Advancing strategy ontology

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Abstract. An ontology seeks to formalise a language and definitions for domain-related communications, thus enhancing the sharing of meaning across relevant stakeholders. A strategy ontology for enterprises should be no exception. Identifying patterns in business-level typologies advance the ontology by informing strategy direction within competitive environments. The array of strategy models that facilitate the formalisation of strategy concepts is investigated. The pathways from strategy through to competency and capability are established. This activity culminates in an extended meta-model that yields the formal concepts (meta-objects) and relations pertinent to strategy. The model's interoperability underpins the strategy ontology's value by a matrix tool that accelerates and selects the appropriate models to facilitate productive work through the strategy lifecycle.

Keywords: Strategy · Ontology · Corporate strategy · Business level strategy · Functional level strategy · Meta model

1 Introduction

The need and requirements for a Strategy Ontology are critically discussed by Caine and von Rosing (2020), highlighting the need to facilitate and enable an effective sharing of meaning across concepts that touch strategy. This need has been exuberated with increasing emphasis on the imperative link between strategy, capability and performance (Warner and Wäger 2019; Feiler and Teece 2014; O'Regan and Ghobadian 2004).

Strategy practitioners remained challenged and responsible for deriving strategic pathways that facilitate competitive advantage. With a complex landscape of strategy models, the difficulty remains in the ability to delineate alignment across strategy and capability to drive organisation performance (Teece 2007; O'Regan and Ghobadian 2004). No works exist that directly relate existing strategy models to competencies and capabilities. Moreover, how organisations compete within their respective environments also deserves attention as this drives the allocation and deployment of resources (Feiler and Teece 2014). These matters contribute to the motivation for this research which is routed upon advancing the Strategy Ontology notion. Specifically, (1) supporting practitioners in their ability to formalise and accommodate strategy concepts across the existing array of strategy models. (2) Delineating relations between concepts, models, capabilities and competencies. (3) Confirming the generic strategic types of competing within competitive environments and (4) establishing a connection back to the strategy lifecycle phases (Caine and von Rosing 2018).

The notion of capability in the context of strategy is discussed and positioned upon Tecce's (2007; 2014) dynamic capabilities as a basis for establishing imperative relations back to strategy.

The author builds upon the requirements for a strategy ontology outlined by Caine and von Rosing (2020), namely, Strategy Semantics, Strategy Taxonomy and Strategy Engineering. The Strategy Semantics are visualised in an extended Strategy Meta Model that delineates relationships between meta objects as a result of analysing strategy models through a predefined lens that ensures a strict focus on models with strategic significance. The Strategy Taxonomy is represented by establishing generic strategies (typologies) based on the analysis of patterns associated with business level strategy.

Strategy Engineering is represented through the capability to instantiate different instances of strategy relevant objects, enabling and facilitating the re-use of strategy concepts across different artefacts.

The LEAD Enterprise Ontology (LEO) (von Rosing and Laurier 2015; Caine and von Rosing 2018; Caine et al. 2021) has been the basis for LEADing Practice to develop standards and reference content that spread across six high level categories, each containing several subject domains. This has resulted in artefacts that represent user informed practices structuring frameworks, taxonomies, populated maps, matrices and models (von Rosing et al. 2017; von Scheel et al. 2017; von Rosing et al. 2016). This article examines two examples of reference content that fall within the Enterprise Management standard, Strategy Taxonomy and Organisation Tier Competencies (LEADing Practice 2022). The development of this reference content has been informed by cross industry representation across different strategic contexts.

The Strategy Taxonomy content represents the analysis of patterns associated with the development of business level strategies. This has resulted in a list of commonly utilised strategy typologies, (1) Strengthen Growth, (2) Cost Efficiency, (3) Improve Competitiveness, (4) Lower Risk and (5) Improvement Operational Excellence. Each of the strategies has associated Critical Success Factors (CSFs). The CSFs are not explicitly listed in this article, however, some of them are referred to when contrasting the LEAD typologies against academically derived typologies. The reference content is cross examined and contrasted with an academic analysis of strategy typologies. The results demonstrate a correlation between the academic analysis of strategic typologies and LEAD reference content.

The Organisation Tier competency reference content groups competencies across the strategic, tactical and operational organisation tiers. This categorisation results from the analysis of patterns associating competencies with a specific organisation tier. This article cross examines these competencies with strategy models in the aim of identifying a relationship between strategy and competency. An extension of this relation results in a taxonomy that groups models according to their strategic nature and relationship to associated competencies. This provides pathways from strategy to competency and vice versa.

