang, 2009; Grossman & Salas, 2011; Salas et al., 2012). For example, gathering data across 163 Korean organisations, Sung and Choi (In Press) compared firm performance, environmental change, and top management strategic orientation towards, and investment in, training and development (T&D). Their results showed an overall pattern indicating that firm performance and environmental change positively affect investment in T&D by influencing top management's strategic orientation towards T&D. They concluded that financially well-performing firms have the resources to allow managers to shift attention from tight materialist control to human causes with a long-term perspective. Thus, there may be a reverse causation, that is, rather than training improving performance and firm survival, firm performance and an expectation of longevity may lead to investment in learning and development (Collier et al., 2011; Sung & Choi, In Press).

Contrary to publicity regarding the importance of training in the knowledge economy, Green, Felstead, Gallie, Inanc, and Jewson (2016) found that overall training activities are actually reducing in many organisations. Their meta-analysis of eight UK workplace surveys concluded that although the rate of participation in formal workplace training had increased from 1995 to 2012, the volume, measured by training days per worker, decreased by 32%, and inflation-adjusted expenditure had decreased by 14%. There are a number of possible explanations for these findings: uncertain conditions reduce management confidence in specific training initiatives to return the desired outcomes; new technologies have radically improved the efficiency of 'lean training', and the growing significance of learning through participation, teams, and communities of practice (e.g., Engeström & Sannino, 2010; Felstead et al., 2005; Guile, 2001). All these explanations support the idea that as learning and development evolves, traditional training is substituted with other forms of skill formation that will not be reported in surveys. For example, high-involvement work teams and contemporary job designs increase tacit knowledge-sharing and are becoming

embedded in the architecture of organisations (Foss, Minbaeva, Pedersen, & Reinholt, 2009; Llopis & Foss, 2016). Such practices fundamentally shift perceptions of workplace learning from formal training to a broader set of activities related to employee development and organisational learning (Noe, 2008; Park & Jacobs, 2011; Spaan, Dekker, van der Velden, & de Groot, 2016).

One major cause of this shift away from traditional modes of training is the redundancy of learning content that is well-known ahead of time. Today the life cycles of product, production, and business concepts are considerably shorter (Dedehayir & Mäkinen, 2011; C. A. O'Reilly & Tushman, 2008; Stubbart & Knight, 2006). Under these conditions, the design of new activities and the acquisition of the knowledge and skills they require become increasingly intertwined (Engeström & Sannino, 2010). A changing environment imposes considerable demands for an organisation to develop distinct advantages over competitors. This can be partly achieved through the development of firm-specific, and therefore inimitable, human capital (Barney, 1991; Shaw, Park, & Kim, 2013). Some authors have pointed out that alterations to a firm's competitive strategy alters the relationship between training and results (e.g., Arraya & Porfírio, 2017; Muñoz Castellanos & Salinero Martín, 2011). For example, Schuler and Jackson (1987) suggest that firms seeking to compete through innovation will need to adopt a training and development strategy than emphasises long-term goals, broad skill application, group orientation, and high participation. Such learning and knowledge management strategies expose employees to broad perspectives, skills, expertise, and additional insights through which they can expand their reservoir of new and useful ideas for innovation (Muñoz Castellanos & Salinero Martín, 2011). The type of learning activities that embody these ideas encourage a shift "from an offsite single episode to a systematic series of learning experiences that are integrated in the workplace and embedded in work technology" (B. S. Bell & Kozlowski, 2010, p. 264). These forms of training are often more informal, self-directed, and learner-centred, therefore making the employee an active participant in the learning process (B. S. Bell & Kozlowski, 2008).

Another major influence on changing learning and development paradigms is the proliferation of computer technology in the workplace. A large body of empirical research shows that demand for higher-skilled labour increases with more widespread use of technology at the worker level (e.g., Autor, Levy, & Murnane, 2003; Castro Silva & Lima, 2017; Spitz-Oener, 2008), firm level (e.g., Beaudry, Green, & Sand, 2015; Brynjolfsson & Hitt, 2003), and industry level (e.g., Autor,

Dorn, & Hanson, 2015; Chennells & Van Reenen, 1998). Further, Bresnahan, Brynjolfsson, and Hitt (2002) found that successful technology investment requires not only higher skills, but complementary workplace reorganisation. Thus, organisations that embrace technology, particularly information technology (IT), as a business strategy, simultaneously need to upgrade their capabilities to match (Mithas, Ramasubbu, & Sambamurthy, 2011; Mithas, Tafti, Bardhan, & Mein Goh, 2012). Usually these investments are part of a divergent or convergent strategy in response to competitive actions. Mithas, Tafti, and Mitchell (2013) found that in turbulent environments, firms tend to invest more in IT infrastructure and in a competitively divergent manner. They concluded from these findings that the use of IT in many organisations has become essential to the framing of the business strategy itself, rather than simply as a functional area that aligns to strategy (Mithas et al., 2013). These ideas fit within the perspective of digital ecodynamics, described by El Sawy, Malhotra, Park, and Pavlou (2010) as a three way system between capabilities, environment, and information systems. The role of IT has shifted from an internal support tool to one that has redrawn competitive boundaries, revised industry rules, brought new organisational forms, and increased organisational reach and range (El Sawy et al., 2010; Zammuto, Griffith, Majchrzak, Dougherty, & Faraj, 2007).

As many learning activities have progressively moved online, traditional ideas of skill and knowledge development may also need to adapt. I discuss the possible implications of these changing organisational paradigms to e-learning in the next section.

1.3.5 Workplace E-learning

Technology-assisted learning or e-learning has been increasing in popularity in industry (Docebo, 2015; L. Miller, 2014; Yacovelli, 2012), which is due in part to its perceived advantages of reach, consistency, cost, and management (H.-J. Chen, 2010; Garcia, 2011; Luor, Hu, & Lu, 2009; Reynolds et al., 2014; Waight & Stewart, 2005). Essentially, e-learning is defined as computer technology used to deliver learning material to users by means of any electronic communication, collaboration, or knowledge transfer media (Y. M. Cheng, 2011; B.-C. Lee et al., 2009). Although still somewhat controversial, it is also fairly well established that e-learning can be at least as effective as classroom training (R. C. Clark & Mayer, 2011; Noe, Clarke, & Klein, 2014; Sitzmann, Kraiger, Stewart, & Wisher, 2006). However, new knowledge management systems enabled by Web 2.0 technologies have the potential to affect organisational learning more

positively than previous systems due to their integrated communication capabilities (Argote, 2011). While previous systems operated simply as knowledge repositories and directories of declared expertise, new systems provide integrated networking tools for collaboration, knowledge creation and sharing (Garcia-Penalvo et al., 2012; McAfee, 2009). Nonetheless, far more important than the knowledge tools are the human processes that influence how an organisation uses this technology (Easterby-Smith & Prieto, 2008; Garcia, 2011; Garcia-Perez & Ayres, 2010). Where technologies enable and provide infrastructure for certain knowledge activities; human processes emphasise the sense-making behaviours of individuals, and the social relations and cultural factors that influence system utility (Easterby-Smith & Prieto, 2008, p. 239).

Like most technological advances, the benefits of e-learning are often reliant on changes to human practices (Brynjolfsson & Hitt, 2000). For example, previous research has shown a variety of issues when introducing web technology into learning environments: difficulties sustaining online collaborations (Bothams & Fordyce, 2002; Faraj et al., 2011), political dynamics that constrained learning with the use of groupware (Hayes & Walsham, 2001), an incompatibility with constructivist pedagogies (Hobbs, 2002; Hodgson & Watland, 2004), and resistance to technology, even when it does work well. Part of the problem is that e-learning provides an unprecedented degree of learner control, which requires a more considered approach to instruction (Landers & Reddock, 2017; Väljataga & Laanpere, 2010). For example, in their meta-analysis, Granger and Levine (2010) concluded that the high learner control that e-learning enables, often has negative effects. Low ability or inexperienced learners may make poor decisions about what and how to learn (DeRouin, Fritzsche, & Salas, 2004). Furthermore, high learner-control e-learning has been shown to be less effective for teaching declarative or complex knowledge (Granger & Levine, 2010; Kraiger & Jerden, 2007; Landers & Reddock, 2017). One suggestion to remedy these problems is to supplement learner control with adaptive guidance – which provides learners with diagnostic and interpretive information designed to assist learning decisions (Aguinis & Kraiger, 2009). By making these adjustments in an e-learning environment, Bell and Kozlowski (2002, 2008) were able to show substantially improved study and practice effort, knowledge acquired, and performance. These findings provide further support for the idea that the introduction of e-learning cannot simply replace existing learning mechanisms but often requires a fundamentally different pedagogical approach (G. Morgan & Adams, 2009).

However, pedagogical approaches appropriate for e-learning may ultimately have little success if they are too distinct from existing organisational structures and knowledge flows (Bontis et al., 2002; Wilden et al., 2016). For example, Bothams and Fordyce (2002) described the unsuccessful introduction of online learning community into a business development unit in Scotland. Technological problems and workload challenges were used as a façade to obscure the underlying obstructive issues of an environmental, cultural, and personal nature. The environment where the online learning could have been accessed was not conducive to learning, and the culture of the unit was staid and inflexible with a general resistance to change. Personal barriers included lack of confidence in personal computing abilities, a fear of exposure amongst peers, and employees feeling threatened by this new mode of learning. To overcome these concealed barriers, combined strategic and operational solutions were suggested by members of the team at a two-day workshop. The sharing of information, capturing best practices, and managing the impact of change to staff was then co-managed and implemented by everyone. The outcome was that both staff and management owned the solution, the system was improved and has become embedded in the consciousness of the unit members resulting in an increased openness to sharing experience and knowledge. The authors concluded that it had been naïve to expect that a new technology would result in a change in knowledge sharing behaviours, when there was in fact a misfit between the tool and the situation (Bothams & Fordyce, 2002).

Faraj et al. (2011) describe the relationship between online communities and organisational structures as overlapping but clearly distinguishable. They contend that as Internet platforms make it possible for traditional organisations to become more fluid; online communities provide an opportunity to observe the nature of this fluidity. Rather than thinking of the technology as existing separately from the people using it, Faraj et al. (2011) suggested that it is emergent, inseparable, and coevolving. Technologies provide the possibility of new ways of working and organising that are difficult to predict *a priori*, partly because certain uses are facilitated or hindered by the qualities of the technological artefact. Social platforms provide affordances for knowledge collaboration, although their use is not defined by the technology, nor are the users entirely free from the platforms' limitations. As the interactions between the users and the technology evolves participants find new ways to use the technologies and develop new social norms for their use. Features of e-learning such as improved access through the removal of temporal, geographical, and situational barriers (Callan et al., 2015), and its self-directed nature, potentially alter

relationships both with knowledge (Garcia-Penalvo et al., 2012) and across learning communities (Reynolds et al., 2014). Although e-learning has the ability to break down physical barriers to social interaction, learning tasks will only be effectively accomplished if the groups feel a sense of cohesion, belonging, and trust (Kreijns & Kirschner, 2010) or organisational support (Joo, Lim, & Park, 2011).

The following section summarises the supportive literature and explains its significance for this thesis.

1.3.6 Summary and Significance

It is easy to assume that effective employee learning will lead to better organisational outcomes. However, deeper enquiry reveals that the link between deliberate learning and performance are complicated. Many aspects of deliberate learning do not ultimately lead to better outcomes as the wrong knowledge is gained (see Gold, 2003). Changing organisational paradigms lead to more fluid conceptions of achievement and complicate learning-performance links. As many aspects of deliberate learning activities stifle innovation, I use the dynamic capabilities concept to develop the idea that e-learning can integrate into adaptive organisational processes. Dynamic capabilities are embedded throughout organisations both in entrepreneurial management and in an organisation's characteristics (Teece et al., 2016). The appropriate fit between developing dynamic or operational capabilities will depend on a combination of environmental conditions, such as turbulence or predictability, and internal factors, such as structure, culture, or strategy. A number of scholars discuss the contingent effect of these factors (see

Table 1.2), but I prefer Wilden et al.'s (2016) argument that it is the *configuration* of these factors that determines an appropriate level of dynamic capabilities. Configurational theory is congruent with assumptions of equifinality, where *ideal* contingencies give way to multiple equally effective paths (Wilden et al., 2016; Wilden, Gudergan, Akaka, Averdung, & Teichert, In Press) This provides a conceptual explanation of the contextual nature of leadership, strategy, culture, structure and so on, as these factors interact with each other. To demonstrate this idea, I used the Oticon example, showing how changes in the organisation's environment and management altered its strategy, structure and culture. In Essays Two and Three I show how these configurations appear to impact e-learning processes across a range of organisations.

The similarities between dynamic capabilities and organisational learning can be observed through their *microfoundations*, *enablers*, and *outcomes* (Wilden et al., 2016). Teece's (2007a) *microfoundations* of dynamic capabilities (sensing, seizing, and reconfiguring), have corresponding knowledge processes (acquisition, sharing, and utilisation) (Huber, 1991). There are also *enablers* common to both dynamic capabilities and organisational learning, such as leadership, culture, structure, and strategy. Research indicates that more transformational leadership, entrepreneurial cultures, organic structures, and a differentiation strategy will enable both dynamic capabilities and organisational learning. The *outcomes* of the concepts also have a close relationship, with most studies finding that they indirectly affect organisational performance, mediated by either changes to operational capabilities (for dynamic capabilities) or innovation (for organisational learning). However when learning becomes deliberate, performance is confounded as formalised knowledge codification is costly and contributes to rigidities (Leonard-Barton, 1992). What is most important when knowledge is exploited in the form of new processes and documentation is that these activities are accompanied by assimilation mechanisms that allow discussion, critical reflection, cognitive effort, and *know why* (Berghman et al., 2013; Zollo & Winter, 2002). I discuss how assimilation mechanisms may be enabled through e-learning processes in Essay One.

The final sections of the supportive literature review concern the contemporary challenges faced by organisations when developing employee learning and development activities, in general, and online. Although training activities have generally been found to positively contribute intermediate organisational outcomes, returns on these investments are often difficult to prove in the short term

(Muñoz Castellanos & Salinero Martín, 2011). Even over longer terms when there are more positive associations between training investment and firm performance or survival, causality cannot be verified (Collier et al., 2011; Sung & Choi, In Press). The efficiency of new knowledge and learning technologies, the pace of change, and the growing significance of informal and collaborative learning activities have changed conceptions of training. Learning and development activities have shifted from single events to learning experiences that are integrated into the workplace, where learners actively participate in the whole learning process (B. S. Bell & Kozlowski, 2008). There is potential for these new forms of skill and knowledge development to be integrated into the new learning paradigms that online learning and communication technologies enable. But like other forms of technological advance, the benefits of e-learning are reliant on human processes (Brynjolfsson & Hitt, 2000). Individual sense-making behaviours, social relations, and cultural factors influence system utility at least as much as the technology that enables and provides infrastructure for knowledge activities (Easterby-Smith & Prieto, 2008). Social platforms provide opportunities for new knowledge collaborations that are neither entirely defined by the technology nor immune to its limitations (Faraj et al., 2011). In Essay One I suggest ways these technologies integrate into organisations' processes and can help to address the contemporary challenges facing them. Essays Two and Three discuss the human and organisational processes that are revealed through the learning and development activities of the investigated organisations.

1.4 Overview of Method

In the following section I provide supplementary information regarding the methodology used in each essay and the justifications for each choice.

1.4.1 Essay One

Essay One is a conceptual paper that outlines and defines the main conceptual framework used in this thesis, that of dynamic capabilities, and discusses how they are developed, and how workplace e-learning can reflect and support their development. The outcome is a list of propositions derived from the dynamic capabilities, organisational learning, learning and

development, and e-learning literatures. The objective was to theorise what specific e-learning processes might align to the development of dynamic capabilities. This proposition-based style of writing theory “formalises contingencies around a subject into basic cause-effect relationships that act as broad signposts and implications for future research” (Cornelissen, 2017, p. 3). According to Cornelissen (2017) this type of theorising is commonly too narrow in scope, captures only basic cause-effect relations, and does not adequately pioneer new territory. However, I believe that the propositions in Essay One are broad in the sense that generally the relationships are quite opaque and cover new theoretical ground. For example, e-learning that; (1) aligns to strategic human resource management, (2) has effective adaptive mechanisms, and (3) has appropriate collaborative techniques - is subject to considerable interpretation and definition so is in itself conceptual. Its interaction with dynamic capabilities forms a set of original assumptions and arguments that do not simply mimic hypotheses, but act as a bridge to future empirical research.

Delbridge and Fiss (2013) describe proposition-based theorising as the use of tight nomological networks that employ a style of writing that pays close attention to causal linkages and pursues a formal-analytical approach. This choice of approach is informed by ontological and epistemological perspectives and has methodological implications towards what Abbott (1988) refers to as *general linear reality*. This approach to theorising views the social world in linear terms where *more of A leads to more of B*. Although the proposition-based approach is attractive in the sense that it offers rigour and precision in estimating cause-effect relations, it is less capable of predicting and explaining nonlinear relationships and interactions (Doty & Glick, 1994). Such is the case where complex phenomena combine, rather than compete, to bring about an outcome. Similarly, in situations where the main phenomenon occurs over a period of time in a process, the proposition-based approach is limited to answering *how* questions without explaining *why* (Delbridge & Fiss, 2013). Although Essay One provides the reader with some plausible associations between dynamic capabilities and e-learning processes, subsequent empirical data highlighted the complex nature of the relationship. Essays Two and Three introduce a more contingent or configurational view to the relationships concerned (Fiss, 2011).

1.4.2 Essay Two

Given that research into dynamic capabilities is still relatively nascent and its relationship with specific learning practices is not well defined, exploratory research is appropriate in this case. The

purpose of exploratory investigation is to move toward a clearer understanding of how a problem should be posed; to learn what are appropriate data, and to develop ideas of what lines of relations are significant (Corbin & Strauss, 2008). Its exploratory nature allows relationships and principles to manifest through the research (Stokes & Urquhart, 2013). Further, considering that capabilities are an embedded process developed as a result of the accumulation of many minor decisions and actions undertaken over a long period of time, a qualitative methodology is appropriate for this form of enquiry (Eisenhardt & Martin, 2000; Henderson, 1994). Approximately two thirds of empirical research into the processes of dynamic capabilities is qualitative, probably because the complexity of the processes involved make it very challenging to operationalise with quantitative measures (Eriksson, 2014). Those studies that do use quantitative measures have a wide range of operationalisations although they all purport to be measuring the same thing (for examples see Appendix A). For example, some studies of dynamic capabilities surveyed knowledge about specific processes, (e.g., Makkonen, Pohjola, Olkkonen, & Koponen, 2013; E. Wang et al., 2007), some surveyed tangible activities (e.g., Wilhelm et al., 2015; Wollersheim & Heimeriks, 2016), whilst most relied on questions about subjective ability, capability, or capacity (e.g., Hung et al., 2010; Wohlgemuth & Wenzel, 2016; Zhan & Chen, 2013).

In a recent review of measures of dynamic capabilities, Laaksonen and Peltoniemi (2016) identified 232 separate operationalisations used in quantitative empirical studies. They classified these into four categories: managers' evaluations (67%); companies' experience, actions, and performance (23%); managers' or employees' experience, actions and performance (6%); and financial data (4%). Initially they also included qualitative studies in their review but quickly realised that these represented an even wider variety of approaches and differ greatly from quantitative studies in their research design, data, and interpretation (see Appendix B for examples). Laaksonen and Peltoniemi (2016) also discussed how operationalisations provide a means for understanding what researchers specifically mean by dynamic capabilities. For example, Teece et al. (1997) consider that dynamic capabilities are idiosyncratic to a firm whereas Eisenhardt and Martin (2000) consider them to be relatively similar across firms in the form of *best practice* routines. If the thesis was following Eisenhardt and Martin's conceptualisation, dynamic capabilities could be measured using binary comparisons of best practice activities thought to be responsible for performance. But as Teece is the main influence for my understanding of dynamic capabilities, comparing activities numerically across firms is unlikely

to produce fruitful knowledge. If firms are unique, numerical comparisons of e-learning types across organisations are unlikely to show useful patterns as many contextual factors exist. For example, in Essay One I propose that particular e-learning strategies, content, and evaluation will be more prevalent in organisations with high dynamic capabilities. What emerged from my trial interviews was that task objectives and features constrained the rationale of direct comparisons across organisations. This result required a shift from deductive to abductive reasoning due to the nature of the inferences (Paavola, 2004), a strategy that has been argued as most suitable for research into dynamic capabilities (e.g., Laamanen & Wallin, 2009; Teece et al., 2016).

Abduction is an alternative form of reasoning to induction and deduction. Deductive methods are concerned with developing testable propositions from existing theory (Dubois & Gadde, 2002). Induction generates theory from data by combining observation with explanation to infer a rule that predicts the likelihood for particular events occurring (Mantere & Ketokivi, 2013). Abduction however, combines the rule and observation to infer a plausible explanation. Abductive reasoning provides a presumptive and conjectural, rather than strictly logical, theoretical hypothesis that typically precedes deduction and represents the inspired “interpretive leap” required to move from data analysis to theory development (Langley, 1999). My observation that direct comparisons between organisations’ e-learning processes would not produce meaningful results without significant theoretical interpretation leads to the adoption of a social constructivist view (Langley et al., 2013). Process research questions that focus on how things change and unfold over time tend to resonate with this view. From the social constructivist view, “ongoing interactions among different individuals, between individuals and organisations, and between multiple levels across organisations and contexts permeate and orientate change processes” (Langley et al., 2013, p. 9).

A case-oriented research method was chosen in Essays Two and Three for the following reasons. First, there is little theoretical precedent for deductive or positivist reasoning (Eisenhardt, 1989; Ragin, 1999, 2001). As Teece (2014b, p. 334) has acknowledged, management theory is not physics – there are few constants. Likewise, in the dynamic capabilities framework the empirical phenomena being described are fluid, even if the underlying concepts are not. Second, dynamic capabilities are a contemporary phenomenon that are best observed within their real-life context (Yin, 2009). Survey-based studies can show relationships between measures of technology use and dynamic capabilities (for example Iris & Vikas, 2011), but cannot explain those relationships

(such as Ravishankar & Pan, 2013). Third, there are no clear boundaries between the phenomenon and the context (Yin, 2009). As discussed in the literature review, the relationship between dynamic capabilities and strategy is difficult to delineate, as they are interrelated. Capability and firm strategy co-evolve as strategy is emergent from internal capabilities and environmental opportunities (S. D. Green et al., 2008; Teece et al., 2016). Fourth, case-oriented research offers an opportunity to select cases from a diverse range of capabilities and contexts (Eisenhardt & Graebner, 2007). Multiple cases provide an opportunity to observe the impact of these contexts on the phenomenon of interest; for example, how high growth might impact learning practices. Case-orientation's central concern is making sense of a relatively small number of cases, chosen for their theoretical significance (Ragin, 2001). In this case, organisations were selected because of the possibility that they possessed a range of low to high dynamic capabilities.

The interview protocol used in Essays Two and Three (see Appendix C) was based on the propositions of Essay One. It was designed to extract information about the ways the organisations built adaptive processes into their e-learning processes. As discussed above, there are no standard operationalisations for dynamic capabilities, and it is accepted practice to apply the framework to a wide range of operational processes and functions. For example, Ravishankar and Pan (2013) used open-ended questions about the modularity of knowledge management systems to assess adaptive processes and knowledge-sharing in a large contact centre. Lee and Kelley (2008) asked research and development (R&D) project leaders questions relating to managerial practices and the deployment of entrepreneurial resources. Dynamic capabilities provided the theoretical lens in both of these studies but there was considerable latitude in its form. Nevertheless, both studied mechanisms to allow change; Ravishankar and Pan (2013) through a knowledge management system, and Lee and Kelley (2008) through management practices. The interview protocol used in Essays Two and Three was based on previous qualitative studies that used dynamic capabilities as a conceptual framework (e.g., Iris & Vikas, 2011; H. Lee & Kelley, 2008; Ravishankar & Pan, 2013) and it was adapted to incorporate e-learning processes.

Essay Two uses the Gioia methodology (Gioia, Corley, & Hamilton, 2013), which has a number of benefits over other thematic analysis techniques. First, it is structured and systematic, which helps to alleviate the *anything goes* critique of qualitative research (Antaki, Billig, Edwards, & Potter, 2003). The technique layers content into a structure of themes, concepts, and aggregate

dimensions in an emergent and cohesive framework. Second, it can be applied across a range of theoretical and epistemological approaches. In contrast to narrative analysis, discourse analysis, or grounded theory, the Gioia methodology is not wedded to any pre-existing theoretical frameworks (Braun & Clarke, 2006). Gioia and his colleagues originally used it for studying sensemaking in strategic change (Gioia & Chittipeddi, 1991; Gioia, Thomas, Clark, & Chittipeddi, 1994), and since then it has been applied to many different contexts, theories, and epistemological and ontological positions (for a list see Gioia et al., 2013). For example, the technique was used by Sutter, Webb, Kistruck, & Bailey (2013) to discover how entrepreneurs cope with street-level organised crime in Guatemala City. Third, the technique allows comparisons between a varied dataset, emergent theory, and relevant literature (S. M. Clark, Gioia, Ketchen, & Thomas, 2010). The Gioia methodology allows considerable freedom within the sources of data to recognise and report themes. The two basic assumptions of the Gioia methodology are also congruent with my study and epistemological stance. These are that the organisational world is socially constructed, and that people in organisations are *knowledgeable agents* who know what they are trying to do and can explain their thoughts, intentions, and actions (Gioia et al., 2013).

1.4.3 Essay Three

The data used in Essay Three was essentially the same as in Essay Two, but the research goals, analysis, and findings differed. Therefore, in this section I will focus on the methodological differences.

First, the objective of Essay Three differed from that of Essay Two. Rather than attempting to deductively extract cohesive themes from the data relating to dynamic capabilities, I was developing patterns from incomplete observations made during data collection. The main aim of Essay Two was to discover if organisations that appear adaptive will develop more modular learning activities. A replication logic was the initial aim, where cases are used as a form of verification of theory, using comparative reasoning (Eisenhardt, 1991). The main criticism with this approach is that generalisation and replication in multiple-case studies is problematic, as the subjects and researcher observations are unique (Dubois & Gadde, 2014). Limiting theory to only observations that are common between cases or groups of cases risks overlooking deep structures of social phenomena (Dyer & Wilkins, 1991). Another weakness with this approach is that it encourages the presentation of only the details that relate to the conceptual arguments where the

predicted A leads to B (Siggelkow, 2007). I eventually realised that the most striking observation was not how a particular organisation conducted its learning activities but rather, what these activities revealed about the organisation. This lent itself to an abductive approach where the confirmation of existing theory become secondary to discovering new things (Dubois & Gadde, 2002). Abductive reasoning allows inferences to be drawn that acknowledge a whole strategic situation and anomalous relationships (Paavola, 2004). For the benefit of selectivity I focused on the indications of organisational culture that emerged out of the data, rather than other configurational factors that, although interesting, may confuse the argument (Siggelkow, 2007). Furthermore, while Essay Two focused only on e-learning processes and evaluation, this was more generalised to learning and development in Essay Three. The primary reason for this shift was that the configurational factors that became apparent (culture, structure, leadership, etc.) needed a broader foundation to make the connections plausible.

Second, data analysis differed in Essay Three, as two new layers of coding were added. The first layer of coding was similar to that used in Essay Two but new codes were added that indicated cultural factors such as external relevance, responsiveness, structure, and formality. These factors aggregated into a significantly different Gioia method coding frame than extracted in Essay Two (see Corley & Gioia, 2011; Gioia et al., 2013). The interview data was re-coded in Essay Three to add operational/dynamic and the competing values framework cultural type statements (Cameron & Quinn, 2011; Quinn & Rohrbaugh, 1983). This enabled a more granular analysis of which organisations considered operational or dynamic factors more, rather than the superficial interview-based assessments used in Essay Two. The competing values framework was used in Essay Three to categorise statements that appeared to reveal cultural characteristics. Although the competing values framework is usually associated with large-scale survey-based research there is some precedent for its use for interview-based studies (Aubry, Richer, & Lavoie-Tremblay, 2014; Dastmalchian et al., 2015; Marshall, Mannion, Nelson, & Davies, 2003). For example, Marshall et al. (2003) used the framework to explore the tensions between managers attempting to change cultures in UK primary care units. Dastmalchian et al. (2015) used the framework to compare the human resource climate with organisational climate across 50 organisations using a qualitative research design. Aubry et al. (2014) applied the competing value framework to study a major organisational transformation in a North American research hospital. In all three studies, the

framework provided a foundation for assessment of organisational values and preferences yet still permitted unanticipated observations (Dubois & Gadde, 2002).

Third, the findings in Essay Three provides further empirical support for the three tentative patterns provided in Essay Two. These patterns are: a) organisations from the most dynamic contexts developed learning processes that accommodated innovation and change b) dynamic and innovative organisations reflect these values in their learning processes c) learning objectives that are primarily operational rather than strategic (long-term, external) goals are evaluated using broader measures. Essay Three's findings supported pattern a) by using a combination of additional organisational data indicating levels of internal change and dynamic/operational re-coding to show that high-change organisations also demonstrated dynamism in their learning processes. Pattern b) was reinforced by showing that cultural type, using the competing values framework (Quinn & Cameron, 1983; Quinn & Rohrbaugh, 1983) and dynamism appeared to be related across the organisations (high dynamism also relates to low control). Pattern c) was supported in Essay Three by comparing culture type with learning evaluation statements. The findings showed that organisations with flexibility-dominant values tended to use a greater diversity of learning measures, both formal and informal, which were used more to inform than to control. The competing values framework used in this bottom-up way offered a parsimonious method of extracting cultural variables from interview data as it relates to specific operational processes (Aubry et al., 2014; Marshall et al., 2003).

1.5 Contributions to Knowledge

In this section I briefly discuss the theoretical and practical contributions made by the individual essays and then by the thesis as a whole.

Three contributions are made in Essay One. First, the essay contributes to the literature by proposing a strategy for investigating the microfoundations of dynamic capabilities through one operational process, in this case e-learning. By separating a practice into its operational and dynamic elements, researchers can establish which aspects of the practice are strategic, in that they contribute to long term objectives, or whether they are operational, and which relate to the current output. Second, investigating the dynamic elements of a learning practice can also provide insights

into organisation-level learning by showing which knowledge processes result in changes to operational processes. This advances our understanding of the *development* of dynamic capabilities. The third contribution made in Essay One is practical. The essay proposes specific e-learning adoption, content, and evaluation strategies and practices that support innovation and adaptation. These propositions extend the value of e-learning processes beyond that of simply providing consistent and efficient training of existing knowledge towards approaches that are more closely aligned to an organisation's competitive strategy.

Essay Two makes four contributions. The first is to show how the microfoundations of dynamic capabilities may be studied by observing one integrated learning practice. Dynamic capabilities are usually investigated through macro-level activities, such as product development (Danneels, 2002; Prieto et al., 2009), but often these activities are not in themselves sufficient to maintain competitive advantage (Teece, 2014b, p. 343). This study extends the idea that dynamic capabilities are evident at the micro-level by considering the organisational-level problems the operational process solves (Barreto, 2010). Second, the essay demonstrates that knowledge processes indicate a level of dynamic capabilities. High level change routines that achieve market agility are the durable signature processes that constitute dynamic capabilities (Teece, 2014a). The degree that this agility is shown in an organisation's learning processes offers insights into to how adaptive, or dynamically capable, an organisation is. Third, the essay demonstrates that at an operational level the value of maintaining flexible processes is greatest to organisations that experience the most change. This extends and supports organisational-level studies that suggests that dynamic capabilities are most valuable in turbulent environments (e.g., Pavlou & El Sawy, 2006; Wilhelm et al., 2015). The fourth contribution made in Essay Two is practical. The essay demonstrates how e-learning can be used strategically by an organisation and how it can be integrated into innovation and adaptive systems. For example, organisations seeking to build learning systems to support innovation will need adaptive approaches to learning, such as, simultaneous product and learning programme development, continuous learner feedback mechanisms, and varied and qualitative measures of learning effectiveness (H.-J. Chen, 2010; Luor et al., 2009).

Essay Three makes five contributions. The first is to make explicit links between dynamic capabilities and organisational culture. Using the competing values framework (Quinn &

Rohrbaugh, 1983) an association was found between culture types and level of dynamic capabilities. Although this is not unexpected as the two concepts share some common dimensions, to the best of my knowledge the association has not been specifically drawn before. Second, a clear link is shown between internal and external dynamism, and flexible learning practices. Under conditions where operations change often, organisations tend to use more flexible pedagogical approaches linked to externally relevant objectives. This essay extends work that shows that the value of maintaining flexible internal systems diminishes in stable conditions (e.g. Pavlou & El Sawy, 2006; Roberts & Grover, 2012; Wilhelm et al., 2015). Third, the study demonstrates how organisational culture affects learning evaluation. Cultures that emphasise *control* in their learning, gravitate towards clear, unambiguous performance measures. Cultures that reflect *flexibility*-dominant values favour greater diversity of measurement, and both more subjective, and more informal controls. This supports other findings that link performance measurement and organisational culture (e.g., Henri, 2006; Nutt, 2006; Speklé & Verbeeten, 2014), but narrows the focus to the learning domain. Fourth, the study described in Essay Three uses the competing values framework (Quinn & Rohrbaugh, 1983) in a unique way through bottom-up content analysis. This approach can closely link culture to specific operational practices, rather than the usual method that compares a practice with the aggregated results of broadly distributed surveys. The fifth contribution is practical. Managers are advised to consider the cultural context as well as the task objectives when designing learning evaluation. If more flexibility is required than the organisation culture normally allows, approaches that externalise learning objectives are recommended. For example, this could involve forms of stakeholder involvement (C. L. Wang & Rafiq, 2014), or service management techniques that have design, content, and measures focussed on service delivery (Osborne, Radnor, Kinder, & Vidal, 2015; Osborne & Strokosch, 2013).

There are four overall contributions made in this thesis. First, it demonstrates how microfoundations of dynamic capabilities reside in a diverse range of sources and practices (Schneckenberg et al., 2015). The microfoundations argument integrates behavioural and social sciences research perspectives to investigate lower-level capabilities and performance (Felin et al., 2015). Previous work on the microfoundations of dynamic capabilities has studied the influence of organisational knowledge and learning at either a cognitive (e.g., Helfat & Peteraf, 2015; Kozlowski & Chao, 2012), conceptual (e.g., Kemper, Schilke, & Brettel, 2013; Kleinbaum & Stuart, 2014) or individual levels (e.g., Minbaeva, 2013). This thesis complements that knowledge

from an operational process perspective. Second, it adds greater richness to the procedural distinctions of Teece's (2007b) sensing, seizing, and reconfiguring processes. The thesis develops understanding of these organisational processes by providing accounts of how they work on the ground, across organisational settings, and through an organisational setting previously not investigated (Schilke et al., 2018). Third, it demonstrates a preliminary investigation process for studying the development of dynamic capabilities at the microfoundational level. The process followed in this thesis was firstly to create a series of propositions, derived from the literature, which suggest the aspects of the operational practice likely to support environmental adaptation and internal innovation. Next, these propositions were empirically investigated across a range of environmental and organisational contexts. Finally, another layer of analysis was used to check, support, and/or extend provisional explanations of how contextual factors impacted the previous results. A similar approach can be applied to a range of operational practices.

The fourth contribution is practical. This thesis also considers the aspects of a learning practice that are most likely to support the development of dynamic capabilities and shows the circumstances under which this occurs. Learning and development activities are traditionally seen as a way for organisations to produce a consistent outcome for specific operational tasks. Contemporary conceptions of learning and development are orientated more towards learning programs and tools that emphasis long-term goals, broad-skill application, group orientation, and high participation (Noe, 2008; Schuler & Jackson, 1987). Flexible learning strategies, content, and evaluation tied to externally-relevant goals offer the best chance of supporting an organisation's capacity to innovate, and subsequently, perform. The value of this flexibility is related to the level of change the organisation experiences, and the efficacy relates to internal factors such as organisational culture.

2. Essay One: Can the Development of Dynamic Capabilities be Supported Using Workplace E-learning processes?

James Costello and Rod McNaughton

Abstract

In this paper we discuss how an organisation's e-learning processes might reflect and accommodate the development of dynamic capabilities. We offer a model of how they are developed, and discuss its component constructs, organisational learning and ambidexterity. We also suggest that the microfoundations of dynamic capabilities can be understood in the context of an organisation's e-learning processes. Using Teece's (2007) sensing, seizing and reconfiguring framework we present a set of empirically testable propositions that suggest how an organisation's e-learning processes can support the development of dynamic capabilities. This article contributes to the literature by laying out a path for investigating the microfoundations of dynamic capabilities by exploring a specific learning process.

2.1 Introduction

The dynamic capabilities school of thought has emerged from notions that performance and profitability are increasingly temporary unless integrated with adaptive and innovative behaviours (M.-J. Chen & Miller, 2012). Central to research on dynamic capabilities are the roles played by knowledge and learning (Easterby-Smith & Prieto, 2008; Eisenhardt & Martin, 2000). The ability to create, integrate, transfer and use knowledge underpins an organisation's capabilities and competitive advantage (Teece, 1998). However, when organisations attempt to stimulate learning, they potentially stifle the innovation needed to reconfigure redundant operational routines (Romme et al., 2010). By formalising learning, there is a risk of solidifying accumulated experience into institutionalised *truths* that are increasingly difficult to change. The challenge is to develop learning mechanisms which allow accrued best practices to transform with shifting environmental conditions.

In this paper, we use the dynamic capabilities framework to explore one specific learning mechanism – technology-assisted learning or e-learning. E-learning encompasses a range of applications and processes such as computer-assisted learning, web-based training, and digital collaboration (Patel, 2010). E-learning technology allows the swift and efficient sharing of distributed knowledge to potentially overcome some of the inertial effects of learning mechanisms (Noe et al., 2014). However, far more important than the technology are the human processes such as the sense-making behaviours of individuals, social relations, and cultural factors that influence how an organisational *learns* (Easterby-Smith & Prieto, 2008). The presence of e-learning, or of any knowledge tool, will have little impact on innovation if it is used solely to support existing practices (see for example; Gold, 2003). We propose that organisations' ability to adapt their resources and routines is due to their capacity to develop dynamic capabilities and that this ability is reflected by, and can be supported through, their e-learning processes.

A key aspect of dynamic capabilities is the application of innovation to the development and adaptation of operating routines. Technological innovations add to the complexity of business processes, resulting in greater demand for knowledge-intensive labour (Bresnahan et al., 2002; Levy & Murnane, 1996; Spitz-Oener, 2008). At the same time, IT has improved employees' ability to collaborate, access information, and make autonomous decisions (Tafti, Mithas, & Krishnan, 2007). Taking this into account, we argue that certain characteristics of e-learning, when used

strategically, have the ability to impact sustainable advantage. For example, the increasing use of integrated networking tools in e-learning initiatives offers a significant opportunity to improve knowledge creation and sharing (Garcia-Penalvo et al., 2012; McAfee, 2009). The delivery advantages of e-learning such as flexibility and time-efficiency permit especially agile responses to environmental changes (H.-J. Chen, 2010; Luor et al., 2009). Furthermore, the integration of e-learning with social media, networking and knowledge management tools potentially alters people's relationships with information and knowledge (Garcia-Penalvo et al., 2012).

In this paper we seek to clarify the mechanisms involved in the development of dynamic capabilities and the potential role of workplace e-learning in their co-evolution. Two questions are addressed:

- (1) What is the role of organisational learning in the development of dynamic capabilities?
- (2) How may dynamic capabilities be reflected in an organisation's e-learning processes?

Our contribution to the literature is threefold. First, we review the extant literature related to developing dynamic capabilities and suggest ways that e-learning processes can accommodate their development. Second, we advance the understanding of the development of dynamic capabilities through their alignment to a learning practice. Third, we offer a set of propositions regarding the relationship between dynamic capabilities and e-learning processes.

The paper is organised as follows. First, we show how dynamic capabilities and workplace e-learning are portrayed in the literature. We then examine the potential links and incongruities between these two processes. Next, focusing on the links and incongruities, we develop propositions about the relationships among elements of the two processes. Third, we discuss our propositions and make recommendations for empirical research.

2.2 What Are Dynamic Capabilities?

The dynamic capabilities discussion has emerged from the resource-based, knowledge-based, and evolutionary theories of the firm. The resource-based view holds that specific physical, human and organisational resources can be used to implement value-creating strategies (Barney, 1991;

Barney, Wright, & Ketchen, 2001). When firm-specific resources are directed at fulfilling customer needs, and are unique and difficult to imitate, they are termed *strategic* (Teece, 2003; Teece et al., 1997). The knowledge-based view holds that the most strategic resource is knowledge that is used to create goods and services (Grant, 1996b; Kogut & Zander, 1992). Evolutionary theories grew from the behavioural premise that “a firm at any time operates largely according to a set of decision rules that link a domain of environmental stimuli to a range of responses on the part of the firm” (Nelson & Winter, 1974, p. 891). When the environment is dynamic or unpredictable, organisations are challenged to generate new routines or practices that form the foundation of their operational capabilities (Helfat & Peteraf, 2003). Operational capabilities are also known as substantive (Zahra et al., 2006), ordinary, or zero-level capabilities (Winter, 2003).

Accordingly, organisations that display dynamic capabilities are those that develop the capacity to change routines and quickly integrate them into their operations. What distinguishes an operational capability from a dynamic capability is much debated (e.g., Helfat & Winter, 2011; Hine, Parker, Pregelj, & Verreynne, 2014). However, most categorisations align operational capability with what Helfat et al. (2007) and Teece (2007a) call technical fitness – that is *doing things right*. Alternatively, dynamic capabilities are those that endeavour to achieve evolutionary fit or *doing the right things*. Evolutionary fitness, refers to “how well the capability enables the firm to make a living by creating, extending, or modifying its resource base” (Helfat et al., 2007, p. 7), and technical fitness is the quality dimension of capability performance (Ambrosini & Bowman, 2009). A similar debate exists regarding the definition of dynamic capabilities.

Multiple definitions share the idea that dynamic capabilities work to change resources, competencies, or operational routines over time. However, these definitions also reveal inconsistencies and ambiguities. For example, definitions that describe dynamic capabilities as a competence, ability, or a contributor to competitive advantage are tautologies (e.g., Teece, 2012; Teece et al., 1997; Winter, 2003). Competence and ability are synonymous with capability and, therefore, redundant in its definition. Superior task performance is also not necessary for a capability to be dynamic. Further, some scholars equate dynamic capabilities with environmental conditions (Teece, 2012; Teece et al., 1997). A radical change in capability may represent a strategic choice, based on an internal desire to improve efficiency, regardless of the environmental conditions (Hrebiniak & Joyce, 1985). Taking these ambiguities into account, we use Zollo and

Winter's (2002, p. 340) definition – *dynamic capabilities is a learned and stable pattern of collective activity through which the organisation systematically generates and modifies its operating routines in pursuit of improved effectiveness.*

The literature on dynamic capability addresses the question of how organisations achieve a long-term competitive advantage by simultaneously developing and reconfiguring their skills and competencies (Helfat et al., 2007; Winter, 2003). Because we are interested in the development of dynamic capabilities, we concentrate on literature that separates the antecedents and microfoundations of dynamic capabilities from their nature or outcomes. Of particular interest is the empirical literature that focuses on the role played by learning mechanisms. Empirical research shows that dynamic capabilities can be developed through such diverse activities as knowledge sharing (Iris & Vikas, 2011), collaborative networks (Rothaermel & Hess, 2007), human capital development (Branzei & Vertinsky, 2006), and strategic human resource management (Judge, Naoumova, & Douglas, 2009).

Investments in learning and knowledge are also compatible with the development of dynamic capabilities (Killen, Hunt, & Kleinschmidt, 2008) particularly if they improve response times to environmental challenges (Zheng, Zhang, Wu, & Du, 2011), facilitate problem-solving (Macher & Mowery, 2009), strengthen a market orientation (N. A. Morgan et al., 2009), and support entrepreneurial actions (Jantunen, Puumalainen, Saarenketo, & Kyläheiko, 2005). Many articles stress the importance of learning cultures (e.g., Tracey, Tannenbaum, & Kavanagh, 1995) or learning processes (e.g., Kale & Singh, 2007) for the development of dynamic capabilities. But few focus on the impact of learning tools or have attempted to integrate into theory the microfoundations or antecedents of organisational learning that contribute to the development of dynamic capabilities (Crossan, Maurer, & White, 2011; Felin & Foss, 2009). One notable exception is Iris and Vikas (2011), who found a strong link between e-learning and dynamic capability. But specifically, how e-learning processes can be used in organisations to help overcome their inherent inertia effects and support dynamic capabilities is yet to be answered.

2.3 How Are Dynamic Capabilities Developed?

Numerous authors have investigated the internal antecedents or microfoundations of dynamic capabilities. Internal antecedents are organisational conditions (Ambrosini & Bowman, 2009) and generally intangible constructs such as learning orientation (McGuinness & Morgan, 2005), collaboration capabilities (Blomqvist, Hara, Koivuniemi, & Äijö, 2004), entrepreneurial orientation (Jantunen et al., 2005) or flexibility (Santos-Vijande et al., 2012). Microfoundations are defined as the constituent actors, processes and/or structures that interact to moderate or mediate higher level phenomenon (Felin et al., 2012). For example, a microfoundation may be events responsible for the creation of a routine or capability such as entrepreneurial activities or managerial decisions (Adner & Helfat, 2003; Jantunen et al., 2005). Microfoundations can also be processes or structures that enable the development of dynamic capabilities such as deliberate learning processes (e.g., Kale & Singh, 2007; Zollo & Singh, 2004), structure and governance (e.g., Jones, Ghobadian, Regan, & Antcliff, 2013), and human resource management activities (e.g., Wooten & Crane, 2004). In summary, internal antecedents are conditions which exist within the organisation that contribute to the creation of routines and capabilities, whereas microfoundations are the constituent components – individuals, processes, and structures – of particular routines or capabilities.

Figure 2.1 presents a simplified model representing the creation of dynamic capabilities through entrepreneurial activities and organisational learning. Our model is based on Zahra et al's (2006) model of capability formation and performance (see Appendix D for an explanation of the differences). Our model shows the key construct leading to the development of dynamic capabilities is organisational learning. E-learning is depicted as one tool that moderates the strength of the relationship between organisational knowledge and learning.