2 Literature Review

The review of literature expands across ontology and its connection to strategy, capabilities and competencies, strategy models and business level strategy. The discussion

on ontology and its connection to strategy reveals key themes that inform the basis of advancing strategy ontology. The capabilities and competencies review support the identification of imperative links that should align back to strategy. The existing array of strategy models are reviewed as a basis to propose ontological definitions for their individual components. Finally, literature is surveyed on generic business level strategic types in aid of identifying patterns to support the acceleration of strategy development.

2.1 Ontology and Strategy

Whilst Gruber (1995) is known to have established ontology within the informatics and computing domain, the routes of ontology lay firmly within social science, based on a philosophical premise; 'the nature of being or reality' (Denzin and Lincoln 2011). Ontology allows us to share and reuse meaning through a formal specification built upon a shared conceptualisation (Gruber 1995; Borst et al. 1997).

It was Powell (2003) who initially discussed the need for a strategy ontology, highlighting this as a significant issue prohibiting the advancement of the strategic management field. Whilst there is a plethora of strategic models and concepts, there lacks a formal description that defines and removes any confusion in the definition of objects relating to strategy (Powell 2003).

Nelson and Nelson (2003) echo Powell's concern highlighting the importance of developing a structured strategy language that can lead to the development of strategic patterns. They also emphasise how technical requirements should be informed by the strategic thread, thus creating alignment and facilitating the integration of business and technology (Nelson and Nelson 2003).

Whilst there are attempts at creating ontologies that relate to strategy, there lacks a comprehensive delineation of concepts and extended relationships. Dalmau Espert et al. (2015) introduced an ontology for a strategic planning process. It is fundamentally based upon Hill and Jones's (2012) strategic planning process which can be summarised as; (1) mission and corporate goals, (2) Strengths, Weaknesses, Opportunities and Threats (SWOT) (3) Strategy and (4) Implementation of Strategy (Dalmau Espert et al. 2015). Whilst the foundations are broadly linked to the necessary concepts that relate to strategy, there are some limitations with their resulting ontology model. Firstly, it doesn't capture the ability to handle the complexity associated with the different levels of strategy. It is well documented that strategic planning has a hierarchal perspective whereby the uppermost strategy informs the lower-level strategies (Prescott 1983; Chafee 1985; De Wit 2017). There is no consideration for this which limits its practical use when orchestrating strategy across different business units. Secondly, there is no attempt to specify how strategy execution connects to technology. Failure rates with strategy execution and digital transformation have historically been overwhelmingly high (Bridges 2016) (McKinsey 2015). Developing an ontology that overlooks the connection to technology creates a blind spot that will surface alignment and integration issues when working through the lifecycle of strategy (Caine and von Rosing 2018).

Dalmau Espert et al. (2015) specify ontology as an 'Action' object that represents initiatives that address the fulfilment of the key performance indicators. As an ontology, this lacks rigour because 'Actions' could relate to a form of service, process, capability or competency. Each of these has a different nature and thus requires specific relations with

other concepts that can support the engineering of strategy. Moreover, without this level of rigour issues will surface when attempting to programme manage strategy execution as services and processes will require owners. They will need to work across different departments engaging with various stakeholders. This will dictate different workflows for processes and service flows for service. Therefore, without them being defined in the ontology this will create difficulty when orchestrating services and managing business processes (Von Rosing et al. 2014).

Finally, Dalmau Espert et al. (2015) ontology hinge on SWOT which encompasses essential concepts that relate to strategy. However, SWOT is not the only model that encompasses concepts that relate to strategic planning. Kaplan and Norton's (1996) balance scorecard, Porter's (2001) value chain and Osterwalder, Piegneur, Clark and Pijl (2010) business model canvas could, amongst other models be justified for the same purpose.

Yakan and Rashid's (2016) Strategic Business Ontology builds upon Osterwalder et al. (2010) Business Model Canvas by adding key performance indicators to measure essential elements of the business model. Whilst essential components that relate to strategy are present there are some fundamental issues that surface with this ontology. The business model canvas is built upon an ontology that intends to serve as a means between the business level strategy and organisation processes (Osterwalder et al., 2010). Its foundation purpose is not to act as a 'strategy' ontology. Furthermore, it takes from the structure of Kaplan and Norton's (1996) Balance Scorecard aligning Product, Customer Interface, Infrastructure Management, and Financial Aspects to the related scorecard areas. This is a similar limitation trait to Dalmau-Espert et al. (2015) who take from SWOT. The nine building blocks of the business model canvas (value proposition, customer segment, channels, customer relationship, revenue streams, key resources, key activities, key partnerships and cost structure) (Osterwalder et al. 2010) are the core of Yakan and Rashid's (2016) strategy ontology. It does not intend to capture essential concepts such as environmental factors that motivate or push an organisation towards a certain direction i.e., drivers and forces. Although it adds the key performance indicator, the ability to connect this to information and technology layer components is missing. Therefore, failing to address the essential alignment between strategy and technology (Nelson and Nelson 2003; Ross 2006).