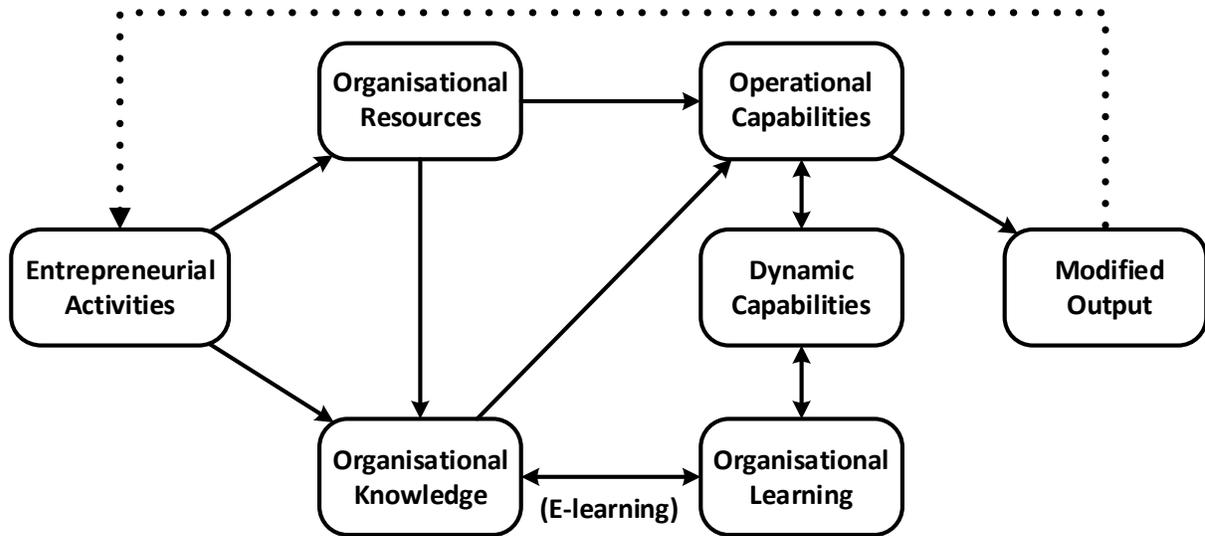


Figure 2.1 A Simplified Model of Capability Development

Source: Adapted from Zahra et al. (2006)

E-learning processes straddle the two main perspectives on the nature of knowledge and learning, the static and dynamic views (Michailova & Sidorova, 2011). The static view conceptualises knowledge as *embrained* in individuals in the form of expertise and capabilities; *embedded* in routines, roles and procedures; or *encoded* in explicit repositories of knowledge (Blackler, 1995). Based on this view, e-learning’s role is to articulate and amplify individually-held, often tacit, knowledge (Nonaka, 1994). Conversely, the dynamic view of knowledge suggests that knowing is mediated in systems, situated in specific contexts, constantly developing, and therefore, provisional and pragmatic (Blackler, 1995). From this view, rather than simply exploiting existing knowledge, e-learning systems should engage individuals in appropriate social practices that generate new knowledge. Instead of taking a dichotomous stance, we subscribe to the simultaneous-path perspective of ambidexterity (Tushman & O’Reilly, 1996).

Ambidexterity is defined as an organisation’s “ability to simultaneously pursue both incremental and discontinuous innovation” (Tushman & O’Reilly, 1996, p. 24). Incremental innovations *exploit* and improve current skills and processes aiming for improvements to efficiency (Holmqvist, 2004). By contrast, discontinuous innovation respond to environmental circumstances by *exploring* and creating substantially new products, services or markets (Jansen,

Van Den Bosch, & Volberda, 2006). An extensive literature shows that both exploitative and exploratory activities are required for sustained organisational performance (See: Junni et al., 2013; C. A. O'Reilly & Tushman, 2013). The knowledge processes which underlie these paradoxical activities reflect *both* the static and dynamic perspectives of knowledge and learning (Michailova & Sidorova, 2011). Deliberate learning activities typically contribute to performance through exploitative learning and capability building. However, elements applied to e-learning such as collaboration, social and informal learning, and retrospective sense-making, can also aid explorative learning. These concepts are discussed in more detail below.

2.4 Workplace E-learning and Dynamic Capability

Deliberate learning practices have a clear place in exploiting existing knowledge to improve business processes, but their role in innovation and adaptation is less apparent (Sung & Choi, 2014). For example, learning and training investment has been strongly linked to indications of knowledge exploitation such as productivity, quality and service (e.g., Birdi et al., 2008; Salas et al., 2012; Úbeda García et al., 2014). However at an organisation level, meta-analytical analyses show that the association between learning investment and other measures of firm performance is unclear (e.g., Percival, Cozzarin, & Formanek, 2013; Valerij & Tomaž, 2013). Despite these ambiguous results, corporate expenditure on training and development has grown at an annualised rate of between three and four percent in the previous decade (Bersin, 2014). By comparison, e-learning market growth is estimated at between seven and thirty-five per cent annually (Docebo, 2015; Reynolds et al., 2014). Technology-enabled training now accounts for 25% of all corporate employee's formal learning hours and 40% in Fortune Global 500 companies (L. Miller, 2014; Yacovelli, 2012).

One explanation for the growth in learning and development expenditure is the proliferation of new technologies (Y.-W. Liao, Wang, Wang, & Tu, 2015). For example, a number of studies have shown that an increase in the capital intensity of an organisation, measured by equipment, computer and software expenditure, is associated in with an increase in the level of human capital held in the organisation (e.g., Bartel, Ichniowski, & Shaw, 2007; Bresnahan et al., 2002; Mehra, Langer, Bapna, & Gopal, 2014). Thus, organisations that upgrade their technology are also more

likely to upgrade their employee skills (Boothby, Dufour, & Tang, 2010). This can be illustrated by Dedrick, Gurbaxani, and Kraemer's (2003) review of 55 studies of IT investment and productivity. Although overall IT investment was associated with increases in productivity, firm-level differences were explained by complementary investment in organisational capital, such as business process redesign and job training. Technical and social advances in learning such as the integration of e-learning with social web platforms and knowledge management tools fundamentally alters how knowledge is generated, stored, and shared (Aharony & Bronstein, 2014; Garcia-Penalvo et al., 2012). Therefore, workplace e-learning is likely to be increasingly significant in organisations' ability to learn and adapt to their environment (M. Wang, 2011).

A major impediment to associating workplace e-learning with dynamic capabilities is the apparent paradox between the change-limiting formality and structures of workplace e-learning and the flexibility and collaboration that it may simultaneously allow. E-learning usually requires the articulation and codification of tacit knowledge. Such codification tends to focus on enabling the economical and accurate execution of specific capabilities rather than the fluid and extemporaneous execution of varied opportunities (Eisenhardt, Furr, & Bingham, 2010). Codified tools and the architecture surrounding them are essentially a form of bureaucratic and behavioural control that specifies how employees should act in a given situation, thereby limiting responses to environmental challenges (Venkitachalam & Willmott, 2016). Furthermore, institutional structures often act to standardise strategic knowledge assets, promoting benchmarked best-practice activities (Francis & Holloway, 2007; Michalski, 2014). On the other hand, capability development activities expose employees to broad perspectives, expertise, and additional insights through which they can expand their capacity for adaptation and innovation (Bosua & Mendoza, 2012; Edmondson, 2003). Moreover, the increasing use of integrated networking tools offers significant opportunity to improve knowledge creation and sharing in the workplace (Garcia-Penalvo et al., 2012; McAfee, 2009).

One way to integrate e-learning processes into the dynamic capability literature is to divide the technology and processes into ambidexterity components. Ambidexterity allows the simultaneous pursuit of incremental and discontinuous innovation by hosting multiple contradictory structures, processes and cultures within the same organisation, (C. A. O'Reilly & Tushman, 2013; Tushman & O'Reilly, 1996). Workplace e-learning is more easily aligned to incremental innovations by

assisting faster communication, distribution, and integration of new or existing operations, products, or services. However, both explorative and exploitative learning processes can be delivered using technical media (Lichtenthaler, 2009). The goals also determine whether explorative or exploitative capabilities are sought. For example, an organisation may seek to become a *learning organisation* (Senge, 1990), develop an innovative workforce, enable the rapid sharing of knowledge, and make internal competence development more efficient and economical (Netteland, 2007). The first two ambitions more relate to explorative learning, and the latter to exploitative, although there is significant complementarity between the processes.

Correspondingly, Adams and Morgan (2007) refer to a paradigmatic continuum of *first* and *second* generation e-learning systems. First generation e-learning tends to be technology-driven and based on a compliance learning model where instruction is controlled and linear. This model assumes there are *correct* answers with assessment systems that record learner progress and test completion (G. Morgan & Adams, 2009). The second-generation approach, on the other hand, is pedagogy-driven and provides a network of interconnected learning opportunities rather than a library of separate online texts and courses. While both paradigms can use sophisticated multimedia, and interactive and collaborative Web 2.0 technologies (P. Anderson, 2007; Y. A. Argyris & Monu, 2015; T. O'Reilly, 2007), the key difference is the fundamental learning design. Although the *first* and *second* implies that the latter follows and is superior to the former, both are useful in different contexts. First generation e-learning is likely to be more appropriate where technical training must meet specific learning goals, where there are legal, ethical and/or quality parameters to meet, and consistency is the primary goal (Adams & Morgan, 2007). Second generation e-learning is more appropriate where the priority is to benefit from empowered learners, where new approaches are needed through innovative thinking, and there is an urgent need for change at a group or organisational level to meet emerging demands. Therefore, technology that enables collaborative, and consequently explorative learning, only contributes to developing dynamic capabilities in certain contexts.

2.5 How Workplace E-learning can Reflect and Support the Development of Dynamic Capabilities

Teece (2007a) describes dynamic capabilities as a process involving the capacity to sense opportunities and threats, seize opportunities, and where necessary reconfigure intangible and tangible assets. Furthermore, continuous or semi-continuous engagement in sensing, seizing, and reconfiguring is essential if the organisation is to sustain itself as customers, competitors, and technologies change (Teece, 2014a). We propose that these capabilities are analogous to e-learning processes in three broad areas: (1) adoption (sensing), (2) content (seizing), and (3) evaluation (reconfiguring). An organisation's leaders seeking to improve capabilities choose to adopt learning technology and particular learning strategies as a result of sensing technological opportunities. The learning content results from the seizing of an organisation's knowledge resources (both tacit and explicit) that address employees' learning needs. The reconfiguring of e-learning technology, content, and strategy results from some degree of evaluation. These three groups of capabilities, as they apply to e-learning processes, are described in greater detail in the following sections. Using these groups, we also offer a set of propositions aimed at explaining how workplace e-learning can both reflect and support the development of dynamic capabilities.

2.5.1 E-learning Adoption

The objectives when adopting e-learning may be operational but can also be dynamic. Operational goals may include: providing consistent training across geographical boundaries, reducing cycle time, increasing learning convenience, improving tracking, lowering costs, and saving time (H.-J. Chen, 2010; Reynolds et al., 2014; Waight & Stewart, 2005). These operational goals align to human resource management practices that contribute to greater cost-efficiencies through increased productivity (Kramar, 2014). Dynamic goals are more aligned to *strategic* human resource management principles in support of the firm's competitive strategy (Huselid, Jackson, & Schuler, 1997) such as competence management (Wright & Snell, 1991), human resource development (Homan & MacPherson, 2005), strategic fit (Boxall & Purcell, 2000; Delery, 1998) and workforce strategy (Becker & Huselid, 2006). Strategic human resource management is "a set of internally consistent policies and practices that ensures a firm's human capital contributes to the achievement of its business objectives" (Huselid et al., 1997, p. 172). The

distinction between human resource management (HRM) and strategic HRM is similar to that of between operational and dynamic capabilities.

Strategic HRM is closely associated with high-performance work systems which consist of such practices as extensive employee development, and participation in decision-making (Boxall & Macky, 2014; Kramar, 2014; Úbeda-García, Claver-Cortés, Marco-Lajara, Zaragoza-Sáez, & García-Lillo, 2018). E-learning processes aligned to strategic human resource management will be configured to disproportionately invest in strategic jobs or the strategic core of the workforce (Becker & Huselid, 2006). For example, Cisco Systems launched an online university in 2003 as a focal point for all employee career management and development. The underlying purpose was to provide the company with the ability to develop versatile and adaptable employees, who could move quickly to areas of highest need (Chang, Chatman, & O'Reilly, 2011). Furthermore, human resource development efforts are supported beyond explicit information transfer by informal tacit knowledge-sharing enabled by Cisco's numerous online networks and local communities of practice (Hildrum, 2009). Cisco engages in strategic human resource management when they deliberately align competence and behaviour to strategy. It is only when employees are able to contribute to an organisation's strategic objectives that they have strategic value (Becker & Huselid, 2006). As such, it is proposed that:

Proposition 1: Alignment of e-learning processes to strategic human resource management will support the development of dynamic capabilities.

Effective e-learning will not contribute to dynamic capabilities unless there are adaptive mechanisms within its processes (DeRouin et al., 2005; Ragab & Arisha, 2013). These adaptive mechanisms allow opportunities for innovation and renewal to the e-learning system itself and also to the learner community. Given that e-learning is a technology-based intervention that is continuously advancing, constant improvement and innovation of the related processes are also necessary. Adaptation within the e-learning intervention itself relates to the pace of development, the degree that the e-learning integrates with the business, and the functionality of the technology (Waight, Downey, Wentling, & Arvidson, 2004). Adaptive mechanisms within the learner community allow opportunities for reflection, evaluation, application and synthesis of business problems and solutions affecting the members of the network (Tell & Halila, 2001). These mechanisms are illustrated by Cisco Systems' Content Network, which is a combined e-learning

and knowledge management system. As well as providing Cisco's 72,000 employees and 350,000 Cisco-certified partner technicians with easy access to technical information, it also provides opportunities for innovation and collaboration (Cisco Systems, 2015; Hildrum, 2009). The Content Network system uses various digital formats, such as video-streaming, 3D animations, simulation exercises and digital interactive documentations, and a large number of technical chat rooms. The system is adaptive not only because of its administration by special groups of staff responsible for updating information but also through the interactivity built into the learning processes (Hildrum, 2009). Therefore, we also propose that:

Proposition 2: Having effective adaptive mechanisms within e-learning processes will support the development of dynamic capabilities.

Dynamic capabilities are closely associated with the speed of environmental change and how quickly an organisation can adapt its operational processes to new circumstances (D. Li & Liu, 2012; Wilhelm et al., 2015). E-learning processes are therefore required to be rapidly developed and swiftly integrated into other organisational processes. Rapid e-learning software and techniques refer to online learning that can be created and administered quickly and which requires limited effort in development and delivery (Bersin, 2004; DeRouin et al., 2005). The rapid e-learning concept is a logical extension of a general movement toward faster training development. Tripp & Bichelmeyer (1990) were the first to suggest that the principles of rapid prototyping for software development could also apply to instructional design. The basis of rapid prototyping is that design and research or construction and utilisation are conducted simultaneously, using tools that offer modularity and plasticity. Modularity allows a segment of an instructional unit to be added, removed, or modified with little impact on the unit as a whole. Plasticity is the ability to change aspects of the unit with only minor time or cost penalties (Tripp & Bichelmeyer, 1990). Through a process of continual development and testing, e-learning programmes can be brought to users more quickly, and are more likely to meet learners' usability and content needs (DeRouin et al., 2005). However, Tripp and Bichelmeyer (1990) acknowledged that rapid prototyping would not be appropriate for every instructional situation. Accordingly, three situations appear to be most appropriate for the rapid model: those where the current experience is unrealised, insufficient, or unsatisfactory. Cisco Systems' rapid e-learning involves video-based instruction where changes

can be communicated quickly through simple changes to the videos posted on the Web (Hildrum, 2009).

Process integration involves minimising communication and coordination efforts between the activities involved in a process (Berente, Vandenbosch, & Aubert, 2009). The fewer the steps and exchanges of information in a process, and the less effort that is involved with each handoff, the greater the integration of the process (Wakayama, Kannapan, Khoong, Navathe, & Yates, 1998). E-learning processes integrated with other organisational functions accelerate the pace that new products, systems, and processes merge into an organisation's operations. The time associated with the flow of information between an operational process and e-learning is a key indicator of the level of process integration. For example, New Zealand-based software company, Orion Healthcare, reduces the lag of bringing new products or software updates to market by establishing matrix teams from product development and training functions (Minnie, 2013).

Bearing in mind these arguments, we propose the following:

Proposition 3: Integration of e-learning processes into aspects of other organisational functions supports the development of dynamic capabilities.

Proposition 4: Using the principles of rapid prototyping in e-learning development, where appropriate, supports the development of dynamic capabilities.

2.5.2 E-learning Content

Learning content delivered online can assist the development of both operational and dynamic capabilities. The e-learning programme itself may be purely operational, relatively static and derived from operating procedures that meet industry standard practices. However, if the content or delivery is significantly different in quality from those of an organisation's competition, the learning programme can create a strategic advantage. For example, IBM uses numerous content-related approaches aimed at dynamic performance, such as on-demand learning, extensive use of distributed subject-matter experts, content modularisation, mixtures of web-based or web-mediated material, and interactive platforms (Tai, 2007). Content alignment to business goals is frequently recommended in the e-learning literature (e.g., M. Wang, 2011). However, van Dam

(2004) argues that alignment alone is no guarantee of business impact if the learners do not accept the technology. Also, the efficient provision of material is insufficient to foster learning without the active and purposeful engagement of the learners (Kellogg & Smith, 2009; Miyazoe & Anderson, 2014). The most widely cited model of technology adoption and usage is the Technology Acceptance Model (Brown & Charlier, 2013). This model maintains that a learner's attitude to a given information system derives from two variables: perceived usefulness and perceived ease of use (F. D. Davis, 1989). The proposition following from these suggestions are:

Proposition 5: E-learning content that is innovative, aligned to strategic goals, and that has user acceptance supports the development of dynamic capabilities.

Where and how e-learning content is derived, also indicates the type of capabilities being developed. Web 2.0 technologies allow other possibilities for learner acceptance by opening previously unavailable communication channels. Web 2.0 functionality affords a greater capacity to aggregate knowledge (M. Wang, 2011) and to provide opportunities for informal learning by supporting knowledge exchanges based on informal social relations (Garcia-Penalvo et al., 2012; Seufert, 2012). For example, the use of wikis has become popular in organisational settings, affording a new open approach to developing content (Bozarth, 2012). Wikis are collaboratively created and iteratively improved sets of interlinked web pages that support group-level knowledge sharing and creation activities in online environments (Daspit & Souza, 2012; Wagner, 2004). These spaces allow members to collaboratively add, delete, and change content in an organic and seemingly anarchic way (Majchrzak, Wagner, & Yates, 2013). Such a system has the potential to threaten the traditional control of organisational knowledge and represents a fundamentally different form of collaboration (Hasan & Pfaff, 2012; Pfaff & Hasan, 2011). However, technologies that promote one skill often get in the way of another. The learning of technical or *hard* skills benefit from an instructional approach geared towards rote learning and where rule-following and memorisation is relevant (G. Morgan & Adams, 2009). In contrast, collaborative learning technologies are appropriate in situations where the content being learned requires significant interpretation and judgment. These arguments lead us the following:

Proposition 6: E-learning that uses appropriate collaborative techniques and technologies will support the development of dynamic capabilities.

Dynamic capabilities take a variety of forms and involve different functions, but the overriding characteristic is that they are higher-level capabilities that create, extend or modify operational capabilities (Winter, 2003; Zollo & Winter, 2002). Learning content that develops adaptive rather than specific capabilities is, therefore, consistent with these goals. Adams & Morgan (2007) refer to the *second generation* e-learning approach that seeks to put the learner in control of the learning. This approach provides a network of interconnected learning opportunities rather than a library of separate online texts and courses. Similarly, content that develops soft skills aims to equip learners with the capacity to apply general learning to their specific contexts (G. Morgan & Adams, 2009). These pedagogical approaches advance a popular vision offered by organisational learning theorists such as Argyris and Schön (1997), Senge (1990) and De Geus (1988) of creating learning organisations in practice. Although e-learning focused on soft skills may primarily communicate a rigorous body of professionally validated content knowledge (e.g., the latest thinking on business strategy, effective teamwork, leadership, operations management, or financial structuring), its principal goals transcend communicating theories and ideas. According to Morgan and Adams (2009) workplace soft skill education has two objectives: to increase the knowledge base of the learner and provide a foundation for personal judgment. Fostering an awareness of how and when to use the material being communicated is as important as the knowledge that it contains (Adams & Morgan, 2007). If the instructional design engages *second generation* reflective learning to address complex issues, the delivery of even technical content can contribute to dynamic capabilities. Examples include problem-solving scenarios (e.g., M. Bell, Martin, & Clarke, 2004), gamification (e.g., De-Marcos, Domínguez, Saenz-De-Navarrete, & Pagés, 2014) and simulations (Watanabe, Okada, & Yamamoto, 2011). Because all these techniques can be delivered in text form, they may need little technical sophistication for delivery. Summarising these arguments, we offer the following proposition:

Proposition 7: E-learning that uses of elements of *second generation* pedagogies support the development of dynamic capabilities.

2.5.3 E-learning Evaluation

Models of dynamic capabilities usually refer to a reconfiguring stage based on some form of evaluation, assessment and judgement (e.g., Teece, 2007a, 2014b). It is through the evaluation process that an organisation can validate and continue activities that work, and modify or discontinue activities that do not work. According to Wang et al. (2010) e-learning systems should be evaluated based on three considerations: alignment of individual and organisational learning needs, the connection between learning and work performance, and the interaction between individual learners. An evaluation strategy that overly focuses on technical fitness – that is *doing things right* – will only contribute to operational capabilities. E-learning development often focus on the technical issues of design, rather than how it can meet the organisation’s vision and mission and therefore programmes fail to improve work performance (M. Wang et al., 2010). However, programme assessment focused on evolutionary fitness or *doing the right things* will be geared more towards the development of strategic capabilities (Nembhard & Tucker, 2011; Teece, 2007a; M. Wang et al., 2010). Emphasis on internal metrics, such as efficiency improvements, can only be considered dynamic if there are externally-relevant benefits. For example, Jiffy Lube International uses e-learning extensively to certify all service centre technicians. Effectiveness measures are based not on learning or even behaviour, but on comparative sales per customer and competitive customer service scores (Training and Development, 2012). Therefore, we suggest the following:

Proposition 8: E-learning processes evaluated for the achievement of externally-relevant objectives are more likely to support the development of dynamic capabilities.

Fundamental to the dynamic capabilities concept is that capabilities have a lifespan, making them subject to constant renewal, replication or retrenchment (George, 2005; Helfat & Peteraf, 2003). Likewise, for an e-learning system to remain relevant to an organisation’s aims, it will need to be responsive to internal requirements and external changes. Ongoing evaluations of the processes involved should also scrutinise the system’s deployment speed and responsiveness to change (H.-J. Chen, 2010; Luor et al., 2009). The degree to which the learning system expedites rather than inhibits new products or processes will partly represent its contribution to developing dynamic capabilities. Another evaluation consideration is the interactions within and between individual learners and instructors (M. Wang, Vogel, & Ran, 2011). Collaboration has been

identified as important for learning acceleration but also for groupwork performance (Nembhard & Tucker, 2011). Dynamic pedagogical evaluation will consider programme changes as a result of interactions through synchronous e-learning delivery or blended learning approaches (Shivetts, 2011). Therefore, dynamic e-learning evaluations will also consider the amount of collaboration and communication that the system stimulates, either off- or online. Based on these arguments, we put forward the following:

Proposition 9: E-learning processes evaluated for internal and external responsiveness are more likely to support the development of dynamic capabilities.

Proposition 10: E-learning processes evaluated for collaboration are more likely to support the development of dynamic capabilities.

2.6 Discussion

The propositions presented here do not suggest that firms with strong dynamic capabilities will use e-learning, nor do they suggest that the use of e-learning will necessarily lead to dynamic capabilities. E-learning use depends on many factors such as the strategy, size, distribution and resources of an organisation (Nunes, McPherson, Annansingh, Bashir, & Patterson, 2009). Dynamic capabilities evolve from a complex network of resources, routines and relationships and cannot be explained through one communication structure (Macpherson, Jones, & Zhang, 2004). What our propositions do suggest is that if an organisation uses e-learning, aspects of these processes will indicate a level of dynamic capability. There will also be an indirect impact on dynamic capability as an organisation's e-learning processes affect the dynamism of its operational capabilities. Underlying these suggestions are the opposing poles of constructivism (technology is only given structure and meaning through human interpretation) and determinism (technology enables or constraints certain behaviours) (Hutchby, 2001). These arguments are at least partially resolved by Zammuto, Griffith, Majchrzak, Dougherty, & Faraj's (2007) explanation of the increasingly symbiotic relationship between IT and organisation, which they call *affordances*. An affordance perspective recognises how the materiality of a technological object "emerges from the intertwining of IT systems and organisation systems" (Zammuto et al., 2007, p. 752). Similarly, Boudreau and Robey (2005) perceived technology as enacted from an evolving human agency that

also may constrain that agency. So how an organisation uses e-learning depends not only on the functionality characterising the technology but also the expertise, organisational processes and procedures, controls, and other social capacities present in the organisation (Zammuto et al., 2007).

One issue with the propositions presented in this article is the direction of causality – do organisations with dynamic capabilities use e-learning in a particular way or does e-learning used in a particular way support the development dynamic capabilities? We suggest that the former is truer, although there is indigeneity between the two. For example, Moon's (2015b) recent study compared social learning technology use between best-in-class and other organisations. Social learning technology includes blogs, wikis, and online communities of practice. Best-in-class organisations are defined as the top 20% over three performance measures: highly engaged employees (81.5% mean); an increase in revenue per full-time-equivalent employee over the previous 12 month period (13.2% mean); and an increase in customer retention (9.5% mean) (Moon, 2015a). The study found that best-in-class organisations are more likely to use social learning via technology (72%); more likely to utilise user-generated content for learning (78%); and more likely to encourage learning from peers (32%), not just from managers (Moon, 2015b). Best-in-class organisations are also two and a half times more likely to say their HR applications are social and collaborative, and their employees are twice as likely (104%) to locate subject-matter experts through socially-enabled technologies (Moon, 2015a). A similar study found that companies using social learning technology improve revenue at twice the rate of those that do not (8% vs 4%) (Lahey, 2014). Does this mean that in order for organisations to become best-in-class they should adopt social learning technology? Clearly not, but we suggest that more dynamically capable organisations will apply these technologies differently.

One of the problems with dynamic capabilities research is the lack of observables (Godfrey & Hill, 1995). Without access to decision-makers' thoughts, researchers cannot adequately test for dynamic capabilities (Arthurs & Busenitz, 2006). For example, if spending on learning and development activities were to be used as a proxy for dynamic capabilities, there is little evidence that this investment results in performance in the short-term (Tharenou, Saks, & Moore, 2007). Also, the outcomes that are generally associated with dynamic capabilities, such as the commercialisation of new products or entry into new markets, are often a result of long-term decisions which are often made years earlier (Ellonen, Wikstrom, & Jantunen, 2009). We suggest

that a practical approach is to focus on concrete organisational processes, and simultaneously link the discussion to knowledge processes. Two good examples of studies that took this approach are Kale and Singh (2007) and Bruni and Verona (2009). Kale and Singh (2007) examined alliance capability in order to discuss learning processes that constituted the specific dynamic capability. Bruni and Verona (2009) investigated product innovation in pharmaceutical firms to determine how much market knowledge contributed to performance heterogeneity. This kind of approach to the operationalisation of dynamic capabilities has the benefit of offering both academic and managerial contributions (Eriksson, 2014).

The study of dynamic capabilities through workplace e-learning offers several advantages over more functional performance indicators such as alliances, product development, and acquisitions (e.g., Kale & Singh, 2007; Macher & Mowery, 2009; Zollo & Singh, 2004). First, workplace e-learning engages many parts of an organisation and therefore performance is not the result of isolated actions. Second, e-learning processes integrate into the development of new operational processes. Third, dissecting e-learning processes offer valuable insights into the operationalisation of an organisation's goals; its environmental responsiveness and approaches to human capital development. For example, Aral and Weill (2007) compared IT investment and IT capabilities with firm performance of 147 US firms over a four year period. The authors were able to show that although total expenditure on IT assets was not associated with performance, investments in specific IT assets explain performance differences along dimensions consistent with their strategic purpose (such as innovation or cost-leadership). Therefore, it is reasonable to assume that organisations that use e-learning will be directed by their strategic intent and their capabilities, and that they will develop online training practices accordingly.

Numerous investigations show that deliberate learning mechanisms play an important role in mediating the assimilation of new ideas and experiences (e.g., Arthur & Huntley, 2005; Berghman et al., 2013). Codification of experience helps organisations to *see through the fog* of causal ambiguity surrounding complex activities (Zollo & Winter, 2002). However, some point out the risks of over-codification limiting flexibility if the documentation process is not coupled with a degree of active enquiry (Heimeriks, Schijven, & Gates, 2012; Venkitachalam & Willmott, 2016). An organisation's capability to accumulate knowledge, or assimilation capacity (Protogerou et al., 2012), are processes aimed at interpreting and understanding acquired knowledge through critical

reflection (Zahra & George, 2002). Zollo and Winter (2002) refer to this practice as retrospective sense-making. Berghman et al. (2013) argue that the value of deliberate learning activities comes not only from their mechanisms for knowledge exploitation but from their capacity to stimulate collective critical reflections and discussions. Thus, an e-learning system integrated into an organisation's operations is not only a better knowledge storage and distribution system, but also a sense-making system that directly affects an organisation's innovation capacity (Donate & Guadamillas, 2011). For example, Kane & Alavi (2007) compared explorative and exploitative processes in an organisation mediated through different IT-enabled learning mechanisms. Their simulation suggested that organisations with high employee turnover benefit most from exploitative learning mechanisms such as knowledge repositories. Alternatively, organisations experiencing substantial environmental turbulence benefit most from an exploration mechanism, such as electronic communities of practice.

2.7 Conclusion

Typically organisational learning and dynamic capabilities are viewed as separate concepts, although there is a great deal of overlap in their literatures (Jiao et al., 2010; Lichtenhaler, 2009). For example, both concepts include an element of ambidexterity, which balances the tension between explorative and exploitative activities. We propose that by disaggregating learning processes into their ambidexterity elements we can better investigate dynamic capability development. Early research interpreted ambidexterity to be a dynamic capability (C. A. O'Reilly & Tushman, 2008), however more recently they have evolved into separate, but related, streams (Wilden, Hohberger, Devinney, & Lavie, In Press). This study may help understanding of how exploration, exploitation, and dynamic capabilities relate. In a similar vein, we argue that to avoid confusing pre-conditions and constituent components, *antecedents* and *microfoundations* should be differentiated. This, however, is often challenging, because antecedents and microfoundations generally co-evolve (Barney & Felin, 2013). For example, an organisation's learning strategy and decisions to engage in an e-learning programme are influenced and altered by subsequent e-learning experiences. Adding to the complexity of the dynamic capabilities literature is the interactivity between levels of analysis. As Coleman (1990) argues, interventions intended to change a variable at the macro-level are often made at levels below that of the system as a whole.

Building responsive and adaptable firm-level capabilities requires significant knowledge of what goes on at the micro levels such as learning mechanisms and learner responses (Foss, Husted, & Michailova, 2010). Because of this, it is possible to gain a greater understanding of the organisation-level construct of dynamic capabilities by examining the workings of an integrated learning activity.

Our contribution can be summarised as follows. First, disaggregating a learning practice by its ambidexterity elements establishes a theoretical link between the practice and the development of dynamic capabilities. Second, the investigation of the dynamic element of a practice provides insights into the microfoundations of organisational learning and ultimately, dynamic capabilities. We make our third contribution by suggesting how e-learning processes can contribute to the sustained success of an organisation. We hope that other scholars will further explore and test these ideas. The challenge is that the research paradigms of the primary construct and learning processes are relatively nascent and fluid. Moreover, different learning processes enable particular organisations to take different paths, creating idiosyncratic operating routines and practices. This diversity creates what Levinthal (1997) describes as a *rugged* landscape, where formal theorising and positivist methodologies make it difficult to meaningfully investigate our propositions. Therefore, we recommend the use of more deductive logic which uses appreciative approaches (qualitative, observation-based) as a starting point (Nelson & Winter, 1974; Teece, 2014a). Although large dataset studies are sometimes used to trace the components of dynamic capabilities, the best opportunity for illuminating the complex relationships discussed in this article is offered by in-depth qualitative research (Teece, 2012).

3. Essay Two: Integrating a Dynamic Capabilities Framework into Workplace E-learning Process Evaluations

James Costello and Rod McNaughton

Abstract

The goal of workplace e-learning programmes is to improve employee capabilities in order to enhance the performance of organisations. However, notions of sustained performance in strategic management have moved from measures of production and profit towards innovation and adaptation. We therefore suggest that the design and evaluation of e-learning should also be consistent with the dynamic capabilities framework (Teece, Pisano, and Shuen, 1997), which suggests that sustained superior performance results from an organisation's ongoing ability to alter operational routines in line with environmental requirements. With the intent of showing how e-learning can be configured and evaluated to support the development of dynamic capabilities, we present the findings of an exploratory qualitative study that examines e-learning processes and evaluations in twelve New Zealand organisations. Our analysis reveals that organisations operating in more dynamic environments are more likely to use e-learning to support innovative and adaptive processes, and to evaluate their e-learning accordingly. This study's findings expand our overall understanding of the dynamic capabilities concept and shows how e-learning can be aligned to the achievement of more fluid objectives.

3.1 Introduction

The goal of workplace e-learning is to improve employee capabilities in order to enhance organisation-level performance. However, effectiveness is usually understood in a static context, where competitive advantage depends on superior capabilities (Baldwin & Ford, 1988; Kline & Harris, 2008). Such capabilities can be valuable, but they are not always sources of sustainable competitive advantage (M.-J. Chen & Miller, 2012; Collis, 1994). This is particularly true of the lower-order capabilities that reflect an organisation's ability to perform basic functions and activities to produce products and services. Such capabilities are increasingly copied, substituted, or made obsolete by competitive actions (D'Aveni, Dagnino, & Smith, 2010; S. Li, Shang, & Slaughter, 2010). To maintain a distinctive advantage, organisations must adopt a more dynamic perspective and develop capabilities and structures that support innovation and adaptation. Employee development activities, such as e-learning, must therefore be designed not only to develop *specific* capabilities but also to create mutable or *dynamic* capabilities (Sung & Choi, 2014). However, there may also be an efficiency trade-off between developing specific capabilities and developing dynamic capabilities (Ambrosini & Bowman, 2009; Drnevich & Kriauciunas, 2011) that is moderated by the degree of environmental turbulence (Pavlou & El Sawy, 2006; Wilhelm et al., 2015).

The dynamic capabilities framework (Teece et al., 1997) suggests that sustained organisational performance results from alterations to operational routines that are consistent with environmental requirements. This is particularly evident in industries with high rates of change in competition, customer preferences, or technology (Eisenhardt & Tabrizi, 1995; Wilhelm et al., 2015). The management of knowledge resources allows an organisation to improve its market responsiveness and leads to the development of dynamic capabilities (Griffith, Noble, & Chen, 2006; J. J. Liao, Kickul, & Ma, 2009). Further, learning mechanisms that accumulate, articulate, and codify knowledge, mediate the impact of knowledge resources on dynamic capabilities (Chien & Tsai, 2012; Zollo & Winter, 2002), and guide their evolution (Easterby-Smith & Prieto, 2008; Zollo & Singh, 2004). Nonetheless, few studies have examined how specific learning tools influence the development of dynamic capabilities. One notable exception is Iris and Vikas (2011), who hypothesised that e-learning technologies and dynamic capabilities coevolve through knowledge

sharing and transfer. They found a strong positive association between general e-learning use and dynamic capabilities but did not fully explain the nature of the relationship.

Investments in learning have generally been shown to improve individual and organisational productivity, skills, and capabilities (e.g., Allaart, Kerkhofs, & de Koning, 2002; Becker & Huselid, 2006; Subramony, Krause, Norton, & Burns, 2008). Yet, these same investments can stifle innovation by promoting best practices that limit creative responses when the business landscape changes (Romme et al., 2010; Schulz, 1998). Aspects of e-learning might overcome some of such inertia by enabling swift integration of learning with organisational strategies and social structures (Noe et al., 2014; Nunes et al., 2009; Wakayama et al., 1998). For instance, e-learning initiatives offer significant opportunities to improve knowledge creation and sharing (Garcia-Penalvo et al., 2012; McAfee, 2009; Yoo, Boland, Lyytinen, & Majchrzak, 2012) and permit more agile responses to environmental changes (H.-J. Chen, 2010; Luor et al., 2009). In addition, technical and social advances such as the integration of e-learning with social media, networking, and knowledge management tools can alter how knowledge is generated and transferred (Garcia-Penalvo et al., 2012; Reynolds et al., 2014). These advances allow organisations to use e-learning to facilitate more responsive, flexible, and innovative learning (Callan et al., 2015; Waight et al., 2004), and thereby contribute to the *democratising* of both the innovation process (Yoo et al., 2012) and organisational structures (Purvis, Sambamurthy, & Zmud, 2001; Zammuto et al., 2007).

This paper explores the possible relationship between the development of dynamic capabilities and e-learning processes. The dynamic capabilities lens has been applied to new product development, alliances, and acquisitions (e.g., Danneels, 2002; Kale & Singh, 2007; Prieto et al., 2009; Zollo & Singh, 2004). Applying this same lens to e-learning processes and their evaluations offers several advantages over more functional applications. First, the development and implementation of workplace e-learning engages many parts of an organisation, rather than only specific functions. Second, e-learning processes are integrated with new operational processes and therefore important to an organisation's innovation and change. Finally, studying these processes may offer valuable insights into operationalisation of organisations' learning goals, environmental responsiveness, and approaches to human capital development. In this study, we explore the following questions: How do organisations use e-learning processes to enable dynamic

capabilities? How do organisations evaluate the ability of these processes to support the development of dynamic capabilities? Are there fundamental differences in how organisations use e-learning processes to accommodate dynamic capabilities? In order to answer these questions, we report and discuss the findings of an exploratory qualitative study that examines e-learning processes and evaluations in twelve large New Zealand-based organisations.

The paper is organised as follows. First, we review the literature on the impact of various learning strategies on dynamic capabilities. We then consider learning effectiveness and how e-learning process evaluations may be influenced by the dynamic capabilities framework. We then explore how organisations use and evaluate their e-learning processes to achieve business goals. Our analysis highlights how organisations' e-learning strategies and measures are embedded in broader capability strategies and the organisational context. We conclude by showing how deliberate learning strategies such as e-learning can reflect and support the development of dynamic capabilities. This paper contributes to current research in several ways. First, it demonstrates how e-learning processes might be used to develop and support capabilities that go beyond fulfilling specific operational requirements (Iris & Vikas, 2011). Second, it explains how microfoundational activities such as e-learning can be linked to dynamic capabilities (Arndt, Pierce, & Teece, 2015; Barreto, 2010). Third, it advances the idea that the effectiveness of dynamic capabilities is moderated by environmental imperatives (e.g., Pavlou & El Sawy, 2006; Wilhelm et al., 2015).

3.2 Theoretical Background

3.2.1 Dynamic Capabilities

The dynamic capabilities framework emerged from the realisation that performance and profitability are temporary unless an organisation can continuously adapt and innovate (M.-J. Chen & Miller, 2012). Dynamic capabilities are usually defined as an “ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (Teece et al., 1997, p. 516). When the environment is dynamic or unpredictable, organisations must

generate new practices or routines, which form the foundation of their operational capabilities⁵. Simply put, an operational capability enables an organisation to *make a living* by performing an activity on an ongoing basis to a more or less consistent standard (Helfat & Winter, 2011; Winter, 2003). Operational capabilities are synonymous with what Helfat et al. (2007) call technical fitness or *doing things right*. In contrast, dynamic capabilities are those that help an organisation to achieve evolutionary fit, or *doing the right things*. They represent a signature or meta-routine that systematically adjusts an organisation's operating routines to fit changing environmental requirements (Teece, 2014a, 2017; Wilhelm et al., 2015). Teece (2007a) argues that dynamic capabilities are composed of three microfoundations: sensing, seizing, and reconfiguring. Sensing refers to the identification and assessment of external and internal opportunities. Seizing is the organisation's ability to amass resources and to address the opportunities and threats it has identified. Reconfiguration is the continued renewal of resources for maximum value (Teece, 2014a). At lower levels there needs to be a corresponding cyclical process relating to newly acquired knowledge and capabilities to accommodate the execution of new organisational tasks.

Central to research on dynamic capabilities is the role played by learning (Easterby-Smith & Prieto, 2008; Zahra et al., 2006). Some authors argue that learning is the process that underlies dynamic capabilities (Bowman & Ambrosini, 2003; Teece et al., 1997). Others argue that learning mechanisms guide the evolution of dynamic capabilities (Eisenhardt & Martin, 2000; Winter, 2003) or are a specific type of dynamic capability (Zollo & Winter, 2002). However, most scholars acknowledge that the process of learning may be central to the creation and renewal of operational capabilities (Easterby-Smith & Prieto, 2008; Schilke et al., 2018). Organisations attempt to enhance learning by intentionally articulating and codifying accumulated knowledge into documented procedures (Lundvall, 2004; Zollo & Winter, 2002). However, this strategy may increase an organisation's inertia because standard operating procedures tend to become institutionalized *truths*, which become increasingly difficult to challenge. Romme et al. (2010) showed in a simulation model that deliberate learning strategies lead to different patterns of dynamic capability development at varying levels of environmental dynamism. Their model

⁵ To limit ambiguity, we use *operational* capabilities in this paper. Synonymous terms include: static (Collis, 1994), zero-level (Winter, 2003), first-order (Danneels, 2002), substantive (Zahra, Sapienza, & Davidsson, 2006), or ordinary (Teece, 2014b) capabilities.

demonstrated that higher levels of articulated knowledge (expressed and shared) and lower levels of codified knowledge (developed and organised artefacts) are more suited to high uncertainty situations. This finding is similar to related findings that organisational learning is reduced at higher levels of bureaucracy (e.g., Adler & Borys, 1996; Gill, 2002) and mechanistic structure (e.g., Mallén et al., 2015).

E-learning offers opportunities for both knowledge articulation and knowledge codification. Knowledge articulation is enabled in e-learning through the use of collaborative processes and social technologies, and knowledge codification is enabled through the distribution of knowledge repositories and instructional materials. The effectiveness of an articulation or codification strategy is likely to be influenced by the same factors that determine the effectiveness of dynamic capabilities (Venkatesh & Davis, 2000; Wilhelm et al., 2015). Codified knowledge often represents *the way things are done*. Although efficient in stable situations, codification can make operational routines more difficult to change (Romme et al., 2010; Vaast & Levina, 2006). In dynamic situations, an articulation e-learning strategy would be more likely to increase operating routine performance (Romme et al., 2010).

3.2.2 E-learning Process Effectiveness

The cost of specific learning investments is often difficult to justify, particularly in the short term (Jiang, Lepak, Hu, & Baer, 2012; Valerij & Tomaž, 2013). Even over longer terms, where there is greater evidence of positive outcomes (Collier et al., 2011; Kozlowski, Brown, Weissbein, Cannon-bowers, & Salas, 2000; Wright, Gardner, Moynihan, & Allen, 2005), effectiveness varies significantly between organisations (e.g., Aguinis & Kraiger, 2009; Birdi et al., 2008; Wright et al., 2005), although organisations that measure the effectiveness of training activities are more likely to see business performance improve (e.g., Aguinis & Kraiger, 2009; Kitching & Blackburn, 2002). Nonetheless, learning programmes are seldom rigorously evaluated to determine their effect on the behaviour or job performance of participants, let alone organisational-level outcomes (Bersin, 2006; H. J. Martin, 2010; Phillips & Phillips, 2010). This problem is magnified as relevant skills and knowledge are becoming obsolete faster, particularly in knowledge-intensive industries and activities (Allaart et al., 2002; Backes-Gellner & Janssen, 2009).

Although e-learning is often argued to be more cost-effective and easier to deliver than face-to-face training (e.g., Callan & Fergusson, 2009; Grollman & Cannon, 2003), the amount organisations spend on training remains relatively constant after the shift to technology-based delivery (Patel, 2010). Technology-related and instructional design costs tend to offset the savings in travel and face-to-face trainer time (Chapman, 2010; Salas et al., 2012). There may, however, be other benefits that make e-learning strategically significant to organisations. For example, e-learning can permit faster responses to change because it can be deployed more rapidly (H.-J. Chen, 2010; Luor et al., 2009). Furthermore, learning technology can improve employees' ability to access information and to collaborate, and offers new opportunities to create and share knowledge (Garcia, 2011; McAfee, 2009; Tafti et al., 2007). The flexibility and control that e-learning offers can also be important to learning motivation and satisfaction (Brown & Charlier, 2013; Orvis, Fisher, & Wasserman, 2009). In addition, e-learning programmes have the evaluation advantages of faster learning assessments, more accessible feedback, and auditable communications (Ozkan & Koseler, 2009).

Beyond system functionality, e-learning content can affect the dynamic effectiveness of a learning programme. Some types of training enhance the learner's ability to generalise knowledge and skills and adapt them to new situations and problems. For example, training programmes directed at mastering or achieving proficiency on a specific task can guide learners to understand the underlying principles of the task more deeply than they could through step-by-step procedural training (B. S. Bell & Kozlowski, 2002, 2008). Although orientations that reward knowledge over proficiency risk elevating learning above achievement, there appear to be contextual considerations (Kozlowski et al., 2001; Kozlowski & Bell, 2006). For example, learning goals appear to be more effective than performance goals are for solving complex tasks because they lead to higher levels of self-efficacy and information search (e.g., Keith & Frese, 2008; Seijts & Latham, 2005; Seijts, Latham, Tasa, & Latham, 2004). Similarly, concept-based training appears more likely to protect against human capital depreciation than skill-specific education does (Hanushek, Woessmann, & Zhang, 2011; Krueger & Kumar, 2004; Weber, 2014). Thus, learning content oriented towards a flexible learning strategy and mastery may improve adaptability and resilience in complex task situations.