Kemp (2021) progressed development towards a strategy ontology. Informed by a fundamental premise that strategy is assembled through 'Ends, Means and Ways', his ontology provides insight into some of the essential elements that compose a strategy. A portion of the elements i.e. (strategy, force, driver, value, risk, end, vision, performance, culture) are directly named in the compilation of Caine and von Rosing (2018)'s strategy lifecycle, founded upon the LEAD Enterprise Ontology (von Rosing and Laurier 2015) and orchestrated through a lifecycle phases model which is underpinned by a 'first cut' strategy ontology meta model. The remaining elements provide detail on a selection of scopes including value and differentiation, along with time and resources. These are considered through the lifecycle phase steps which denote specific actions through the use of artefacts that relate to domain model practices (value model, revenue model, service model, performance model, operating model and cost model) (Caine and von Rosing 2018; von Rosing and von Scheel 2016).

Kemp's (2021) noteworthy critique of the levels of military decision making and its relationship to strategy levels, affirms corporate, business and functional level strategies (Prescott 1986; Chafee 1985; De Wit 2017). Distinctively, it further delineates operational planning, tactics and technology as decompositions following on from levels of strategy (Kemp 2021). This article extends Kemp's work by expanding on the nature of competencies required at the business level of strategy, this also further develops the 'means', as resources and capabilities are needed to create a competency (Madhok 1997). Furthermore, analysis of the generic types of strategy applied at the business level and an extended delineation of concepts associated with strategy, courtesy of an extended strategy models review; provide advancement to the strategy ontology notion.

Principles of Ontology Application. Several articles discuss how an ontology should be used (Guarino 1997; Falbo et al. 2002; Roussey et al., 2011) which all encompass the three principles discussed by Uschold and Grunniger (1996). From a systems and organisation perspective, they are categorised into three principles **Communication**, **Interoperability** and **Systems Engineering.**

The **Communication** category seeks to *"…reduce conceptual and terminological confusion by providing a unifying framework within an organisation"* (Uschold and Grunniger 1996, p. 98). This supports a shared understanding across all stakeholders within an organisation who have their individual viewpoints and organisational context. For a strategy to be effective, it must be understood and relate to different viewpoints where the communication used does not become an additional task for deciphering and relating to a specific context. A Strategy Ontology should facilitate effective communication and enable a shared meaning, addressing Powell's (2003) 'game of language' concern that highlights the issues of having multiple meanings attached to the same strategy concept. The Strategy Ontology should enable a shared meaning across the main layers of an organisation, namely business, information and technology.

Interoperability foscusses on addressing the integration needs of "*…users that need to exchange data or who are using different software tools"* (Uschold and Grunniger 1996, p. 98). This requires the application of enterprise modelling to support the integration of tools that users need to perform their job (Uschold and Grunniger 1996). The Strategy Ontology will need to demonstrate how it supports the interoperability of tools used by stakeholders of different viewpoints. From an enterprise modelling perspective, tools (which are also referred to as artefacts) entail **Maps**, **Matrices** and **Models** (von Rosing and von Scheel 2016). Maps detail a list of composed or decomposed concepts, from a strategy context this could be a list of Strategy Objectives for a given organisational area. Matrices fundamentally consist of rows and columns that delineate where concepts are related to each other. The concepts may already be in the form of a Map but will be enhanced by a Matrix view displaying where concepts relate. Models are developed from concepts taken from the Map or Matrix. The Strategy Ontology will integrate the practice of enterprise modelling to produce tools that support stakeholders from specific viewpoints.

Systems Engineering focuses on the role ontologies play in supporting the design and development of software systems. Whilst the focal point of the Strategy Ontology does not focus on designing and developing software systems, it will apply some of the traits associated with systems engineering. One of those traits is reusability.

The ontology should facilitate which concepts are "…reusable between different domains and tasks." Uschold and Grunniger 1996, p. 98). It should also "…provide an "easy to re-use" library of class objects for modelling problems and domains" (Uschold and Grunniger 1996, p. 98).

Reusability also aligns with the Liskov and Wing (1994) substitution principle which supports the validation of decomposition where stereotypes, types and subtypes all adhere to their class type meta object (where the 'is a' relationship exists). Instances of a class type can be reused across different domains and applied to different maps, matrices and models.

The strategy ontology will involve engineering concepts that relate to strategy. Once engineered, this will support the ability to reuse them across different artefacts i.e. maps matrices and models.

Ontology provides us with the ability to enhance the way in which we work with strategy. This review delineated key themes that inform the scope, applicability and fundamental principles that will underpin the development of an enhanced strategy ontology.