The key consideration of e-learning effectiveness is the performance goals such learning is designed to achieve (Kozlowski et al., 2001). Views of how employee development affects organisational performance have changed dramatically in recent decades (Glaveli & Karassavidou, 2011). Traditionally, training was perceived as a reactive, piecemeal intervention in response to specific problems. From this view, training can be evaluated quantitatively through *hard* measures such as number of employees trained, hours of training, demonstrable knowledge, productivity gains, and cost per trainee (Black & Lynch, 1996; Ichniowski & Shaw, 1997). In contrast, effective employee development may be viewed as an activity with strong links to organisational missions and strategic goals (Alavi & Leidner, 2001; Dimitriadis, 2005; Garavan, Costine, & Heraty, 1995). This latter view broadens the goals of learning activities beyond the acquisition of specific skills needed for current business operations towards creating an adaptive and innovative workforce that can operate in dynamic environments (Salas et al., 2012). It follows a *soft* approach to understanding effectiveness, which postulates that training activities are effective if they equip employees with the necessary knowledge, skills and attitudes to function autonomously (Guest, 2002). Hard, quantitative measures from this perspective are often unhelpful as they use criteria that are too explicit or too superficial (Kraiger, 2014).

In conclusion, we argue that e-learning process effectiveness is likely to be bound by the same environmental contexts that make the possession of dynamic capabilities effective. Organisations in dynamic environments seem to benefit more from the development and maintenance of dynamic capabilities than those in stable environments (e.g., J. P. Davis et al., 2009; D. Li & Liu, 2012; Wilhelm et al., 2015). Systems that accommodate frequent adjustments to operating routines are less efficient (Pavlou & El Sawy, 2006; Winter, 2003). Flexible learning activities are more difficult to deliver and measure (Romme et al., 2010; Zollo & Winter, 2002) and have change and opportunity costs (Barreto, 2010; Zahra et al., 2006). Therefore, organisations might consider environmental conditions when they balance their learning processes and supporting structures between process efficiency and adaptive effectiveness. An e-learning process strategy that supports the development of dynamic capabilities may be more prevalent in organisations and industries that are characterised by greater uncertainty. We explore these assumptions by comparing e-learning processes across a range of organisations and industries.

3.3 Method

The dynamic capabilities concept is context-bound, complex, and still relatively new, so it is therefore best studied through qualitative research (Teece, 2012, p. 1400). We use a case-orientated research method, as there is little theoretical precedent for deductive or positivist reasoning in this area of research (Eisenhardt, 1989; Ragin, 1999, 2001; Teece, 2014b; Yin, 2009). This orientation is appropriate to document a contemporary phenomenon within its real-life context, particularly where there are no clear boundaries between the phenomenon and the context (Yin, 2009). Twelve New Zealand organisations were chosen that have a distributed workforce of at least 1,000 employees and that use bespoke e-learning as a considerable part of their learning and development strategies. We purposefully selected the cases from diverse industries to enable comparisons that clarify whether e-learning processes are idiosyncratic to single cases or consistent across industries (Eisenhardt & Graebner, 2007). Four of the twelve were public-sector organisations that actively used e-learning. Although public-sector organisations are generally not associated with high rates of change, their managers are increasingly obliged to improve performance (Kearney & Morris, 2015; Meier & O'Toole, 2009; Pablo, Reay, Dewald, & Casebeer, 2007). Another three organisations were from technology-intensive industries, which are associated with high environmental velocity (Bourgeois & Eisenhardt, 1988; McCarthy, Lawrence, Wixted, & Gordon, 2010; Wilhelm et al., 2015). We expected the technology-sector organisations to experience higher levels of change than the public-sector organisations. The remaining five organisations in this study were from the financial and health sectors, which have been categorised as either moderate or high-velocity industries (e.g., Jansen et al., 2006; Judge & Miller, 1991; Stepanovich & Uhrig, 1999). Table 3.1 provides details of the participant organisations, although employee numbers have been rounded and pseudonyms have been used to protect identities.

Some of the sampled organisations are likely to possess stronger dynamic capabilities than others (Teece, 2014a). For example, the three technology companies displayed innovation leadership by entering new markets, and operated with rapidly advancing technology and short product lifecycles (He & Wong, 2004; Jansen et al., 2006; Macher & Mowery, 2009). They were all recently featured in the top five of the Technology Investment Network 100 list, which ranks growth and innovation in the New Zealand technology sector (TIN100, 2016). BetaTech and GammaTech both reported annual revenue growth in excess of 20% over the previous four years.

Over the same period, AlphaTech, an older privately-held company, has won many industry awards for innovation and excellence and reported average annual sales growth of 12%. Therefore, we use revenue growth in rapidly changing environments as a proxy for strong dynamic capabilities. This approach is supported by numerous studies that find environmental dynamism positively affects the contribution of dynamic capabilities to relative firm performance (e.g., Drnevich & Kriauciunas, 2011; D. Li & Liu, 2012; Romme et al., 2010). Other studies support our assumption that organisations possessing strong capabilities are better able to leverage their existing capabilities in innovation development (e.g., Ellonen et al., 2009; Jantunen, Ellonen, & Johansson, 2012).

Table 3.1 Participant Organisation Descriptive Data

Pseudonym	Sector	Employees	Distribution	Interviews
AlphaGov	Government	5,000+	National	1
BetaGov	Government	5,000+	National	2
GammaGov	Government	5,000+	National	2
AlphaTech	Technology	1,000+	International	2
BetaTech	Technology	1,000+	International	4
GammaTech	Technology	1,000+	International	3
AlphaHealth	Health	2,000+	International	2
BetaHeath	Health	3,000+	National	1
AlphaFin	Financial Serv.	3,000+	National	2
BetaFin	Financial Serv.	2,000+	National	2
GammaFin	Financial Serv.	3,000+	National	1

Our data came primarily from semi-structured interviews, which we conducted face-to-face in three New Zealand cities over a fifteen-month period. Research participants were recruited directly by phone and invited to participate. We identified potential participant organisations from membership in, and presentations to, related New Zealand trade associations – the Human Resource Management Institute, the Association of Training and Development, and the Technical Communicators Association. Acceptance was high (above 80%) and those who declined to participate did not appear to be systematically different than those who accepted. The interview participants were responsible for decisions regarding the adoption, content, and evaluation of e-learning within their organisations. Participants’ job titles included Digital Learning Specialist, Learning and Development Manager, and Director of Education. In instances when decisions regarding e-learning were distributed over a number of roles, we interviewed additional respondents from the same organisation for clarification and verification purposes.

We developed an interview protocol based on literature with established dynamic capabilities scales (e.g., Iris & Vikas, 2011; Ravishankar & Pan, 2013) and adapted these to incorporate e-learning processes. The protocol was tested and adjusted from trial interviews of six e-learning practitioners who were not part of this study. Examples of questions from the protocol are ‘How do you know if e-learning content is up to date?’, ‘How do you assess the effectiveness of your e-learning programmes (both formally and informally)?’ and ‘Describe a situation where the assessment has changed the way you do things.’ The full list of the interview questions is provided in Appendix C. A total of twenty-three semi-structured interviews were conducted, each lasting between thirty and sixty minutes, all were recorded and transcribed verbatim. We triangulated our interview data with additional material to better understand the organisational context and cultural features (Yin, 2009). Publicly available documents were obtained about each organisation, including; recent company and annual reports, media articles, press releases and the organisation’s website. These documents were used to assess change rates over multiple dimensions such as revenue, staff turnover, financial growth, technology, and major strategic alterations (Bourgeois & Eisenhardt, 1988; McCarthy et al., 2010; Romanelli & Tushman, 1994).

Broad assessments of industries and organisations often miss the granularity needed to make specific distinctions (Helfat & Winter, 2011). Therefore, we also coded each interview by *emphasis* – dynamic or operational. Table 3.2 shows representative quotations of operational or dynamic emphasis for each theoretical category⁶. Operational contexts and processes primarily concern efficacy, whereas dynamic contexts and processes primarily concern effectiveness (Tece, 2007a). The ratings were independently verified to determine if the interviews focused more on operational or dynamic contexts and processes. We used two research assistants who also coded the dynamic and operational statements in a large sample of our interview data. The overall inter-rater reliability was 94.6 percent, well above the recommended 70 percent (J. Cohen, 2003). Matrix queries were run for attribute values, industry types, and the code categories. Figure 3.1 shows how the interviews were ranked by organisation. Technology companies were more likely to make more dynamic emphasis statements, whereas government organisations made more operational statements. This observation does not clearly indicate the existence of a dynamic capability, but it

⁶ The theoretical categories are explained in the Analysis section.

supports the assumptions discussed in the previous paragraphs. An operational emphasis is concerned with maintaining status quo to support existing practices (Helfat & Winter, 2011), whereas a dynamic emphasis is concerned with extending or modifying existing operational practices (Teece, 2007a).

Table 3.2 Representative Operational and Dynamic Emphasis Quotations by Theoretical Category

Theoretical Categories	Operational	Dynamic
Strategic Adoption Triggers		
Innovation-supporting context Operational and strategic justification	“The business would like to say the rate of change has increased. My interpretation is the rate of change has not.” (GammaGov) “we need to make sure that all 800 people who deal with us have read and understood this memo of the core rules.” (GammaGov)	“decisions are made quickly, you know, we don’t fluff around with lots of paperwork and lots of people” (AlphaTech) “we’re going to do that with online learning as well because globally, if they can do that conversation at the right time and the right place, then they can be more effective, too.” (BetaTech)
Flexibility and management support	“Okay, by having an online platform, we know when people are accessing that platform, and when they’re not accessing it, we can have a conversation with them at an early stage to see what the problem is.” (AlphaHealth)	“I think [xxx] is actually doing really well in that. That’s the CEO of the company. So, he’s on top of all of those new requirements and getting our products in faster, quicker and leaner.” (GammaTech)
Content Alignment and Integration		
Learning-content integration Learning/learner alignment	“And we—from an LMS point of view, we have quite a rigorous sign-off process for something to actually go live.” (AlphaGov) “we do our training needs analysis, ... then we look at the content and look at—so, what are the key messages, what are the skills that you want them to develop, what is the knowledge that they need to develop.” (GammaFin)	“And our customers have log ins to support tracker and they can log their own calls or log their own problems.” (GammaTech) “It’s built into Totara, it’s so—instead of having to say, come into the classroom for two hours to do this classroom training, what we do instead is just post the video and then open a discussion forum.” (BetaFin)
Learning/learner values	“So, the learning content might not be particularly well-designed, it might be quite awful to navigate you through it or complete it, but the first test is the technically correct part...” (GammaGov)	“So, while we’re telling people what to do, we’ve got to give them the freedom to have a play around with it and make sense of it themselves.” (BetaTech)
Responsive Programme Evaluation		
Programme integration	“If you have met your targets but you’re still not into those modules, you’re not going to get a bonus, so it’s kind of hand-in-hand with that.” (BetaFin)	“The final assessment, they are given a scenario, and they have to submit their file, so it’s the environment file, and then it’s marked by a human. ... and I believe it’s a point of difference for us, over other technology companies.” (GammaTech)
Programme review emphases	“And I mean, all of the content owners know that, ... we need you to tell us what’s out of date, we need to make sure all of the scenarios have been updated for current happenings in the business” (GammaFin)	“each server has an open free form field for people to put any additional comments. ... and we get like a hundred and fifty people responding. And that's a fairly--it's a--you get a sense.” (AlphaFin)
Programme Re/development	“so, they’re looking at learning plan reports ... and then we overlay that with budget, but we run a centralised budget, we use our learning plan in order to get funding.” (GammaFin)	“We’re acting on feedback when we get it ...so that everybody knows that they can always provide feedback on any training they do. So, it becomes a given.” (GammaTech)

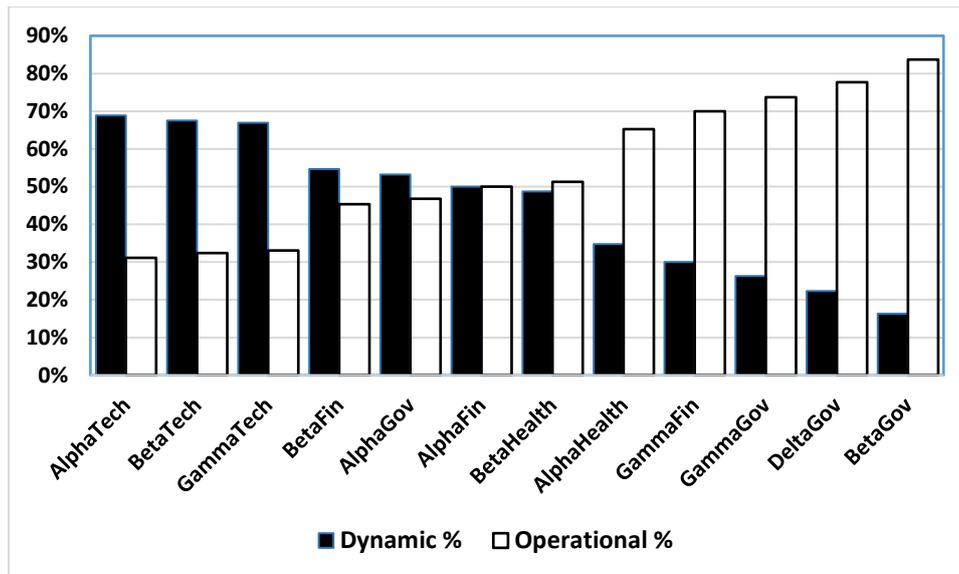


Figure 3.1 Percentage of Dynamic to Operational-Type Statements by Organisation

3.4 Analysis

We used two data analysis approaches, drawing from previous exploratory research on dynamic capabilities (H. Lee & Kelley, 2008; Verona & Ravasi, 2003), and following recommended practices for qualitative data analysis (Corbin & Strauss, 2008; Gioia et al., 2013). We first examined the data using thematic analysis (Braun & Clarke, 2006), followed by mapping and interpretation, guided by a derived theoretical coding frame (Ritchie & Spencer, 1994; Ward, Furber, Tierney, & Swallow, 2013). We categorised each interview by organisation, to allow for a case-orientation, which seeks to explain how processes and causes *fit together* in each individual case (Ragin, 1999). Our first approach involved the initial coding of the interview transcripts using NVivo qualitative research software (version 10). During this process, we constructed initial data matrices to examine the key variables within and across organisations. The second approach was to review theory on dynamic capabilities and human capital development. By iterating between theory and data, we developed a framework of understanding of how e-learning programmes are, or can be, structured and integrated to support dynamic capabilities.

We began with line-by-line coding to discern which type of action an interviewee was discussing. As the project developed, we sometimes moved, merged, renamed, or redefined these codes. During this stage, we iterated between data analysis and the literature to refine our coding scheme and make sense of the concepts that emerged. This step identified 146 open

codes, which are broad categories in which concepts, processes, thoughts and ideas are stored (Edhlund, 2011; Hoover & Koerber, 2011). We then scrutinized these open codes and reduced them to 85 codes (similar to Corbin and Strauss', 1990, axial coding) (See Appendix E for a complete list of the NVivo codes). The next step was focused coding, where we scrutinised the data across the cases in order to test the validity of the codes. We attached memos to codes to justify the selection of passages and to explore each participant's tacit and overt meanings (Charmaz & Bryant, 2010). The memo writing became more analytic and directed as the inquiry progressed.

We then undertook a second level of descriptive coding to identify any sub-categories that might relate to elements of the dynamic capabilities framework. This stage identified theoretical themes and sub-themes to emerge while oscillating between the raw data and a summary table (Corbin & Strauss, 2008). This step enabled us to cluster our initial first-order codes into nine more precise yet still provisional theoretical categories (see Figure 3.2). For example, statements reflecting the history, objectives, and expectations of an e-learning initiative indicate levels of 'operational and strategic justification', which is indicated in the theoretical categories. Following the refinement of existing, or the creation of new theoretical categories, we evaluated these constructs to ensure the themes accurately reflected the subcategories. For example, 'financial, practical and strategic justification' became the simpler and more theoretically relevant 'strategic justification'. This stage allowed us to add precision to the categorisation and to better analyse and refine other emerging concepts, such as 'flexibility and management support'.

After finalising the provisional categories, we investigated their underlying theoretical dimensions in order to understand how the various themes interacted and related to each other in the wider context. For example, some themes indicated environmental and internal conditions conducive to more dynamic learning (innovation supporting contexts) leading to e-learning having been adopted for more strategic reasons (strategic adoption triggers). Some evaluation-related themes indicated how the programme approaches fitted the organisation's strategy (programme integration), the importance placed on various review strategies (programme review emphases), or the growth or changes to the programme itself (programme re/development). These evaluation-related categories showed how the e-learning programme evaluation approach interacted with the organisation's requirements and its context (responsive programme evaluation). See Table 3.3 for representative quotes for all of the theoretical categories.

Table 3.3 Representative Supporting Data for Each Theoretical Subcategory

Theoretical Categories	Theoretical Subcategories
Innovation-supporting context	<p>“I can’t speak for all banks but in this one in particular, there’s an openness to change, and so if you say actually this is a better way of doing things and we want to give this a go. Generally, people are pretty open and will go, ‘okay let’s do it, but let’s do it fast’.” (AlphaFin)</p> <p>“... it seems there’s never an obstacle that’s too big to overcome. If you say I want to do this, then generally, people will make it happen, or they help you make it happen.” (BetaFin)</p>
Operational and strategic justification	<p>“...so, we’re going to do that with online learning as well because globally, if they can do that conversation at the right time and the right place, then they can be more effective” (BetaTech)</p> <p>“...the more cost we can recover, the more investment we can put into developing the platform, developing the content.” (AlphaHealth)</p>
Management flexibility and support	<p>“... the CEO, [said] well I think that e-learning would be great for that because it can be rolled out to everybody, and it’s easy to change and keep up to date.” BetaHealth</p> <p>“Well, I sold it [a substantial e-learning initiative] to our management team in New Zealand. So, I wrote a paper, ... we’re not a corporate so it wasn’t a hundred pages, I think it was three.” (AlphaTech)</p>
Learning/learner alignment	<p>“So, our whole focus on how we talk to people through online learning—we are talking to them to say: you need to own this, so, we’re going to give you the content you can do something with.” (BetaTech)</p> <p>“People are now really starting to get into their online discussion; it’s actually been interesting watching the evolution—how everyone hung back, and now it’s not a big deal.” (AlphaGov)</p>
Learning content integration	<p>“The LMS has a large number of pages that ... that are not traditional LMS activities. So social community for our team leaders who are very isolated across the business...” (GammaGov)</p> <p>“Yes, we do use our Wiki, ... it’s very well-used, and it’s very, very collaborative, it’s used in the way that the Wiki should be used, so it’s excellent.” (BetaTech)</p>
Learning/learner values	<p>“We have close to a 100% capture of not only training activity in the business, but a large quantity of the non-training—the seminars, the presentations, the workshops, this is quite deliberate.” (GammaGov)</p> <p>“So, it’s voluntary, and so we’re getting feedback on the modules all the time to see whether there was engagement, what people are saying and obviously we can also track to see, did people actually complete them.” (AlphaFin)</p>
Programme integration	<p>“For anything compliance-based, we have sort of reporting regimes, on any given day, we’ll be writing reports on various compliance learning.” (BetaFin)</p> <p>“The best model we have is with our product [xxx], and that, our training is launched at the same time as the product is launched.” (GammaTech)</p>
Programme review emphases	<p>“I prefer to do those [reviews] as a face-to-face conversation, because you don’t get quality of information than if you just do a standard evaluation form, everyone’s going to tick it, fantastic, thanks for coming, because they just want to get it done.” (GammaFin)</p> <p>“So, we manage our content via exception, we do six-monthly sweep of material that is not accessed, we mark it as being possibly out of date, and if it’s not used for another six months, we archive it.” (GammaGov)</p>
Programme Re/development	<p>“Someone may have done a procedure wrong out in a district, and that’s come back to bite the organisation—we want to know what the training was like as part of the internal investigation, so records [evaluation] are very important.” (DeltaGov)</p> <p>“Three years ago, almost to a person, people were complaining that they were not getting any training. And I think that was quite true. Now, in general staff surveys, it’s not mentioned. So that’s better than mentioning it all the time.” (GammaTech)</p>

Out of the full list of themes and sub-themes, we distilled a set of three aggregate dimensions (consistent with the approach recommended by Corley and Gioia, 2011; Gioia et al., 2013). These dimensions represent how elements of the theoretical categories relate to one another

and show their contribution to dynamic capabilities. We also evaluated each theoretical category to understand how they fitted together by incorporating the dynamic capabilities framework whenever possible. For example, dynamic capability research often focuses on environmental and organisational contexts (innovation-supporting contexts) (e.g., Makkonen, Pohjola, Olkkonen, and Koponen, 2013; Teece, 2014b), the balance between strategic and operational focus (operational and strategic justification) (e.g., Helfat and Winter, 2011; Kahl, 2014), and the role of management (management flexibility and support) (e.g., Helfat and Martin, 2015; Helfat and Peteraf, 2015). Figure 3.2 graphically outlines how we aggregated our themes. It shows the theoretical subcategories, theoretical categories, and aggregate dimensions that best explain how e-learning can contribute to the development of dynamic capabilities.

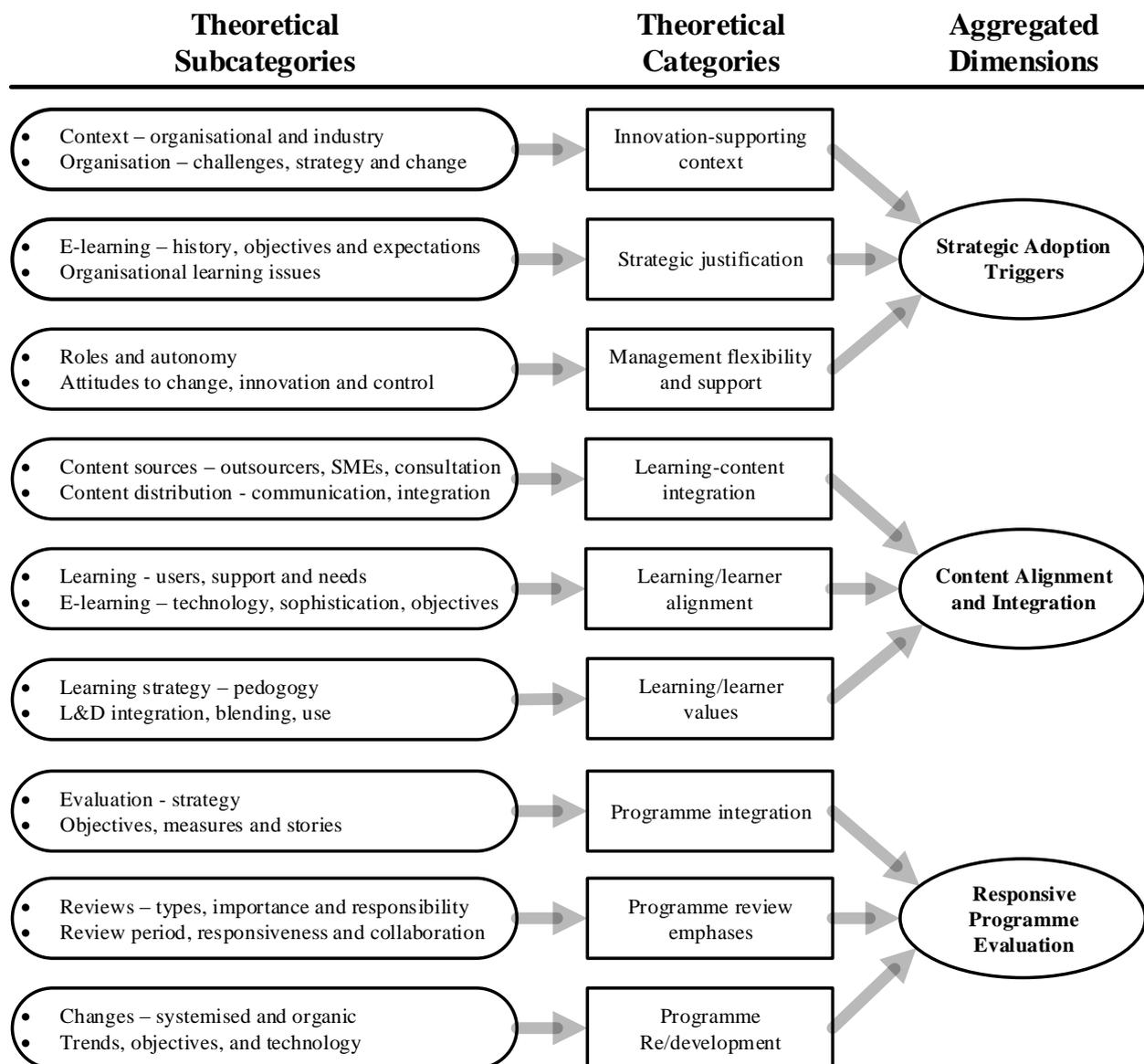


Figure 3.2 Data Structure Overview

3.5 Findings

As we analysed our interview data, it became evident to us that e-learning processes reveal more about the organisation than simply an operational desire to solve training issues. Much is shown of an organisation's objectives, culture, and human resource strategies through its e-learning activities. For comparison purposes, we separate organisations that displayed strong dynamic capabilities from the rest of the sample. The organisations in this study represented four industry sectors; government, finance, health, and technology. Although some government agencies displayed remarkably mature and sophisticated e-learning processes (e.g., GammaGov and DeltaGov), they work within structural and cultural constraints that limit their opportunities to innovate (Piening, 2013). Most finance- and health- sector organisations in this study have all reported growth in assets, revenue, and profitability in recent years. However, it was harder to discern how innovation and adaptation contributed to this growth because these organisations fundamentally provided well-established products and services to existing markets (Teece, 2014b). It was also difficult to make comparisons between these organisations, as the variance between their e-learning processes was not as dramatic. We discuss our findings below.

3.5.1 E-learning Adoption

Evaluation is a measure of whether the programme objectives have been achieved (Ford, Kozlowski, Kraiger, Salas, & Teachout, 1997), so e-learning programme goals set the direction, content, and evaluation of the initiatives. For example, GammaTech's informant described the operational objectives of this organisation's e-learning programme (Table 3.4, A1), but later outlined its more dynamic programme objectives (Table 3.4, A2). Interestingly, two of the technology companies in this study planned to implement learner certifications, which are unique to their industries (Table 3.4, A3 and A4). In those cases, what would normally be operational can be classified as a dynamic goal. How e-learning is adopted can also reveal structural relationships that empower or constrain resource actions. Examples of structures include authority relationships, autonomy, roles, and incentive systems (J. A. Martin, 2011). An authority relationship was revealed in the language of AlphaHealth's informant (Table 3.4, A5). In contrast, a high degree of employee autonomy at AlphaTech was described by our informant when explaining the informal approval process to develop a substantial e-learning programme (Table 3.4, A6). AlphaTech's high-participation culture was also described later by the same respondent (Table 3.4, A7). In contrast, BetaHealth's informant comments

revealed less autonomy (Table 3.4, A8). Similarly, GammaGov’s informant also described a more regimented setting (Table 3.4, A9), which appeared to restrict innovation, as risk-taking was discouraged (Table 3.4, A10). At the other extreme, BetaTech’s informant, described a culture with greater risk tolerance (Table 3.4, A11).

Table 3.4 E-learning Adoption Quotes

A1:	‘Product training is the most important, because obviously, our implementation consultants, our developers, and so on, need to understand the product, need to know what they’re building, what they’re installing into client’s sites’ (GammaTech)
A2	‘So we’ve had a bit of a two-pronged approach, I suppose, putting in place some onboarding training, so that at least when [new employees] come into the organisation, they understand what the culture’s all about, they understand how we work, who we are, who the people are, what the different areas are, and actually get people into the organisation so that the training isn’t just training, it’s actually bringing them into the organisation, how we would like them to come in’.
A3	‘We’ve built a certification course, I suppose, or a series of certification courses for our main product..., and I’m turning that into an industry standard basically’ (GammaTech)
A4	‘So, I went to NZQA [New Zealand Qualifications Authority] and talked to them ... The thing that blew me away was they’ve seen nothing like it in the industry, so we were first—we had first mover advantage’ (AlphaTech)
A5	‘Okay, by having an online platform, we know when people are accessing that platform, and when they’re not accessing it, we can have a conversation with them at an early stage to see what the problem is.’ (AlphaHealth)
A6	‘Well, I sold it to our management team in New Zealand. I wrote a paper... it wasn’t a hundred pages, I think it was three.’ (AlphaTech)
A7	‘It’s the syndrome of our company. If you have an idea or a strategy, you write the paper, you drive it, and it ends up yours, and it doesn’t matter what it is, it’s yours and you drive it.’ (AlphaTech)
A8	‘So, our head office is in London, and a lot of our initiatives come from there, so we’re definitely very strongly guided by the international – by their strategies, and their goals, and divisions.’ (BetaHealth)
A9	‘The context of [GammaGov] is heavily rules-based and compliance-focused... we’ve got a lot of workflow, a lot of process, and a lot of rules.’ (GammaGov)
A10	‘The biggest criteria in [GammaGov’s] context is technical accuracy. We all live in fear of being wrong. It’s not a natural human emotion, but it’s our context (GammaGov).
A11	‘[Management] are sympathetic to the fact that if we go five steps forward and two steps back that’s okay because making mistakes is a part of creativity and innovation. You lock people down you won’t get it, so, we’re very forgiving around people just playing with stuff and having fun with it.’ (BetaTech)

3.5.2 E-learning Content

Dynamic e-learning content is learning material that is rapidly adapted to meet the changing needs of learners and their organisation (Stepanyan, Littlejohn, & Margaryan, 2013). Content that is derived and tested often and widely, is more likely to respond to these needs. For example, GammaGov’s informant explained the use of an online forum for pre-testing e-learning content to a wide audience of subject matter experts and training specialists (Table 3.5, B1). AlphaTech extended this practice by including customers and resellers in pretesting

(Table 3.5, B2). Online learning content designed to develop adaptive rather than specific capabilities may also be termed dynamic (G. Morgan & Adams, 2009). This type of content is described by AlphaFin’s informant, demonstrating a trend towards adaptive learning pedagogies (Table 3.5, B3). Open-ended learner control approaches are also demonstrated by some organisations that use sophisticated online discussion groups linked to their learning management systems. This approach is discussed by GammaGov’s informant (Table 3.5, B4). The idea of user-generated content is exemplified by the success of GammaTech’s Wiki (Table 3.5, B5), which is a collaboratively created and iteratively improved set of web pages (Wagner, 2004, p. 265).

The quotes in Table 3.5 suggest variations in how extensively the organisations in our study integrated e-learning content with operational processes. For example, Betafin linked training to performance incentives (Table 3.5, B6). DeltaGov integrated its learning management system with other HR systems (Table 3.5, B7). AlphaGov used area specialists within the learning and development team to build tighter relationships across the organisation (Table 3.5, B8).

Table 3.5 E-learning Content Quotes

B1:	“eValue ... is the concept of asking before we give out the training, get views so we can design the training – so it’s really an analysis tool, but it adds value.” (GammaGov)
B2:	“The other thing I did was I went to one of our trusted partners ... and sat them down as well and went through the scope with them and said, this is what we want to build, how do you think this will work? And then during the first phase of it, we involved them in the testing.” (AlphaTech)
B3:	“Give a person the big picture and then they can use the intranet to reference documentation... that’s volatile. So... we’ve moved from including volatile information modules to now having modules that are far more conceptual.” (AlphaFin)
B4:	“iGroups are communities of practice... they’re small groups, but they’re spread out, so the mechanism is to bring those people together, so they can discuss what they find... their issues, their problems, their solutions are through iGroups, which is predominantly around forums, so it looks a bit like Facebook.” (GammaGov)
B5:	“We do use our Wiki... it’s where [GammaTech] keeps information, and it’s fantastic, it’s a brilliant tool, it’s very well-used, and it’s very, very collaborative, it’s used in the way that the Wiki should be used, so it’s excellent.” (GammaTech)
B6:	“There is of portion about learners ... tied to key performance indicators. So, if you haven’t done these particular modules, and you haven’t met your targets, you’re not going to get a performance payment or a bonus.” (BetaFin)
B7:	“What we’ve got now in this project is an integration between ... a SAP HR system, which will do payroll and timesheets ... and a workforce management system.” (DeltaGov)
B8:	“We have relationships all through the business, and that’s one of the reasons why we operate on a portfolio approach, so that we’re not trying to look after every part of the business. So, for example, I look after the [xxx] area ... Someone else looks after the [xxx] area...” (AlphaGov)

3.5.3 E-learning Evaluation

Dynamic programme evaluations in organisational contexts are ultimately based on the achievement of externally-relevant goals (Kozlowski & Bell, 2006). This point is illustrated by GammaFin’s and AlphaTech’s informants (Table 3.6, C1 and C2). BetaTech’s informant also discussed how programme objectives have an external element, but also demonstrated a financial benefit (Table 3.6, C3). Programme integration is achieved when communication and coordination between activities in a process is minimised (Wakayama et al., 1998). Therefore, e-learning processes can be considered to be integrated with other organisational functions if they accelerate rather than inhibit the pace that new products, systems, or processes become operational. A successful programme integration is discussed by BetaTech’s informant (Table 3.6, C4). This integration is aided in part by a real-time collaborative product development tool that is available to the learning team (Table 3.6, C5). Another evaluation consideration is the interactions within and between individual learners and instructors (Wang et al., 2011). A dynamic e-learning process evaluation will also consider the amount of collaboration and communication that the system stimulates, either on- or off-line. The means of evaluation of learning collaboration varied between organisations in this study but was most commonly qualitative or anecdotal. An exception was GammaGov, whose informant outlined a very sophisticated collaboration measurement model (Table 3.6, C6).

Table 3.6 E-learning Evaluation Quotes

C1:	“But on a behavioural side, it is a little bit harder [to evaluate], but we do things like audit telephone calls, so all our calls are recorded, with the customer and so we will audit those and look, okay, so from a customer perspective and a behavioural perspective—what happened there?” (GammaFin)
C2:	“So, we’ve had e-mails coming in from the branch network itself telling us how successful this has been. The most successful one was a [xxx] student who was working part-time in a store, she undertook the training and on the first Saturday sold a quite sophisticated piece of equipment...” (AlphaTech)
C3:	“The other check is revenue, I was given a goal of breaking-even... so as long as my team is covered by revenue I bring in from clients ...last year we achieved 36% [profit].” (GammaTech)
C4:	“We’ve got a bit of a dichotomy, I suppose, where our products are changing so quickly that we can’t keep the training up to date necessarily. However, the best model we have is with our product [XXX], for that, our training is launched at the same time as the product is launched.” (GammaTech)
C5:	“So that whole system, we can see it and we can work with it and we can test it and we’ve got visibility throughout the process.” (GammaTech)
C6:	“We have some metrics around how communities of learning work, around engagement. Are there clear leaders? Is there more than one? Is there rotation of leadership? Does it sustain over a period of time? Has the number of people engaging increased? Is there churn, but still a core base number? So those are indicators to us that the community is active and continuing to meet enough engagement to persist.” (GammaGov)

3.6 Discussion

Our findings have been categorised into three core groups that relate to e-learning; adoption, content, and evaluation. We integrate these categories with the dynamic capabilities concept, using our data to arrive at three aggregate dimensions; ‘strategic adoption triggers’, ‘content alignment and integration’, and ‘responsive programme evaluation’ (see Figure 3.3). The first dimension, ‘strategic adoption triggers’, is the organisational context, such as culture, justification, and management, which affect how e-learning programmes may support the development of dynamic capabilities. The premise for including these triggers is that in order for e-learning to contribute to innovation, adaptiveness, and higher-order human capital, there needs to be compatible programme objectives and organisational contexts (Pineda, 2010; Salas et al., 2012; C. L. Wang, Senaratne, & Rafiq, 2015). The second dimension, ‘content alignment and integration’, relates to how the learning material helps organisations achieve dynamic objectives. This includes the alignment between the learner and the learning material, the sources and distribution of the material, pedagogical approach, and integration with other learning and development initiatives. The third dimension, ‘responsive programme evaluation’, considers how e-learning responds to organisational changes as a result of assessments. Dynamic capabilities are indicated and supported through these modifications (Teece, 2007a). The findings, grouped by each aggregate dimension, are discussed below.

3.6.1 Strategic Adoption Triggers

It is evident from the data that organisational objectives, context, and culture set the path that e-learning programmes take. Equally, how and why e-learning is adopted reveal aspects of strategic intent, structural relationships, and organisational culture (J. A. Martin, 2011; Úbeda García et al., 2014). For example, where the primary goal of the e-learning programme is to achieve operational excellence, emphasis is placed on the accurate distribution of best practices throughout an organisation (D. Lee & Van Den Steen, 2010). The government organisations in our study exemplified this emphasis. These objectives align with human resource management (HRM) practices that contribute to greater cost efficiencies through increased productivity (Kramar, 2014). Dynamic objectives are more aligned to *Strategic* HRM principles to support the organisation’s competitive strategy (Huselid et al., 1997; C. Y.-P. Wang, Jaw, & Tsai, 2012). Strategic HRM is closely associated with extensive employee development, participation in decision-making, and enhanced knowledge sharing (Becker & Huselid, 2006; Boxall & Purcell, 2000; C. J. Chen & Huang, 2009). This form of management was most

apparent in the technology companies that we investigated. These organisations drove e-learning strategies oriented towards *becoming*, rather than *following*, industry best practice (Romme et al., 2010; Schulz, 1998).

Learning strategies are profoundly influenced by the contexts created by environmental turbulence and internal change (El Sawy et al., 2010; Wilhelm et al., 2015). For example, relative to the technology companies, the government organisations demonstrated high authority relationships, low employee autonomy, and risk aversion (J. A. Martin, 2011). These organisations encourage more pre-determined behaviours from employees, which restricts creative actions. Their e-learning strategy and approach reflects this orientation. These organisations emphasise the efficient distribution of standard operating procedures, which are important for consistent task performance (Carley, 1996), but are of less value in more dynamic situations (Garud, Dunbar, & Bartel, 2011). Alternatively, the more dynamic organisational contexts of the technology companies in this study orient these firms' e-learning programmes to support change. The organic and flexible structures of these organisations is shown in e-learning programmes that appear less formal, have decentralised authority, and more open channels of communication (Mallén et al., 2015). The e-learning initiatives in these companies went beyond conveying standard operating procedures and sought to transform aspects of their operations to match their competitive strategy.

3.6.2 Content Alignment and Integration

Dynamic capabilities enable organisations to respond to, or even pre-empt, changes to their business environments by varying resources and operating routines (Hine et al., 2014). Dynamic evaluations of e-learning content can determine how closely the learning content aligns to business goals and how quickly the content is adapted to new operational needs (DeRouin et al., 2005; M. Wang, 2011). In a large workforce, expertise is usually distributed across multiple subject matter experts throughout the organisation. Dynamic content is therefore likely to be derived from collaborative techniques and technologies, such as online or offline discussion groups or forums. Most organisations in this study used social learning technology, but there appeared to be subtle differences in their usage. For example, two of the government organisations extensively used social technologies to enable communities of practice, procedural discussion, and content testing. Although this does suggest reasonably democratic content development and communication structures (Purvis et al., 2001; Yoo et al., 2012; Zammuto et al., 2007), there seemed to be greater controls on its usage. By contrast, the

two technology companies that used social technology extensively, revealed more freedom of usage, greater distribution of the technology across the organisation, and user-generated content. User-generated content was facilitated in these companies through the use of Wikis, which are collaboratively created and iteratively improved sets of interlinked web pages (Daspit & Souza, 2012). We suggest that Wiki use is an indicator that innovation and adaptation has priority over procedural accuracy and control.

The pedagogical approach used by the organisation is also an indicator of the type of capabilities sought – best practice or dynamic capability. At the heart of best-practice operational capability is efficiency, whereas dynamic capability is about adapting, orchestrating, and innovating (Teece, 2014b). Accordingly, learning content that is oriented towards developing adaptive rather than specific capabilities is consistent with the development of dynamic capabilities. This pedagogical approach stresses flexibility, over conformity, and shows a desire for the e-learning programme to allow opportunities for adaptation in both the learner community and in the e-learning system itself (G. Morgan & Adams, 2009). Adaptation within the learner community allows opportunities for reflection, evaluation, and problem solving (Tell & Halila, 2001). Adaptation goals of the e-learning system itself were related to the pace of development; how extensively the system was integrated with business processes, and the functionality of the technology (Bersin, 2004; DeRouin et al., 2005; Waight et al., 2004). The technology companies in this study favoured a pedagogical approach that enabled learners to apply general learning to their specific contexts. They also focused more on integrating the e-learning programme closely with their business requirements. This was particularly apparent when the environment was highly volatile (i.e., when products changed rapidly). The government organisations, on the other hand, gave greater emphasis on achieving consistent best practices, or on practices that increased speed, quality, and efficiency (Teece, 2014b).

To summarise, organisations can make dynamic e-learning content if they have adaptive mechanisms for generating and adapting learning material. These mechanisms include systems for generating content from sources likely to provide the most effective material, testing content and technologies on the learning audience, and ongoing evaluations of content for relevance to desired outcomes. All organisations in this study used either online or offline collaboration to generate and test content, but some incorporated targeted collaboration into their standard e-learning procedures. The variance between the organisational groups was in the goals of these collaborations rather than in the degree of their use. Technology companies appeared to use

collaboration to create, extend, or modify e-learning content, whereas government organisations used consultation primarily to achieve best practice content. Technology companies also reported more relational rather than formalised integration between learning functions and other business activities. These observations are supported by other research, which finds the value of developing flexible operating routines is greater in highly-dynamic environments (e.g., Barreto, 2010; J. P. Davis et al., 2009; Wilhelm et al., 2015). The next section discusses how the organisations in our study evaluated their e-learning programmes and whether these assessments lead to modifications.

3.6.3 Responsive Programme Evaluation

The evaluations of an organisation's e-learning processes can focus on the achievement of either operational or dynamic organisational goals, although the relationship between the two goals is complex (Reynolds et al., 2014). E-learning efforts often focus on the technical issues of design, rather than on how it can meet the organisation's vision and mission. Such programmes thus often fail to improve work performance (Wang et al., 2010). Programme assessment focused on evolutionary fitness or *doing the right things* will be geared more towards the development of strategic capabilities (e.g., Wang et al., 2010; Nembhard and Tucker, 2011; Teece, 2007). Emphasis on internal metrics, such as efficiency improvements, can be considered dynamic only if there are externally-relevant measures. For example, a customer service learning intervention that improves average response time per employee, will ultimately need to result in better external results such as reduced resource cost and improved service levels. Dynamic e-learning programme evaluation would therefore include measures of external relevance, external responsiveness, and collaboration. Again, the technology company respondents appeared to emphasise these dynamic evaluations and were satisfied with mostly *soft* measures (Guest, 2002). In contrast, the government organisations tended to measure success against the requirements of specific operational tasks.

The health and finance organisations cited both dynamic and operational evaluations, but no pattern emerged that was specific to their industries. However, within these industries there did appear to be consistency between percentages of dynamic statements and demonstrable change rates. For example, compared to the other financial organisations in this study, Gammafin had a higher percentage of operational evaluation statements, as well as lower rates of profit, asset, and equity growth over the previous five years. Thus, dynamic e-learning evaluations appear more prevalent in dynamic contexts. These observations support the premise that when an

organisation operates in a highly dynamic environment, advantage is gained through agility linked to external feedback. When organisations operate in less-dynamic environments, quick responses to external opportunities are not nearly as critical (Wilhelm et al., 2015). Further, the technology companies focused more on dynamic evaluations. For example, they appeared to report more external outcome-based assessments, qualitative evaluations, the integration of e-learning into product development, customer evaluations and feedback, rapid development, and learner involvement. Although the government organisations had e-learning systems and processes that were mature and sophisticated, they focused more on tangible internal metrics. These observations are not value judgements that rank high dynamically capable organisations more positively, we suggest instead that there is no universally optimal strategy. Dynamic capabilities have been argued to be antithetical to operating efficiency (e.g., Peteraf & Barney, 2003; Wilhelm et al., 2015).

The cyclical processes of e-learning (adoption, content, and evaluation) and the microfoundations of dynamic capabilities (sensing, seizing, and reconfiguring) identified by Teece (2007a) appear analogous. For example, the way an organisation investigates and adopts e-learning programmes is similar to Teece's sensing opportunities. Developing and distributing content can be compared to the seizing or execution of learning opportunities. Finally, an organisation uses evaluation to validate and continue e-learning processes that work, and modify or discontinue e-learning that does not work (Salas et al., 2012). The evaluation process and the subsequent modification of an online learning strategy, clearly aligns with Teece's (2007a) description of reconfiguring. However, an even stronger parallel can be drawn between the microfoundations of dynamic capabilities and the dynamic e-learning processes identified in this study (illustrated in Figure 3.3). When e-learning is adopted for strategic reasons (strategic adoptions triggers) in dynamic contexts, more change opportunities are sensed. These opportunities are better seized when the e-learning content is aligned to learning needs and new business processes (content alignment and integration). Finally, when the e-learning programmes are evaluated against external objectives, operational capabilities are reconfigured (responsive programme evaluation).

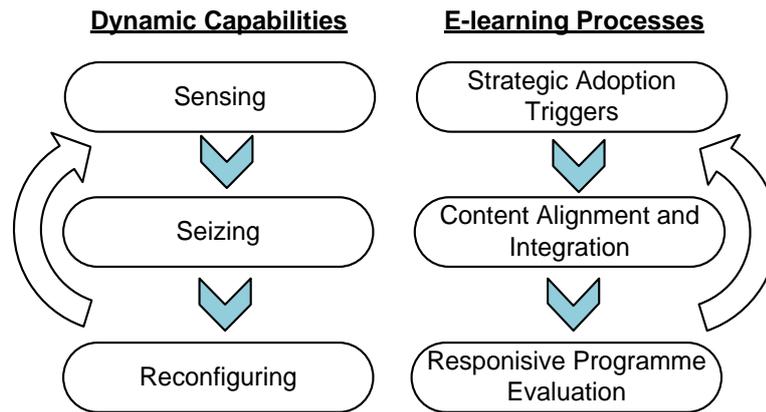


Figure 3.3 Parallels Between Dynamic Capabilities Microfoundations and E-learning Processes
(adapted from Teece, 2007a)

3.7 Conclusion

Our exploratory analysis reveals three main patterns that add to our understanding of dynamic capabilities. First, organisations that operate in the most dynamic contexts provided more evidence that their e-learning processes and evaluations accommodated innovation and change. Respondents from these organisations provided numerous examples of collaborative and rapid e-learning development, responsive feedback, and externally-relevant assessments. Those organisations tended to conduct compliance, procedural, and technical or product-based e-learning uniquely to their industry and used more flexible pedagogical approaches. This observation supports previous findings associating flexible internal systems and processes as most prevalent and necessary in turbulent environments (e.g., Roberts & Grover, 2012; Wilhelm et al., 2015).

Second, the data reveal that an organisation's e-learning programme strategies are often as dynamic and innovative as the organisations themselves are. Respondents from some organisations discussed adaptive approaches such as simultaneous product and learning programme development, rapid e-learning production, interactive e-learning, continuous feedback mechanisms, and soft approaches to learning effectiveness (H.-J. Chen, 2010; Guest, 2002; Luor et al., 2009). In these organisations, learning is encouraged rather than controlled or provoked (Bowman and Ambrosini, 2003). Again, these adaptive approaches were most prevalent in organisations that most needed to respond to environmental opportunities (Roberts & Grover, 2012).

Third, when e-learning objectives and use are strategic, rather than operational, an organisation's evaluations reflect this intent. For example, if the goal for the adoption of an e-learning programme was to gain a specific competitive advantage, the evaluation focused on this external achievement. E-learning is ostensibly used to efficiently distribute operational processes throughout an organisation. However, in dynamic organisations, e-learning was found to be integral to product development and release, reducing cycle time, and improving competitiveness.

Such patterns echo wider debates common to studies of microfoundations. For example, they evoke discussions of causal relations, the mechanisms between and across levels, and the primacy of particular levels (Barney & Felin, 2013). The exploratory findings presented here do not suggest that firms with strong dynamic capabilities will use e-learning, nor do they suggest that the use of e-learning will lead to dynamic capabilities. We do suggest that the way organisations develop, use, and measure e-learning says a lot about the organisation and its strategy for developing dynamic capabilities. Organisations with strong dynamic capabilities are likely to gear their internal structures and networks to suit rapid organisational responses to environmental and market turbulence (Teece, 2007a; C. Y.-P. Wang et al., 2012). E-learning is a deliberate attempt to accelerate experience articulation and knowledge codification throughout an organisation (Zollo and Winter, 2002). The extent of knowledge articulation and codification reflects managerial decisions and strategies, rather than being determined solely by the knowledge environment (Macher and Mowery, 2009).

This study makes several contributions to our understanding of dynamic capabilities and e-learning effectiveness. First, it shows how the microfoundations of dynamic capabilities can be investigated by carefully observing one integrated learning practice. Dynamic capabilities are usually studied through organisational-level activities such as new product development, alliances, acquisitions, and internationalisation (e.g., Danneels, 2002; Kale & Singh, 2007; Prieto et al., 2009; Teece, 2014a). Yet, as Teece (2014b, p. 343) argues, these activities are more properly thought of as ordinary capabilities because they cannot in themselves sustain competitive advantage. Barreto (2010) suggests that microfoundational activities and dynamic capabilities can be connected by promoting the *problem* as the unit of analysis (Arndt et al., 2015). So, how organisations use e-learning to solve organisational-level problems links these micro activities to dynamic capabilities. Second, we develop the idea that an organisation's level of dynamic capabilities is indicated in knowledge processes. Teece (2014a, 2017) asserts that organisations with strong dynamic capabilities achieve technological and market agility

through durable signature practices and business models. Our study shows how e-learning processes may reveal higher-level change routines, which are the roots of dynamic capabilities. Third, we suggest ways that e-learning can contribute to an organisation's sustained success. This study shows how e-learning might be used to develop capabilities that go beyond short-term operational needs by building flexible capabilities. Fourth, we support and extend the premise that dynamic capabilities are most valuable to organisations that experience the most change (Pavlou & El Sawy, 2006; Wilhelm et al., 2015).

As with any research, this study has limitations. Some of these suggest promising directions for future research. The suggested relationships between particular organisations and e-learning processes need to be validated against other cases and methods to see if these findings survive empirical tests. This study provides limited generalisability due to the small sample size, a potential organisational grouping bias. Future studies could explore the linkages between dynamic capabilities and e-learning processes in organisations of similar sizes, ages, and sectors using larger data sets. The findings may also be limited by the use of cross-sectional research to study dynamic capabilities, which is inherently a longitudinal construct (Arndt & Norbert, 2015). Therefore, longitudinal studies examining the co-evolution of innovation activities and capability development would also be valuable.

4. Essay Three: The Impact of Organisational Culture and Dynamic Capabilities on Learning Evaluation: An Interpretive Analysis

James Costello and Barbara Plester

Abstract

Organisations develop online learning to achieve operational objectives, with the ultimate aim of improving overall business performance, but the operational goals of learning are entangled in the complexities of organisational culture and industry norms. Shared beliefs and values about what learning is important and how this should be measured are further complicated by external changes that alter the efficacy of learning investments. In this study we take a critical, interpretive approach to answer the question – *how does organisational change and culture influence deliberate e-learning effectiveness criteria?* Borrowing from the dynamic capabilities and competing values frameworks, we present the findings of an exploratory qualitative study of twelve theoretically-selected New Zealand organisations. Our analysis shows that organisations from more dynamic, internal, and cultural contexts built more flexible online learning activities and used more unstructured, informal, and externally-focused effectiveness criteria. The article contributes to the literature by demonstrating links between dynamic capabilities and organisational culture and suggesting how external and internal dynamism might impact human resource development choices.

4.1 Introduction

Organisations evaluate deliberate learning activities primarily to assess whether they have achieved their operational objectives and ultimately whether those objectives align with their organisation-level goals. However, the operational objectives of learning activities are entangled in the complexities of organisational culture and environmental dynamics. Over time, shared learning becomes a pattern of beliefs and values that shape and give meaning to the daily activities and behavioural expectations of groups (Schein & Schein, 2017). Activities that successfully achieve a purpose eventually become self-reinforcing behavioural norms embedded into operating routines and learning processes. Compromising these procedural and learning norms is the need to adjust operating routines to meet rapidly changing environmental conditions (Romme et al., 2010; Teece, 2007a; Zollo & Winter, 2002). Useful individual knowledge, skills, and capabilities are becoming obsolete faster (Backes-Gellner & Janssen, 2009; Sanders, Dorenbosch, & Blonk, 2015) as the lifespans of products, organisations, and industries contract (Costabile, Fera, Fruggiero, Lambiase, & Pham, 2017; C. A. O'Reilly & Tushman, 2008). The ways organisations design and evaluate their learning activities not only reflects their cultural beliefs and values about what they consider to be important learning outcomes, but also how they solve their problems of external adaptation.

Overlaying the cultural elements of organisations are the industry and competitor conditions that seem to encourage particular organising forms (Wilden et al., 2013). For example, performance in turbulent or hostile environments appears to be best suited to organic organisational structures that aid the development of more environmentally-responsive learning and dynamic capabilities (Burns & Stalker, 1961; Mallén et al., 2015; Wilden et al., 2013). The development of dynamic capabilities helps organisations to modify or create new operational routines as business needs change (H. H. Chen, Lee, & Lay, 2009; Helfat et al., 2007). Organisations differ in their dynamic capabilities partly because they inhabit environments with differing rates of change, and partly because they are more or less culturally disposed toward accepting and anticipating change (Zollo & Winter, 2002). We suggest that these contingencies are evident in an organisation's learning processes, as they influence the learning goals, content, and measures of learning achievement. Organisational culture rarely features in the learning effectiveness literature, although it is generally acknowledged as strongly related to successfully implementing learning (e.g., Beer et al., 2016; Grossman & Salas, 2011; Sung & Choi, 2014).

In this exploratory study we take an abductive, interpretive approach (Dubois & Gadde, 2002; A. E. Lee, 1991) to answer the question – *how do organisational change and culture influence e-learning effectiveness criteria?* We focus on bespoke online learning, as these activities are generally centralised and therefore reveal organisation-wide learning strategies. The paper is structured as follows. First, we integrate selected prior literature concerning organisational culture and change, dynamic capabilities, and learning effectiveness in order to make the connections between the three explicit. Second, we discuss our sample data and method before reporting the results of content analysis to differentiate how e-learning strategies and processes differ across a range of organisations. Third, the findings are presented and elaborated. The final section discusses and summarises the key theoretical and practical implications of the study, its limitations, and provides suggestions for future research.

4.2 Theoretical Foundation

4.2.1 Organisational Culture and Change

Organisational culture is a contested concept – there is little agreement on what culture is and how it should be studied. For every definition of what culture is there is an important contrary view (Schneider, Ehrhart, & Macey, 2013). For example, most definitions describe organisational culture as something that is shared. Yet one influential perspective, proposed by J. Martin (1992, 2015), is that this *integrationist* view which assumes a dominant culture shared by all, is but one of three views. The other two are *fragmented*, which supposes a variety of ambiguous subcultures within one organisation, and *differentiation*, which assumes that organisations are composed of nested subcultures that coexist in harmony, conflict, or indifference (J. Martin, 2015). At the macro conceptual level, definitional approaches distinguish culture as something that organisations *are* or *have* (Schneider et al., 2013). From the *organisations are cultures* perspective, the researcher's goal is description and understanding, including of how individuals develop meaning of the organisation's very basic assumptions or root metaphors (Smircich, 1983). In contrast, the *organisations have cultures* perspective researchers are concerned with how organisations differ, and particularly focus on effectiveness and change (Alvesson, 2013; Costanza et al., 2016; Wei, Samiee, & Lee, 2014). The issue of *levels* is another concern of organisational culture research. These levels have been conceptualised in a variety of similar ways, although the most frequently used is Schein's

(1984) framework. Schein proposed three levels; artefacts, espoused values, and underlying assumptions. Of these, artefacts are the easiest to observe but also the most ambiguous when seeking to interpret their underlying meaning (Schneider et al., 2013).

Organisational culture has also been recognised as an important mechanism for enabling organisations to adapt in conditions of continuous environmental change (Weick & Quinn, 1999). Culture binds multiple changes together, gives legitimacy to nonconforming actions that improve adaptation (Costanza et al., 2016; Kotter, 1992), and embeds knowledge of adaptation into norms and values (Chatman et al., 2014; O'Reilly & Chatman, 1996). Culture is the vehicle that preserves the know-how of adaptation that has been arranged into a tacit “pattern of recipes for handling situations” (Weick & Quinn, 1999, p. 378). Culture, viewed as a stock of knowledge, serves as a scheme “that constrains what people do and a scheme of interpretation of how the doing is evaluated” (Weick & Quinn, 1999, p. 378). For example, Henri (2006) discussed the connections between an organisation’s values concerning change and their effects on the use of performance information. Using survey data, he compared the evaluation methods of organisations that predominately reflected *control* values with those that reflected predominately *flexibility* values. Control values refer to stability, predictability, formality, rigidity, and conformity while flexibility values refer to change, spontaneity, openness, adaptability, and responsiveness. He found evidence that organisational culture from a control-flexibility perspective, has an effect on both the diversity of measurement and the use of these measures. Henri (2006) found that managers from *flexibility value* firms tended to use a wider variety of performance indicators and these more for supporting strategic decision-making and legitimizing actions (Henri, 2006).

In this study we follow J. Martin’s (2015) differentiation view of culture, where change is localised within one or more subcultures, and determined by pressures from an organisation’s environment. From this perspective, subcultures within the same organisation can experience different kinds and rates of change yet are simultaneously relevant to the wider cultural context through interactive influence within sub-culture boundaries (J. Martin, 2015). As we seek to compare how organisations differ in their approach to learning effectiveness criteria, we also follow the macro assumption of culture being an attribute of what organisations *have* (Alvesson, 2013; Weick & Quinn, 1999). Finally, we are looking to explore underlying assumptions about change, not by investigating the existence of learning artefacts, but through interpreting the values revealed by their use (Schein, 1984). In the next section we discuss possible links between organisational culture and dynamic capabilities.

4.2.2 Organisational Culture and Dynamic Capabilities

Since its introduction in the mid 1990's, the concept of 'dynamic capabilities' has been gaining popularity as an explanation why some organisations are able to perform over sustained periods (Di Stefano, Peteraf, & Verona, 2014). It is argued that organisations with high dynamic capabilities have the ability to adjust their operating routines to meet rapidly changing environmental conditions (Romme et al., 2010; Teece, 2007a; Zollo & Winter, 2002). Although organisational scholars tend to refer to the association in very general terms (e.g. Nonaka et al., 2016; Teece, 2014b), the characteristics of dynamic capabilities appear to be closely related to specific organisational cultures. For example, Alvesson (2013) and Constanza et al. (2016) refer to *adaptive cultures*. This type of culture will be likely to have an organic or flexible structure in which planning and control are decentralised (Roberts & Grover, 2012; Teece, 2007a; Wilden et al., 2013). Members of these cultures are enabled and encouraged to recognise environmental threats and develop solutions to change rapidly (Costanza et al., 2016; Schneider et al., 2013) through a system of social controls, policies, and procedures that support change (Ostroff et al., 2013; Whiteley, Price, & Palmer, 2013).

Adaptability is a cultural trait which guides behaviours and processes that support appropriate responses to external conditions (Costanza et al., 2016) and is the cornerstone of both dynamic capabilities and adaptive cultures (Helfat & Winter, 2011; Kleinbaum & Stuart, 2014). How effectively an organisation is able to respond to environmental challenges and opportunities will represent its level of dynamic capability and adaptive culture. Furthermore, both organisational adaptability *and* dynamic capabilities involve the re-allocation of resources towards new activities (Sirmon, Hitt, & Ireland, 2007; Teece, 2007a) and the use of higher-order routines, or signature processes, that modify lower-order operating routines (Heimeriks et al., 2012; Teece, 2014a, 2014b). This ability to recombine and reconfigure resources requires a high degree of flexibility of both human capital and the structures that support them (Helfat et al., 2007; Ployhart & Turner, 2014; Teece, 2007a). However, Alvesson (2013) and Eisenhardt et al (2010) point out that too much flexibility can lead to instability, low cost-efficiency, risky projects, and a loss of strategic direction. Similar to discussions regarding the *ideal* level of dynamic capabilities that draw from contingency thinking (e.g. Karna et al., 2016; Wilhelm et al., 2015) there are suggestions that under certain conditions a particular type of culture is appropriate, even necessary, and contributes to efficiency.

In the following section we discuss a framework for organisational analysis that has considerable relevance to both organisational culture and dynamic capabilities – the competing values framework (Quinn & Rohrbaugh, 1983).

4.2.3 The Competing Values Framework

The competing values framework was developed as a parsimonious way to identify the key factors of organisational effectiveness. Some organisations are viewed as effective if they are changing, adaptable, and organic – such as technology firms that operate in dynamic and unpredictable emerging markets (Wei et al., 2014). Other organisations are regarded as effective if they are stable, predictable and mechanistic, such as most government agencies, universities and conglomerates (Cameron & Quinn, 2011). Although the competing values framework is not without its limitations – for example, it does not adequately account for subcultures, the equivocal culture-effectiveness link, or synergistic interactions between the culture types (Hartnell, Ou, & Kinicki, 2011), it has a number of benefits for this study. Specifically, the dimensions of flexibility and external focus it employs relate closely to characteristics of dynamic capabilities (e.g. Bock et al., 2012). The framework implies that particular culture types are most strongly associated with a specific set of effectiveness criteria (Hartnell et al., 2011). Finally, it is frequently used in interview-based data collection (e.g., Aubry et al., 2014; Dastmalchian et al., 2015; Marshall et al., 2003) which will be the approach of this study.

The competing values framework aggregates the many manifestations of organisational culture into two simple dimensions which are also frequently represented in the dynamic capabilities literature (e.g., Wilden et al., 2013) – structure and focus. These two dimensions divide organisational cultures based on the intersections of two axes. The structure axis contrasts flexibility, discretion and dynamism with stability, order, and control, and the focus dimension contrasts an emphasis on either the internal organisation or the external environment. These bipolar dimensions define four cells – *Clan* (internal and flexible with a focus on people), *Adhocracy* (external and flexible with a focus on growth), *Market* (external and stable with a focus on competition), and *Hierarchy* (internal and stable with a focus on organisational structure). Figure 4.1 shows a summary of the competing values framework outlining the model, values, artefacts, and effectiveness criteria for each cell.

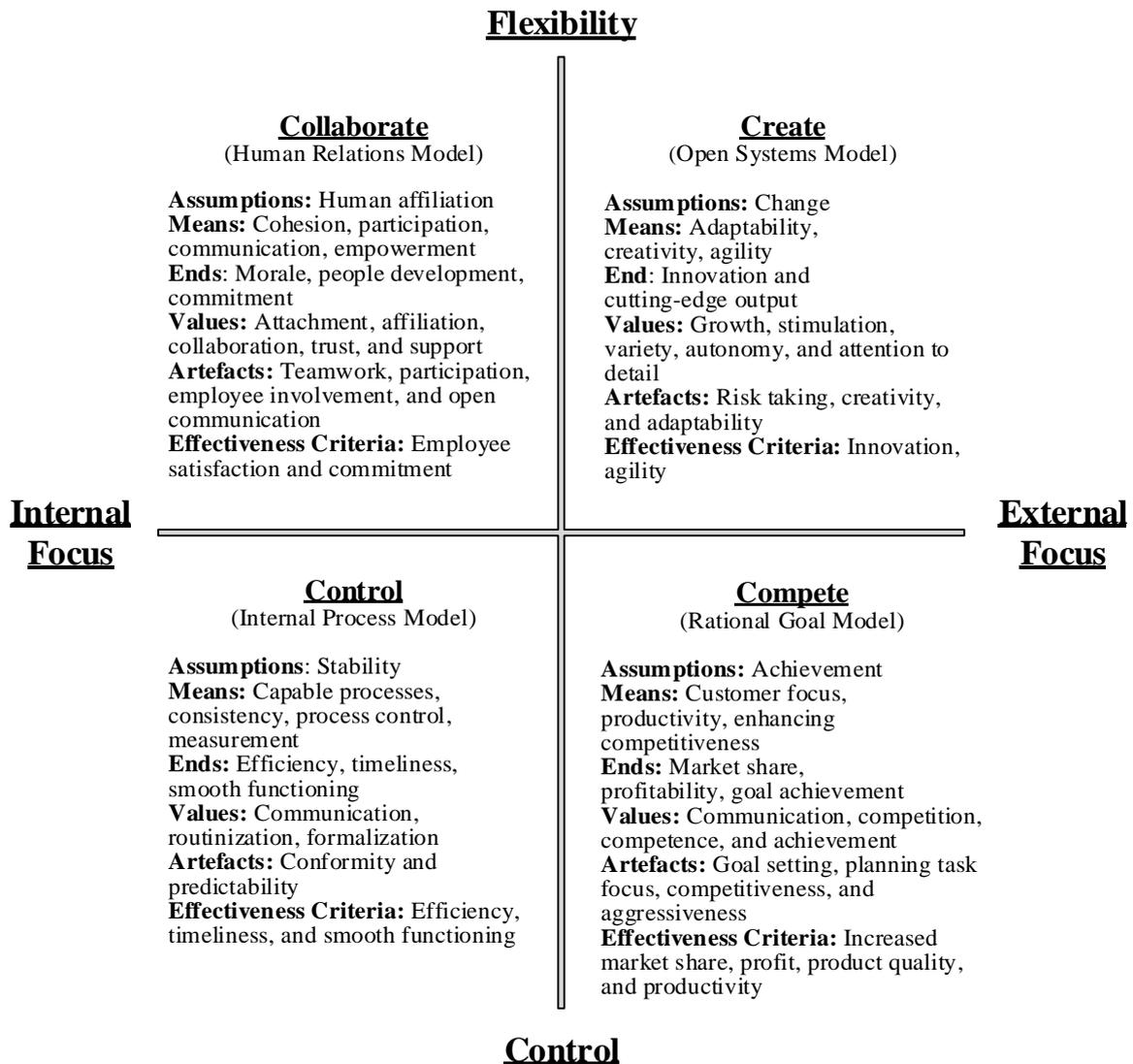


Figure 4.1 The Competing Values Framework

Adapted from Hartnell et al. (2011), Quinn & Rohrbaugh (1983), and Schein & Schein (2017).

In this study we use a combination of the competing values and dynamic capabilities frameworks to show an impact of culture and change on e-learning processes and effectiveness criteria. In more stable environments, an organisation’s learning investment may be focused primarily on improving operational capabilities by distributing standardised existing knowledge and skills efficiently throughout an organisation. This best-practice orientation can be assessed through prescriptive comparisons of learning outcomes and behavioural standards (Francis & Holloway, 2007). This orientation is successful with proven knowledge but in ambiguous situations the hope that practices will definitely be identified as *best* is futile

(Wellstein & Kieser, 2011). Alternatively, a learning strategy may include dynamic objectives such as facilitating problem-solving and supporting entrepreneurial actions. Learning designed to achieve these goals may include material requiring significant interpretation and judgement (Battou, 2017; Daspit & Souza, 2012; Kent, Laslo, & Rafaeli, 2016), and may be facilitated by technologies that allow collaborative and social-learning opportunities (e.g., Pfaff & Hasan, 2011). Positivist evaluations of such complex goals are nearly impossible in non-controlled environments (Passmore & Velez, 2015). We therefore propose that learning activities in dynamic cultural and industry contexts will have broader and less tangible objectives than are traditionally expected from training. Overly formal measurement is not only impracticable in an organisation in constant flux, but antithetical to an adaptive culture.

4.2.4 New Conceptions of Learning Effectiveness

Learning evaluation is a measure of whether the program objectives have been achieved and whether the a programme should be continued (Ford et al., 1997; Griffin, 2011). But in dynamic internal and environmental contexts conceptions of learning achievement are significantly distorted. For example, in highly dynamic work environments, knowledge can no longer be considered something that is objectively defined by the organisation (Kraiger, 2008). Traditional task analysis involves cataloguing the steps and procedures of a task using structured data collection protocols, but this will not work for jobs that are new to the organisation or where there are substantial changes in the task requirements (Dachner, Saxton, Noe, & Keeton, 2013). Equally, quantitative measures of goal achievement where there are ill-defined behavioural expectations are often unhelpful, as they use criteria that are too explicit or too superficial. In such circumstances a social constructivist approach to learning may be more appropriate; where individual learners test and experiment with propositions in a social context (Kraiger, 2014). Before knowledge is codified into definite and observable procedures, desirable operational outcomes must remain relatively ambiguous and tacit (Dachner et al., 2013).

The proliferation of computer-based or 'e'-learning in the delivery of learning in organisations, also presents challenges and opportunities for human resource development. Essentially, e-learning is defined as computer technology used to deliver learning material to users, using any electronic communication, collaboration, and knowledge transfer media (Y. M. Cheng, 2011). Many aspects of e-learning have purely operational advantages over traditional forms of employee training. For example, learning material delivered online can be

more cost-effective, consistent, and efficiently centrally managed (H.-J. Chen, 2010; Reynolds et al., 2014). Our interest, however, is in discovering how organisations use their e-learning for more strategic (or long-term) purposes. Sometimes this may be through the use of characteristics of the technology, such as integrated social media, networking, and knowledge management tools (Garcia-Penalvo et al., 2012). It may also be through adaptive learning strategies, such as contemporary pedagogical approaches, rapid development approaches, or integration with human resource management strategies (Becker & Huselid, 2006; Úbeda García et al., 2014; Úbeda-García et al., 2018).

Pedagogical approaches that maximise the strategic benefits of e-learning include Kraiger's (2008) third generation instructional models, Kozlowski and Bell's (2008) active learning, and Adams and Morgan's (2007) second-generation e-learning. All of these approaches are learner-centred; evoke shared meaning through social interaction and shift the focus from knowledge transmission to knowledge building. However, pedagogical approaches appropriate for the collaborative and adaptive features of e-learning may ultimately have little success if they are too distinct from existing organisational structures and knowledge flows (Wilden et al., 2016; Wong & Huang, 2011). The utopian ideal of democratising the ownership and creation of knowledge is usually conditional on compatible human resource strategies and architectures (Kepes & Delery, 2007). For example, the participative decision-making and extensive knowledge-sharing strategies of high-involvement work practices, high-performance work systems, or strategic human resource management approaches (Boxall & Macky, 2014; C. J. Chen & Huang, 2009; Úbeda-García et al., 2018) are closely aligned with learner-centred pedagogical approaches (B. S. Bell & Kozlowski, 2008). Criteria for measuring learning effectiveness from these philosophies are considerably more complex due to the broadening of learning outcomes as the target of instruction (Kraiger, 2008).

The literature suggests that organisational culture and environmental dynamism interact to affect the way organisations solve operational problems in order to adapt. We propose that the ways that an organisation measures achievement of learning goals also offers insights into its wider culturally-bound performance values. In the following section we explore these assumptions by comparing e-learning processes across a range of industry and cultural contexts.

4.3 Method

We adopt the perspective that organisational culture functions as an adaptive regulatory mechanism to unite individuals into social structures (Smircich, 1983). From this structuralist perspective, the primary research goal is description and understanding. Therefore, we aim to comment on how members of an organisation develop meaning and share basic assumptions that guide the way the organisation functions. The chosen research approach is inductive; using the Gioia methodology, which aims both to capture the rich concepts relevant to the human organisation experience *and* to provide an adequate level of scientific theorising about that experience (Corley & Gioia, 2011; Gioia et al., 2013). We believe that this methodological standpoint is the best suited to offering a better understanding of the complex and unique manifestations of culture and dynamic capabilities in their settings.

4.3.1 Sample

We identified potential participant organisations from membership, and presentations to, related New Zealand trade associations – the Human Resource Institute, the Association of Training and Development, and the Technical Communicators Association. Bespoke e-learning activities were chosen, as they are considered more likely to be used to support change initiatives and projects than ‘off the shelf’ e-learning (Callan et al., 2015). Twelve organisations were selected. All had at least a thousand employees and used custom e-learning as a substantial part of their learning and development strategies. We drew from larger organisations, as they would be more likely to employ individuals with specific responsibility for, and knowledge about, the organisation’s online learning and development strategies (van Rooij & Merkebu, 2015). We used theoretical sampling that included *polar* organisational types, hoping to observe contrasting patterns in the data (Eisenhardt & Graebner, 2007). The assumption was made that the variations in e-learning processes would reveal elements and features of the organisation’s culture and strategy relating to the research phenomenon (Eisenhardt & Graebner, 2007). Our goal was to compare e-learning activities between organisations likely to possess different levels of dynamic capabilities and of different cultural types (Henri, 2006; Teece, 2014b).

Three of the twelve organisations were from technology-intensive industries which are generally associated with high rates of environmental velocity, organic structures, and adaptive cultures (Alvesson, 2013; McCarthy et al., 2010). The possession of dynamic capabilities is

difficult to measure (Laaksonen & Peltoniemi, 2016), but typically the outcome shown through various firm-level, domain, or process-specific performance (Schilke et al., 2018). For example, organisations with high dynamic capabilities may exhibit growth through entry into new markets or technology fields (Jansen et al., 2006; Schilke et al., 2018; Teece et al., 2016). These activities characterise the three technology companies in this study, as they have all recently featured in the top five of the Technology Investment Network 100 list, which ranks technology-sector companies for innovation and growth in New Zealand (TIN100, 2016). Another four organisations in this study were public sector, which is associated with comparatively stable operating environments, mechanistic structures, and bureaucratic values (Alvesson, 2013; Kearney & Morris, 2015; Osborne & Strokosch, 2013). The remaining five organisations were drawn from the health and financial sectors, which are usually regarded as either moderate or high velocity industries (e.g., Jansen et al., 2006; Judge & Miller, 1991; Stepanovich & Uhrig, 1999).

Details of the participant organisations are provided in Table 4.1, although to maintain anonymity, employee numbers are rounded, and pseudonyms have been used. The suffix of each pseudonym name indicates in which industry the organisation operated: Tech, Gov, Health, or Fin.

Table 4.1 Participant Organisations Descriptive Data

Pseudonym	Sector	Employees	Distribution	Interviews
AlphaGov	Government	3,000+	National	1
BetaGov	Government	8,000+	National	2
GammaGov	Government	10,000+	National	2
DeltaGov	Government	10,000+	National	1
AlphaTech	Technology	1,200+	International	2
BetaTech	Technology	1,200+	International	4
GammaTech	Technology	1,200+	International	3
AlphaHealth	Health	2,000+	International	2
BetaHeath	Health	3,000+	National	1
AlphaFin	Financial Serv.	3,000+	National	2
BetaFin	Financial Serv.	2,000+	National	2
GammaFin	Financial Serv.	3,000+	National	1

Our sampling strategy is based on the assumption that the level of dynamic capabilities is a characteristic of individual organisations and their business environments (Wilhelm et al., 2015). Environmental velocity is a multidimensional concept that will not always determine competitive intensity (McCarthy et al., 2010; Nadkarni, Chen, & Chen, 2015). Therefore a

better determinant of the strength of dynamic capabilities is the speed and degree to which idiosyncratic resources can be aligned and realigned to strategy (Teece, 2014b). All three technology-sector companies entered new markets, expanded their product ranges and their technological sophistication. BetaTech and GammaTech, both software companies, reported high levels of revenue growth (annual average 82% and 21% respectively) and staffing growth (annual average 68% and 19% respectively) over the previous five years. Alphatech, a privately-owned company that designs and manufactures innovative physical products, reported average sales growth of 12% per annum over the same period. By comparison the public-sector organisations showed less dramatic growth in operating expenses (1.4 to 5.4%) and staff numbers (-0.4% to 5.5%) over the previous five years. The remaining five organisations reported growth figures that ranged between the technology and public-sector organisations (1% to 12% average revenue growth, -2% to 8% average growth in staff numbers).

4.3.2 Data Collection

The main data source was face-to-face, semi-structured interviews conducted between July 2015 and September 2016 in four locations across New Zealand. Participants were chosen because they were identified by the researchers (through online profile searches) as being knowledgeable about their organisation's online learning and development activities (Gioia et al., 2013). The job titles of the research participants varied, including Learning Designer, Development Advisor, Head of Learning Experience, and Global Education Director. Research participants were all checked for suitability through online profile searches and then recruited directly by phone and invited to participate. Participants were drawn from various levels of the organisations for two reasons. First, the qualifying criteria related to extensive knowledge of their organisation's e-learning activities, which could be found at a range of levels. Second, the differentiation view of organisational culture tends to focus on relatively low-ranking employees who do not necessarily share the views of senior management (J. Martin, 2015). In some cases, the responsibility for the adoption, content, or evaluation of e-learning was spread across a number of roles, so additional candidates from the same organisation were identified during the course of the first interview to fill knowledge gaps about their organisation's e-learning processes. The acceptance rate was above eighty percent, and those who declined to be interviewed did not appear to be systematically different from those who accepted. A total

of twenty-three interviews were conducted across the twelve organisations and all were audio-recorded and transcribed verbatim.

An interview protocol was developed, designed to establish whether aspects of e-learning strategy, content, and evaluation could support modifications to operational processes. For example, questions were asked to determine: how e-learning programs were aligned to organisational goals, the degree of collaboration, and assessment strategies. Questions regarding assessment aimed to establish how the organisations evaluated the achievement of externally-relevant goals; responsiveness to learner and subject matter expert feedback, and the extent and effectiveness of collaborations. The protocol was tested and adjusted following eight trial interviews of e-learning practitioners who were not part of this study. We allowed the line of questioning to evolve, however, to probe areas that emerged during the interviews. Interviews ranged from thirty minutes to sixty minutes long. Secondary data was also collected from publicly-available sources, such as annual reports, media articles, organisational websites and press releases. The purpose of collecting these documents was not to assess performance but primarily to judge internal change rates across a number of dimensions such as revenue, profitability, staff turnover, financial growth, and major strategic alterations (C. L. Wang et al., 2015).

4.4 Analysis

We used two methods of data analysis. The first identified the key themes relating to adaptability and culture using the techniques described by Gioia, et al. (2013). The second technique built on these findings to identify specific patterns, using latent content analysis (Potter & Levine-Donnerstein, 1999).

4.4.1 Gioia Methodology

The Gioia approach to data analysis (Gioia et al., 2013) is a rigorous way of conducting qualitative inductive research that still allows enough freedom for original theorising. The technique layers content into a structure of themes, concepts, and aggregate dimensions. Our interview protocol purposely avoided direct references to organisational change or culture but relied on informants to describe their own organisational realities. This way we avoided imposing our preordained understandings on their experience (Gioia et al., 2013). We began

our analysis by identifying relevant concepts in the data and grouping them into categories using open-coding and NVivo software (version 10). For this analytic step we used in-vivo or first-order coding, which are descriptive terms or phrases that identify a level of meaning (Van Maanen, 1979). During this process, we constructed and re-constructed initial data matrices that could be used for comparisons within and across organisations. We grouped the initial coding using functional themes that were descriptive of the stage of learning material development that was being discussed – learning adoption, content, or evaluation. Closely following the Gioia methodological process (Gioia et al., 2013) we eventually reduced the 146 initial codes to 18 first-order categories that begin to introduce theoretical influence. For example, with discussions about evaluation we included such germane terms as external significance, responsiveness, structure, and formality.

Next, we employed axial coding (Corbin & Strauss, 2008), where concepts and categories are related to one other and assembled into higher order themes. This stage of analysis distilled the data to six theoretically-relevant second-order themes that emerged from cycling between emergent data, themes, concepts, and relevant literature. After finalising these second-order themes, we sought to gain an understanding of how these themes interacted with and related to one another within the larger context. This process enabled us to distil the second-order themes further into aggregate dimensions. This iterative process resulted in the data structure presented in Figure 4.2, which outlines our methodology showing the first-order codes, second-order themes, and aggregate theoretical dimensions. The second order themes and aggregate dimensions were then used as a guide for the dynamic capabilities and cultural type coding below.

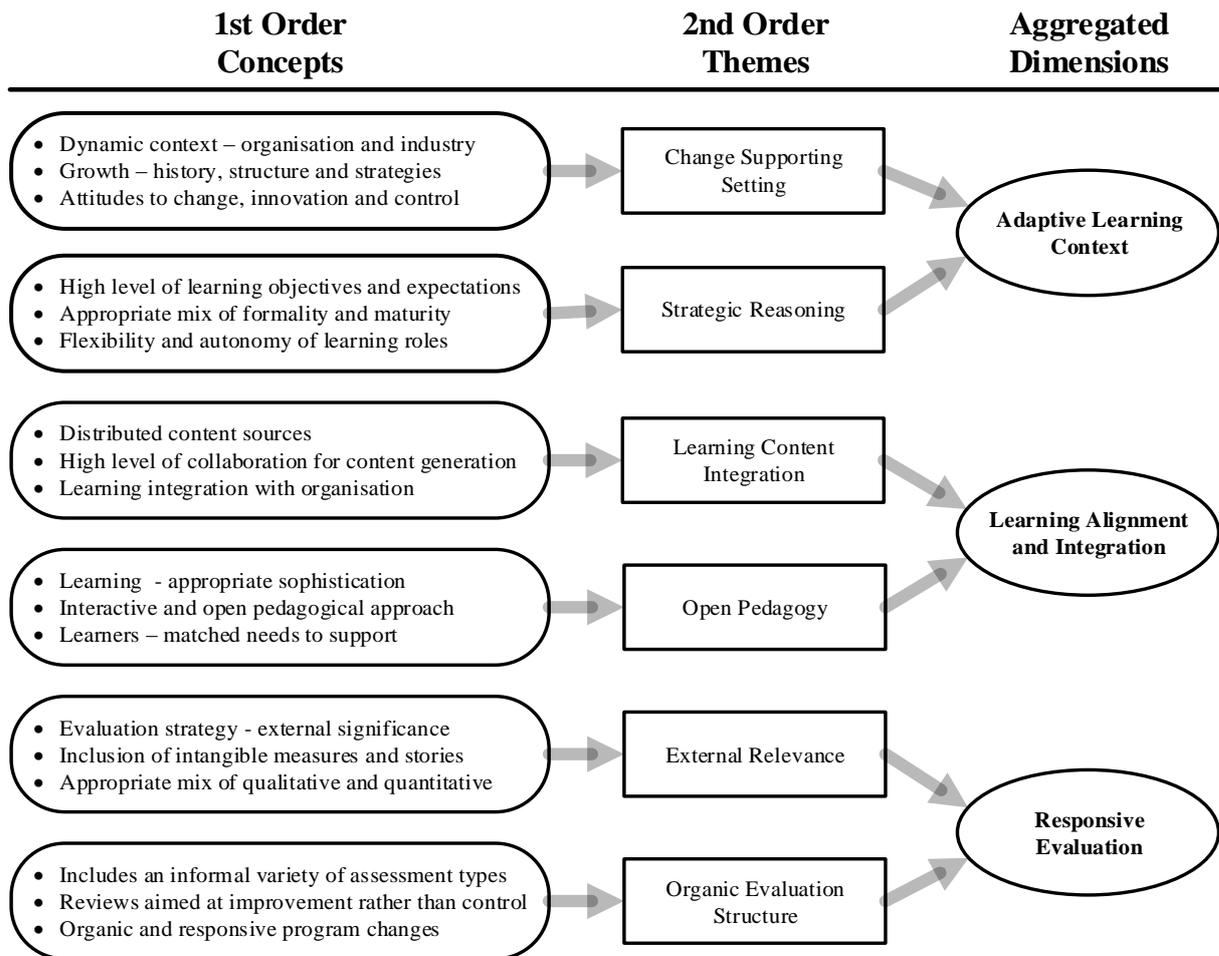


Figure 4.2 Gioia Methodology Data Structure Overview

4.4.2 Latent Content Analysis

The goal of a latent approach to content analysis is to validate conceptually or extend a theory or theoretical framework (Potter & Levine-Donnerstein, 1999). Whereas the Gioia methodology aims to arrange the manifest content into reductive patterns, latent content analysis is an attempt to code the underlying meaning of the text (Graneheim & Lundman, 2004). Both manifest and latent content analysis requires interpretation, but they vary in depth and level of abstraction. Rather than seeking patterns derived from the content itself, we put precedence on judgements based on pre-existing mental schema (Potter & Levine-Donnerstein, 1999). Our aim of this stage of coding was to establish whether the participant was indicating an emphasis on developing operational or dynamic capabilities. By separating comments into operational or dynamic we aimed to distinguish or weigh the primary emphasis of a particular discussion. While Helfat and Winter (2011, p. 1243) note that the difference between dynamic and operational capabilities is “unavoidably blurry”, they nonetheless encourage researchers to

distinguish between the two. Dynamic capabilities promote significant change, operational capabilities are concerned primarily with efficiency, and still others have a dual purpose (Laaksonen & Peltoniemi, 2016). At our micro level, operational comments are those focused on achieving a particular task; dynamic comments are more flexible and growth-oriented.

To aid coding of divergent statements we also compared respondent comments within the aggregated dimensions of Gioia data structure (Figure 4.2). For example, statements relating to evaluation were coded as dynamic if they indicated *external relevance* or an *organic evaluation structure*. Next, we categorised data by cultural characteristics based on the categories of the competing values framework (Cameron & Quinn, 2011; Quinn & Rohrbaugh, 1983). In some cases, pieces of data were coded to more than one cultural approach; such as, where a respondent was discussing formalising (*Hierarchy type*) a collaborative activity (*Clan type*). See Table 4.2 and Table 4.3 for a list of representative coding examples. To assess the reliability of the underlying coding scheme, we had two independent researchers code and check the data relating to dynamism and culture. The intercoder reliability was satisfactory with 94.6 percent agreement for the dynamism data and 96.2 for the culture data, both well above the suggested threshold of 70 percent (J. Cohen, 2003).

Table 4.2 Representative Examples of Quotes Classified by Competing Values Framework Culture Type

Clan	<p>“I’ve got staff here who’ve been here over thirty years, some people go away and come back...even though it is a big company, it’s still family” (AlphaTech)</p> <p>“People are now really starting to get into their online discussion; it’s actually been interesting watching the evolution—how everyone hung back, and now it’s not a big deal.” (AlphaGov)</p> <p>“Where we’re heading is much more in to that online space, much more informal learning, a lot more use of things like video, online communities, forums, that sort of thing.” (BetaFin)</p> <p>“Yes, we do use our Wiki... and it’s fantastic, it’s a brilliant tool, it’s very well-used, and it’s very, very collaborative, it’s used in the way that the Wiki should be used, so it’s excellent.” (GammaTech)</p>
Adhocracy	<p>“That’s my preference, to have those scenarios and problem-solving so they’re actually contextual and it’s real-life examples.” (BetaFin)</p> <p>“... and decisions are made quickly, we don’t fluff around with lots of paperwork and lots of people.” (AlphaTech)</p> <p>“So that’s the risk you’ve got to offset—but it empowers people to find their own way through, as opposed to trying to do the real manual.” (BetaTech)</p> <p>“So, I suppose the innovation is driven with, you know, anywhere within the organisation... basically, we’re trying to be fast, nimble, agile, pro-active, not reactive.” (DeltaGov)</p>
Market	<p>“A green one’s not so important, yellow we need to look at, red is high priority, and severity is high, so we do it immediately.” (BetaTech)</p> <p>“The LMS [Learning Management System] tracks, reports, and does everything that an LMS should, and that includes knowing that your instructors are actually accessing the material.” (DeltaGov)</p> <p>“So, we’re using it as a type of LMS, where you would ask people formative questions and that would be a type of training because you get feedback if you got it wrong and those are our early learning modules. Most of that was around compliance, and we used it extensively for the training of products.” (AlphaFin)</p> <p>“So, it’s part of our framework. If we think about projects, or process changes, there is a framework and that process for how those things get released to the business.” (GammaFin)</p>
Hierarchy	<p>“...but the key is technical accuracy that trumps everything else.” (GammaGov)</p> <p>“Okay, by having an online platform, we know when people are accessing that platform, and when they’re not accessing it.” (AlphaHealth)</p> <p>“So our head office is in London, and a lot of our initiatives come from there, so we’re definitely guided very strongly by the international.” (BetaHealth)</p> <p>“And when I say it’s a knowledge base, it would be very, very detailed, like step one: do this, step two: do this; so very process-oriented, with screenshots.” (BetaGov)</p>

Table 4.3 Representative Operational and Dynamic Emphasis Quotations by Functional Theme

Functional Theme	Operational Emphasis	Dynamic Emphasis
Adoption	“I guess like a lot of organisations, our e-learning began as compliance e-learning—largely structured to hit that compliance space” (AlphaGov)	“...also, in ten years we've moved from including volatile information modules to now having modules that are far more conceptual.” (AlphaFin)
	“And a part of it is an L&D push, to move the business toward this more mature operating model where we actually have change processes in place and formal structures where we've got to go through this process each time.” (BetaFin)	“...we make sure all of our training is aligned to strategies, so we don't do anything, so we ask: Are we achieving our strategy?” (GammaFin)
	“Okay, by having an online platform, we know when people are accessing that platform, and when they're not accessing it, we can have a conversation with them at an early stage to see what the problem is.” (AlphaHealth)	“Where we're heading is much more into that online space, much more informal learning, lot more use of things like video, online communities, forums, that sort of thing.” (BetaFin)
Content	“...we have quite a rigorous sign-off process for something to actually go live.” (AlphaGov)	“So we've just put out some new values and there's been a real big promotion on what our values are, and helping people to link them with their roles...” (BetaHealth)
	“So the learning content might not be particularly well-designed, it might be quite awful to navigate you through it or complete it, but the first test is the technically correct part...” (GammaGov)	“...it might be that you're thinking of putting up some training... You want to survey them, you want to use forums to discuss it; we've done that before.” DeltaGov
	“...we do our training needs analysis ... then we look at the content and look at—so, what are the key messages, what are the skills that you want them to develop, what is the knowledge that they need to develop.” (GammaFin)	“So while we're telling people what to do, we've got to give them the freedom to have a play around with it and make sense of it themselves.” (BetaTech)
Evaluation	“So you might actually say, now that I've completed this module, my confidence around using the X system is good. And then all our evaluations are in a scale and they'll say strongly disagree or strongly agree.” (AlphaFin)	“...because we can throw stuff out there and let people play with it. But I suppose, to a certain degree, if we do that too much, then it becomes very inefficient or it becomes confusing, so, we've got to be quite directive.” (BetaTech)
	“...those are generally created by subject matter experts or imposed on us by senior parts of the business saying, we need to make sure that all 800 people who deal with us have read and understood this memo of the core rules.” GammaGov	“...we've got one company for example; they've got roughly a thousand retail staff, and they've got nearly eight hundred signed up. I doubt that there's many other tools in the marketplace that have got that sort of uptake.” (AlphaTech)
	“...so they're looking at learning plan reports ... and then we overlay that with budget, but we run a centralised budget, and so in order to get funding.” (GammaFin)	“We're acting on feedback when we get it ...so that everybody knows that they can always provide feedback on any training they do. So, it becomes a given.” (GammaTech)

4.5 Findings

4.5.1 Gioia Methodology

Figure 4.2 shows the data structure of the initial layer of analysis which follows the Gioia methodology (Gioia et al., 2013). This stage was used to interpret the adaptive aspects of the

e-learning activities to use in the later organisational comparisons. The three aggregated dimensions are derived from the relevant literature and the interview data. Knowing the literature *a priori* risks confirmation bias, but it is also a feature of the Gioia methodology (Alvesson & Kärreman, 2007; Gioia et al., 2013). The data structure is divided into three broad areas that have an impact on learning effectiveness criteria – context, content, and evaluation. The concepts and principles of the data structure are common across the industries and organisations – what varies is the frequency and level of intensity. An *adaptive learning context* includes organisational and industry settings that encourage and support change, and whether the learning goals and structures are long-term and strategic (dynamic) (e.g., Mallén et al., 2015; Wilden et al., 2013). *Content alignment and integration* represents the change-supporting features of the learning material, such as; the distribution of sources, and the levels of collaboration, learner involvement, and open pedagogies (e.g., B. S. Bell & Kozlowski, 2008; Kraiger, 2008). *Responsive evaluation* consists of the adaptive evaluation mechanisms that have external relevance, such as; variety of measures, feedback loops, flexible assessment, and responsive program changes (Kraiger, 2014).

As we analysed our interview data it quickly became apparent that considerably more was revealed about the organisations than merely a desire to solve operational training issues. Much is shown of an organisation’s strategic objectives, human resource approaches, and culture through its e-learning activities. The organisations in this study represented four industry sectors: government, finance, health, and technology. Although interviewees from some government agencies discussed remarkably sophisticated and mature e-learning activities (e.g., DeltaGov and GammaGov) they also revealed that they operate within cultural and structural constraints that restricted opportunities to innovate. At the dynamic end of the continuum; respondents from the technology firms discussed e-learning strategies that were more accepting of change and supportive of entrepreneurial actions. These conditions appear in the Gioia data structure (Figure 4.2) as *change supporting settings* which is part of the *adaptive learning context*. For instance, it would be very difficult for BetaTech and GammaGov to develop and evaluate learning in a similar way, given the significantly divergent settings that the following quotes reveal:

“[Management] are sympathetic to the fact that if we go five steps forward and two steps back that’s okay because making mistakes is a part of creativity and innovation. You lock people down you won’t get it, so, we’re very forgiving around people just playing with stuff and having fun with it.” (BetaTech)

“The context of [GammaGov] is heavily rules-based and compliance-focused... we’ve got a lot of workflow, a lot of process, and a lot of rules.” (GammaGov)

The BetaTech quote above implies a number of *adhocracy* or *market* cultural dimensions such as risk-taking, innovation, autonomy, adaptability, and goal achievement (Ostroff et al., 2013). The GammaGov quote by contrast implies the *hierarchy* values of predictability, stability, formality, rigidity and conformity (see Quinn & Rohrbaugh, 1983). These cultural settings underlie learning practices and help to explain why the organisations value and measure learning achievement differently.

In the theoretical foundation section we discuss the suggestion that organisations from stable environmental and cultural contexts will be more likely to use best-practice orientations and attempt to evaluate using prescriptive comparisons of learning and behavioural standards (Francis & Holloway, 2007). To some degree this appeared to be the case but cannot be interpreted using artefacts alone. Depending upon the organisations’ e-learning experience, the maturity of their programs, and task requirements, all of the organisations in our study used tools that supported learner-centred approaches to knowledge building and sharing. These included the integration of e-learning with social media, mobile networking, and knowledge management tools which can be regarded as adaptive (Garcia-Penalvo et al., 2012; Reynolds et al., 2014). What varied across the industry sectors and cultural types was the underlying assumptions shown by the ways these tools were used. For example, in the first quotation below, the GammaGov respondent describes attempts to measure the effectiveness of his or her online communities. The underlying beliefs that lead to such a rationalistic approach to measurement may be revealed in the second quotation:

“We have some metrics around how communities of learning work. You know, around engagement; Are there clear leaders? Is there are more than one? Is there a rotation of leaderships? Does it sustain over a period of time? Is the number of people engaging, increasing? Is there churn... but still a core base? Those are indicators to us that the community is active and is continually meeting an interest or continuing to meet enough engagement to persist.” (GammaGov)

“No, the crux normally comes down to a matter of control. So normally, the senior manager that won’t get it or won’t understand the requirement will be seeking controls and accountability in the way that you would expect them from a rigid hierarchal structure.” (GammaGov)

In the above example we demonstrate that even social learning activities such as online communities are subject to a higher-level evaluation norm, favouring control, formalisation, and predictability typical in a hierarchical organisation (Cameron & Quinn, 2011). This would also indicate that for this organisation there is less concern for the dynamic elements of evaluation, such as *external relevance* or an *organic evaluation structure* (see Figure 4.2).

4.5.2 Dynamic Capabilities and Cultural Type

The dynamic capabilities and cultural type coding generated frequencies and percentages that provided a common metric to allow comparison (see Appendix F for full results), although these percentages are not statistically trustworthy (D. L. Morgan, 1993). However, our approach is consistent with Miles and Huberman (1994, p. 253) who underscore the role of numbers in qualitative research – “Doing qualitative analysis of all data with the aid of numbers is a good way of testing for possible bias, and seeing how robust our insights are.” Numerical analyses of content analyses are sometimes devalued as overly simplistic and uninspired counting of words or themes. However, others believe that, on occasion, topic frequencies can yield insightful results that complement qualitative research (e.g., Allemann & Sund-Levander, 2015; Cho et al., 2016). In particular, recognising the recurrence of themes helps researchers to avoid weighing single comments too heavily or generalising findings too quickly (Schilling, 2006) especially if the code categories emerge from the data themselves (D. L. Morgan, 1993, p. 199). To illustrate the relationships between the dynamic and the cultural type statements Figure 4.3 shows the percentages of *operational* and *hierarchy* coded statements.

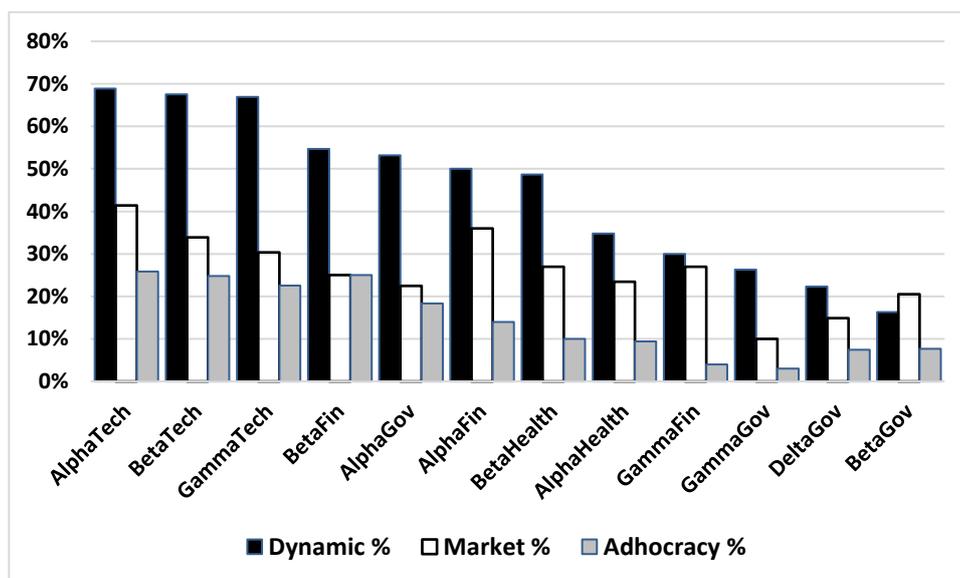


Figure 4.3 Percentage of Dynamic to Market and Hierarchy-Type Statements by Organisation

Not surprisingly, the technology firms had a lower percentage of operational statements than the other organisations in the study. This result would be expected given that these industries operate with higher internal change rates and competitive turbulence than organisations from other sectors (Bourgeois & Eisenhardt, 1988). The cultural-type coding added more complexity to the relationship between flexibility and stability but follows broadly the same pattern. In general, respondents from government organisations are considerably more inclined to mention *hierarchy* factors when discussing e-learning practices than respondents from technology firms. Technology firms are also more likely to be concerned with encouraging growth and innovation (*adhocracy*) through their e-learning than are other organisations in the study.

Possible explanations for industry outliers contributes some interest to the more predictable findings. For example, AlphaGov had comparatively low percentages of *operational* and *hierarchy* statements compared to the other government organisations in the study. Correspondingly, of the four government organisations in this study AlphaGov had the highest average growth over the previous five years in operating budget, assets, return on assets, and headcount (5.5%, 12.4%, 10.3, and 5.5% respectively). It is therefore not unexpected that their learning approach was also more growth-orientated, collaborative, and adaptive, than other government organisations. Also of note is the high *hierarchy* culture-type emphasis of GammaTech, compared to the other technology firms. GammaTech is a software company that operates in a highly-regulated professional sector. Their e-learning programs are created primarily for their large contractor network who are required to be formally certified to work with GammaTech's products. Therefore, GammaTech are obliged to bring a higher degree of control into their learning processes than the other technology firms in the study. Despite that constraint, GammaTech had comparably high *adhocracy* and *market* culture-type scores. They demonstrated rapid e-learning development techniques, seamlessly integrated e-learning and product development, and their use of social technology and collaborative knowledge management tools was widespread (Wagner, 2004).

4.5.3 Impact on Learning Effectiveness Criteria

We used the matrix query feature of NVivo to compare the organisations' industry, change rates, dynamism, and culture type with evaluation statements. We found that across the organisations in this study, those that made more *dynamic*; or *adhocracy* and *market* culture-types statements also relied more on primary impressions and anecdotal indicators (e.g., Table

4.4, A1 & A2). As they tended to be younger organisations and might not have had the same connections to the past, they demonstrated less mature process evaluations and used some unorthodox methods of measurement (e.g., Table 4.4, A3 & A4). They also revealed a higher ‘action orientation’ to evaluation, where judgements and decisions are made quickly, based on simple models and unsophisticated reasoning (e.g., Table 4.4, A5 & A6). Thus, these organisations used more *organic evaluation structures*, and achievement had a greater focus on *external relevance* (see Figure 4.2).

By comparison, organisations with lower change rates, and that used more operational and hierarchical statements, tended towards rationalistic and measurement-oriented approaches to evaluating e-learning programs (e.g., Table 4.4, A7 & A8). Even when the measures are relevant externally, the emphasis is more formal and structured. For example, the GammaFin respondent stated that the firm “*audits* phone calls” (see, Table 4.4, A7) rather than using a more lenient term, such as *sample* or *review*. These organisations also revealed a strong organisational memory, where benchmarked performances were established and routinised as convention (e.g., Table 4.4, A9 & A10). They also revealed an intellectual orientation towards a more considered approach, using careful analysis before decisions were made regarding the process-outcome relationship to a particular result (e.g., Table 4.4, A11 & A12).

Table 4.4 Learning Evaluation Example Quotes

A1	“So, we’ve had e-mails coming in from the branch network itself telling us how successful this has been. The most successful one was a [xxx] student who was working part-time in a store; she undertook the training and on the first Saturday sold a quite sophisticated piece of equipment...” (AlphaTech)
A2	“What prompted this in the first place three years ago is that almost to a person, people were complaining that they were not getting any training. And I think that was quite true. Now, any surveys that go around – general staff surveys – it’s not mentioned. So that’s better than mentioning it all the time.” (GammaTech)
A3	“And that has probably a couple of iterations as people review them, and we do pilots, ... but what it’s told us is actually it’s amazing the different ways that people look at stuff, and the kind of feedback we’re getting back.” (BetaTech)
A4	“We do solicit feedback through the online courses, and also through face-to-face courses. So we haven’t been all that good at analysing feedback up until now [but] we’ve got another project going now to actually make that a little bit more, yes, more visible.” (GammaHealth)
A5	“And decisions are made quickly, you know, we don’t fluff around with lots of paperwork and lots of people, you know, at my level we’ve only got two people between me and [the CEO/Chairman], so being able to make decisions is pretty quick, really.” (AlphaTech)
A6	“We do solicit feedback through the online courses, and also through face-to-face courses. So we haven’t been all that good at analysing feedback up until now we’ve got another project going now to actually make that a little bit more visible.” (GammaTech)
A7	“But on a behavioural side, it is a little bit harder [to evaluate], but we do things like audit telephone calls, so all our calls are recorded, with the customer and so we will audit those and look, okay, so from a customer perspective and a behavioural perspective—what happened there?” (GammaFin)
A8	“We have some metrics around how communities of learning work, around engagement. Are there clear leaders? Is there more than one? Is there rotation of leadership? Does it sustain over a period of time? Has the number of people engaging increased? Is there churn, but still a core base number? So those are indicators to us that the community is active and continuing to meet enough engagement to persist.” (GammaGov)
A9	“But we’ve found over the years that by being a part of it from very early on, you pick up all of those things that are important, so you have less rework and less issues when you present back.” (GammaFin)
A10	“We do a whole new approach now [to learner feedback] – we decided we needed at least 500 people to respond. So then it was more personal, what we sent up, just so that our target for feedback was clear enough so that we were getting a good indication.” (AlphaFin)
A11	“We are only going to deliver this if there is an actual business outcome and we can measure it. So, we are getting stakeholders in the business to start thinking this way. The solution is to deliver some learning, and if someone completes it, then we tick the box and we know they’ve learnt something. Which we know doesn’t work.” (BetaFin)
A12	“That’s generally done with a quiz or a question bank from the question bank – we call them exams – they can be quite deep, or they can be quite a light quiz, but really it’s just to prove that you’ve understood what you’ve read and been asked to do.” (DeltaGov)

4.6 Discussion

This study assumes microfoundational thinking by focusing on how individual and micro processes suggest collective outcomes and impact organisational-level phenomena (Barney & Felin, 2013; Felin et al., 2015). E-learning was chosen as it is a relatively characteristic and observable representation of an organisation’s wider learning processes (Callan et al., 2015). The microfoundations argument claims that the effects of macro entities are always fully mediated through micro mechanisms and actors (Felin et al., 2015). This implies that organisational-level learning and dynamic capabilities are processes that are replicated at lower

levels. For example, process orientated studies of how dynamic capabilities emerge, grow, or terminate over time (e.g., Fischer et al., 2010; Jenkins, 2010) suggest that they develop through a series of typical stages (Schilke et al., 2018). At the highest levels these stages follow a cyclical process such as Teece's (2007b) sensing, seizing, and reconfiguring of opportunities. At lower levels there will be a corresponding cyclical process as new knowledge and capabilities are acquired to accommodate the execution of new organisational tasks. Thus, where the environment and internal systems favour change there is a greater likelihood that e-learning processes will mirror this need.

There were four industry sectors represented in this study: finance, government, health, and technology. Within the industry groups there appears to be reasonably high consistency along the dynamic and cultural dimensions of this study. The most distinct comparisons were between the government and technology sectors. The differences in e-learning practices between the government and technology organisations in this study appeared to relate mainly to the learning objectives and strategy, as much of the learning content and tools used were fundamentally alike. Our findings suggest that respondents from the government organisations in the study were likely to emphasise the achievement of operational excellence through the efficient distribution of standard operating procedures. Often the primary concern of the government organisations' learning programs was compliance, consistency, and accuracy. However, the government organisations did appear to have very sophisticated, mature, and efficient processes for achieving these goals. Learning strategies that encourage pre-determined behaviours are important for creating consistent task performance, but are less beneficial in dynamic situations (Garud et al., 2011).

The technology firms, on the other hand, had a less restrained approach to deliberate learning, even for compliance, product, or technical training. This is not to say that the two groups of organisations had entirely different approaches, but that they tended to emphasise one approach over the other. Of course, there are other factors that influence the level of operationalism in e-learning activities, such as task features, organisation size, organisation age, industry standards, as well as individual factors (Protogerou et al., 2012; Zollo & Winter, 2002). However, our findings appear to be consistent with the conditions discussed in the theoretical foundation section – deliberate learning practices are greatly influenced by environmental conditions and the internal responsiveness to those conditions. That is, organisations operating in turbulent or unpredictable environments are likely to build more flexible internal systems and processes in order to respond quickly to changing business needs

(Eisenhardt & Martin, 2000; Roberts & Grover, 2012; Wilhelm et al., 2015). At the micro level of our research we conclude that organisations that are changing fastest emphasise adaptive learning approaches most prevalently. This finding supports other literature that suggests that organisations experiencing higher levels of change will limit knowledge codification and pursue an articulation strategy (Barkema & Schijven, 2008; Romme et al., 2010) which requires a greater range of evaluation methods. In each situation the *ideal* balance between creative innovation and predictable goal achievement will depend on a culturally-bound definition of success (Henri, 2006).

The associations found between the primary constructs further support the idea that the *ideal* level of dynamic capabilities and culture type are not only highly contextual (Wilhelm et al., 2015), but also non-linear. In this, we agree with Wilden and his colleagues' (Wilden et al., 2016; Wilden, Gudergan, et al., In Press) argument for a configurational view. This view extends contingent ideas where optimal strategies, culture, and structure individually interact with the environment to create competitive advantage, to the idea that they all interact in a complex system. Rather than assuming linear associations between constructs there appears to be many requisites. For example, as shown with the anomaly organisations in this study (AlphaGov and GammaTech), their approach to learning and change are profoundly influenced by industry and organisational idiosyncrasies. Similarly, approaches to learning effectiveness can be dynamically-orientated, but will ultimately conform to culturally-established measurement norms.

4.7 Conclusion

Our exploratory study focuses on one core question: *how do organisational change and culture influence effectiveness criteria for deliberate e-learning?* By answering this question, we make three main contributions to the literature. First, we demonstrate explicit links between the dynamic capabilities and organisational culture concepts. Organisational culture provides guidance to an organisation's members as to how to recognise, respond, and adapt to constant environmental change (Barney, 1986; Cheung et al., 2012; Schein & Schein, 2017). Using the competing values framework we find that the organisations operating with the most internal dynamism demonstrate learning practices that emphasise less of the *hierarchy* culture type and have more emphasis on *market* and *adhocracy* cultural behaviours. Hartnell et al's (2011) meta-

analysis of the competing values framework and organisational performance found that *market* cultures exhibit the strongest association with innovation, rather than *adhocracy* as the framework predicts. Therefore, the *market* and *adhocracy* organisation types may also be consistent with organisations that demonstrate high dynamic capabilities, particularly as both concepts share common dimensions of flexible structures and an external focus (Grant, 1996a; Teece, 2007a; Teece et al., 1997).

Second, we show a link between internal and external dynamism and HRD practices. The organisations in this study that operated in turbulent environments and reported higher internal change rates provided more examples of dynamic learning objectives, processes, and evaluation. Respondents from these organisations discussed numerous examples of collaborative learning development, responsive learner feedback, more flexible pedagogical approaches, and externally-relevant learning objectives and assessments. These organisations also tended to conduct compliance, procedural, and technical or product-based learning uniquely to their industries. Conversely, those organisations that operated in relatively stable environments and reported generally stable internal characteristics, provided more examples of tangible learning goals, formal processes, best-practice approaches to procedural training, and an overall concern with compliance and control. These findings are consistent with other studies that conclude that the value of maintaining flexible internal systems and processes diminishes in stable conditions (e.g. Pavlou & El Sawy, 2006; Roberts & Grover, 2012; Wilhelm et al., 2015). We contribute to this line of research by demonstrating the impact of an imperative to adapt on low-level learning activities.

Third, we show how evaluation strategies may be affected by organisational culture. Our findings build on other studies that compare performance measurement and organisational culture. For example, Henri (2006) compared performance management measures with organisational cultural values that favoured either *flexibility* or *control*. He found that managers of organisations reflecting *flexibility*-dominant values tended to use a greater diversity of measurement, such as loose and informal controls, and used the results more to inform strategic decision-making than to monitor and control. Conversely, organisations with strong control values may face more routine issues where unambiguous and objective measures are feasible (Henri, 2006). These findings help to explain the paradox we observed – that government organisations (*hierarchy* culture type) gravitate operationally towards clear, tangible performance metrics despite being generally challenged by notoriously ambiguous business goals (Nutt, 2006; Speklé & Verbeeten, 2014). *Market* and *adhocracy* cultures appear less

concerned with explicit and measurable pre-set performance targets and focus more on managing the results rather than the measures.

Our study also has some interesting implications for management. First, we showed that the ways organisations measure learning effectiveness often has more to do with cultural values than task necessity. Where it is perceived that an organisation is not able to change its capabilities to match its environment, actions are required to address this disparity. For example, in the case of the government organisations, Osborne et al. (2015) and Osborne & Strokosch (2013) argued for combining insights from services management for public administration as a way to externalise objectives. That implies developing learning strategies that have design, content and effectiveness measures focused on service delivery. Second, we showed that some organisations combined knowledge exploration and exploitation by co-producing learning with internal and external stakeholders. Third, the study suggests that for organisations and tasks that require flexibility, learning strategies can adopt more learner-centred approaches with a diversity of measurements that combine informal, qualitative, and quantitative assessments (Henri, 2006). Fourth, we demonstrate that learning evaluation is bound not only by cultural expectations but by expectations of change. When developing learning, management need to be mindful not only of the current operational needs but also of how much this learning will support dynamic learning objectives (Kraiger, 2014).

As in any study, there are several limitations. Our data came from a range of organisations that in many ways cannot be compared. A medium-sized technology firm on a strong growth path cannot be operationally similar to a large government agency. However, these polar extremes do illuminate contrasting patterns of microfoundational activities that may contribute to organisation-level adaptation (Eisenhardt & Graebner, 2007). The online learning programs of the organisation that we examined for comparison purposes, were also vastly different in terms of strategy, maturity, and audience. Furthermore, the respondents were limited in number and varied in level and role. Future studies could examine whether our findings generalise to more comparable samples of organisations, roles, and operational settings. Other caveats include the following. First, the results presented here are based on perceptions, both of the respondents and the researchers, and as such, may be biased. Wider respondent selection, more structured interviews, and more inter-rater reliability and agreement estimates in future empirical studies would help to alleviate these concerns. Second, the unique bottom-up method of determining dynamic capabilities and organisational culture type is untested. The additional use of validated survey instruments in future research may verify the efficacy of this technique.

Third, learning evaluation was based on interview data and therefore subject to misrepresentation and misinterpretation. Observation and process documentation analysis would help to verify self-report data in subsequent studies. Despite these limitations, we hope that future researchers will develop our ideas to further investigate the multi-level interactions between organisational dynamism and online learning activities.

5. Summary and Conclusion

This chapter summarises and reiterates the various components of the research project including the empirical approach, findings, and contributions. Despite the body of this thesis being composed of individual essays, each adds a coherent contribution to scholarly work on dynamic capabilities and organisational learning. Generally, these two concepts are used to explain how organisations adapt to new opportunities and challenges. But investments in certain types of capability development might actually make an organisation less adaptable, and yet more competitive in a specific context. There are trade-offs (Pisano, 2016). This thesis is concerned with showing how these trade-offs manifest at a microfoundational level across a range of contexts.

5.1 Summary of Findings

5.1.1 Essay One

The first goal of Essay One was to establish the roles of organisational learning and e-learning in the dynamic capabilities framework. A simplified model of capability development (Figure 2.1) is presented. This model places organisational learning as an antecedent of dynamic capabilities and e-learning, as one of the tools that mediates the interactions between organisational knowledge and organisational learning. Deliberate learning activities have always been considered an important component of knowledge exploitation, but their contribution to explorative knowledge is less clear (Sung & Choi, 2014). Our model shows that in order to participate in the development of dynamic capabilities, some of these deliberate learning activities need to change organisational knowledge and ultimately operational capabilities. This establishes a theoretical premise that deliberate learning activities can support the development of dynamic capabilities if they integrate with organisational change routines and facilitate the creation of *new* knowledge. Further, the essay clarifies explicitly, the characteristics of e-learning most likely to impact innovation and change. For example, e-learning integrated with networking, social media and knowledge management tools offers a significant opportunity to improve employees' access to information, enhances their collaboration, and their ability to make faster decisions (Garcia-Penalvo et al., 2012; Luor et al., 2009). It is proposed that if organisations take up this opportunity it will support the development of new knowledge and altered operational capabilities.

The second goal of Essay One was to propose ways that the development of dynamic capabilities can be supported using e-learning processes. First, the procedural distinctions made by Teece (2007a) (sensing, seizing, and reconfiguring) were aligned to the cyclical processes of e-learning (adoption, content, and evaluation) to create a common typology. How an organisation investigates and adopts e-learning programmes is similar to Teece's *sensing* of opportunities. The development and distribution of content can be compared to the *seizing* or execution of learning opportunities. Finally, an organisation uses evaluation to validate and continue e-learning processes that work, and to modify or discontinue e-learning that does not (Salas et al., 2012). The evaluation process and subsequent modifications to an online learning strategy as a result, clearly aligns with Teece's (2007a) description of *reconfiguring*. Next, a list of propositions was presented that combined the e-learning and dynamic capabilities literatures, arranged to reflect the cyclical processes of e-learning development. The main assumption here is that for e-learning processes to support the development of dynamic capabilities, it will be necessary for them to integrate with organisations' change processes. For example, it is proposed that e-learning that: 1) aligns with strategic human resource management principles; 2) uses appropriate collaboration techniques and technologies; and 3) is evaluated for the achievement of externally relevant objectives, is more likely to support the development of dynamic capabilities.

Although the propositions in Essay One presented opportunities for further empirical studies, there are also significant challenges. For example, Proposition 7 states that e-learning that uses elements of 'second generation' pedagogies (Adams & Morgan, 2007), will support the development of dynamic capabilities. Second generation pedagogies transcend the traditional workplace education goal of increasing the learner's knowledge base and aim to provide a foundation for personal judgement (G. Morgan & Adams, 2009). There are at least three empirical challenges when testing this proposition. First, the application of second generation pedagogies is often task-specific, and its isolated use cannot be generalised to the whole organisation's learning strategy. Second, the number of propositions and the process nature of both e-learning and dynamic capabilities demands an inordinate amount of observation, and therefore resources, before meaningful conclusions can be drawn. Third, individual learning practices are only indirectly linked to organisational-level outcomes and therefore very difficult to associate casually with the development of dynamic capabilities. For these reasons, the studies in Essays Two and Three are focussed more on e-learning *evaluation*, as it is generally more comparable, specific, and tangible. To overcome the difficulty of linking

individual learning practices to the development of dynamic capabilities, the direction of causality was reversed – to imply that it is dynamic capabilities that influence the learning process. For example, *organisations with high dynamic capabilities are more likely to evaluate e-learning processes for the achievement of externally-relevant objectives.*

5.1.2 Essay Two

The most striking discovery made when collecting data for the first empirical essay (Essay Two) was how much is revealed by an organisation's e-learning strategy and practices. For example, a pedagogical approach that favoured social learning, autonomy, participation, and open communication, might indicate a strategic human resource approach (Boxall & Macky, 2014; Kramar, 2014), an open culture (Chirico & Nordqvist, 2010), unstructured task problems (Joo et al., 2011), and a degree of internal or environmental dynamism (J. A. Martin, 2011; Wilden et al., 2013). The three theoretical categories that were derived from the data are; 1) *strategic adoption triggers* – which are the organisational context, such as culture, justification, and management, that affect how the e-learning programmes are designed to support the development of dynamic capabilities, 2) *content alignment and integration* – which relate to how the learning material helps organisations achieve dynamic objectives and is able to be adapted to new operational needs. For example, extensive use of user-generated content or collaborative technologies and techniques, and 3) *responsive programme evaluation* – which considers how e-learning responds to organisational changes as a result of programme assessments. Dynamic evaluations will therefore include measures of external relevance, external responsiveness, and collaboration.

The predicted outcome of the study was that organisations that possess high dynamic capabilities will use e-learning predominantly as proposed in Essay One. However, what transpired was the discovery that relationships between organisational contexts, task objectives, and e-learning processes are considerably more complex than anticipated. The presence of a particular technology, for example, indicated little about how the organisations dealt with innovation and change. Two of the large government organisations in the study had sophisticated and mature social learning systems and online communities of practice. However, these were generally used for isolated or temporary purposes with the majority of e-learning being directive and procedural. The technology companies were relatively new to e-learning; mainly used it for specific product-related training and had less established e-learning development and evaluation processes. Yet, two of the three technology companies in the study

aimed to establish qualifications for their e-learning programmes, which is unique to their industries. So, what is most revealing is the subtle differences in the way the tools were used in these theoretically extreme organisations. For example, the government organisations predominantly used e-learning for the efficient distribution of standard operating procedures to ensure consistent task performance. Learning evaluation tended to be focussed on standardised internal metrics. The technology firms, on the other hand, created less formal learning that was likely to be generated through a distributed network of developers using relatively open channels of communication. Evaluation in these organisations appeared to be more: related to external outcomes, qualitative or anecdotal, integrated into rapid product development, and involving of learners.

These findings indicated two main conclusions. First, a level of dynamism is revealed in an organisation's e-learning processes. That is, organisations that operate in the most dynamic contexts provide more evidence of e-learning processes that accommodate innovation and change. Second, how learning processes are evaluated is highly dependent on contextual factors, such as culture and environment. For example, organisations from more dynamic environments reported the use of more adaptive evaluations such as: external outcome-based assessments, qualitative evaluations, the integration of e-learning into product development, customer evaluations and feedback, rapid development, and learner involvement. These conclusions were investigated in more depth in the next essay.

5.1.3 Essay Three

Essay Three investigates the idea that organisations differ in their dynamic capabilities partly, because they operate in markets that have differing levels of change, and partly due to cultural factors (Zollo & Winter, 2002). This essay builds on the previous one by analysing data by operational or dynamic emphasis and also by the quadrants of the competing values framework. In addition, further data was gathered about each organisation to support assumptions about its level of dynamic capabilities, such as innovation awards, and financial and staffing growth. This strategy enabled the comparison of dynamism with organisational culture, applied to a specific operational process. The findings showed a spread of dynamism in a spectrum, with the government organisations demonstrably more concerned with operational matters than the technology companies. Anomalies could at least partially be explained through comparisons of the organisation's growth and change figures. Similarly, the government organisations demonstrated a noticeably greater control orientation than the

technology firms. Compared to the results for dynamism, the culture-type findings were not as distinct across industry, but anomalies were also mostly explained by the growth and change figures relative to other organisations in their sector. The findings, therefore, demonstrate that learning approaches are influenced by the organisation's level of dynamism and culture. The findings also showed a relationship between dynamic capabilities and organisational culture, although the concepts do have related dimensions. For example, similar to *create-type* cultures, organisations with a high level of dynamic capabilities are also likely to have learning cultures with flexible structures and an external focus (Bock et al., 2012; Grant, 1996a; Hung et al., 2010; Teece, 2007a; C. Y.-P. Wang et al., 2012).

These findings support the general premise that the appropriate fit between developing dynamic or operational capabilities is dependent on a combination of environmental conditions, such as turbulence and predictability, and internal factors, such as leadership, structure, culture, and strategy. I argue that these factors are more configurational than contingent. For example, organisations in an industry that has a high level of dynamism but that are also highly regulated (as in GammaTech's case), will not necessarily suit flexibility-dominant structures, procedures, and controls (Henri, 2006). In such a case, forms of separation between exploratory and exploitative actions may be required to isolate activities that need consistency, accuracy, and stability. Birkinshaw, Zimmermann, and Raisch (2016) proposed that organisations can pursue three distinct modes of adaptation when faced with discontinuities in their environment. These are: *structural separation*, which places exploration and exploitation activities in different organisational units; *behavioural integration*, which brings the conflicting activities together in a single unit by providing a supportive behavioural context; and *sequential alteration* which involves deliberately alternating between exploration and exploitation over time. Birkinshaw et al. (2016) concluded that, rather than suggesting one approach is inherently more effective than others, their evidence was indicating that the optimal choice would be that which is appropriate to a firm's environmental context and organisational heritage.

I also suggest that the organisations in my study appeared to pursue distinct modes of adaptation. Organisations that favoured dynamic rather than operational capabilities, demonstrated compete- or create-type cultures, and operated in high velocity environments, appeared to favour *behavioural integration*. These organisations mentioned multi-function teams, simultaneous product and learning production, and collaborative learning content generation. However, organisations that favour control, which operate in a relatively stable environments, and used learning that focused on achieving operational objectives, appeared to

use more *structural separation*. Content in these organisations was generally created with the assistance of, rather than with, distributed subject matter experts, and a departmental and hierarchical sign-off process prevailed.

5.2 Contributions

This thesis seeks to contribute to a more nuanced and configurational understanding of the dynamic capabilities concept. Traditionally, researchers have located dynamic capabilities at the organisational level of analysis, but in recent years there is a trend towards focusing on its microfoundations, such as the individual, group, functional, or process levels (Schilke et al., 2018). However, the overwhelming majority of microfoundational dynamic capabilities studies are conducted at the individual, group (e.g., focusing on skills and cognitions of managers) or functional levels (e.g., new product development) (Schilke et al., 2018). The first contribution to theory made by this thesis is that it deepens our understanding of the microfoundations of dynamic capabilities at a *process* level. The research showed how different levels of dynamic capability can influence the goals and practice of an organisation's learning strategy profoundly. In particular, the findings indicate that higher levels of dynamic capabilities motivate learning strategies and practices to be oriented towards stimulating and accommodating *new* learning. The theoretical implication of this is that it provides further support for the co-dependence of organisational learning and dynamic capabilities. Organisational learning is sometimes considered an antecedent, sometimes a dimension, and sometimes a consequence of dynamic capabilities (Schilke et al., 2018), but I suggest that they are almost too indistinct to separate in such a way.

The appreciation of *context* as antecedent, mitigating variable, and enabler has gained increasing attention in the dynamic capabilities literature (Kay, 2010; Wilden et al., 2016; Wilden & Gudergan, 2015). The three main contextual influences considered in this thesis – industry, environmental dynamism, and organisational culture – may not be as distinct as they first appear. For example, organisations from the same industry generally face similar levels of environmental dynamism, and the amount of change an organisation encounters, guides the collective behaviours and processes (cultural traits) that support appropriate responses to external conditions (Costanza et al., 2016; Denison & Mishra, 1995). Therefore, external changes influence organisational culture *and* dynamic capabilities. The underlying theoretical

argument is based on the idea that building and maintaining organisational change routines is particularly advantageous when there is change in the environment (Schilke et al., 2018). The findings in this thesis are consistent with organisational-level studies that show that the benefits of maintaining flexible internal systems increase in dynamic conditions (e.g., Pavlou & El Sawy, 2006; Protogerou et al., 2012; Wilden & Gudergan, 2015; Wilhelm et al., 2015). Moreover, dynamic capabilities and adaptive cultures are likely to have a greater effect on performance in this circumstance (Costanza et al., 2016; Wilden et al., 2016). This thesis demonstrates how lower-level activities are also impacted by an imperative to adapt. Therefore, this thesis' second contribution is to strengthen that argument and provide evidence, at a microfoundational level, that organisations' adaptive processes are strongly related to environmental dynamism and shows empirically that an organisation's cultural type and level of dynamic capabilities are interrelated.

The third contribution this thesis makes is methodological. Research into dynamic capabilities at varying levels is usually interpreted to mean organisational, functional group, or individual (Wilden et al., 2016). This thesis offers another possibility – a multi-level *process*. Observing processes (for example e-learning) offers several advantages in the advancement of dynamic capabilities knowledge: 1) it contributes to much-requested microfoundational research on the concept (e.g. Barney & Felin, 2013; Eriksson, 2014); 2) it accounts for the multi-level nature of dynamic capabilities (Schilke et al., 2018); 3) it overcomes definitional issues with the concept, as consensus exists that dynamic capabilities act to change operational routines (Helfat et al., 2007; Teece et al., 1997; Zollo & Winter, 2002); and 4) it addresses concerns of methodological determinism as it can use very different methodological logics – for example, learning performance can be measured very differently from learning development. The process followed in this thesis was firstly to create a series of propositions, derived from the literature, which suggest the aspects of the operational practice likely to support environmental adaptation and internal innovation. In Essay One this was achieved by separating the operational and dynamic components of e-learning processes. The assumption was that by investigating the dynamic elements of e-learning processes, insights could be gained into the microfoundations of dynamic capabilities. I suggest that this method can be applied to the observation of other business processes to determine which aspects of the practice are strategic, in that they contribute to the long-term objectives of the organisation, and which are purely operational and relate to current output. As most processes include interactions and the organisational context, this reveals considerably more than the micro unit of the process

itself (Barney & Felin, 2013; Whetten, Felin, & King, 2009). This method provides an analytical focus to identify factors that facilitate the development, maintenance, or actual usage of dynamic capabilities.

The remaining contributions made by this thesis are practical. The thesis firstly demonstrates how, by dividing e-learning technology and processes into their ambidexterity components, practitioners can balance the need for efficient competency development with support of organisational-level learning. The implication for e-learning, and deliberate learning in general, is to propose benefits beyond the efficient exploitation of current knowledge, by showing how learning activities may enhance innovation and adaptation. For example, organisations can create dynamic e-learning if they have integrated mechanisms for generating and adapting learning material. The characteristics of e-learning potentially facilitate more responsive, flexible, and innovative learning (Callan et al., 2015; Waight et al., 2004). However, it is naïve to believe that the tools alone will result in immediate changes to existing knowledge-sharing behaviours or social hierarches (Bothams & Fordyce, 2002). Therefore, it would be advisable to match the strategic and operational objectives of the learning programmes with the existing knowledge structures of the organisation. Furthermore, the thesis demonstrates an impact of organisational culture on evaluation strategies. Previous work comparing performance management measures with cultural values has shown that organisations with flexibility-dominant values had greater diversity of evaluation, loose and informal controls, and used results to inform decision-making rather than control behaviours (Henri, 2006). When evaluating learning, management need to be mindful of the culturally-determined expectations of their organisation to provide compatible measures.

5.3 Limitations

There are several limitations of this study that offer opportunities for future study. First, the qualitative data are cross-sectional, yet dynamic capabilities is an inherently longitudinal construct (Arndt & Norbert, 2015). Nonetheless, there is some justification for the cross-sectional method, since I conceptualised e-learning as a process, where the components of adoption, content and evaluation are analogous to Teece's (2007a) sensing, seizing, and reconfiguring (see Figure 3.3). Investigating a process need not be conducted over time if all stages can be observed simultaneously. Unfortunately, collecting longitudinal data may still be

limited to proxy measures, as constructs such as dynamic capabilities, organisational learning, and organisational culture cannot readily be assessed from archival data. Second, the subjective assumptions used in this study as to what constitutes *high* dynamic capabilities is also open to criticism. An organisation's industry and performance growth rates may be too blunt an instrument for accurate appraisal. More conventional survey data combined with bottom-up abductive reasoning may add more credibility to the findings. Although I criticise the wide variety and range of quantitative dynamic capabilities measures (see Appendix A), survey data is more comparable across organisations.

A third limitation is the lack of generalisable results, which is due to the case-study design, the relatively small sample size, and the focus on large organisations. All of these limitations represent the trade-off between measurement precision and contextual realism (McGrath, 1981). The case-orientation was a deliberate methodological decision made in order to reconcile the phenomenon and process in question. Generalisability is a casualty of that decision. However, given the sample sizes required, this would lead to a much larger and more labour-intensive research programme. The small sample size is an aspect of the case-orientation that trades generalisation for depth of contextual explanation. Fourth, there are two main sampling biases in this study. The first is the inclusion of smaller private companies with large public-sector organisations, and the second is the variety in level and role of the research participants. It has been argued that public and private organisations have divergent goals, values, and structures and so on, and therefore cannot be compared adequately (see for example, Poole, Mansfield, & Gould-Williams, 2006). However, polar extremes do provide valuable information about which operational processes are present in exceptional cases of high dynamic capabilities (Eisenhardt & Graebner, 2007). Further, the respondent roles varied because of differences between the organisations' structures, and inconsistencies between e-learning or learning and development-related roles across large organisations.

Finally, there is a fifth limitation which is procedural. More data could be gathered, and additional analysis conducted to strengthen the validity and reliability of this study. This could include inter-rater reliability measures, more structured interviews, more sources of data to verify interviews, and the use of validated survey instruments for cross-referencing moderators such as culture type, leadership style, and organisational structure. However, the aim of this exploratory case study was not to make statistical generalisations but to seek new insights and provide guidance for future empirical studies.

5.4 Future Research

The limitations listed above provide opportunities for future research. First, longitudinal studies that examine the co-evolution of dynamic capabilities and capability development activities, would overcome some of the criticisms of using a cross-sectional study. Comparing firm performance with learning investments over time may also strengthen the cause-effect inferences. However, this approach is also not without challenges, as contextual moderators, which are difficult to hold constant, will distort results in multi-organisation longitudinal studies. Second, the additional use of survey data may overcome the issue of subjectivity in judging and organisation's level of dynamic capability. Future research could use a mixed-methodology with a validated survey instrument to assess the level of dynamic capability of the case organisations and contrast that with qualitative data concerning specific operational or learning processes. Third, to help overcome the generalisability issue, future research could use a matched-pair method to control for sampling variances such as organisation size, age, sector, and respondent role. Similarly, a case-control design could be used, where a high dynamically-capable organisation is compared to a random selection of ostensibly similar organisations (Forgues, 2012).

Fourth, in order to hold constant the sampling bias described in the limitations section, future research could either widen the investigation to more organisations or dig even deeper into the contextual causes by using more respondents within each organisation. The focus on large organisations allowed access to respondents with specialised expertise. However, there is precedent for investigation of both e-learning (Raymond, Uwizeyemungu, Bergeron, & Gauvin, 2012; Roy, 2009) and dynamic capabilities (e.g., Rice, Liao, Galvin, & Martin, 2015; Woldesenbet, Ram, & Jones, 2012) in smaller enterprises. Finally, future studies could advance the premise developed in this thesis that the microfoundations of dynamic capabilities are observable, by separating the ambidexterity components of an operational process. Quasi-replication studies that either seek to reproduce these findings in different settings or use other operational processes, will help scholars both to understand the generalisability of these results (Bettis, Helfat, & Shaver, 2016) and to suggest additional theoretical considerations.

6. Appendices

Appendix A: Example Dynamic Capabilities Measures – Quantitative

I explain in Segment 1.3.2 that quantitative studies use a wide variety of operationalisations and scales for measuring dynamic capabilities. Table 6.1 illustrates this point by listing selected quantitative dynamic capabilities measures (not using a proxy) that have been used in recent studies:

Table 6.1 Selected Dynamic Capabilities Quantitative Measures

Study	Key DC findings	Operational measures
Chien and Tsai (2012)	Direct relationship between DC and subjective performance relative to competitors.	<ol style="list-style-type: none"> 1. Absorb new knowledge from market sources 2. Encourage knowledge contributions and sharing 3. Stored knowledge is accessed and applied 4. Use knowledge to improve efficiency 5. Makes knowledge accessible to those who need it 6. Quickly apply knowledge to critical competitive needs
Hung, Yang, Lien, McLean, and Kuo (2010)	DC acted as a mediator between organisational learning culture and subjective performance relative to largest competitor.	<p>Organisational strategic capability</p> <ol style="list-style-type: none"> 1. My organisation owns future competitive flexibility in industry. 2. My organisation owns ability that can fast aware new business opportunity or threat possibility. 3. In my organisation, leaders have entrepreneurship characteristics. 4. My organisation has the ability to cohesive employees' knowledge by visioning. <p>R&D innovative capability</p> <ol style="list-style-type: none"> 5. My organisation has the ability to evaluate my own organisation's strength and weakness. 6. My organisation has the ability to know the direction and timing for R&D. 7. My organisation has the flexibility to development new product or technology. <p>Organisational management capability</p> <ol style="list-style-type: none"> 8. My organisation has the flexibility to understand the specific needs of customers. 9. My organisation has the flexibility to communicate and coordinate effectively among departments. 10. My organisation helps employees to balance the life of work and family. 11. My organisation coordinates with community to fulfil mutual needs.
Iris and Vikas (2011)	The findings support the underlying assumption that E-Learning and knowledge sharing	<ol style="list-style-type: none"> 1. Enhanced learning effectiveness of new knowledge 2. Enhanced decision quality 3. Enhanced capabilities of communication and coordination 4. Enhanced responsiveness 5. Enhanced integration in new product development

	directly enhance dynamic capabilities.	6. Enhanced capabilities of resource deployment
Makkonen, Pohjola, Olkkonen, and Koponen (2013)	The results support the underlying view that dynamic capabilities and innovation give firms competitive advantage and increase their evolutionary fitness.	<p>Sensing and seizing</p> <ol style="list-style-type: none"> 1. We systematically search for new business concepts through observation of processes in the environment 2. We systematically bring together creative and knowledgeable persons within the firm to identify new business opportunities 3. We systematically bring together creative and knowledgeable persons from outside the firm to help identify new business opportunities 4. Our firm systematically transfers resources to the development of new business activities <p>Knowledge creation</p> <ol style="list-style-type: none"> 5. We seek to increase R&D investments 6. Our firm has specific plans for R&D activity 7. Our management promotes R&D processes 8. We are developing routines for firm R&D <p>Integration</p> <ol style="list-style-type: none"> 9. The firm uses networks as knowledge resources 10. The firm exploits the personal network of the manager 11. Employees' networks are important information sources for the firm 12. The firm uses networks to influence actors in the environment <p>Reconfiguration</p> <ol style="list-style-type: none"> 13. We have developed routines to enable employees' active participation in generating ideas for new products or services 14. We have developed routines to enable employees' active participation in generating ideas for new production processes or organisational procedures 15. The firm has routines for systematizing employees' experiences <p>Leveraging</p> <ol style="list-style-type: none"> 16. Our employees are more willing to adopt new ways of working than those of our competitors (not in the final model) 17. Employees have room to exploit new opportunities as long as it does not affect current activities 18. The firm strongly encourages employees and managers to promote new visions, goals and ideas <p>Learning</p> <ol style="list-style-type: none"> 19. The firm emphasizes the need to increase the level of competence among employees 20. The firm allocates resources to increasing employees' competence 21. The firm strongly encourages employees to learn from their experiences
Wang, Klein, and Jiang (2007)	Direct relationship between knowledge-based DC and subjective performance relative to competitors.	<p>Knowledge absorption.</p> <ol style="list-style-type: none"> 1. Absorb new knowledge from external/market sources 2. Absorb new knowledge from suppliers, competitors and customers 3. Absorb new knowledge from educational/research establishments 4. Absorb new knowledge from patents 5. Absorb new knowledge from personnel mobility <p>Knowledge creation.</p> <ol style="list-style-type: none"> 6. Employee rotation across areas 7. Brainstorming retreats or camps 8. Cooperative projects across directorates 9. Learning by observation

		<ul style="list-style-type: none"> 10. On-the-job training 11. Face-to-face meetings 12. Repositories of information, best practices, and lessons learned 13. Groupware and other team collaboration tools 14. Modelling based on analogies <p>Knowledge storage.</p> <ul style="list-style-type: none"> 15. Translating the tacit knowledge into readily understandable forms 16. Encouraging knowledge contribution and sharing in organisations 17. Ensure effective interpretation and application 18. Stored knowledge is accessed and applied <p>Knowledge application.</p> <ul style="list-style-type: none"> 19. Retrieval mechanisms are effective in enabling knowledge retrieval 20. Takes advantage of new knowledge 21. Have processes for applying knowledge learned from mistakes 22. Have processes for applying knowledge learned from experiences 23. Have processes for using knowledge in development of new products/services 24. Have processes for using knowledge to solve new problems 25. Uses knowledge to improve efficiency 26. Uses knowledge to adjust strategic direction 27. Makes knowledge accessible to those who need it 28. Quickly applies knowledge to critical competitive needs 29. Quickly links sources of knowledge in solving problems
Wilden and Gudergan (2017)	The results indicate that marketing and technological capabilities fully mediate the relationship between a firm's service-dominant orientation and firm performance. In addition, the positive effect of service-dominant orientation on marketing capabilities reduces the more the firm deploys dynamic capabilities.	<p>Sensing</p> <p>In my organisation</p> <ul style="list-style-type: none"> 1. People participate in professional association activities* 2. We use established processes to identify target market segments, changing customer needs and customer innovation 3. We observe best practices in our sector 4. We gather economic information on our operations and operational environment. <p>Seizing</p> <p>In my organisation</p> <ul style="list-style-type: none"> 5. We invest in finding solutions for our customers 6. We adopt the best practices in our sector 7. We respond to defects pointed out by employees 8. We change our practices when customer feedback gives us a reason to change <p>Reconfiguring</p> <p>How often have you carried out the following activities between 2004 and 2008?</p> <ul style="list-style-type: none"> 9. Implementation of new kinds of management methods 10. New or substantially changed marketing method or strategy 11. Substantial renewal of business processes 12. New or substantially changed ways of achieving our targets and objectives
Wohlgemuth and Wenzel (2016)	The results suggest that firms with dynamic capabilities routinize at	<p>Strategic sense-making capacity</p> <ul style="list-style-type: none"> 1. We can perceive environmental change before competitors 2. We often have meetings to discuss the market demand

	the strategic level. However, the findings also indicate that firms with dynamic capabilities do not routinize at the operational level.	<ol style="list-style-type: none"> 3. We can feel the major potential opportunities and threats 4. We have a perfect information management system 5. We have a good observation and judgment ability <p>Timely decision-making capacity</p> <ol style="list-style-type: none"> 6. We can quickly deal with conflicts in the strategic decision-making process 7. Under many circumstances we can make timely decisions to deal with strategic problems 8. We can remedy quickly to unsatisfied customers 9. We can reconfigure resources in time to address environmental change. <p>Change implementation capacity</p> <ol style="list-style-type: none"> 10. Our strategic changes can be efficiently carried out 11. Good cooperation exists among different functions 12. We help each other with strategic change implementation 13. We can efficiently improve strategic change implementation
Wu and Hu (2012)	Indirect relationship between knowledge-based DC and subjective performance relative to competitors through process (operational) capabilities in hospitals.	<p>Acquisition</p> <ol style="list-style-type: none"> 1. My hospital has the ability to develop the knowledge of medical and administrative personnel. 2. My hospital has the ability to codify acquired knowledge into applicable formats. 3. My hospital has the ability to store acquired knowledge in the hospital repository. <p>Transfer</p> <ol style="list-style-type: none"> 4. My hospital has the ability to transfer relevant knowledge to medical and administrative personnel. 5. My hospital has the ability to distribute relevant knowledge throughout the hospital. 6. My hospital has the ability to share relevant knowledge between medical and administrative units. <p>Integration</p> <ol style="list-style-type: none"> 7. My hospital has the ability to organize relevant medical and administrative knowledge. 8. My hospital has the ability to integrate different medical and administrative knowledge. 9. My hospital has the ability to interpret new knowledge on the basis of prior knowledge. <p>Application</p> <ol style="list-style-type: none"> 10. My hospital has the ability to apply knowledge to develop new medical services. 11. My hospital has the ability to apply knowledge to change healthcare market competition. 12. My hospital has the ability to apply knowledge to maintain patient relationships.
Zhan and Chen (2013)	Direct relationship between exploitation capability and exploration capability (DCs) and subjective financial and competitive performance in international joint ventures (IJVs).	<p>Exploitation capability</p> <ol style="list-style-type: none"> 1. Our IJV has the ability to integrate resources contributed by foreign and Chinese partners along the value chain system to create maximum possible values. 2. Our IJV is capable of blending resources contributed by foreign and Chinese partners in a complementary way to the greatest extent possible. 3. Our IJV has the ability to utilize resources contributed by foreign and Chinese partners optimally to the greatest extent possible. 4. Our IJV has the ability to configure or reconfigure resources contributed by foreign and Chinese partners to meet specific or unique needs of the Chinese market. 5. Our IJV has the ability to constantly analyse new environmental conditions and redeploy existing resources accordingly. <p>Exploration capability</p> <ol style="list-style-type: none"> 6. Our IJV has the ability to learn from past experiences or from other firms to upgrade current capabilities. 7. Our IJV has the ability to use alliances and acquisitions that bring in new resources and capabilities into our IJV. 8. Our IJV has the ability to develop new resources or capabilities needed for local operations through R&D and innovation.

Zheng, Zhang, Wu, and Du (2011)	Direct relationship between knowledge-based DC and innovative performance. Four proxies used for innovative performance including: number of new products, share of turnover with new products, the speed of new product development and commercialization.	<p>Knowledge acquisition.</p> <ol style="list-style-type: none"> 1. Our firm could acquire technological knowledge 2. Our firm could acquire marketing knowledge 3. Our firm could acquire managerial knowledge 4. Our firm could acquire manufacturing and process knowledge 5. Our firm could acquire other knowledge and expertise. <p>Knowledge generation capability</p> <ol style="list-style-type: none"> 6. Our firm could create technological knowledge 7. Our firm could create marketing knowledge 8. Our firm could create managerial knowledge 9. Our firm could create knowledge 10. Our firm could create technological knowledge <p>Knowledge combination capability.</p> <ol style="list-style-type: none"> 11. Our firm could combine internal and external knowledge 12. Our firm could integrate knowledge from different segments, team and individuals 13. Our firm could combine knowledge in different technological or market fields 14. Our firm could combine new knowledge with original knowledge pool 15. Our firm could adapt the internal structure and process to combine knowledge effectively 16. Our firm could coordinate internal and external networks to combine knowledge effectively.
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Appendix B: Example Dynamic Capabilities Measures – Qualitative

In Segment 1.3.2 I explain that qualitative work on dynamic capabilities use a wide variety of approaches and measures. Table 6.2 lists selected qualitative dynamic capability measures that have been used in recent studies:

Table 6.2 Selected Qualitative Dynamic Capabilities Measures

Study	Key DC findings	Interview Protocol?
Boccardelli and Magnusson (2006)	The results suggest that earlier proposed dynamic capabilities frameworks need to be modified, by taking into account the single entrepreneur as a source of dynamic capabilities, and by introducing the concept of resource flexibility. In terms of managerial implications, the findings underline the importance for entrepreneurs to balance the striving for distinctive capabilities that provide competitive advantage and the experimentation and improvisation needed to adapt to changes in the market.	Non-specified interview protocol based around: Market change - refers to changes to customers or markets for the firm's offerings. Technology change - refers to changes to the technology used in the products and services. Survival - refers to the status of the investigated company at the time of study.
Ellonen, Wikstrom, and Jantunen (2009)	Building on qualitative data from the publishing industry, our analysis revealed that companies that had relatively strong dynamic capabilities in all three areas (sensing, seizing and reconfiguration) seem to produce innovations that combine their existing capabilities on either the market or the technology dimension with new capabilities on the other dimension thus resulting in niche creation and revolutionary type innovations.	Non-specified interview protocol based around sensing, seizing and reconfiguration. Our primary data-collection method was the semi- structured interview. We prepared an interview guide consisting of five sections. The first covered the background of the respondent and the competitive environment of the product. The second part of the interview focused on the nature of the online products, the third on product development and the fourth on the organisational changes triggered by the online products. Finally, we asked the respondents to evaluate their current online services.
Kindström, Kowalkowski, and Sandberg (2013)	Direct relationship between DC and subjective performance relative to competitors.	Non-specified interview protocol. Interviews were semi-structured, guided by a case study protocol based on inputs from the service innovation literature and the dynamic capability framework.
Lee and Kelley (2008)	Our comparative case analysis of divisions of two established Korean organisations suggests that managerial practices include the deployment of entrepreneurial resources having particular skills, characteristics, and motivation.	Specified interview protocol. Before the interviews, we developed a protocol focused around our research question. We allowed the line of questioning to evolve, however, in order to probe in areas emerging during the interviews. Examples of questions from the protocol for the managers are, 'What characteristics do you look for in project leaders?' 'Who makes major decisions on the project?' and 'How often do you communicate with project leaders?' Examples of questions from the protocol for the project leaders are, 'What motivated you to work on your current project?' 'How much freedom are you given to make decisions about the project?' and 'In what ways does your manager help you?'

Narayanan, Colwell, and Douglas (2009)	<p>We provide evidence that senior managers undertake specific initiatives based on their own particular cognitive orientations and then orchestrating the multilevel organisational routines. These replicable actions by senior management during the early stages of capability development can lead to the development of a capability that is not initially in the cognitive frames of lower level employees. Furthermore, internal and external contingencies have a profound impact on the decision to develop a capability, and to discontinue its development.</p>	<p>Non-specified interview protocol. The interviews were semi-structured and open ended. Senior managers were asked about the logic of developing the capability in question and the challenges of implementation. The focus of these questions was on events and processes, managerial actions and their rationale, and the actual impact of these decisions in order to create a chronology of processes involved in the initiatives.</p>
Mathiassen and Vainio (2007)	<p>We argue that the framework offered a comprehensive and useful approach to understand the dynamic capabilities in the two firms, and on that basis we suggest the principles for how managers can apply the framework to small software firms.</p>	<p>Protocols specified – based on sensing and interpreting – Case study across two cases. Initially, the CEO (at Starter Inc.) and the Head of business development (at Mature Inc.) were interviewed on why and how environmental signals were sensed and interpreted, and on how responses were designed and decided upon. During a subsequent visit to the two firms, the same respondents were interviewed to answer the questions focusing on management, business development, and marketing practices.</p> <p>Why and how certain environmental signals are sensed and interpreted: How responses are designed and decided upon? How internal practices, such as management respond to the environment? How sensing and responding to events in environments are implemented in project management? How sensing and responding to events in environments are implemented in project management?</p>
Newey and Zahra, 2009 (2009)	<p>Our analysis has extended existing understandings of firm evolution by identifying key organisation processes that enact dynamic and operating capabilities respectively and have highlighted a key knowledge-based mechanism that links learning at both levels to act as the trigger for operating capability reconfiguration</p>	<p>Specified interview protocol – Cases study of 8 organisations multiple data sources.</p> <p><u>Knowledge acquisition</u> was defined as the gathering of information from internal and external sources. Example questions included: What new information did you acquire that became the basis of your work? How did you acquire information about the market?</p> <p><u>Knowledge assimilation</u> referred to the processing of acquired knowledge for interpretation and understanding. Firm-level inquiries of assimilation asked: How was that new information distributed to relevant parts of the organisation for interpretation and evaluation?</p> <p><u>Knowledge transformation</u> was regarded as the process of combining newly acquired and assimilated knowledge with existing knowledge. We asked interviewees: What new understandings emerged in your work? How did these new understandings emerge?</p> <p><u>Exploitation</u> was defined as those activities relating to the offering of a product for sale. Exploitation was captured by asking: How did you seek to create commercial value from your ‘product’?</p>

Ravishankar and
Pan (2013)

Our findings suggest that a full capitalization of the efficiencies created by modularity may be closely linked to the strategic sense making abilities of senior managers to assess the long-term business value of the dominant designs available in the market.

Specified interview protocol – Interviews were open-ended, but based on an illustrative list of questions.
Selected examples below:

1. What are the areas in which modularity has worked for ASIASPEAK? Why?
 2. How is the IT-support function organised at ASIASPEAK?
 3. Who championed the cause of modular management? Why?
 4. How are CRs trained at ASIASPEAK?
 5. What is the impact of modularity on customer relationship management?
 6. Can you elaborate on the specific advantages your business unit has derived from the implementation of modular systems?
 18. How did you design reward systems as part of the KM strategy?
 19. What IT-systems are deployed to better utilize front-line personnel's operational knowledge?
 20. How do you assess the overall impact of ASIASPEAK's KM strategy?
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Appendix C: Interview Protocol

The interview protocol below was used in both Essay 2 and Essay 3.

Strategy

1. What are the primary goals of your e-learning programs?
2. How does this integrate with your other learning and development initiatives?
3. Overall how well do you believe your learning and development initiatives integrate with your organisation's goals?
4. How do you know if an e-learning content is up to date?
5. How often are changes made, or new content added?
6. Who decides, and who makes these changes?
7. How are new segments or topics generated? Briefly describe the process.
8. Can new segments or topics be easily added to your LMS or system?
9. How easy/difficult is it to alter content in a segment or topic?
10. Are new segments or topics developed using subject matter experts from more than one department?
11. Can you give example(s)?
12. How common is this?

Content

1. How is it decided what content to include in training (on or offline)?
2. How is it decided what content goes online?
3. Where are these decisions made? – Who makes them?
4. What methods do you have to check that learners are using the system?
5. What methods do you have to check that employees find the training useful?
6. Are these systems regularly used, reported on?
7. Can you describe any situations where the learning is flexible, where ideas can be generated collaboratively (on or offline)?
8. Are there any collaborative technologies integrated into the e-learning system (Web 2.0, shared spaces)?
9. If there is any collaboration in the learning, how is that information used?
10. Approximately what percentage of the learning and development budget/time goes to soft skills training (on or offline).
11. Are there any e-learning segments or topics where the objectives of the training material are to encourage more critical thinking and reflection (where there is no right answer)?
12. Are problem-solving scenarios or simulations available to the learners?

Evaluation

1. How do you assess the effectiveness of your learning and development programs (both formally and informally)?
2. How often is this done?
3. Describe a situation where the assessment has changed the way you do things.
4. Once you decide that a piece of learning is required, how long does it usually take to develop a new segment or topic?
5. What is the typical review period for a topic or module? Do you think this is often enough?

6. Can you give me examples?
7. Either formally or informally, is there any assessment of how collaborative your learning and development programs are?
8. If there is collaboration in your e-learning how can you tell if the interactions are useful?
9. Can you give me an example?

Based on previous dynamic capabilities studies (e.g., Iris & Vikas, 2011; H. Lee & Kelley, 2008; Ravishankar & Pan, 2013) and adapted to incorporate e-learning processes.

Appendix D: Modifications to Zahra et al's (2006) model

In Segment 2.2 a model is presented that is based on Zahra et al's (2006) stylised model of capability development and performance. Table 6.3 lists the differences and explains why these modifications were made.

Table 6.3 Modifications made to Zahra et al's (2006) model

Zahra et. al's (2006) Model	Our Model	Explanation of Differences
Entrepreneurial actions	Entrepreneurial activities	We suggest that entrepreneurial activities imply actions which are distributed throughout an organisation.
Dedicated and leveraged resources/skills	Resources and skills	Resources and skills are subject to reassignment, therefore are only temporarily dedicated and leveraged.
Learning processes	Organisational learning	We suggest it is the application of organisational resources and learning that act to renew operational capabilities. E-learning is one of the learning processes that can contribute to the development of dynamic capabilities.
Substantive capabilities	Operational capabilities	Operational capabilities less ambiguously <i>describe the how we make a living</i> capabilities (Winter, 2003, p. 992).
Organisational knowledge	Organisational knowledge	We suggest that organisational knowledge and organisational learning interact, and that knowledge precedes learning.
Dynamic capabilities	Dynamic capabilities	In Zahra et al's (2006) model, dynamic capabilities interact with organisational knowledge. We suggest dynamic capabilities interact with organisational learning, as knowledge requires learning to before change can occur.
Performance	Modified output	Performance indicates achievement of goals which may not always be the case.

Appendix E: NVivo Classifications – Essay 2

As noted in Section 3.4, interview transcripts were entered into NVivo (version 10) qualitative data analysis software and coded. Table 6.4 lists the coding structure used, with node name and node description listed alphabetically. The column *Sources* totals the number of transcripts coded using that node. The *Refs.* column totals the number of times each node was used within those transcripts. Example quotes for each node are also provided.

Table 6.4 NVivo Classifications Used in Essays 2 and 3

Name	Description	Sources	Refs.	Example Quotes
<u>Adoption</u>	<u>Any comments relating to the adoption of e-learning</u>	<u>28</u>	<u>643</u>	
Adaptability	Comments indicating the adaptability of the organisation	6	10	“So we’ve analysed all the 360s enough to say: here are your core things that people are caring about. So if we can make sure that we bring the solutions that give people access to that core stuff, then we’re probably doing a good job.”
Benefits	Perceived or actual benefits of using e-learning	14	31	“We’re going to do that with online learning as well because globally, if they can do that conversation at the right time and the right place, then they can be more effective, too.”
Collaboration	Adoption aspects that are collaborative.	11	14	“People are now really starting to get into their online discussion; it’s actually been interesting watching the evolution—how everyone hung back, and now it’s not a big deal.”
Compliance training	Comments regarding compliance training	10	21	“And we have a lot of that [compliance], and those are generally created by subject matter experts or imposed on us by senior parts of the business saying, we need to make sure that all 800 people who deal with us have read and understood this memo of the core rules.”
Culture	Cultures that impact the e-learning strategy	12	25	“In fact, when we went into this, it was a bit of an eye-opener as well and again it’s the syndrome of our company. If I have an idea or a strategy, I write the paper, I drive it, and it ends up yours, and it doesn’t matter what it is, it’s yours and you drive it. So that’s definitely the centre of our company.”
Decisions	How decisions are made to bring particular content online	16	46	“In depends on the size of the change, so if it’s say a legislative change, it’s kind of big, say, 75% of our staff, then we might actually just assign someone to the project and I’ll actually be in—more or less, be in imbedded in that project, and that’s their sole focus, is to make sure that the learning needs for that project are met.”
Justification	Justifications used to get an e-learning program	20	53	“Because we’re based around the country, pulling people out of stores and bringing them into one place which is sort of logistically, it’s a nightmare.”

Objectives	The objectives of adopting an e-learning topic or programme	17	35	“Product training is the most important, because obviously, our implementation consultants, our developers, and so on, need to understand the product, need to know what they’re building, what they’re installing into clients’ sites.”
Organisation - details	Details of the organisation	18	63	“We received in the budget, four years ago—quite a large amount of money to hire a whole lot of debt campaign people to chase down a particular type of elderly debt that we had, and they use a course page as campaign central, and then they have a target I think 200 million a year.”
Organisation - history	History of the organisation	13	30	“Like a lot of organisations, our e-learning began as compliance e-learning—largely structured to hit that compliance space, you know, box ticking someone has done their health and safety—health and safety being a hot topic at the moment.”
Organisation - objectives	Objectives of the organisation	14	38	“We do a lot of research in what the market wants and where the world is going. People want to be empowered, they want to be in charge of their own patient records.”
Organisation - size	Size of the organisation	18	27	“Actually that’s an easy question to answer. We have 2,864 staff at present.”
Organisation - strategy	Strategy of the organisation	18	61	“And then the crown issue the budget, which normally means lots of changes for us. Then every now and then there’s a change of government, which tend to have quite a lot of upheaval to the tax system, and then we have various big public initiatives, Kiwisaver, Working for families, child support etc. And so, there is a steady stream of new legislation, interpretations, system, and processes.”
Philosophy	The foundations to the adoption of e-learning	21	41	“We run workshops, we work on course development projects, we work on a variety of different ways, because we realise that training—in the more conventional sense, like staff come along to workshops—maybe useful up to a point, but it’s not a really—not the most effective way to change people’s practice in a sustainable way.”
Problem	Problems that-learning may solve	19	46	“Again, in the past it’s been very reactive, it’s—yeah, we might be launching a new product, there might be a legislative change, a process change, system change, and then whoever owns that certain part of the business will come to us and say we need some training on this because this is changing.”
Process	The process of creating new e-learning	19	37	“Okay, we made a decision last year to implement an online training program, for a number of different reasons, but firstly so we—then went through process where we talk to a number of third parties who could help us develop both the platform and the content.”
Respondent - details	Background and details of the respondent	17	30	“So, my background is a bit public sector. So coming from the public sector to a bank, particularly this bank, it’s definitely a lot more dynamic, a lot more adaptable and just—it’s a lot easier to make change happen.”
Respondent - role	Role of the respondent	12	33	“During that time, I’ve also been the L&D manager here, and an L&D consultant, but not primarily focus on the LMS and it’s my passion.”

Content	Comments relating to the e-learning content	28	919	
Certification	Whether learner certification is considered important	9	30	“Well certainly, in our contract with ACC, we’re required to have a certain—well everyone’s supposed to have at least got level 2.”
Challenges	Problems with e-learning content or usage	14	28	“How do we make those more modern and relevant to people when... Particularly in the compliance-space, how do we sort of get away from this monthly collective groan when compliance is rolling out?”
Collaboration	Aspects of the content that allows collaboration	18	51	“Yeah, we do use our Wiki, [...] and it’s fantastic, it’s a brilliant tool, it’s very well-used, and it’s very, very collaborative, it’s used in the way that the Wiki should be used, so it’s excellent. So the culture of that is already here.”
Decisions	Comments about how content decisions are made	11	25	“When someone comes to us and we identify a learning need, and it varies, we get both in—we might be going: hey this needs to be done, or we might have someone come to us and say: we need to learn about this.”
Details	Details of the content, What is the type of learning required? What specifications is it.	23	110	“Videos are really good for overviews, they’re good for a general understanding of how things work, but the textual material actually gives you that depth of understanding which is impossible to impart in a video. So by combining both of them, I think we get the best of both worlds. “
Future	What future content needs to be added. What is the vision - content-wise.	16	39	“Where we’re heading is much more in to that online space, much more informal learning, lot more use of things like video, online communities, forums, that sort of thing. So moving away from people just sort of... [Screen to screen, you pass, done.]”
Learning needs analysis	Mention of learning needs analysis	4	4	“I will advise on how you can best use the LMS to deliver loosely online learning or e-learning, and again, as I’ve explained it, it isn’t really—it’s a bit more—so for instance—so first thing is the design, so generally the designs are obviously just designed from a training-needs analysis.”
Modularity	Can the content be loaded as modules (therefore easily updated).	8	10	“[Is it modular based?] Some is, some isn’t.”
Objectives	Objectives of varied content	13	29	“We do it when we do our training needs analysis, so we sit down with a customer or the stakeholder who’s asked us to produce this piece of training, and so we go through and we look at who’s in the mix of the audience and what are their ages and skill experience and backgrounds and learning styles and then we look at the content and look at—so, what are the key messages, what are the skills that you want them to develop, what is the knowledge that they need to develop.”
Objectives - learning	Learning objectives	15	46	“So they think about how staff might respond to a piece of work they receive or inquiry whilst at work and they don’t know how to do it. The tools available to them are a helpdesk to park the problem with a knowledge base to help transact it, and an LMS with e-learning – in the first instance where they will learn, but also grow and refine their technical skills.”

Ownership	Discussion about who owns the learning content	10	13	“Generally we’ll ask the business to identify them. And it’s usually pretty easy to sort of to spot who those people are going to be. Then we would tend to go out looking for them ourselves. If someone needs some training, I guess it’s our role to identify who the best person to give us that content is.”
Pedagogy	The method and practice of teaching	5	6	“So, I think there’s quite a volume of courses, but actually if you were to look at them, all of them really would fit within that model of ‘sit here and read’. And so, discerning the difference, saying to people: what is the difference between this and an internet page, which is an informational knowledge base?”
Problem	Learning issues with e-learning	11	21	“So, the learning content might not be particularly well-designed, it might be quite awful to navigate you through it or complete it, but the first test is the technically correct part, and often the testing of the quality of training stops there. And that’s hard, that’s really hard to influence, particularly as there is very little competition, it’s quite difficult to model quality engaging learning when there’s only one provider and only a handful of people who will consume it.”
Process	Comments about e-learning processes	14	23	“So, we’ve ended up with quite a long process, but it’s working, and that is before we put a storyboard, we’ve got to kind of write the story, and that’s been the challenge for us. So our very first stage is actually writing the story, so it’s just a Word document and it ends up being two or three or four pages, and what I’ve asked her to do is just write the story from the start to finish.”
Scenarios	Does the training content include scenarios?	11	17	“You’re dealing with customers, and the sort of customer conversations—it’s not those hard skills. That’s my preference, is to have those scenarios and problem-solving so they’re actually contextual and it’s sort of real-life examples.”
Situation	Details of how e-learning is conducted in the organisation	18	27	“And we encourage people to use that tool for small, group inductions or small team inductions, because the manager or their sort-of GM of that area can do an introductory ‘hey great to have you on board’, ‘the importance of this job’... and then, they can have some ‘in your first week, you’re going to do this’.”
Soft skills	Are soft skills taught? On or off-line	11	20	“We’ve got a bit of a focus on diversity at the moment, so, the ability to bring in regional diversity, ethnicity, gender, which is very important for us.”
Sources	Where does the content come from? (subject matter experts, general users, managers, etc.).	14	29	“And we have a lot of that, and those are generally created by subject matter experts or imposed on us by senior parts of the business saying, we need to make sure that all 800 people who deal with us have read and understood this memo of the core rules.”
Structure	How their e-learning is structured	12	24	“My Class means the resource is for, you know, for instructors to deliver. Then I said, and there’s another that—eValue, which is anything that adds value to the organisation, and that’s what we’re talking about now which is the concept of asking before we give out the training, get views so we can design the training—so it’s really an analysis tool.”

Subject matter experts	Are SMEs integral to the content generation and upkeep?	12	27	“Usually it will be the same person, yeah, but sometimes some of the bigger pieces of work that subject matter expert might be a contractor who’s come in to work on that specific project, [then] they disappear, and then it’s sort of yeah, it’s kind of up to the business area to identify someone to keep an eye on the content and make sure it is up to date.”
Technology	Details of the technology they are currently using	26	59	“So that would define our content, and then because we sought to make the LMS quite central—we’ve got a number of pages that are not training-related. We have a social network for our team leaders. We have—we don’t use Microsoft SharePoint server in our environment, so we’ve got a number of course pages used effectively as the equivalent of SharePoint sites.”
Technology - future	Discussion regarding planned technical upgrades	17	37	“The thing is that it will happen, the move to laptops has been proposed, that sort of thing will suggest that managers will initially have more tablet-type laptops, senior managers will have tablets. I think it will come, and it will be nice to have it built in from the bottom of the architecture that it doesn’t matter what device you access it from.”
Technology - issues	Technical issues encountered with their e-learning	13	25	“It’s just a technology solution—now our internal support for servers has diminished, we’ve moved down to a class called legacy, soon it will be heritage, so we get little or no support now and we’ve been advised that that level of support will dramatically drop. So, it’s a little bit of self-preservation.”
Technology details	Details of the learning technology used	15	57	“So, webinars seem to be more accepted and people understood them. So, we ran them in two ways: one is an actual sort of public webinar, so people could sign up and just to attend, but we also use them as a discussion, a way to bring managers together especially if they weren’t based in the same office. So, we have four people on that, on a webinar, and we have these slides, we have this sort of content to talk through but then they would all be able to participate in the discussion. So, it’s basically coaching with follow-up sessions.”
Trends	Learning trends	6	8	“There is, you know, there is a trend away from doing everything in the classroom, because we want to do just-in-time training.”
Types	What are the types of content used? (Video, audio, text, Articulate, etc.)	16	46	“So, there’s around 2,000 live courses in the LMS, we’ve got another 5,000 or so archived, because we manage, you know, courses like—and of that, maybe a hundred—those expensive kind of e-learning products involving Flash or HTML5 with tens of thousands of them spent to instructional design, project manage, build, publish, and monitor—the SCORM-based objects.”
Users	General comments about the users of e-learning	11	16	“That is the social network for baby team leaders, those who have just started and those who aren’t very senior. So, we are a seven-tier deep organisation, so tier three—tier four—tier five—tier six managers are in a group we call <i>Leaders Online</i> ”
Users - behaviour	Comments regarding e-learning user behaviours	10	14	“But the more complex the work becomes, the more disparate these systems are. So, our lawyers—so we have 200 odd lawyers—they would never use the help desk or the knowledge base, but they can use the LMS a lot. If only to make sure their professional development hours are there.”

Users - expectations	Comments regarding user expectations of the e-learning system	6	13	“You know, for instance, we—you know, moving into online learning, there is an expectation from learners that if they post something in a forum, that they will get a response that day even though it’s a Saturday.”
Users - issues	Issues related to users of e-learning	14	26	“I dealt in the world that we’re at, a lot of it was around managing that change, finding mechanisms to manage that change, and then yeah, so I just used different ways of getting the message out there, but as time went past, so you’re talking about dinosaurs, people would say like I don’t even open my e-mail mate, oh really, yeah.”
Users - motivation	Issues with or efforts to improve user motivation	13	36	“So if you send somebody a booklet and you don’t have a proper administration system, you might not know what they’re doing and you might suddenly bring it up in a year’s time and say, we sent you the booklet but we never heard back from you, and they say, oh yeah it’s sitting here, I’m getting around to it.”
<u>Evaluation</u>	<u>General comments regarding learning initiative evaluation</u>	<u>28</u>	<u>1057</u>	
Collaboration	Evaluation of collaboration	11	22	“And that was a few years ago, it was really around—we were changing the way we were doing our firearms training and what we call PICK training. So, part of that was to have a look at, yeah, new legislation was coming out, we—and this is what happens all the time obviously. We knew we had to do the training on it, so we put up forums and evaluations so people could ask questions, so we’d say, you know, this new policy is coming out and this is what it looks like—questions please.”
Details	Specifics about how e-learning is evaluated	19	57	“We’re removing it and actually putting it into an LMS-driven assessment tool, which actually allows you rather than just getting a pass mark, to actually go—we have the ability to actually look at how each individual question is performed, so that’s why we’re moving it out of that traditional e-learning.”
Evaluation objectives	Evaluation objectives	13	20	“Ultimately, what the business cares about drives a lot of the things that we can implement, and there isn’t a sense of the training is broken, and the training is unsuccessful, it’s either one of the areas or mistakes or issues you have when you’re trying to get something done in the business, you need to work harder in other areas to compensate or adjust their expectations.”
Evaluation problems	Problems encountered with evaluation	15	43	“We’ve got people saying, we’ve got all these experts, but their knowledge is all disparate, and as a result we are seeing them work a lot harder and it’s harder to get things done, so - an input that we can put in place is would be a community practice would take away some of that pain. But that’s as fine-grained as the evaluation gets...”
Evaluation strategy	E-learning evaluation strategy	19	60	“Ultimately, it’s that you know, the business goal here is: has the learning hit the mark, and are we actually getting people ready for the job in a timely manner. So, it’s part of that assessment to actually say that to get that business goal, to get people up and running as fast as possible, so it’s a testable learning—have the learning interventions worked, be they online, be they face-to-face, be they buddies.”

Feedback from learners	Evaluation based on learner feedback	16	48	“People are saying I’m confident enough to do this--or there'll be a question, there was sufficient activities around the system practicing for me to go back on to my machine, et cetera. And then a lot of--each server has an open free form field for people to put any additional comments.”
Feedback how much	Quantity of learner feedback	13	20	“I would say ours is probably 15 to 20%. So, like you know, like a thousand people complete the module, and we get like a hundred and fifty people responding. And that's a fairly--it's a--you get a sense.”
Future	Evaluation plans for the future	18	30	“Yeah, so that’s all online. We’re looking at bringing in mentoring and buddy recording, buddy training; we’re looking at also bringing that online. I expect that we will do that within the next year.”
Growth	Growth in e-learning usage or acceptance	10	13	“I guess like a lot of organisations, our e-learning began as compliance e-learning—largely structured to hit that compliance space, you know, box ticking someone has done their health and safety. We have expanded that e-learning—we now have a lot of the e-learning in our induction programs.”
Integration	E-learning integration with L&D or operational functions	16	43	“I think they’re amazing, actually. Do I think it’s really well-developed learning? I don’t. But I think that’s amazing. I’ve never seen an organisation disseminate messages—key messages, and send it everywhere, as well as what they do. And they do do that.”
Issues	Issues encountered implementing the e-learning programme	16	51	“But we have confidentiality issues, so we’re not allowed to reveal taxpayer data, which is the accounting stuff that the accountant has been working on—outside the business. And even internally in the business, you’re only allowed to see taxpayer data that the stuff that is the nature of your work.”
Learning evaluation	Evaluation of learning	12	28	“We’re removing it and actually putting it into an LMS-driven assessment tool, which actually allows you rather than just getting a pass mark, to actually go—we have the ability to actually look at how each individual question is performed, so that’s why we’re moving it out of that traditional e-learning.”
Learnings	Learnings and improvements made to the e-learning programme or content	18	22	“We’re working obviously toward making it work the best it can, and I mean it’s a bit of a changing—as we learn more, we get an understanding of what we can and can’t do, and what we have to wait for.”
LMS	Comments regarding the Learning Management System	7	8	“And then we use the LMS to do things that are functionally quite difficult. We ran the voluntary redundancy process through the LMS a couple of years ago, well it required that you as an individual identified that you would like to be considered for voluntary redundancy, and that needed to be endorsed by your managers saying that you had had all the requisite conversations, about your preparedness and the impact to the business if you left, and then then it needed further sign off.”
Measures	Evaluation measures	23	65	“So, it's voluntary, and so we're getting feedback on the modules all the time to see whether there was engagement, what people are saying and obviously we can also track to see, did people actually complete them.”

Objective	E-learning programme objectives	12	27	“That’s the big part about the online learning [...] needs to be about—it’s talking to you, it’s about you, so, that’s where the human stuff comes in. A lot of the subject matter is about like giving feedback or leading the values or setting expectations.”
Outsourcers - process	Process where outsourcers are used to create programme content	11	26	“We have performance consultants who engage with the business with business normally on more –meaty subjects rather than small technical stuff. They work with external agencies to build products for it.”
Process	Process for evaluating e-learning and L&D programmes	17	64	“For anything else, it tends to be as part of the development of that learning. Someone will work out a reporting schedule with the business owner and they can say they want reporting or monitoring weekly, monthly—whatever sort of system, and it tends to be you know, again dependent on the learning, if it’s a change to a product, or policy or something like that.”
Process improvements	Examples or comments were the e-learning processes have improved	17	41	“The whole idea that we’re moving to a more cloud-based solution for the LMS and part of that is that you have a basically an integration between three systems.”
Process problems	Issues developing e-learning programmes	8	13	“Yes, yes, so it’s definitely collaborative, but the curriculum managers are the ones really that are driving the whole process, and sometimes it’s like getting blood out of stone, so driving is kind of important to actually make sure that it does keep the momentum going.”
Reconfiguring - Frequency	How often is the programme or content is updated	12	18	“Well, Rhapsody, it’s our most mature course, and it’s the certification course. We have archived Rhapsody Four, and we’ve archived two Rhapsody Fives and we’re now on Rhapsody Six. So, we’ve kept up-to-date with the launch of the product, and we have archives. And that’s just been three years, these are big pieces of work, so I think that’s quite a good measure actually.”
Reconfiguring - Process	Details of how content gets updated	10	30	“Absolutely, the big fear that we have is that somebody that doesn’t know how to, uses our system to learn the wrong way. So, I’d say that we have knowledge management and information management, and some curation of our content, but it’s never tight enough. We forever find something that we thought was up-to-date.”
Reconfiguring - Success stories	Stories about positive feedback	11	23	“The final assessment, they are given a scenario, and they have to submit their file, so it’s the environment file, and then it’s marked by a human. So, it’s not marked by the system, it’s marked by human. And that’s where I’ve tried to, quite carefully, to get this blended idea, and I believe it’s a point of difference for us, over other technology companies.”
Reconfiguring - Who	Who is responsible for updating the material	7	15	“Then there are subject matter experts who are isolated on their own who look after one or two pieces, and then we have a small core tax technical group who deal with the core suite of tax documentation – they’re fine.”
Review period	Time between e-learning evaluations	11	21	“We actually—any content that is in the Learning Management System has a yearly review.”
Review process	How evaluations are conducted	22	80	“For our mandatory training, we have a review process in place, so about every six months we’ll actually pull all that content off and give it to the content owner and say, review it, give it back to us.”

Strategy	Discussion about programme strategy	20	73	“Transformation will require going back to some hardcore traditional training and development practices and the nature of learning in the future will mean we’ll need to move into quite a different way of supporting learning in the business. So that’s our focus.”
Success stories	Recounting evaluation successes	18	52	“Yes it is very successful here, the LMS is very integrated, I’m not going to say it is a purist L&D solution, but it fits the organisation.”
Types	Types of e-learning evaluation used by organisation	10	22	“And I prefer to do those in a face-to-face conversation environment, because you get a better of quality of information than if you just do a standard evaluation form, everyone’s going to tick it, fantastic, thanks for coming, because they just want to get it done. Whereas if you pitch it to them as look, we’re reviewing the content, we know you’ve done it, we’d really like to understand how we can make the experience better. You get a lot better buy in and quality information coming back.”
Usage	Evaluation of e-learning usage	13	18	“In Totara, we see that as a new start. It’s a chance to say, actually it’s not that difficult, here’s how you do it and it’s pretty straightforward. Some managers are better than others, some will actually go in and they keep quite a close eye.”

Appendix F: NVivo Queries – Essay 3

As noted in Section 4.4.2, each transcription was coded to separate comments that emphasised either dynamic or operational capability development. Table 6.5 shows the results of the NVivo query comparing nodes, coded by emphasis on developing operational or dynamic capabilities, with respondent organisation. The numbers denote how many times that node was coded, and the percentages show the distribution of nodes across the respondent organisation. Like the graph in Section 4.5.2, the table is sorted by *Dynamic* emphasis to highlight the emergent pattern.

Table 6.5 Respondent Organisation by Dynamic/Operational Emphasis

	A: Dynamic	%	B: Operational	%
1: Respondent Organisation = AlphaTech	42	69%	19	31%
2: Respondent Organisation = BetaTech	75	68%	36	32%
3: Respondent Organisation = GammaTech	91	67%	45	33%
5: Respondent Organisation = BetaFin	35	55%	29	45%
7: Respondent Organisation = AlphaGov	25	53%	22	47%
4: Respondent Organisation = AlphaFin	19	50%	19	50%
6: Respondent Organisation = BetaHealth	19	49%	20	51%
8: Respondent Organisation = AlphaHealth	16	35%	30	65%
9: Respondent Organisation = GammaFin	15	30%	35	70%
12: Respondent Organisation = GammaGov	15	26%	42	74%
11: Respondent Organisation = DeltaGov	21	22%	73	78%
10: Respondent Organisation = BetaGov	7	16%	36	84%

As noted in Section 4.4.2, each transcription was also coded by the categories of the competing values framework (Cameron & Quinn, 2011; Quinn & Rohrbaugh, 1983). Table 6.6 shows the results of the NVivo query comparing the nodes by culture type, with respondent organisation. The numbers denote how many times that node was coded, the percentages show the distribution of nodes across the respondent organisation. Like the graph in Section 4.5.3 the table is sorted by percentage of nodes coded by the *control* type. The *control* type illustrates the widest variance across the sample organisations and demonstrates the cultural spread between the technology and government organisations.

Table 6.6 Respondent Organisation by Culture Type

	A: Control	%	B: Collaborate	%	C: Compete	%	D: Create	%
1: BetaTech	10	8%	40	33%	41	34%	30	25%
2: AlphaTech	7	12%	12	21%	24	41%	15	26%
3: Beta Heath	7	18%	12	32%	16	42%	3	8%
4: AlphaFin	10	20%	15	30%	18	36%	7	14%
5: GammaTech	37	24%	36	23%	47	30%	35	23%
6: AlphaGov	13	27%	16	33%	11	22%	9	18%
7: BetaFin	17	33%	9	17%	13	25%	13	25%
8: AlphaHealth	31	48%	12	19%	15	23%	6	9%
9: DeltaGov	46	49%	27	29%	14	15%	7	7%
10: BetaGov	27	54%	9	18%	11	21%	4	8%
11: GammaFin	23	55%	7	17%	12	29%	0	0%
12: GammaGov	30	65%	11	24%	5	11%	0	0%

7. References

- Abbott, A. (1988). Transcending general linear reality. *Sociological Theory*, 6(2), 169–186.
- Adams, J., & Morgan, G. (2007). ‘Second generation’ e-learning: characteristics and design principles for supporting management soft-skills development. *International Journal on E-Learning*, 6(2), 157–185.
- Adler, P. S., & Borys, B. (1996). Two types of bureaucracy: Enabling and coercive. *Administrative Science Quarterly*, 41(1), 61–89.
- Adner, R., & Helfat, C. E. (2003). Corporate effects and dynamic managerial capabilities. *Strategic Management Journal*, 24(10), 1011–1025.
- Aguinis, H., & Kraiger, K. (2009). Benefits of training and development for individuals and teams, organizations, and society. *Annual Review of Psychology*, 60(1), 451–474.
- Aharony, N., & Bronstein, J. (2014). A Delphi investigation into future trends in e-learning in Israel. *Interactive Learning Environments*, 22(6), 789–803.
- Ahuja, G., & Lampert, C. M. (2001). Entrepreneurship in the large corporation: A longitudinal study of how established firms create breakthrough inventions. *Strategic Management Journal*, 22(6–7), 521–543.
- Alavi, M., & Leidner, D. E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25(1), 107–136.
- Allaart, P., Kerkhofs, M., & de Koning, J. (2002). Skills obsolescence and technological progress: An empirical analysis of expected skill shortages. In A. de Grip, J. van Loo, & K. Mayhew (Eds.), *The Economics of Skills Obsolescence (Research in Labor Economics)* (Vol. 21, pp. 119–138). Bingley, U.K.: Emerald Group Publishing.
- Allemann, H., & Sund-Levander, M. (2015). Nurses’ actions in response to nursing assistants’ observations of signs and symptoms of infections among nursing home residents. *Nursing Open*, 2(3), 97–104.
- Alvesson, M. (2013). *Understanding Organizational Culture* (2nd ed.). London, UK: Sage.
- Alvesson, M., & Kärreman, D. (2007). Constructing mystery: Empirical matters in theory development. *Academy of Management Review*, 32(4), 1265–1281.
- Ambrosini, V., & Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, 11(1), 29–49.
- Ambrosini, V., Bowman, C., & Collier, N. (2009). Dynamic capabilities: An exploration of how firms renew their resource base. *British Journal of Management*, 20(1), S9–S24.

- Anderson, B. S., Covin, J. G., & Slevin, D. P. (2009). Understanding the relationship between entrepreneurial orientation and strategic learning capability: An empirical investigation. *Strategic Entrepreneurship Journal*, 3(3), 218–240.
- Anderson, P. (2007). *What is Web 2.0? Ideas, technologies and implications for education* (Report). Bristol, UK: JISC Technology and Standards Watch.
- Andersson, U., Buckley, P. J., & Dellestrand, H. (2015). In the right place at the right time!: The influence of knowledge governance tools on knowledge transfer and utilization in MNEs. *Global Strategy Journal*, 5(1), 27–47.
- Antaki, C., Billig, M., Edwards, D., & Potter, J. (2003). Discourse analysis means doing analysis: A critique of six analytic shortcomings. *Discourse Analysis Online*, 1–39.
- Aragón-Correa, J. A., García-Morales, V. J., & Córdón-Pozo, E. (2007). Leadership and organizational learning's role on innovation and performance: Lessons from Spain. *Industrial Marketing Management*, 36(3), 349–359.
- Aral, S., & Weill, P. (2007). IT assets, organizational capabilities, and firm performance: How resource allocations and organizational differences explain performance variation. *Organization Science*, 18(5), 763–780.
- Arend, R. J., & Bromiley, P. (2009). Assessing the dynamic capabilities view: Spare change, everyone? *Strategic Organization*, 7(1), 75–90.
- Argote, L. (2011). Organizational learning research: Past, present and future. *Management Learning*, 42(4), 439–446.
- Argote, L. (2012). *Organizational Learning: Creating, Retaining and Transferring Knowledge*. Heidelberg, Germany: Springer.
- Argote, L., & Miron-Spektor, E. (2011). Organizational learning: From experience to knowledge. *Organization Science*, 22(5), 1123–1137.
- Argote, L., & Ren, Y. (2012). Transactive memory systems: A microfoundation of dynamic capabilities. *Journal of Management Studies*, 49(8), 1375–1382.
- Argyris, C. (1977). Double loop learning in organizations. *Harvard Business Review*, 55, 115–125.
- Argyris, C., & Schön, D. A. (1997). *Organizational Learning: A Theory of Action Perspective*. Reading, MA: Addison-Wesley.
- Argyris, Y. A., & Monu, K. (2015). Corporate use of social media: Technology affordance and external stakeholder relations. *Journal of Organizational Computing and Electronic Commerce*, 25(2), 140–168.

- Arndt, F. F., & Norbert, B. (2015). Evolutionary and ecological conceptualization of dynamic capabilities: Identifying elements of the Teece and Eisenhardt schools. *Journal of Management & Organization*, 21(05), 701–704.
- Arndt, F. F., Pierce, L., & Teece, D. J. (2015). *The behavioral and evolutionary roots of dynamic capabilities* (SSRN Scholarly Paper) (pp. 1–42). Retrieved from <http://ssrn.com/abstract=1161171>
- Arraya, M. A. M., & Porfírio, J. A. (2017). Training delivery methods as source of dynamic capabilities: The case of sports' organisations. *European Journal of Training and Development*, 41(4), 354–372.
- Arthur, J. B., & Huntley, C. L. (2005). Ramping up the organizational learning curve: Assessing the impact of deliberate learning on organizational performance under gainsharing. *Academy of Management Journal*, 48(6), 1159–1170.
- Arthurs, J. D., & Busenitz, L. W. (2006). Dynamic capabilities and venture performance: The effects of venture capitalists. *Journal of Business Venturing*, 21(2), 195–215.
- Athreye, S., Kale, D., & Ramani, S. V. (2009). Experimentation with strategy and the evolution of dynamic capability in the Indian pharmaceutical sector. *Industrial and Corporate Change*, 18(4), 729–759.
- Aubry, M., Richer, M.-C., & Lavoie-Tremblay, M. (2014). Governance performance in complex environment: The case of a major transformation in a university hospital. *International Journal of Project Management*, 32(8), 1333–1345.
- Augier, M., & Teece, D. J. (2009). Dynamic capabilities and the role of managers in business strategy and economic performance. *Organization Science*, 20(2), 410–421.
- Autor, D. H., Dorn, D., & Hanson, G. H. (2015). Untangling trade and technology: Evidence from local labour markets. *The Economic Journal*, 125(584), 621–646.
- Autor, D. H., Levy, F., & Murnane, R. J. (2003). The skill content of recent technological change: An empirical exploration. *Quarterly Journal of Economics*, 118(4), 1279–1333.
- Backes-Gellner, U., & Janssen, S. (2009). Skill obsolescence, vintage effects and changing tasks. *Applied Economics Quarterly*, 55(1), 83–104.
- Baldwin, T. T., & Ford, J. K. (1988). Transfer of training: A review of directions for future research. *Personnel Psychology*, 41(1), 63–105.
- Barkema, H. G., & Schijven, M. (2008). How do firms learn to make acquisitions? A review of past research and an agenda for the future. *Journal of Management*, 34(3), 594–634.

- Barney, J. B. (1986). Organizational culture: Can it be a source of sustained competitive advantage? *Academy of Management Review*, *11*(3), 656–665.
- Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120.
- Barney, J. B., & Felin, T. (2013). What are microfoundations? *Academy of Management Perspectives*, *27*(2), 138–155.
- Barney, J. B., Wright, P. M., & Ketchen, D. J. (2001). The resource-based view of the firm: Ten years after 1991. *Journal of Management*, *27*(6), 625–641.
- Barreto, I. (2010). Dynamic capabilities: A review of past research and an agenda for the future. *Journal of Management*, *36*(1), 256–280.
- Bartel, A., Ichniowski, C., & Shaw, K. (2007). How does information technology affect productivity? Plant-level comparisons of product innovation, process improvement, and worker skills. *Quarterly Journal of Economics*, *122*(4), 1721–1758.
- Battou, A. (2017). Designing an adaptive learning system based on a balanced combination of agile learner design and learner centered approach. *American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS)*, *37*(1), 178–186.
- Beaudry, P., Green, D. A., & Sand, B. M. (2015). The Great Reversal in the Demand for Skill and Cognitive Tasks. *Journal of Labor Economics*, *34*(S1), S199–S247.
- Becker, B. E., & Huselid, M. A. (2006). Strategic human resources management: Where do we go from here? *Journal of Management*, *32*(6), 898–925.
- Beer, M., Finnström, M., & Schrader, D. (2016). Why leadership training fails - and what to do about it. *Harvard Business Review*, *94*(10), 50–57.
- Bell, B. S., & Kozlowski, S. (2002). Adaptive guidance: Enhancing self-regulation, knowledge, and performance in technology-based training. *Personnel Psychology*, *55*(2), 267–306.
- Bell, B. S., & Kozlowski, S. (2008). Active learning: Effects of core training design elements on self-regulatory processes, learning, and adaptability. *Journal of Applied Psychology*, *93*(2), 296–316.
- Bell, B. S., & Kozlowski, S. (2010). Toward a theory of learner-centered training design: an integrative framework of active learning. In S. Kozlowski & E. Salas (Eds.), *Learning, Training, and Development in Organizations* (pp. 263–300). New York: Routledge.
- Bell, M., Martin, G., & Clarke, T. (2004). Engaging in the future of e-learning: A scenarios-based approach. *Education and Training*, *46*(6/7), 296–307.
- Berente, N., Vandenbosch, B., & Aubert, B. (2009). Information flows and business process integration. *Business Process Management Journal*, *15*(1), 119–141.

- Berghman, L., Matthyssens, P., Streukens, S., & Vandenbempt, K. (2013). Deliberate learning mechanisms for stimulating strategic innovation capacity. *Long Range Planning*, 46(1–2), 39–71.
- Bersin, J. (2004). *The Blended Learning Book: Best Practices, Proven Methodologies, and Lessons Learned*. San Francisco, CA: Pfeiffer.
- Bersin, J. (2006). Companies still struggle to tie training to business goals. *Training*, 43(10), 22.
- Bersin, J. (2014). *Spending on corporate training soars: Employee capabilities now a priority* (Industry Report). Docebo. Retrieved from <http://www.forbes.com/sites/joshbersin/2014/02/04/the-recovery-arrives-corporate-training-spend-skyrockets/>
- Bettis, R. A., Helfat, C. E., & Shaver, J. M. (2016). The necessity, logic, and forms of replication - Bettis - 2016 - Strategic Management Journal - Wiley Online Library. *Strategic Management Journal*, 37(1), 2193–2203.
- Bilanakos, C., Green, C. P., Heywood, J. S., & Theodoropoulos, N. (2016). Do dominant firms provide more training? *Journal of Economics & Management Strategy*, 26(1), 67–95.
- Bingham, C. B., Heimeriks, K. H., Schijven, M., & Gates, S. (2015). Concurrent learning: How firms develop multiple dynamic capabilities in parallel. *Strategic Management Journal*, 36(12), 1802–1825.
- Birdi, K., Clegg, C., Patterson, M., Robinson, A., Stride, C. B., Wall, T. D., & Wood, S. J. (2008). The impact of human resource and operational management practices on company productivity: A longitudinal study. *Personnel Psychology*, 61(3), 467–501.
- Birkinshaw, J., Zimmermann, A., & Raisch, S. (2016). How do firms adapt to discontinuous change? *California Management Review*, 58(4), 36–58.
- Black, S. E., & Lynch, L. M. (1996). Human-capital investments and productivity. *American Economic Review*, 86(2), 263–267.
- Blackler, F. (1995). Knowledge, knowledge work and organizations: An overview and interpretation. *Organization Studies*, 16(6), 1021–1046.
- Blomqvist, K., Hara, V., Koivuniemi, J., & Äijö, T. (2004). Towards networked R&D management: The R&D approach of Sonera Corporation as an example. *R & D Management*, 34(5), 591–603.
- Bloom, N., & Van Reenen, J. (2007). Measuring and explaining management practices across firms and countries. *Quarterly Journal of Economics*, 122(4), 1351–1408.

- Bloom, N., & Van Reenen, J. (2010). Why do management practices differ across firms and countries? *Journal of Economic Perspectives*, 24(1), 203–224.
- Blume, B. D., Ford, J. K., Baldwin, T. T., & Huang, J. L. (2009). Transfer of training: A meta-analytic review. *Journal of Management*, 36(4), 1065–1105.
- Boccardelli, P., & Magnusson, M. G. (2006). Dynamic capabilities in early-phase entrepreneurship. *Knowledge and Process Management*, 13(3), 162–174.
- Bock, A. J., Opsahl, T., George, G., & Gann, D. M. (2012). The effects of culture and structure on strategic flexibility during business model innovation. *Journal of Management Studies*, 49(2), 279–305.
- Bontis, N., Crossan, M. M., & Hulland, J. (2002). Managing an organizational learning system by aligning stocks and flows. *Journal of Management Studies*, 39(4), 437–469.
- Boothby, D., Dufour, A., & Tang, J. (2010). Technology adoption, training and productivity performance. *Research Policy*, 39(5), 650–661.
- Bosua, R., & Mendoza, A. (2012). Knowledge sharing during technology implementation: Enabling elements and problems. Presented at the PACIS 2012 (Pacific Asia Conference on Information Systems), Saigon, Vietnam: Association for Information Systems. Retrieved from <http://aisel.aisnet.org/pacis2012>
- Bothams, J. F., & Fordyce, L. (2002). Barriers to on-line learning – the experience of the Scottish Executive Business Development Unit. In S. Banks, P. Goodyear, V. Hodgson, & D. McConnell (Eds.), *Networked Learning 2002: A Research Based Conference on E-learning in Higher Education and Lifelong Learning* (pp. 329–334). Sheffield, UK: Lancaster University and University of Sheffield.
- Boudreau, M.-C., & Robey, D. (2005). Enacting integrated information technology: A human agency perspective. *Organization Science*, 16(1), 3–18.
- Bourgeois, L. J., & Eisenhardt, K. M. (1988). Strategic decision process in high velocity environments: Four cases in the microcomputer industry. *Management Science*, 34(7), 816–835.
- Bowman, C., & Ambrosini, V. (2003). How the resource-based and the dynamic capability views of the firm inform corporate-level strategy. *British Journal of Management*, 14(4), 289–303.
- Boxall, P. (1992). Strategic human resource management: Beginnings of a new theoretical sophistication? *Human Resource Management Journal*, 2(3), 60–79.
- Boxall, P., & Macky, K. (2014). High-involvement work processes, work intensification and employee well-being. *Work, Employment & Society*, 28(6), 963–984.

- Boxall, P., & Purcell, J. (2000). Strategic human resource management: Where have we come from and where should we be going? *International Journal of Management Reviews*, 2(2), 183–203.
- Bozarth, J. (2012). From traditional instruction to: Instructional Design 2.0. *Training and Development*, 66(3), 64–67.
- Branzei, O., & Vertinsky, I. (2006). Strategic pathways to product innovation capabilities in SMEs. *Journal of Business Venturing*, 21(1), 75–105.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Bresnahan, T., Brynjolfsson, E., & Hitt, L. M. (2002). Information technology, workplace organization, and the demand for skilled labor: Firm-level evidence. *Quarterly Journal of Economics*, CXVII(1), 339–376.
- Brown, K. G., & Charlier, S. D. (2013). An integrative model of e-learning use: Leveraging theory to understand and increase usage. *Human Resource Management Review*, 23(1), 37–49.
- Bruni, D. S., & Verona, G. (2009). Dynamic marketing capabilities in science-based firms: An exploratory investigation of the pharmaceutical industry. *British Journal of Management*, 20(1), S101–S117.
- Brynjolfsson, E., & Hitt, L. M. (2000). Beyond computation: Information technology, organizational transformation and business performance. *Journal of Economic Perspectives*, 14(4), 23–48.
- Brynjolfsson, E., & Hitt, L. M. (2003). Computing productivity: Firm-level evidence. *Review of Economics and Statistics*, 85(4), 793–808.
- Burns, T., & Stalker, G. M. (1961). *The Management of Innovation*. London, UK: Tavistock.
- Callan, V. J., & Fergusson, A. (2009). How training organisations are using e-learning to support national training initiatives around apprenticeships and RPL. Presented at the 12th Annual Australian Vocational Education and Training Research Association, Sydney, Australia: AVITRA.
- Callan, V. J., Johnston, M. A., & Poulsen, A. L. (2015). How organisations are using blended e-learning to deliver more flexible approaches to trade training. *Journal of Vocational Education & Training*, 67(3), 1–16.
- Cameron, K. S., & Quinn, R. E. (2011). *Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework* (3rd ed.). Malden, MA: Jossey-Bass.

- Camisón, C., & Villar-López, A. (2012). On how firms located in an industrial district profit from knowledge spillovers: Adoption of an organic structure and innovation capabilities. *British Journal of Management*, 23(3), 361–382.
- Carley, K. M. (1996). A comparison of artificial and human organizations. *Journal of Economic Behavior & Organization*, 31(2), 175–191.
- Castro Silva, H., & Lima, F. (2017). Technology, employment and skills: A look into job duration. *Research Policy*, 46(8), 1519–1530.
- Cepeda, G., & Vera, D. (2007). Dynamic capabilities and operational capabilities: A knowledge management perspective. *Journal of Business Research*, 60(5), 426–437.
- Cha, J., Kim, Y., Lee, J.-Y., & Bachrach, D. G. (2015). Transformational leadership and inter-team collaboration: Exploring the mediating role of teamwork quality and moderating role of team size. *Group & Organization Management*, 40(6), 715–743.
- Chang, V., Chatman, J., & O'Reilly, C. A. (2011, June 16). The case study: How to develop a flexible workforce. *The Financial Times*, p. 16.
- Chapman, B. (2010). How long does it take to create learning? (Research study). Retrieved from <http://www.chapmanalliance.com/howlong/>
- Charmaz, K., & Bryant, A. (2010). Grounded theory. In P. Peterson, E. Baker, & B. McGaw (Eds.), *International Encyclopedia of Education - 3rd ed* (pp. 406–412). Elsevier Ltd.
- Chatman, J. A., Caldwell, D. F., O'Reilly, C. A., & Doerr, B. (2014). Parsing organizational culture: How the norm for adaptability influences the relationship between culture consensus and financial performance in high-technology firms. *Journal of Organizational Behavior*, 35(6), 785–808.
- Chen, C. J., & Huang, J. W. (2009). Strategic human resource practices and innovation performance: The mediating role of knowledge management capacity. *Journal of Business Research*, 62(1), 104–114.
- Chen, C.-J., & Huang, J.-W. (2007). How organizational climate and structure affect knowledge management: The social interaction perspective. *International Journal of Information Management*, 27(2), 104–118.
- Chen, H. H., Lee, P. Y., & Lay, T. J. (2009). Drivers of dynamic learning and dynamic competitive capabilities in international strategic alliances. *Journal of Business Research*, 62(12), 1289–1295.
- Chen, H.-J. (2010). Linking employees' e-learning system use to their overall job outcomes: An empirical study based on the IS success model. *Computers & Education*, 55(4), 1628–1639.

- Chen, M.-J., & Miller, D. (2012). Competitive dynamics: Themes, trends, and a prospective research platform. *The Academy of Management Annals*, 6(1), 135–210.
- Cheng, B., Wang, M., Mørch, A. I., Chen, N. S., Kinshuk, S., & Spector, J. M. (2014). Research on e-learning in the workplace 2000-2012: A bibliometric analysis of the literature. *Educational Research Review*, 11(1), 56–72.
- Cheng, Y. M. (2011). Antecedents and consequences of e-learning acceptance. *Information Systems Journal*, 21(3), 269–299.
- Chennells, L., & Van Reenen, J. (1998). Establishment level earnings, technology and the growth of inequality: Evidence from Britain. *Economics of Innovation and New Technology*, 5(2–4), 139–164.
- Cheung, S. O., Wong, P. S., & Lam, A. L. (2012). An investigation of the relationship between organizational culture and the performance of construction organizations. *Journal of Business Economics and Management*, 13(4), 688–704.
- Chien, S. Y., & Tsai, C. H. (2012). Dynamic capability, knowledge, learning, and firm performance. *Journal of Organizational Change Management*, 25(3), 434–444.
- Chirico, F., & Nordqvist, M. (2010). Dynamic capabilities and trans-generational value creation in family firms: The role of organizational culture. *International Small Business Journal*, 28(5), 487–504.
- Cho, Y., Park, J., Ju, B., Han, S. J., Moon, H., Park, S., ... Park, E. (2016). Women leaders' work-life imbalance in South Korean companies: A collaborative qualitative study. *Human Resource Development Quarterly*, 27(4), 461–487.
- Cidral, W. A., Oliveira, T., Di Felice, M., & Aparicio, M. (2018). E-learning success determinants: Brazilian empirical study. *Computers & Education*, 122(1), 273–290.
- Cisco Systems. (2015). Cisco Learning Network. Retrieved 2 February 2016, from <https://learningnetwork.cisco.com/community/about>
- Clark, R. C., & Mayer, R. E. (2011). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. San Francisco, CA: Pfeiffer.
- Clark, S. M., Gioia, D. A., Ketchen, D. J., & Thomas, J. B. (2010). Transitional identity as a facilitator of organizational identity change during a merger. *Administrative Science Quarterly*, 55(3), 397–438.
- Cohen, J. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Hillsdale, N.J.: Erlbaum Associates.

- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128–152.
- Coleman, J. S. (1990). *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.
- Collier, W., Green, F., Kim, Y. B., & Peirson, J. (2011). Education, training and economic performance: Evidence from establishment survival data. *Journal of Labor Research*, 32(4), 336–361.
- Collis, D. J. (1994). How valuable are organizational capabilities? *Strategic Management Journal*, 15(Special issue), 143–152.
- Colombo, E., & Stanca, L. (2014). The impact of training on productivity: evidence from a panel of Italian firms. *International Journal of Manpower*, 35(8), 1140–1158.
- Corbin, J. M., & Strauss, A. L. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, 13(1), 3–21.
- Corbin, J. M., & Strauss, A. L. (2008). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (3rd ed.). Los Angeles, CA: Sage Publications.
- Corley, K. G., & Gioia, D. A. (2011). Building theory about theory building: What constitutes a theoretical contribution? *Academy of Management Review*, 36(1), 12–32.
- Cornelissen, J. (2017). Editor's comments: Developing propositions, a process model, or a typology? Addressing the challenges of writing theory without a boilerplate. *Academy of Management Review*, 42(1), 1–9.
- Costabile, G., Fera, M., Fruggiero, F., Lambiase, A., & Pham, D. (2017). Cost models of additive manufacturing: A literature review. *International Journal of Industrial Engineering Computations*, 8(2), 263–283.
- Costanza, D. P., Blacksmith, N., Coats, M. R., Severt, J. B., & DeCostanza, A. H. (2016). The effect of adaptive organizational culture on long-term survival. *Journal of Business and Psychology*, 31(3), 361–381.
- Crossan, M. M., Maurer, C., & White, R. (2011). Reflections on the 2009 AMR decade award: do we have a theory of organizational learning? *Academy of Management Review*, 36(3), 446–460.
- Dachner, A. M., Saxton, B. M., Noe, R. A., & Keeton, K. E. (2013). To infinity and beyond: Using a narrative approach to identify training needs for unknown and dynamic situations. *Human Resource Development Quarterly*, 24(2), 239–267.

- Damanpour, F., & Gopalakrishnan, S. (2001). The dynamics of the adoption of product and process innovations in organizations. *Journal of Management Studies*, 38(1), 45–65.
- Danneels, E. (2002). The dynamics of product innovation and firm competences. *Strategic Management Journal*, 23(12), 1095–1121.
- Daspit, J. J., & Souza, D. E. (2012). Using the community of inquiry framework to introduce Wiki environments in blended-learning pedagogies: Evidence from a business capstone course. *Academy of Management Learning and Education*, 11(4), 666–683.
- Dastmalchian, A., McNeil, N., Blyton, P., Bacon, N., Blunsdon, B., Kabasakal, H., ... Steinke, C. (2015). Organisational climate and human resources: Exploring a new construct in a cross-national context. *Asia Pacific Journal of Human Resources*, 53(4), 397–414.
- D'Aveni, R. A., Dagnino, G. B., & Smith, K. G. (2010). The age of temporary advantage. *Strategic Management Journal*, 31(13), 1371–1385.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–339.
- Davis, J. P., Eisenhardt, K. M., & Bingham, C. B. (2009). Optimal structure, market dynamism, and the strategy of simple rules. *Administrative Science Quarterly*, 54(3), 413–452.
- Day, G. S. (1994). The capabilities of market-driven organizations. *The Journal of Marketing*, 58(4), 37–52.
- De Geus, A. P. (1988). Planning as learning. *Harvard Business Review*, 66(2), 70–74.
- DeCarolis, D. M., & Deeds, D. L. (1999). The impact of stocks and flows of organizational knowledge on firm performance: An empirical investigation of the biotechnology industry. *Strategic Management Journal*, 20(10), 953–968.
- Dedehayir, O., & Mäkinen, S. J. (2011). Measuring industry clockspeed in the systemic industry context. *Technovation*, 31(12), 627–637.
- Dedrick, J., Gurbaxani, V., & Kraemer, K. L. (2003). Information technology and economic performance: A critical review of the empirical evidence. *ACM Computer Surveys*, 35(1), 1–28.
- Delbridge, R., & Fiss, P. C. (2013). Editors' comments: Styles of theorizing and the social organization of knowledge. *Academy of Management Review*, 38(3), 325–331.
- Delery, J. E. (1998). Issues of fit in strategic human resource management: Implications for research. *Human Resource Management Review*, 8(3), 289–309.
- De-Marcos, L., Domínguez, A., Saenz-De-Navarrete, J., & Pagés, C. (2014). An empirical study comparing gamification and social networking on e-learning. *Computers and Education*, 75(1), 82–91.

- Denison, D. R., & Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. *Organization Science*, 6(2), 204–223.
- DeRouin, R. E., Fritzsche, B. A., & Salas, E. (2004). Optimizing e-learning: Research-based guidelines for learner-controlled training. *Human Resource Management*, 43(2–3), 147–162.
- DeRouin, R. E., Fritzsche, B. A., & Salas, E. (2005). E-learning in organizations. *Journal of Management*, 31(6), 920–940.
- Dess, G. G., Ireland, R. D., Zahra, S. A., Floyd, S. W., Janney, J. J., & Lane, P. J. (2003). Emerging issues in corporate entrepreneurship. *Journal of Management*, 29(3), 351–378.
- Dhar, R. L. (2015). Service quality and the training of employees: The mediating role of organizational commitment. *Tourism Management*, 46(1), 419–430.
- Di Stefano, G., Peteraf, M., & Verona, G. (2014). The organizational drivetrain: A road to integration of dynamic capabilities research. *Academy of Management Perspectives*, 28(4), 307–328.
- Dibella, A. J., Nevis, E. C., & Gould, J. M. (1996). Understanding organizational learning capability. *Journal of Management Studies*, 33(3), 361–379.
- Dimitriadis, Z. S. (2005). Creating strategic capabilities: Organizational learning and knowledge management in the new economy. *European Business Review*, 17(4), 314–324.
- Docebo. (2015, February 2). E-Learning market trends and forecast: 2014-2016 report. Retrieved 25 February 2016, from <http://www.docebo.com/elearning-lms-resources/papers-researches/>
- Donate, M. J., & Guadamillas, F. (2011). Organizational factors to support knowledge management and innovation. *Journal of Knowledge Management*, 15(6), 890–914.
- Doty, D. H., & Glick, W. H. (1994). Typologies as a unique form of theory building: Toward improved understanding and modeling. *The Academy of Management Review*, 19(2), 230–251.
- Doty, D. H., Glick, W. H., & Huber, G. P. (1993). Fit, equifinality, and organizational effectiveness: A test of two configurational theories. *Academy of Management Journal*, 36(6), 1196–1250.
- Drnevich, P. L., & Kriauciunas, A. P. (2011). Clarifying the conditions and limits of the contributions of ordinary and dynamic capabilities to relative firm performance. *Strategic Management Journal*, 32(3), 254–279.

- Dubois, A., & Gadde, L.-E. (2002). Systematic combining: An abductive approach to case research. *Journal of Business Research*, 55(7), 553–560.
- Dubois, A., & Gadde, L.-E. (2014). “Systematic combining”—A decade later. *Journal of Business Research*, 67(6), 1277–1284.
- Dyer, W. G., & Wilkins, A. L. (1991, July). Better stories, not better constructs, to generate better theory: A rejoinder to Eisenhardt. *Academy of Management Review*, pp. 613–619.
- Easterby-Smith, M., & Prieto, I. M. (2008). Dynamic capabilities and knowledge management: an integrative role for learning? *British Journal of Management*, 19(3), 235–249.
- Edhlund, B. M. (2011). *NVivo 9 Essentials: Your Guide to the World’s Most Powerful Qualitative Data Analysis Software*. Stallarholmen, Sweden: Form & Kunskap AB.
- Edmondson, A. C. (2003). Framing for learning: Lessons in successful technology implementation. *California Management Review*, 45(2), 34–54.
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532–550.
- Eisenhardt, K. M. (1991). Better stories and better constructs: The case for rigor and comparative logic. *Academy of Management Review*, 16(3), 620–627.
- Eisenhardt, K. M., Furr, N. R., & Bingham, C. B. (2010). Microfoundations of performance: Balancing efficiency and flexibility in dynamic environments. *Organization Science*, 21(6), 1263–1273.
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1), 25–32.
- Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, 21(10–11), 1105–1121.
- Eisenhardt, K. M., & Tabrizi, B. N. (1995). Accelerating adaptive processes: Product innovation in the global computer industry. *Administrative Science Quarterly*, 40(1), 84–110.
- El Akremi, A., Perrigot, R., & Piot-Lepetit, I. (2015). Examining the drivers for franchised chains performance through the lens of the dynamic capabilities approach. *Journal of Small Business Management*, 53(1), 145–165.
- El Sawy, O. A., Malhotra, A., Park, Y., & Pavlou, P. A. (2010). Seeking the configurations of digital ecodynamics: It takes three to tango. *Information Systems Research*, 21(4), 835–848.

- Ellonen, H.-K., Wikstrom, P., & Jantunen, A. (2009). Linking dynamic capability portfolios and innovation outcomes. *Technovation*, 29(11), 753–762.
- Engeström, Y., & Sannino, A. (2010). Studies of expansive learning: Foundations, findings and future challenges. *Educational Research Review*, 5(1), 1–24.
- Eriksson, T. (2014). Processes, antecedents and outcomes of dynamic capabilities. *Scandinavian Journal of Management*, 30(1), 65–82.
- Faraj, S., Jarvenpaa, S. L., & Majchrzak, A. (2011). Knowledge collaboration in online communities. *Organization Science*, 22(5), 1224–1239.
- Felin, T., & Foss, N. J. (2009). Organizational routines and capabilities: Historical drift and a course-correction toward microfoundations. *Scandinavian Journal of Management*, 25(2), 157–167.
- Felin, T., Foss, N. J., Heimeriks, K. H., & Madsen, T. L. (2012). Microfoundations of routines and capabilities: Individuals, processes, and structure. *Journal of Management Studies*, 49(8), 1351–1374.
- Felin, T., Foss, N. J., & Ployhart, R. E. (2015). The microfoundations movement in strategy and organization theory. *The Academy of Management Annals*, 9(1), 575–632.
- Felstead, A., Fuller, A., Unwin, L., Ashton, D., Butler, P., & Lee, T. (2005). Surveying the scene: learning metaphors, survey design and the workplace context. *Journal of Education and Work*, 18(4), 359–383.
- Fiol, C. M., & Lyles, M. A. (1985). Organizational learning. *The Academy of Management Review*, 10(4), 803–813.
- Fischer, T., Gebauer, H., Gregory, M., Ren, G., & Elgar Fleisch. (2010). Exploitation or exploration in service business development?: Insights from a dynamic capabilities perspective. *Journal of Service Management*, 21(5), 591–624.
- Fiss, P. C. (2011). Building better casual theories: A fuzzy set approach to typologies in organizational research. *Academy of Management Journal*, 54(2), 393–420.
- Ford, J. K., Kozlowski, S., Kraiger, K., Salas, E., & Teachout, M. S. (Eds.). (1997). *Improving Training Effectiveness in Work Organizations*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Forgues, B. (2012). Sampling on the dependent variable is not always that bad: Quantitative case-control designs for strategic organization research. *Strategic Organization*, 10(3), 269–275.

- Foss, N. J. (2003). Selective intervention and internal hybrids: Interpreting and learning from the rise and decline of the Oticon spaghetti organization. *Organization Science*, *14*(3), 331–349.
- Foss, N. J., Husted, K., & Michailova, S. (2010). Governing knowledge sharing in organizations: Levels of analysis, governance mechanisms, and research directions. *Journal of Management Studies*, *47*(3), 455–482.
- Foss, N. J., & Klein, P. G. (2005). Entrepreneurship and the economic theory of the firm: Any gains from trade? In *Handbook of Entrepreneurship Research* (pp. 55–80). Springer, Boston, MA.
- Foss, N. J., & Lindenberg, S. (2013). Microfoundations for strategy: A goal-framing perspective on the drivers of value creation. *Academy of Management Perspectives*, *27*(2), 85–102.
- Foss, N. J., Minbaeva, D. B., Pedersen, T., & Reinholt, M. (2009). Encouraging knowledge sharing among employees: How job design matters. *Human Resource Management*, *48*(6), 871–893.
- Francis, G., & Holloway, J. (2007). What have we learned? Themes from the literature on best-practice benchmarking. *International Journal of Management Reviews*, *9*(3), 171–189.
- Frigotto, M. L., & Zamarian, M. (2015). Mindful by routine: Evidence from the Italian Air Force Tornado crews flying practices. *Journal of Management and Organization*, *21*(3), 321–335.
- Galvin, P., Rice, J., & Liao, T.-S. (2014). Applying a Darwinian model to the dynamic capabilities view: Insights and issues. *Journal of Management & Organization*, *20*(02), 250–263.
- Garavan, T., N., Costine, P., & Heraty, N. (1995). The emergence of strategic human resource development. *Journal of European Industrial Training*, *19*(10), 4–10.
- Garcia, A. W. (2011). *Exploring Organizational Transfer in Self-directed, Self-selected E-learning Courses* (PhD Thesis). University of Southern California, Los Angeles, CA.
- García-Morales, V. J., Jiménez-Barrionuevo, M. M., & Gutiérrez-Gutiérrez, L. (2012). Transformational leadership influence on organizational performance through organizational learning and innovation. *Journal of Business Research*, *65*(7), 1040–1050.
- García-Morales, V. J., Llorèns-Montes, F. J., & Verdú-Jover, A. J. (2007). Influence of personal mastery on organizational performance through organizational learning and innovation in large firms and SMEs. *Technovation*, *27*(9), 547–568.

- Garcia-Penalvo, F. J., Colomo-Palacios, R., & Lytras, M. D. (2012). Informal learning in work environments: Training with the Social Web in the workplace. *Behaviour and Information Technology*, 31(8), 753–755.
- Garcia-Perez, A., & Ayres, R. (2010). Wikifailure: The limitations of technology for knowledge sharing. *Electronic Journal of Knowledge Management*, 8(1), 43–52.
- Garicano, L., & Wu, Y. (2012). Knowledge, communication, and organizational capabilities. *Organization Science*, 23(5), 1382–1397.
- Garud, R., Dunbar, R. L. M., & Bartel, C. A. (2011). Dealing with unusual experiences: A narrative perspective on organizational learning. *Organization Science*, 22(3), 587–601.
- Gelade, G. A., & Ivery, M. (2003). The impact of human resource management and work climate on organizational performance. *Personnel Psychology*, 56(2), 383–404.
- George, G. (2005). Learning to be capable: Patenting and licensing at the Wisconsin Alumni Research Foundation 1925-2002. *Industrial and Corporate Change*, 14(1), 119–151.
- Getz, I. (2009). Liberating leadership: How the initiative-freeing radical organizational form has been successfully adopted. *California Management Review*, 51(4), 32–58.
- Gill, R. (2002). Change management—or change leadership? *Journal of Change Management*, 3(4), 307–318.
- Gioia, D. A., & Chittipeddi, K. (1991). Sensemaking and sensegiving in strategic change initiation. *Strategic Management Journal*, 12(6), 433–448.
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16(1), 15–31.
- Gioia, D. A., Thomas, J. B., Clark, S. M., & Chittipeddi, K. (1994). Symbolism and strategic change in academia: The dynamics of sensemaking and influence. *Organization Science*, 5(3), 363–383.
- Glaveli, N., & Karassavidou, E. (2011). Exploring a possible route through which training affects organizational performance: The case of a Greek bank. *The International Journal of Human Resource Management*, 22(14), 2892–2923.
- Godfrey, P. C., & Hill, C. W. L. (1995). The problem of unobservables in strategic management research. *Strategic Management Journal*, 16(7), 519–533.
- Gold, M. (2003). Developing enterprise e-learning at Kodak. *Training and Development Journal*, 57(6), 48–50.

- Goldstein, I. L. (1993). *Training in organizations: Needs assessment, development, and evaluation*. Pacific Grove, CA: Brooks/Cole.
- Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24(2), 105–112.
- Granger, B. P., & Levine, E. L. (2010). The perplexing role of learner control in e-learning: will learning and transfer benefit or suffer? *International Journal of Training and Development*, 14(3), 180–197.
- Grant, R. M. (1996a). Prospering in dynamically-competitive environments: Organizational capability as knowledge integration. *Organization Science*, 7(4), 375–387.
- Grant, R. M. (1996b). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17(Winter Special Issue), 109–122.
- Green, F., Felstead, A., Gallie, D., Inanc, H., & Jewson, N. (2016). The declining volume of workers' training in Britain. *British Journal of Industrial Relations*, 54(2), 422–448.
- Green, S. D., Larsen, G. D., & Kao, C. C. (2008). Competitive strategy revisited: Contested concepts and dynamic capabilities. *Construction Management and Economics*, 26(1), 63–78.
- Grégoire, D. A., Barr, P. S., & Shepherd, D. A. (2010). Cognitive processes of opportunity recognition: The role of structural alignment. *Organization Science*, 21(2), 413–431.
- Gresov, C., & Drazin, R. (1997). Equifinality: Functional equivalence in organization design. *The Academy of Management Review*, 22(2), 403–428.
- Griffin, R. P. (2011). Workplace learning evaluation: A conceptual model and framework. *Industrial and Commercial Training*, 43(3), 172–178.
- Griffith, D. A., Noble, S. M., & Chen, Q. (2006). The performance implications of entrepreneurial proclivity: A dynamic capabilities approach. *Journal of Retailing*, 82(1), 51–62.
- Grollman, W. K., & Cannon, D. (2003). eLearning: A better chalkboard. *Financial Executive*, 19(8), 45–47.
- Grossman, R., & Salas, E. (2011). The transfer of training: What really matters. *International Journal of Training and Development*, 15(2), 103–120.
- Guest, D. (2002). Human resource management, corporate performance and employee wellbeing: Building the worker into HRM. *Journal of Industrial Relations*, 44(3), 335–358.

- Guile, D. (2001). Education and the economy: Rethinking the question of learning for the 'knowledge' era. *Futures*, 33(6), 469–482.
- Gumusluoglu, L., & Ilsev, A. (2009). Transformational leadership, creativity, and organizational innovation. *Journal of Business Research*, 62(4), 461–473.
- Haas, M. R., & Hansen, M. T. (2005). When using knowledge can hurt performance: The value of organizational capabilities in a management consulting company. *Strategic Management Journal*, 26(1), 1–24.
- Hanushek, E. A., Woessmann, L., & Zhang, L. (2011). *General education, vocational education, and labor-market outcomes over the life-cycle* (Working Paper No. 17504). Cambridge, MA: National Bureau of Economic Research.
- Hara, H. (2014). The impact of firm-provided training on productivity, wages, and transition to regular employment for workers in flexible arrangements. *Journal of the Japanese and International Economies*, 34, 336–359.
- Hartford, T. (2017, July 17). 50 things that made the modern economy: Dynamo. Retrieved 31 July 2017, from <http://www.bbc.co.uk/programmes/p057xsl0>
- Hartnell, C. A., Ou, A. Y., & Kinicki, A. (2011). Organizational culture and organizational effectiveness: A meta-analytic investigation of the competing values framework's theoretical suppositions. *Journal of Applied Psychology*, 96(4), 677–694.
- Hasan, H. M., & Pfaff, C. C. (2012). An activity-theory analysis of corporate wikis. *Information Technology and People*, 25(4), 423–437.
- Hayes, N., & Walsham, G. (2001). Participation in groupware-mediated communities of practice: A socio-political analysis of knowledge working. *Information and Organization*, 11(4), 263–288.
- He, Z.-L., & Wong, P.-K. (2004). Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. *Organization Science*, 15(4), 481–495.
- Heery, E., & Noon, M. (2017). Online learning. In *A Dictionary of Human Resource Management* (3rd ed.). Oxford University Press. Retrieved from <http://www.oxfordreference.com/view/10.1093/acref/9780191827822.001.0001/acref-9780191827822-e-1741>
- Heimeriks, K. H., Schijven, M., & Gates, S. (2012). Manifestations of higher-order routines: The underlying mechanisms of deliberate learning in the context of postacquisition integration. *Academy of Management Journal*, 55(3), 703–726.

- Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M. A., Singh, H., Teece, D. J., & Winter, S. G. (2007). *Dynamic Capabilities: Understanding Strategic Change in Organizations*. Malden, MA: Blackwell.
- Helfat, C. E., & Martin, J. A. (2015). Dynamic managerial capabilities: Review and assessment of managerial impact on strategic change. *Journal of Management*, *41*(5), 1281–1312.
- Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal*, *24*(10), 997–1010.
- Helfat, C. E., & Peteraf, M. A. (2015). Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal*, *36*(6), 831–850.
- Helfat, C. E., & Winter, S. G. (2011). Untangling dynamic and operational capability: Strategy for the (n)ever-changing world. *Strategic Management Journal*, *32*(11), 1243–1250.
- Henderson, R. (1994). The evolution of integrative capability: Innovation in cardiovascular drug discovery. *Industrial and Corporate Change*, *3*(3), 607–630.
- Henderson, R., & Mitchell, W. (1997). The interactions of organizational and competitive influences on strategy and performance. *Strategic Management Journal*, *18*, 5–14.
- Henker, N., Sonnentag, S., & Unger, D. (2015). Transformational leadership and employee creativity: The mediating role of promotion focus and creative process engagement. *Journal of Business and Psychology*, *30*(2), 235–247.
- Henri, J.-F. (2006). Organizational culture and performance measurement systems. *Accounting, Organizations and Society*, *31*(1), 77–103.
- Hildrum, J. M. (2009). Sharing tacit knowledge online: A case study of e-learning in Cisco's network of system integrator partner firms. *Industry and Innovation*, *16*(2), 197–218.
- Hine, D., Parker, R., Pregelj, L., & Verreynne, M.-L. (2014). Deconstructing and reconstructing the capability hierarchy. *Industrial and Corporate Change*, *23*(5), 1299–1325.
- Hobbs, D. L. (2002). A constructivist approach to web course design: A review of the literature. *International Journal on E-Learning*, *1*(2), 60–65.
- Hodgson, V., & Watland, P. (2004). Researching networked management learning. *Management Learning*, *35*(2), 99–116.
- Holmqvist, M. (2004). Experiential learning processes of exploitation and exploration within and between organizations: An empirical study of product development. *Organization Science*, *15*(1), 70–81.

- Homan, G., & MacPherson, A. (2005). E-learning in the corporate university. *Journal of European Industrial Training*, 29(1), 75–90.
- Hoover, R. S., & Koerber, A. L. (2011). Using NVivo to answer the challenges of qualitative research in professional communication: Benefits and best practices tutorial. *IEEE Transactions on Professional Communication*, 54(1), 68–82.
- Howard-Grenville, J. A. (2005). The persistence of flexible organizational routines: The role of agency and organizational context. *Organization Science*, 16(6), 618–636.
- Hrebiniak, L. G., & Joyce, W. F. (1985). Organizational adaptation: Strategic choice and environmental determinism. *Administrative Science Quarterly*, 30(3), 336–349.
- Huber, G. P. (1991). Organizational learning: The contributing processes and the literatures. *Organization Science*, 2(1), 88–115.
- Hult, G. T. M., Hurley, R. F., & Knight, G. A. (2004). Innovativeness: Its antecedents and impact on business performance. *Industrial Marketing Management*, 33(5), 429–438.
- Hung, R. Y., Yang, B. Y., Lien, B. Y., McLean, G. N., & Kuo, Y. M. (2010). Dynamic capability: Impact of process alignment and organizational learning culture on performance. *Journal of World Business*, 45(3), 285–294.
- Huselid, M. A., Jackson, S. E., & Schuler, R. S. (1997). Technical and strategic human resource management effectiveness as determinants of firm performance. *Academy of Management Journal*, 40(1), 171–188.
- Hutchby, I. (2001). Technologies, texts and affordances. *Sociology*, 35(2), 441–456.
- Hutzschenreuter, T., & Israel, S. (2009). A review of empirical research on dynamic competitive strategy. *International Journal of Management Reviews*, 11(4), 421–461.
- Ichniowski, C., & Shaw, K. (1997). The effects of human resource management practices on productivity: A study of steel finishing lines. *American Economic Review*, 87(3), 291–313.
- Iris, R., & Vikas, A. (2011). E-learning technologies: A key to dynamic capabilities. *Computers in Human Behavior*, 27(5), 1868–1874.
- Jansen, J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2006). Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. *Management Science*, 52(11), 1661–1674.
- Jantunen, A., Ellonen, H.-K., & Johansson, A. (2012). Beyond appearances: Do dynamic capabilities of innovative firms actually differ? *European Management Journal*, 30(2), 141–155.

- Jantunen, A., Puumalainen, K., Saarenketo, S., & Kyläheiko, K. (2005). Entrepreneurial orientation, dynamic capabilities and international performance. *Journal of International Entrepreneurship*, 3(3), 223–243.
- Jenkins, M. (2010). Technological discontinuities and competitive advantage: A historical perspective on formula 1 motor racing 1950–2006. *Journal of Management Studies*, 47(5), 884–910.
- Jiang, K., Lepak, D. P., Hu, J., & Baer, J. C. (2012). How does human resource management influence organizational outcomes? A meta-analytic investigation of mediating mechanisms. *Academy of Management Journal*, 55(6), 1264–1294.
- Jiao, H., Wei, J., & Cui, Y. (2010). An empirical study on paths to develop dynamic capabilities: From the perspectives of entrepreneurial orientation and organizational learning. *Frontiers of Literary Studies in China*, 4(1), 47–72.
- Jones, O., Ghobadian, A., Regan, N., & Antcliff, V. (2013). Dynamic capabilities in a sixth-generation family firm: Entrepreneurship and the Bibby Line. *Business History*, 55(6), 910–941.
- Joo, Y. J., Lim, K. Y., & Park, S. Y. (2011). Investigating the structural relationships among organisational support, learning flow, learners' satisfaction and learning transfer in corporate e-learning. *British Journal of Educational Technology*, 42(6), 973–984.
- Judge, W. Q., & Miller, A. (1991). Antecedents and outcomes of decision speed in different environmental contexts. *Academy of Management Journal*, 34(2), 449–463.
- Judge, W. Q., Naoumova, I., & Douglas, T. (2009). Organizational capacity for change and firm performance in a transition economy. *The International Journal of Human Resource Management*, 20(8), 1737–1752.
- Junni, P., Sarala, R. M., Taras, V., & Tarba, S. Y. (2013). Organizational ambidexterity and performance: A meta-analysis. *Academy of Management Perspectives*, 27(4), 299–312.
- Kalali, N. S., & Heidari, A. (2016). How was competitive advantage sustained in management consultancies during change: The role of dynamic capabilities. *Journal of Organizational Change Management*, 29(5), 661–685.
- Kale, P., & Singh, H. (2007). Building firm capabilities through learning: The role of the alliance learning process in alliance capability and firm-level alliance success. *Strategic Management Journal*, 28(10), 981–1000.
- Kane, G. C., & Alavi, M. (2007). Information technology and organizational learning: An investigation of exploration and exploitation processes. *Organization Science*, 18(5), 796–812.

- Karim, S. (2006). Modularity in organizational structure: The reconfiguration of internally developed and acquired business units. *Strategic Management Journal*, 27(9), 799–823.
- Karna, A., Richter, A., & Riesenkampff, E. (2016). Revisiting the role of the environment in the capabilities–financial performance relationship: A meta-analysis. *Strategic Management Journal*, 37(6), 1154–1173.
- Kay, N. M. (2010). Dynamic capabilities as context: The role of decision, system and structure. *Industrial and Corporate Change*, 19(4), 1205–1223.
- Kearney, C., & Morris, M. H. (2015). Strategic renewal as a mediator of environmental effects on public sector performance. *Small Business Economics*, 45(2), 425–445.
- Keith, N., & Frese, M. (2008). Effectiveness of error management training: A meta-analysis. *Journal of Applied Psychology*, 93(1), 59–69.
- Kellogg, D. L., & Smith, M. A. (2009). Student-to-student interaction revisited: A case study of working adult business students in online courses. *Decision Sciences Journal of Innovative Education*, 7(2), 433–456.
- Kemper, J., Schilke, O., & Brettel, M. (2013). Social capital as a microlevel origin of organizational capabilities. *Journal of Product Innovation Management*, 30(3), 589–603.
- Kent, C., Laslo, E., & Rafaeli, S. (2016). Interactivity in online discussions and learning outcomes. *Computers & Education*, 97(1), 116–128.
- Kepes, S., & Delery, J. E. (2007). HRM systems and the problem of internal fit. In P. Boxall, J. Purcell, & P. Wright (Eds.), *Oxford Handbook of Human Resource Management* (pp. 385–404). Oxford, UK: Oxford University Press.
- Killen, C. P., Hunt, R. A., & Kleinschmidt, E. J. (2008). Learning investments and organizational capabilities: Case studies on the development of project portfolio management capabilities. *International Journal of Managing Projects in Business*, 1(3), 334–351.
- Kim, S. H. (2008). *An Empirical Assessment of Knowledge Management Systems* (PhD Thesis). Carnegie Mellon University, Pittsburgh, PA.
- Kindström, D., Kowalkowski, C., & Sandberg, E. (2013). Enabling service innovation: A dynamic capabilities approach. *Journal of Business Research*, 66(8), 1063–1073.
- Kitching, J., & Blackburn, R. (2002). The nature of training and motivation to train in small firms. *Labour Market Trends*, 110(5), 275–276.

- Kleinbaum, A. M., & Stuart, T. E. (2014). Network responsiveness: The social structural microfoundations of dynamic capabilities. *Academy of Management Perspectives*, 28(4), 353–367.
- Kline, S., & Harris, K. (2008). ROI is MIA: Why are hoteliers failing to demand the ROI of training? *International Journal of Contemporary Hospitality Management*, 20(1), 45–59.
- Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3(3), 383–397.
- Konings, J., & Vanormelingen, S. (2014). The impact of training on productivity and wages: Firm level evidence. *Review of Economics and Statistics*, 97(2), 485–497.
- Kotter, J. P. (1992). *Corporate Culture and Performance*. New York: NY: Free Press.
- Kozlowski, S., & Bell, B. S. (2006). Disentangling achievement orientation and goal setting: Effects on self-regulatory processes. *Journal of Applied Psychology*, 91(4), 900–916.
- Kozlowski, S., Brown, K. J., Weissbein, D. A., Cannon-bowers, J. A., & Salas, E. (2000). A multilevel approach to theory and research in organizations: contextual, temporal, and emergent processes. In K. J. Klein & S. Kozlowski (Eds.), *Multilevel Theory, Research, and Methods in Organizations: Foundations, Extensions, and New Directions* (pp. 3–90). San Francisco, CA, US: Jossey-Bass.
- Kozlowski, S., & Chao, G. T. (2012). The dynamics of emergence: Cognition and cohesion in work teams. *Managerial and Decision Economics*, 33(5–6), 335–354.
- Kozlowski, S., Gully, S. M., Brown, K. G., Salas, E., Smith, E. M., & Nason, E. R. (2001). Effects of training goals and goal orientation traits on multidimensional training outcomes and performance adaptability. *Organizational Behavior and Human Decision Processes*, 85(1), 1–31.
- Kraiger, K. (2008). Transforming our models of learning and development: Web-based instruction as enabler of third-generation instruction. *Industrial and Organizational Psychology*, 1(4), 454–467.
- Kraiger, K. (2014). Looking back and looking forward: Trends in training and development research. *Human Resource Development Quarterly*, 25(4), 401–408.
- Kraiger, K., & Jerden, E. (2007). A new look at learner control: Meta-analytic results and directions for future research. In S. M. Fiore & E. Salas (Eds.), *Towards a Science of Distributed Learning* (pp. 65–90). Washington, DC: American Psychological Association.

- Kramar, R. (2014). Beyond strategic human resource management: Is sustainable human resource management the next approach? *The International Journal of Human Resource Management*, 25(8), 1069–1089.
- Kreijns, K., & Kirschner, P. (2010). Measuring perceived social presence in distributed learning-groups. *Education and Information Technologies*, 16(4), 365–381.
- Krueger, D., & Kumar, K. B. (2004). Skill-specific rather than general education: A reason for US-Europe growth differences? *Journal of Economic Growth*, 9(2), 167–207.
- Laaksonen, O., & Peltoniemi, M. (2016). The essence of dynamic capabilities and their measurement. *International Journal of Management Reviews*, 16(0), 1–22.
- Laamanen, T., & Wallin, J. (2009). Cognitive dynamics of capability development paths. *Journal of Management Studies*, 46(6), 950–981.
- Lahey, Z. (2014). *Trending now: Social learning* (Whitepaper) (pp. 1–8). Boston, MA: Aberdeen Group. Retrieved from <http://www.aberdeen.com/research/8741/rb-hcm-social-learning/content.aspx>
- Lancioni, R. A., & Chandran, R. (2009). Managing knowledge in industrial markets: New dimensions and challenges. *Industrial Marketing Management*, 38(2), 148–151.
- Landers, R. N., & Reddock, C. M. (2017). A meta-analytic investigation of objective learner control in web-based instruction. *Journal of Business and Psychology*, 32(4), 455–478.
- Langley, A. (1999). Strategies for theorizing from process data. *Academy of Management Review*, 24(4), 691–710.
- Langley, A., Smallman, C., Tsoukas, H., & Van De Ven, A. H. (2013). Process studies of change in organization and management: Unveiling temporality, activity, and flow. *Academy of Management Journal*, 56(1), 1–13.
- Larsen, H. H. (2002). Oticon: Unorthodox project-based management and careers in a ‘Spaghetti Organization’. *Human Resource Planning*, 25(4), 30–37.
- Latham, G. P. (1988). Human resource training and development. *Annual Review of Psychology*, 39(1), 545.
- Lee, A. E. (1991). Integrating positivist and interpretive approaches to organizational research. *Organization Science*, 2(4), 342–365.
- Lee, B.-C., Yoon, J.-O., & Lee, I. (2009). Learners’ acceptance of e-learning in South Korea: Theories and results. *Computers & Education*, 53(4), 1320–1329.
- Lee, D., & Van Den Steen, E. (2010). Managing know-how. *Management Science*, 56(2), 270–285.

- Lee, H., & Kelley, D. (2008). Building dynamic capabilities for innovation: An exploratory study of key management practices. *R & D Management*, *38*(2), 155–168.
- Lee, Y. H., Hsieh, Y. C., & Chen, Y. H. (2013). An investigation of employees' use of e-learning systems: Applying the technology acceptance model. *Behavior and Information Technology*, *32*(2), 173–189.
- Leonard-Barton, D. (1992). Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal*, *13*(S1), 111–125.
- Levinthal, D. A. (1997). Adaptation on rugged landscapes. *Management Science*, *43*(7), 934–950.
- Levinthal, D. A., & March, J. G. (1993). The myopia of learning. *Strategic Management Journal*, *14*(S2), 95–112.
- Levinthal, D. A., & Rerup, C. (2006). Crossing an apparent chasm: Bridging mindful and less-mindful perspectives on organizational learning. *Organization Science*, *17*(4), 502–513.
- Levitt, B., & March, J. G. (1988). Organizational learning. *Annual Review of Sociology*, *14*(1), 319–340.
- Levy, F., & Murnane, R. J. (1996). With what skills are computers a complement? *American Economic Review*, *86*(2), 258–262.
- Lewis, K., & Herndon, B. (2011). Transactive memory systems: Current issues and future research directions. *Organization Science*, *22*(5), 1254–1265.
- Li, D., & Liu, J. (2012). Dynamic capabilities, environmental dynamism, and competitive advantage: evidence from China. *Journal of Business Research*, *67*(1), 2793–2799.
- Li, S., Shang, J., & Slaughter, S. A. (2010). Why do software firms fail? Capabilities, competitive actions, and firm survival in the software industry from 1995 to 2007. *Information Systems Research*, *21*(3), 631–654.
- Liao, J. J., Kickul, J. R., & Ma, H. (2009). Organizational dynamic capability and innovation: An empirical examination of internet firms. *Journal of Small Business Management*, *47*(3), 263–286.
- Liao, Y.-W., Wang, Y.-M., Wang, Y.-S., & Tu, Y.-M. (2015). Understanding the dynamics between organizational IT investment strategy and market performance: A system dynamics approach. *Computers in Industry*, *71*(1), 46–57.
- Lichtenthaler, U. (2009). Absorptive capacity, environmental turbulence, and the complementarity of organizational learning processes. *Academy of Management Journal*, *52*(4), 822–846.

- Linder, S., & Foss, N. J. (2018). Microfoundations of organizational goals: A review and new directions for future research. *International Journal of Management Reviews*, 20(S1), S39–S62.
- Liu, Q., & Lu, R. (2016). On-the-job training and productivity: Firm-level evidence from a large developing country. *China Economic Review*, 40(1), 254–264.
- Llopis, O., & Foss, N. J. (2016). Understanding the climate–knowledge sharing relation: The moderating roles of intrinsic motivation and job autonomy. *European Management Journal*, 34(2), 135–144.
- Lucas, H. C., & Goh, J. M. (2009). Disruptive technology: How Kodak missed the digital photography revolution. *Journal of Strategic Information Systems*, 18(1), 46–55.
- Lundvall, B.-Å. (2004). The economics of knowledge and learning. *Product Innovation, Interactive Learning and Economic Performance*, 8(1), 21–42.
- Luor, T., Hu, C., & Lu, H. P. (2009). Mind the gap: An empirical study of the gap between intention and actual usage of corporate e-learning programmes in the financial industry. *British Journal of Educational Technology*, 40(4), 713–732.
- Macher, J. T., & Mowery, D. C. (2009). Measuring dynamic capabilities: Practices and performance in semiconductor manufacturing. *British Journal of Management*, 20, S41–S62.
- MacLean, D., MacIntosh, R., & Seidl, D. (2015). Rethinking dynamic capabilities from a creative action perspective. *Strategic Organization*, 13(4), 340–352.
- Macpherson, A., Jones, O., & Zhang, M. (2004). Evolution or revolution? Dynamic capabilities in a knowledge-dependent firm. *R & D Management*, 34(1), 161–178.
- Majchrzak, A., Wagner, C., & Yates, D. (2013). The impact of shaping on knowledge reuse for organizational improvement with Wikis. *MIS Quarterly*, 37(2), 455–469.
- Makkonen, H., Pohjola, M., Olkkonen, R., & Koponen, A. (2013). Dynamic capabilities and firm performance in a financial crisis. *Journal of Business Research*, 67(1), 2707–2719.
- Mallén, F., Chiva, R., Alegre, J., & Guinot, J. (2015). Organicity and performance in excellent HRM organizations: The importance of organizational learning capability. *Review of Managerial Science*, 10(3), 463–485.
- Mantere, S., & Ketokivi, M. (2013). Reasoning in organization science. *Academy of Management Review*, 38(1), 70–89.
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71–87.

- Marshall, M. N., Mannion, R., Nelson, E., & Davies, H. T. O. (2003). Managing change in the culture of general practice: Qualitative case studies in primary care trusts. *BMJ*, *327*(7415), 599–602.
- Martin, H. J. (2010). Improving training impact through effective follow-up: Techniques and their application. *Journal of Management Development*, *29*(6), 520–534.
- Martin, J. (1992). *Cultures in Organizations: Three Perspectives*. Cary, NC: Oxford University Press.
- Martin, J. (2015). Organizational Culture. In *Wiley Encyclopedia of Management*. Thousand Oaks, CA: Sage Publications.
- Martin, J. A. (2011). Dynamic managerial capabilities and the multibusiness team: The role of episodic teams in executive leadership groups. *Organization Science*, *22*(1), 118–140.
- Martínez-León, I. M., & Martínez-García, J. A. (2011). The influence of organizational structure on organizational learning. *International Journal of Manpower*, *32*(5/6), 537–566.
- Mathiassen, L., & Vainio, A. M. (2007). Dynamic capabilities in small software firms: A sense-and-respond approach. *IEEE Transactions on Engineering Management*, *54*(3), 522–538.
- McAfee, A. (2009). *Enterprise 2.0: New Collaborative Tools for Your Organization's Toughest Challenges*. Boston, MA: Harvard Business Press.
- McCarthy, I. P., Lawrence, T. B., Wixted, B., & Gordon, B. R. (2010). A multidimensional conceptualization of environmental velocity. *Academy of Management Review*, *35*(4), 604–626.
- McGrath, J. E. (1981). Dilemmatics: The study of research choices and dilemmas. *American Behavioral Scientist*, *25*(2), 179–210.
- McGuinness, T., & Morgan, R. E. (2005). The effect of market and learning orientation on strategy dynamics: The contributing effect of organisational change capability. *European Journal of Marketing*, *39*(11–12), 1306–1326.
- Mehra, A., Langer, N., Bapna, R., & Gopal, R. D. (2014). Estimating returns to training in the knowledge economy: A firm level analysis of small and medium enterprises. *MIS Quarterly*, *38*(3), 757–772.
- Meier, K. J., & O'Toole, L. J. (2009). The dog that didn't bark: How public managers handle environmental shocks. *Public Administration*, *87*(3), 485–502.
- Mesu, J., Sanders, K., & Van Riemsdijk, M. (2015). Transformational leadership and organisational commitment in manufacturing and service small to medium-sized

- enterprises: The moderating effects of directive and participative leadership. *Personnel Review*, 44(6), 970–990.
- Michailova, S., & Sidorova, E. (2011). From group-based work to organisational learning: The role of communication forms and knowledge sharing. *Knowledge Management Research & Practice*, 9(1), 73–83.
- Michalski, M. P. (2014). Symbolic meanings and e-learning in the workplace: The case of an intranet-based training tool. *Management Learning*, 45(2), 145–166.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook*. Thousand Oaks, CA: Sage Publications.
- Miller, D. (1981). Toward a new contingency approach: The search for organizational gestalts. *Journal of Management Studies*, 18(1), 1–26.
- Miller, L. (2014). *ASTD State of the Industry Report 2014: Spending on Employee Training Remains a Priority*. Alexandria, VA: American Society for Training & Development.
- Minbaeva, D. B. (2013). Strategic HRM in building micro-foundations of organizational knowledge-based performance. *Human Resource Management Review*, 23(4), 378–390.
- Minnie, S. (2013, October). *Documentation at Orion Health*. Presentation to members of the Technical Communicators Association of New Zealand, The Normanby Hotel, Mount Eden, New Zealand.
- Mithas, S., Ramasubbu, N., & Sambamurthy, V. (2011). How information management capability influences firm performance. *MIS Quarterly*, 35(1), 237–256.
- Mithas, S., Tafti, A., Bardhan, I., & Mein Goh, J. (2012). Information technology and firm profitability: Mechanisms and empirical evidence. *MIS Quarterly*, 36(1), 205–224.
- Mithas, S., Tafti, A., & Mitchell, W. (2013). How a firm’s competitive environment and digital strategic posture influence digital business strategy. *MIS Quarterly*, 37(2), 511–536.
- Miyazoe, T., & Anderson, T. (2014). Empirical research on learners’ perceptions: Interaction equivalency theorem in blended learning. *European Journal of Open, Distance and E-Learning*, 2010(1), 1–9.
- Moon, M. (2015a). *Social in HR: Embedding Social into HR Systems and Processes* (Whitepaper) (pp. 1–16). Boston, MA: Aberdeen Group. Retrieved from http://v1.aberdeen.com/launch/report/research_report/10772-RR-social-engagement-technology.asp
- Moon, M. (2015b). *The new 70:20:10: The changing face of learning* (Whitepaper) (pp. 1–22). Boston, MA: Aberdeen Group. Retrieved from

<http://www.aberdeen.com/research/11040/11040-rr-new-learning-framework/content.aspx>

- Morgan, D. L. (1993). Qualitative content analysis: A guide to paths not taken. *Qualitative Health Research*, 3(1), 112–121.
- Morgan, G., & Adams, J. (2009). Pedagogy first: Making web-technologies work for soft skills development in leadership and management education. *Journal of Interactive Learning Research*, 20(2), 129–155.
- Morgan, N. A., Vorhies, D. W., & Mason, C. H. (2009). Market orientation, marketing capabilities, and firm performance. *Strategic Management Journal*, 30(8), 909–920.
- Muñoz Castellanos, R. M., & Salinero Martín, M. Y. (2011). Training as a source of competitive advantage: Performance impact and the role of firm strategy, the Spanish case. *The International Journal of Human Resource Management*, 22(3), 574–594.
- Nadkarni, S., Chen, T., & Chen, J. (2015). The clock is ticking! Executive temporal depth, industry velocity, and competitive aggressiveness. *Strategic Management Journal*, 37(6), 1132–1153.
- Nadler, D. A., & Tushman, M. L. (1990). Beyond the charismatic leader: Leadership and organizational change. *California Management Review*, 32(2), 77–97.
- Nahm, A. Y., Vonderembse, M. A., & Koufteros, X. A. (2003). The impact of organizational structure on time-based manufacturing and plant performance. *Journal of Operations Management*, 21(3), 281–306.
- Nelson, R. R., & Winter, S. G. (1974). Neoclassical vs. evolutionary theories of economic growth: Critique and prospectus. *The Economic Journal*, 84(336), 886–905.
- Nelson, R. R., & Winter, S. G. (1982). *An evolutionary theory of economic change*. Cambridge, MA: Harvard University Press.
- Nembhard, I. M., & Tucker, A. L. (2011). Deliberate learning to improve performance in dynamic service settings: Evidence from hospital intensive care units. *Organization Science*, 22(4), 907–922.
- Netteland, G. (2007). *E-learning for change in a large organization* (PhD Thesis). The University of Bergen, Bergen, Norway.
- Newbert, S. L. (2007). Empirical research on the resource-based view of the firm: An assessment and suggestions for future research. *Strategic Management Journal*, 28(2), 121–146.

- Newey, L. R., & Zahra, S. A. (2009). The evolving firm: How dynamic and operating capabilities interact to enable entrepreneurship. *British Journal of Management*, 20, S81–S100.
- Ngo, H.-Y., & Loi, R. (2008). Human resource flexibility, organizational culture and firm performance: An investigation of multinational firms in Hong Kong. *The International Journal of Human Resource Management*, 19(9), 1654–1666.
- Noe, R. A. (2008). *Employee Training and Development* (4th ed.). New York, N.Y.: McGraw-Hill/Irwin.
- Noe, R. A., Clarke, A. D. M., & Klein, H. J. (2014). Learning in the twenty-first-century workplace. *Organizational Psychology and Organizational Behavior*, 1(1), 245–275.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14–37.
- Nonaka, I., Hirose, A., & Takeda, Y. (2016). ‘Meso’-foundations of dynamic capabilities: Team-level synthesis and distributed leadership as the source of dynamic creativity. *Global Strategy Journal*, 6(3), 168–182.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York, NY: Oxford University Press.
- Nunes, M., McPherson, M., Annansingh, F., Bashir, I., & Patterson, D. (2009). The use of e-learning in the workplace: A systematic literature review. *Journal of Applied Research in Workplace E-Learning*, 1(1), 97–111.
- Nutt, P. C. (2006). Comparing public and private sector decision-making practices. *Journal of Public Administration Research and Theory*, 16(2), 289–318.
- O’Reilly, C. A., & Chatman, J. A. (1996). Culture as social control: Corporations, cults, and commitment. In B. M. Staw & L. L. Cummings (Eds.), *Research in Organizational Behavior* (Vol. 18, pp. 157–200). Greenwich, CT: JAI Press.
- O’Reilly, C. A., Harreld, J. B., & Tushman, M. L. (2009). Organizational ambidexterity: IBM and emerging business opportunities. *California Management Review*, 51(4), 75–99.
- O’Reilly, C. A., & Tushman, M. L. (2008). Ambidexterity as a dynamic capability: Resolving the innovator’s dilemma. *Research in Organizational Behavior*, 28(1), 185–206.
- O’Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *Academy of Management Perspectives*, 27(4), 324–338.
- O’Reilly, T. (2007). What is Web 2.0: Design patterns and business models for the next generation of software. *Communications and Strategies*, 65(1), 17–37.

- Orvis, K. A., Fisher, S. L., & Wasserman, M. E. (2009). Power to the people: Using learner control to improve trainee reactions and learning in web-based instructional environments. *Journal of Applied Psychology, 94*(4), 960–971.
- Osborne, S. P., Radnor, Z., Kinder, T., & Vidal, I. (2015). The SERVICE framework: A public-service-dominant approach to sustainable public services. *British Journal of Management, 26*(3), 424–438.
- Osborne, S. P., & Strokosch, K. (2013). It takes two to tango? Understanding the co-production of public services by integrating the services management and public administration perspectives. *British Journal of Management, 24*, S31–S47.
- Ostroff, C., Kinicki, A. J., & Muhammad, R. S. (2013). Organizational culture and climate. In I. B. Weiner, N. W. Schmitt, & S. Highhouse (Eds.), *Handbook of Psychology. Industrial and Organizational Psychology* (Vol. 12, pp. 643–676). Hoboken, NJ: Wiley.
- Ozkan, S., & Koseler, R. (2009). Multi-dimensional students' evaluation of e-learning systems in the higher education context: An empirical investigation. *Computers and Education, 53*(4), 1285–1296.
- Paavola, S. (2004). Abduction as a logic and methodology of discovery: The importance of strategies. *Foundations of Science, 9*(3), 267–283.
- Pablo, A. L., Reay, T., Dewald, J. R., & Casebeer, A. L. (2007). Identifying, enabling and managing dynamic capabilities in the public sector. *Journal of Management Studies, 44*(5), 687–708.
- Park, Y., & Jacobs, R. L. (2011). The influence of investment in workplace learning on learning outcomes and organizational performance. *Human Resource Development Quarterly, 22*(4), 437–458.
- Passmore, J., & Velez, M. J. (2015). Training evaluation. In K. Kraiger, J. Passmore, N. Rebelo dos Santos, & S. Malvezzi (Eds.), *The Wiley Blackwell Handbook of the Psychology of Training, Development, and Performance Improvement* (pp. 136–153). Chichester, UK: Wiley Blackwell.
- Patel, L. (2010). *ASTD State of the Industry Report 2010*. Alexandria, VA: American Society for Training & Development.
- Pavlou, P. A., & El Sawy, O. A. (2006). From IT leveraging competence to competitive advantage in turbulent environments: The case of new product development. *Information Systems Research, 17*(3), 198–227.

- Percival, J. C., Cozzarin, B. P., & Formanek, S. D. (2013). Return on investment for workplace training: The Canadian experience. *International Journal of Training and Development*, 17(1), 20–32.
- Peteraf, M. A., & Barney, J. B. (2003). Unraveling the resource-based tangle. *Managerial and Decision Economics*, 24(4), 309–323.
- Peters, T. J. (1992). *Liberation Management: Necessary Disorganization for the Nanosecond Nineties*. London, UK: Macmillan.
- Pfaff, C. C., & Hasan, H. (2011). Wiki-based knowledge management systems for more democratic organizations. *Journal of Computer Information Systems*, 52(2), 72–82.
- Phillips, J. J., & Phillips, P. P. (2010). Confronting CEO expectations about the value of learning. *Training and Development*, 64(1), 52–57.
- Piening, E. P. (2013). Dynamic capabilities in public organizations: A literature review and research agenda. *Public Management Review*, 15(2), 209–245.
- Pineda, P. (2010). Evaluation of training in organisations: A proposal for an integrated model. *Journal of European Industrial Training*, 34(7), 673–693.
- Pisano, G. (2016). *Towards a prescriptive theory of dynamic capabilities: Connecting strategic choice, learning, and competition: Working Paper 16-146* (No. Working Paper 16-146). Harvard Business School.
- Pitelis, C. N., & Teece, D. J. (2010). Cross-border market co-creation, dynamic capabilities and the entrepreneurial theory of the multinational enterprise. *Industrial and Corporate Change*, 19(4), 1247–1270.
- Ployhart, R. E., & Turner, S. F. (2014). Organizational adaptability. In D. Chan (Ed.), *Individual Adaptability to Changes at Work: New Directions in Research* (pp. 73–91). New York, NY: Routledge.
- Poel, F. M. de, Stoker, J. I., & Zee, K. I. van der. (2012). Climate control? The relationship between leadership, climate for change, and work outcomes. *The International Journal of Human Resource Management*, 23(4), 694–713.
- Poole, M., Mansfield, R., & Gould-Williams, J. (2006). Public and private sector managers over 20 years: a test of the ‘convergence thesis’. *Public Administration*, 84(4), 1051–1076.
- Potter, W. J., & Levine-Donnerstein, D. (1999). Rethinking validity and reliability in content analysis. *Journal of Applied Communication Research*, 27(3), 258–284.

- Prieto, I. M., Revilla, E., & Rodriguez-Prado, B. (2009). Building dynamic capabilities in product development: How do contextual antecedents matter? *Scandinavian Journal of Management*, 25(3), 313–326.
- Protogerou, A., Caloghirou, Y., & Lioukas, S. (2012). Dynamic capabilities and their indirect impact on firm performance. *Industrial and Corporate Change*, 21(3), 615–647.
- Purvis, R. L., Sambamurthy, V., & Zmud, R. W. (2001). The assimilation of knowledge platforms in organizations: An empirical investigation. *Organization Science*, 12(2), 117–135.
- Quinn, R. E., & Cameron, K. S. (1983). Organizational life cycles and shifting criteria of effectiveness: Some preliminary evidence. *Management Science*, 29(1), 33.
- Quinn, R. E., & Rohrbaugh, J. (1983). A spatial model of effectiveness criteria: Towards a competing values approach to organizational analysis. *Management Science*, 29(3), 363–377.
- Raab, K. J., Ambos, B., & Tallman, S. (2014). Strong or invisible hands? – Managerial involvement in the knowledge sharing process of globally dispersed knowledge groups. *Journal of World Business*, 49(1), 32–41.
- Ragab, M. A. F., & Arisha, A. (2013). Knowledge management and measurement: A critical review. *Journal of Knowledge Management*, 17(6), 873–901.
- Ragin, C. C. (1999). The distinctiveness of case-oriented research. *Health Services Research*, 34(5), 1137–1151.
- Ragin, C. C. (2001). Case-oriented research. In N. J. Smelser & P. B. Baltes (Eds.), *International Encyclopedia of the Social & Behavioral Sciences* (pp. 1519–1525). Oxford, UK: Elsevier Ltd.
- Ravichandran, T. (2018). Exploring the relationships between IT competence, innovation capacity and organizational agility. *The Journal of Strategic Information Systems*, 27(1), 22–42.
- Ravishankar, M. N., & Pan, S. L. (2013). Examining the influence of modularity and knowledge management (KM) on dynamic capabilities: Insights from a call center. *International Journal of Information Management*, 33(1), 147–159.
- Raymond, L., Uwizeyemungu, S., Bergeron, F., & Gauvin, S. (2012). A framework for research on e-learning assimilation in SMEs: a strategic perspective. *European Journal of Training and Development*, 36(6), 592–613.
- Real, J. C., Roldán, J. L., & Leal, A. (2014). From entrepreneurial orientation and learning orientation to business performance: Analysing the mediating role of organizational

- learning and the moderating effects of organizational size. *British Journal of Management*, 25(2), 186–208.
- Reynolds, K., Becker, K., & Fleming, J. (2014). Contemporary challenges in e-learning. In R. Harris & T. Short (Eds.), *Workforce Development: Perspectives and Issues* (pp. 269–282). New York: Springer.
- Rice, J., Liao, T.-S., Galvin, P., & Martin, N. (2015). A configuration-based approach to integrating dynamic capabilities and market transformation in small and medium-sized enterprises to achieve firm performance. *International Small Business Journal*, 33(3), 231–253.
- Ritchie, J., & Spencer, L. (1994). Qualitative data analysis for applied policy research. In R. G. Burgess & A. Bryman (Eds.), *Analysing Qualitative Data* (pp. 172–194). London, UK: Routledge.
- Roberts, N., & Grover, V. (2012). Leveraging information technology infrastructure to facilitate a firm's customer agility and competitive activity: An empirical investigation. *Journal of Management Information Systems*, 28(4), 231–270.
- Romanelli, E., & Tushman, M. L. (1994). Organizational transformation as punctuated equilibrium: An empirical test. *The Academy of Management Journal*, 37(5), 1141–1166.
- Romme, G., Zollo, M., & Berendsy, P. (2010). Dynamic capabilities, deliberate learning and environmental dynamism: A simulation model. *Industrial and Corporate Change*, 19(4), 1271–1299.
- Rothaermel, F. T., & Hess, A. M. (2007). Building dynamic capabilities: Innovation driven by individual-, firm-, and network- level effects. *Organization Science*, 18(6), 898–921.
- Roy, A. (2009). The training process of SMEs: What motivates SMEs to use e-learning. *International Journal of Advanced Corporate Learning (IJAC)*, 2(3), 66–72.
- Salas, E., Tannenbaum, S. I., Kraiger, K., & Smith-Jentsch, K. A. (2012). The science of training and development in organizations. *Psychological Science in the Public Interest*, 13(2), 74–101.
- Sanders, J., Dorenbosch, L., & Blonk, R. (2015). The fragility of employability: A dynamic perspective and examples from The Netherlands. In J. Vuori, R. Blonk, & R. H. Price (Eds.), *Sustainable Working Lives* (pp. 187–214). Dordrecht, Netherlands: Springer.
- Santos-Vijande, M. L., Lopez-Sanchez, J. A., & Trespacios, J. A. (2012). How organizational learning affects a firm's flexibility, competitive strategy, and performance. *Journal of Business Research*, 65(8), 1079–1089.

- Santos-Vijande, M. L., Sanzo-Pérez, M. J., Álvarez-González, L. I., & Vázquez-Casielles, R. (2005). Organizational learning and market orientation: Interface and effects on performance. *Industrial Marketing Management*, 34(3), 187–202.
- Schein, E. H. (1984). Coming to a new awareness of organizational culture. *Sloan Management Review*, 25(2), 3–16.
- Schein, E. H., & Schein, P. (2017). *Organizational Culture and Leadership* (5th ed.). Hoboken, NJ: Wiley.
- Schilke, O. (2014). On the contingent value of dynamic capabilities for competitive advantage: The nonlinear moderating effect of environmental dynamism. *Strategic Management Journal*, 35(2), 179–203.
- Schilke, O., Hu, S., & Helfat, C. E. (2018). Quo vadis, dynamic capabilities: A content-analytic review of the current state of knowledge and recommendations for future research. *Academy of Management Annals*, 12(1), 390–439.
- Schilling, J. (2006). On the pragmatics of qualitative assessment. *European Journal of Psychological Assessment*, 22(1), 28–37.
- Schneckenberg, D., Truong, Y., & Mazloomi, H. (2015). Microfoundations of innovative capabilities: The leverage of collaborative technologies on organizational learning and knowledge management in a multinational corporation. *Technological Forecasting and Social Change*, 100, 356–368.
- Schneider, B., Ehrhart, M. G., & Macey, W. H. (2013). Organizational climate and culture. *Annual Review of Psychology*, 64(1), 361–388.
- Schroeder, R. G., Bates, K. A., & Junttila, M. A. (2002). A resource-based view of manufacturing strategy and the relationship to manufacturing performance. *Strategic Management Journal*, 23(2), 105–117.
- Schuler, R. S., & Jackson, S. E. (1987). Linking competitive strategies with human resource management practices. *The Academy of Management Executive*, 1(3), 207–219.
- Schulz, M. (1998). Limits to bureaucratic growth: The density dependence of organizational rule births. *Administrative Science Quarterly*, 43(4), 845–876.
- Seijts, G. H., & Latham, G. P. (2005). Learning versus performance goals: When should each be used? *Academy of Management Executive*, 19(1), 124–131.
- Seijts, G. H., Latham, G. P., Tasa, K., & Latham, B. W. (2004). Goal setting and goal orientation: An integration of two different yet related literatures. *The Academy of Management Journal*, 47(2), 227–239.

- Senge, P. M. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York, NY: Doubleday.
- Seufert, S. (2012). Trust and reputation in e-learning at the workplace: The role of social media. (pp. 604–607). Presented at the Proceedings of the 12th IEEE international conference on advanced learning technologies, Rome, Italy: IEEE.
- Shaw, J. D., Park, T.-Y., & Kim, E. (2013). A resource-based perspective on human capital losses, HRM investments, and organizational performance. *Strategic Management Journal*, 34(5), 572–589.
- Shen, J., & Tang, C. (2018). How does training improve customer service quality? The roles of transfer of training and job satisfaction. *European Management Journal*, X(X), 1–8.
- Shivetts, C. (2011). E-learning and blended learning: The importance of the learner: A research literature review. *International Journal on E-Learning*, 10(3), 331.
- Siggelkow, N. (2007). Persuasion with case studies. *Academy of Management Journal*, 50(1), 20–24.
- Siguaw, J. A., Simpson, P. M., & Enz, C. A. (2006). Conceptualizing innovation orientation: A framework for study and integration of innovation research. *Journal of Product Innovation Management*, 23(6), 556–574.
- Sirén, C., Hakala, H., Wincent, J., & Grichnik, D. (2017). Breaking the routines: Entrepreneurial orientation, strategic learning, firm size, and age. *Long Range Planning*, 2(50), 145–167.
- Sirmon, D. G., Hitt, M. A., & Ireland, R. D. (2007). Managing firm resources in dynamic environments to create value: Looking inside the black box. *Academy of Management Review*, 32(1), 273–292.
- Sitzmann, T., Kraiger, K., Stewart, D., & Wisher, R. (2006). The comparative effectiveness of web-based and classroom instruction: A meta-analysis. *Personnel Psychology*, 59(3), 623–664.
- Slater, S. F., Olson, E. M., & Hult, G. T. M. (2006). The moderating influence of strategic orientation on the strategy formation capability–performance relationship. *Strategic Management Journal*, 27(12), 1221–1231.
- Smircich, L. (1983). Concepts of culture and organizational analysis. *Administrative Science Quarterly*, 28(3), 339–358.
- Spain, N. R., Dekker, A. R. J., van der Velden, A. W., & de Groot, E. (2016). Informal and formal learning of general practitioners. *Journal of Workplace Learning*, 28(6), 378–391.

- Speklé, R. F., & Verbeeten, F. H. M. (2014). The use of performance measurement systems in the public sector: Effects on performance. *Management Accounting Research*, 25(2), 131–146.
- Spitz-Oener, A. (2008). The returns to pencil use revisited. *Industrial and Labor Relations Review*, 61(4), 502–517.
- Stepanovich, P. L., & Uhrig, J. D. (1999). Decision making in high-velocity environments: Implications for healthcare. *Journal of Healthcare Management*, 44(3), 197–204.
- Stepanyan, K., Littlejohn, A., & Margaryan, A. (2013). Sustainable e-learning: Toward a coherent body of knowledge. *Educational Technology & Society*, 16(2), 91–102.
- Stokes, Peter, & Urquhart, C. (2013). Qualitative interpretative categorisation for efficient data analysis in a mixed methods information behaviour study. *Information Research*, 18(1), 1–17.
- Stubbart, C. I., & Knight, M. B. (2006). The case of the disappearing firms: Empirical evidence and implications. *Journal of Organizational Behavior*, 27(1), 79–100.
- Subramony, M., Krause, N., Norton, J., & Burns, G. (2008). The relationship between human resource investments and organizational performance: A firm-level examination of equilibrium theory. *Journal of Applied Psychology*, 93(4), 778–788.
- Sung, S. Y., & Choi, J. N. (In Press). To invest or not to invest: Strategic decision making toward investing in training and development in Korean manufacturing firms. *The International Journal of Human Resource Management*, 0(0), 1–26.
- Sung, S. Y., & Choi, J. N. (2014). Do organizations spend wisely on employees? Effects of training and development investments on learning and innovation in organizations. *Journal of Organizational Behavior Management*, 35(3), 393–412.
- Sutter, C. J., Webb, J. W., Kistruck, G. M., & Bailey, A. V. G. (2013). Entrepreneurs' responses to semi-formal illegitimate institutional arrangements. *Journal of Business Venturing*, 28(6), 743–758.
- Tafti, A., Mithas, S., & Krishnan, M. S. (2007). Complementarities between information technology and human resource practices in knowledge work (Vol. 132, pp. 1–32). Presented at the ICIS 2007, Montreal, Canada: Association for Information Systems.
- Tai, L. (2007). *Corporate E-learning: An Inside View of IBM's Solutions*. New York: Oxford University Press.
- Teece, D. J. (1998). Capturing value from knowledge assets: The new economy, markets for know-how, and intangible assets. *California Management Review*, 40(3), 55–79.

- Teece, D. J. (2003). Knowledge and competence as strategic assets. In C. W. Holsapple (Ed.), *Handbook on Knowledge Management* (pp. 129–152). New York, NY: Springer.
- Teece, D. J. (2007a). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350.
- Teece, D. J. (2007b). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350.
- Teece, D. J. (2012). Dynamic capabilities: Routines versus entrepreneurial action. *Journal of Management Studies*, 49(8), 1395–1401.
- Teece, D. J. (2014a). A dynamic capabilities-based entrepreneurial theory of the multinational enterprise. *Journal of International Business Studies*, 45(1), 8–37.
- Teece, D. J. (2014b). The foundations of enterprise performance: Dynamic and ordinary capabilities in an (economic) theory of firms. *Academy of Management Perspectives*, 28(4), 328–352.
- Teece, D. J. (2017). Dynamic capabilities and the multinational enterprise. In B. J. Christensen & C. Kowalczyk (Eds.), *Globalization* (pp. 105–129). Berlin, Germany: Springer.
- Teece, D. J., Peteraf, M., & Leih, S. (2016). Dynamic capabilities and organizational agility: Risk, uncertainty, and strategy in the innovation economy. *California Management Review*, 58(4), 13–35.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
- Tell, J., & Halila, F. (2001). A learning network as a development method – an example of small enterprises and a university working together. *Journal of Workplace Learning*, 13(1), 14–23.
- Tharenou, P., Saks, A. M., & Moore, C. (2007). A review and critique of research on training and organizational-level outcomes. *Human Resource Management Review*, 17(3), 251–273.
- Tierney, P., Farmer, S. M., & Graen, G. B. (1999). An examination of leadership and employee creativity: The relevance of traits and relationships. *Personnel Psychology*, 52(3), 591–620.
- TIN100. (2016). 2015 Technology Industry: Top Tech Companies - TIN report. Retrieved 10 March 2016, from <http://www.tin100.com/About+TIN100+Reports.html>

- Tracey, J. B., Tannenbaum, S. I., & Kavanagh, M. J. (1995). Applying trained skills on the job: The importance of the work environment. *Journal of Applied Psychology, 80*(2), 239–252.
- Training and Development. (2012). Shell Oil Company - Jiffy Lube International. *Training and Development Journal, 66*(10), 48.
- Travkin, P., & Sharunina, A. (2016). The returns to training in Russia: a difference-in-differences analysis. *International Journal of Training and Development, 20*(4), 262–279.
- Tripp, S. D., & Bichelmeyer, B. (1990). Rapid prototyping: An alternative instructional design strategy. *Educational Technology Research and Development, 38*(1), 31–44.
- Tushman, M. L., & O'Reilly, C. A. (1996). Ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review, 38*(4), 8–30.
- Úbeda García, M., Cortes, E. C., Marco-Lajara, B., & Zaragoza-Saez, P. (2014). Strategy, training and performance fit. *International Journal of Hospitality Management, 42*(1), 100–116.
- Úbeda-García, M., Claver-Cortés, E., Marco-Lajara, B., Zaragoza-Sáez, P., & García-Lillo, F. (2018). High performance work system and performance: Opening the black box through the organizational ambidexterity and human resource flexibility. *Journal of Business Research, 88*(1), 397–406.
- Vaast, E., & Levina, N. (2006). Multiple faces of codification: Organizational redesign in an IT organization. *Organization Science, 17*(2), 190–201.
- Valerij, D., & Tomaž, Č. (2013). The influence of training and training transfer factors on organisational learning and performance. *Personnel Review, 42*(3), 324–348.
- Väljataga, T., & Laanpere, M. (2010). Learner control and personal learning environment: A challenge for instructional design. *Interactive Learning Environments, 18*(3), 277–291.
- van Dam, N. (2004). *The E-learning Fieldbook: Implementation Lessons and Case Studies From Companies That Are Making E-learning Work*. New York, NY: McGraw-Hill.
- Van Maanen, J. (1979). The fact of fiction in organizational ethnography. *Administrative Science Quarterly, 24*(4), 539–550.
- van Rooij, S. W., & Merkebu, J. (2015). Measuring the business impact of employee learning: A view from the professional services sector. *Human Resource Development Quarterly, 26*(3), 275–297.

- Vanpoucke, E., Vereecke, A., & Wetzels, M. (2014). Developing supplier integration capabilities for sustainable competitive advantage: A dynamic capabilities approach. *Journal of Operations Management*, 32(7–8), 446–461.
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science*, 46(2), 186–204.
- Venkitachalam, K., & Willmott, H. (2016). Determining strategic shifts between codification and personalization in operational environments. *Journal of Strategy and Management*, 9(1), 2–14.
- Verona, G., & Ravasi, D. (2003). Unbundling dynamic capabilities: An exploratory study of continuous product innovation. *Industrial and Corporate Change*, 12(3), 577–606.
- Wagner, C. (2004). Wiki: A technology for conversational knowledge management and group collaboration. *Communications of the Association for Information Systems*, 13(19), 265–289.
- Waight, C. L., Downey, S., Wentling, T. L., & Arvidson, R. (2004). Innovation and renewal of an e-learning solution within an insurance corporation. *Performance Improvement Quarterly*, 17(4), 50–65.
- Waight, C. L., & Stewart, B. L. (2005). Valuing the adult learner in e-learning: Part one - a conceptual model for corporate settings. *Journal of Workplace Learning*, 17(5–6), 337–345.
- Wakayama, T., Kannapan, S., Khoong, C. M., Navathe, S., & Yates, J. M. (1998). Documents, processes, and metaprocesses. In T. Wakayama, S. Kannapan, C. M. Khoong, S. Navathe, & J. M. Yates (Eds.), *Information and Process Integration in Enterprises - Rethinking Documents* (pp. 15–29). Boston, MA: Springer.
- Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews*, 9(1), 31–51.
- Wang, C. L., & Rafiq, M. (2014). Ambidextrous organizational culture, contextual ambidexterity and new product innovation: A comparative study of UK and Chinese high-tech firms. *British Journal of Management*, 25(1), 58–76.
- Wang, C. L., Senaratne, C., & Rafiq, M. (2015). Success traps, dynamic capabilities and firm performance. *British Journal of Management*, 26(1), 26–44.
- Wang, C. Y.-P., Jaw, B.-S., & Tsai, C. H.-C. (2012). Building dynamic strategic capabilities: a human capital perspective. *The International Journal of Human Resource Management*, 23(6), 1129–1157.

- Wang, E., Klein, G., & Jiang, J. J. (2007). IT support in manufacturing firms for a knowledge management dynamic capability link to performance. *International Journal of Production Research*, 45(11), 2419–2434.
- Wang, M. (2011). Integrating organizational, social, and individual perspectives in Web 2.0-based workplace e-learning. *Information Systems Frontiers*, 13(2), 191–205.
- Wang, M., Ran, W., Liao, J., & Yang, S. J. H. (2010). A performance-oriented approach to e-learning in the workplace. *Educational Technology & Society*, 13(4), 167–179.
- Wang, M., Vogel, D., & Ran, W. (2011). Creating a performance-oriented e-learning environment: A design science approach. *Information & Management*, 48(7), 260–269.
- Ward, D. J., Furber, C., Tierney, S., & Swallow, V. (2013). Using framework analysis in nursing research: A worked example. *Journal of Advanced Nursing*, 69(11), 2423–2431.
- Watanabe, K., Okada, M., & Yamamoto, K. (2011). EPR (Electronic Patient Record) laboratory - simulated environment to learn about a hospital EPR system. *Knowledge Management and E-Learning*, 3(1), 35–50.
- Weber, S. (2014). Human capital depreciation and education level. *International Journal of Manpower*, 35(5), 613–642.
- Wei, Y., Samiee, S., & Lee, R. (2014). The influence of organic organizational cultures, market responsiveness, and product strategy on firm performance in an emerging market. *Journal of the Academy of Marketing Science*, 42(1), 49–70.
- Weick, K. E., & Quinn, R. E. (1999). Organizational change and development. *Annual Review of Psychology*, 50(1), 361.
- Wellstein, B., & Kieser, A. (2011). Trading “best practices”—a good practice? *Industrial and Corporate Change*, 20(3), 683–719.
- Whetten, D. A., Felin, T., & King, B. G. (2009). The practice of theory borrowing in organizational studies: Current issues and future directions. *Journal of Management*, 35(3), 537–563.
- Whiteley, A., Price, C., & Palmer, R. (2013). Corporate culture change: Adaptive culture structuration and negotiated practice. *Journal of Workplace Learning*, 25(7), 476–498.
- Wilden, R., Devinney, T. M., & Dowling, G. R. (2016). The architecture of dynamic capability research identifying the building blocks of a configurational approach. *The Academy of Management Annals*, 10(1), 997–1076.

- Wilden, R., & Gudergan, S. P. (2015). The impact of dynamic capabilities on operational marketing and technological capabilities: Investigating the role of environmental turbulence. *Journal of the Academy of Marketing Science*, 43(2), 181–199.
- Wilden, R., & Gudergan, S. P. (2017). Service-dominant orientation, dynamic capabilities and firm performance. *Journal of Service Theory and Practice*, 27(4), 808–832.
- Wilden, R., Gudergan, S. P., Akaka, M. A., Averdung, A., & Teichert, T. (In Press). The role of cocreation and dynamic capabilities in service provision and performance: A configurational study. *Industrial Marketing Management*, X(X), 1–15.
- Wilden, R., Gudergan, S. P., Nielsen, B. B., & Lings, I. (2013). Dynamic capabilities and performance: Strategy, structure and environment. *Long Range Planning*, 46(1), 72–96.
- Wilden, R., Hohberger, J., Devinney, T. M., & Lavie, D. (In Press). Revisiting James March (1991): Whither exploration and exploitation? *Strategic Organization*, X(X), 1–18.
- Wilhelm, H., Schlömer, M., & Maurer, I. (2015). How dynamic capabilities affect the effectiveness and efficiency of operating routines under high and low levels of environmental dynamism. *British Journal of Management*, 26(2), 327–345.
- Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal*, 24(10), 991–995.
- Wohlgemuth, V., & Wenzel, M. (2016). Dynamic capabilities and routinization. *Journal of Business Research*, 69(5), 1944–1948.
- Woldesenbet, K., Ram, M., & Jones, T. (2012). Supplying large firms: The role of entrepreneurial and dynamic capabilities in small businesses. *International Small Business Journal*, 30(5), 493–512.
- Wollersheim, J., & Heimeriks, K. H. (2016). Dynamic capabilities and their characteristic qualities: Insights from a lab experiment. *Organization Science*, 27(2), 233–248.
- Wong, W.-T., & Huang, N.-T. N. (2011). The effects of e-learning system service quality and users' acceptance on organizational learning. *International Journal of Business and Information*, 6(2), 205–225.
- Wooten, L. P., & Crane, P. (2004). Generating dynamic capabilities through a humanistic work ideology: The case of a certified-nurse midwife practice in a professional bureaucracy. *American Behavioral Scientist*, 47(6), 848–866.
- Wright, P. M., Gardner, T. M., Moynihan, L. M., & Allen, M. R. (2005). The relationship between HR practices and firm performance: Examining causal order. *Personnel Psychology*, 58(2), 409–446.

- Wright, P. M., & Snell, S. A. (1991). Toward an integrative view of strategic human resource management. *Human Resource Management Review*, *1*(3), 203–225.
- Wu, B., & Zhang, C. (2014). Empirical study on continuance intentions towards E-Learning 2.0 systems. *Behaviour & Information Technology*, *33*(10), 1027–1038.
- Wu, I. L., & Hu, Y. P. (2012). Examining knowledge management enabled performance for hospital professionals: A dynamic capability view and the mediating role of process capability. *Journal of the Association for Information Systems*, *13*(12), 976–999.
- Yacovelli, S. (2012). How to effectively evaluate e-learning. *Training and Development Journal*, *66*(7), 52–57.
- Yin, R. K. (2009). *Case Study Research: Design and Methods* (4th ed.). Thousand Oaks, CA: Sage Publications.
- Yoo, Y., Boland, R. J., Lyytinen, K., & Majchrzak, A. (2012). Organizing for innovation in the digitized world. *Organization Science*, *23*(5), 1398–1408.
- Yuen, S. C.-Y. (2014). Integrating e-learning 2.0 into online courses. *International Journal of Information and Communication Technology Education*, *10*(1), 49–60.
- Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review*, *27*(2), 185–203.
- Zahra, S. A., Ireland, R. D., & Hitt, M. A. (2000). International expansion by new venture firms: International diversity, mode of market entry, technological learning, and performance. *Academy of Management Journal*, *43*(5), 925–950.
- Zahra, S. A., Nielsen, A. P., & Bogner, W. C. (1999). Corporate entrepreneurship, knowledge, and competence development. *Entrepreneurship: Theory and Practice*, *23*(3), 169–189.
- Zahra, S. A., Sapienza, H., & Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: A review, model and research agenda. *Journal of Management Studies*, *25*(4), 917–955.
- Zammuto, R. F., Griffith, T. L., Majchrzak, A., Dougherty, D. J., & Faraj, S. (2007). Information technology and the changing fabric of organization. *Organization Science*, *18*(5), 749–762.
- Zhan, W., & Chen, R. (2013). Dynamic capability and IJV performance: The effect of exploitation and exploration capabilities. *Asia Pacific Journal of Management*, *30*(2), 601–632.

- Zheng, S. L., Zhang, W., Wu, X. B., & Du, J. (2011). Knowledge-based dynamic capabilities and innovation in networked environments. *Journal of Knowledge Management*, *15*(6), 1035–1051.
- Zollo, M., & Singh, H. (2004). Deliberate learning in corporate acquisitions: Post-acquisition strategies and integration capability in U.S. bank mergers. *Strategic Management Journal*, *25*(13), 1233–1256.
- Zollo, M., & Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organization Science*, *13*(3), 339–351.