2.2 Competencies, Capabilities and Competitive Advantage

Competitive advantage is commonly associated with competencies and capabilities as they are deemed to enable an organisation to differentiate its position in the competing market (Teece et al. 1997; O'Regan and Ghobadian 2004). Achieving competitive advantage through leveraging competencies and capabilities requires effective strategic planning, thus alignment of strategy, competency and capability are essential (Teece et al. 1994). These two terms are sometimes loosely interchanged (Marino, 1996). It is, therefore, necessary to understand why so confusion can be limited when working with the two concepts.

Cambridge dictionary definitions make clear distinctions between the two, competency is defined as an essential skill to perform a specific job. Whereby a capability is the ability to perform something (Cambridge University Press 2022). Henderson and Cockburn (1994) define competencies as local abilities combined with the knowledge required to perform day to day tasks. Madhok (1997) makes a clear connection between resources, capabilities and competencies by defining competencies as a result of combing capability (ability to do something) with the necessary resources required. Marino's (1996) definition relates to these highlighting competencies that have knowledgebase or technology components that result in a skill. He also effectively distinguishes between the two highlighting that capabilities are '…rooted more in processes and business routines' (Marino 1996, p. 41). Meaning they are of a complex nature and often involve interaction with people, organisation structures and technology (Marino 1996) (Teece et al. 1997). The distinction between the two can be blurred, especially when the competency assessment developed by pioneers on the notion of 'Core Competencies' Prahalad and Hamel (1990), can be applied to capabilities and competencies (Marino 1996). Their assessment places three tests on a competency, namely: (1) does it enable an organisation to compete in more than one market, (2) will it provide value to the end product/service and (3) is it difficult for competitors to imitate (Prahalad and Hamel 1990). To date,

there is still ambiguity surrounding the distinction between the two terms in practice. When applying the distinction criteria discussed above this results in an argument for both capability and competency. Nevertheless, they both hold significance when working through the lifecycle of strategy.

Scholarly work on the connection between competency and strategy grew exponentially following the 'Core Competency' notion. This resulted in greater emphasis on capabilities, particularly dynamic capabilities and how they support a competitive strategic endeavour. Tecce and Pisano (1994) introduced the notion of dynamic capabilities which expanded the competitive advantage paradigm. The term is rooted in two perspectives, (a) recognising that the business environment has a continuous character shift and this requires a dynamic strategic response to support time to market and innovation. (B), emphasis on adapting, integrating and aligning internal and external skills, resources and functional competences in building capability towards a changing environment (Teece and Pisano 1994). Progression of this notion resulted in the frequently cited 'Sensing, Seizing and Transforming/Reconfiguring' framework (Teece et al. 1997) which has been often utilised as a vehicle for scholarly research on dynamic capabilities and more recently, its connection to digital transformation and strategy (Vanpoucke et al. 2014; Breznik et al. 2018; Matysiak et al. 2017; Enkel and Sagmeister, 2020; Ince and Hahn 2020; Warner and Wäger 2019; Bojesson and Fundin 2021). Research output derived from empirical industrial analysis and orchestration of fundamental concepts have delineated several frameworks that identify essential activities for developing dynamic capabilities.

'Ultimately, good performance requires strong dynamic capabilities to sense, seize, and transform in conjunction with a good strategy' (Teece 2014).

Identifying and developing dynamic capabilities is essential for creating and maintaining a sustainable competitive advantage. Implementing them entails doing the right thing, at the right time, supported with the management and orchestration of new processes that lead to the development of an adaptive culture (Teece 2014). Alongside dynamic capabilities, it is also essential to attain technical efficiency in the operations, administration and governance of core business functions. Moving the emphasis away from doing the right things, this focuses on 'doing the things right' (Teece 2014). Numerous terms are used to describe 'doing the things right' capabilities, 'static' (Collis 1994), 'first order' (Danneels 2002) and 'substantive' (Sharker et al. 2006). Teece (2014) uses the term 'ordinary capabilities' and effectively distinguishes the differences when contrasted with dynamic capabilities (Table 1).

Building on the endeavour to delineate relations between concepts, models, capabilities and competencies, this article will contrast frameworks and essential activities from (Day and Schoemaker 2016; Breznik et al. 2018; Bojesson and Fundin 2021; Warner and Wäger 2019) all of which take from Tecce's (2007) Sensing, Seizing and Reconfigure/Transform structure. Consideration will be given to ordinary capabilities and their nature, thus also aligning them back to strategic models where applicable (Tables 2, 3 and 4).

Contrasts will be drawn from the LEAD Organisation Tier Competency reference content and where possible aligned back to strategic models. Competencies across the strategic, tactical and operational tiers are listed in Table 5 (LEADing Practice 2022). A

Table 1. Tecce's (2014) comparison of ordinary and dynamic capabilities

	Ordinary capabilities	Dynamic capabilities
Purpose	Technical efficiency in business functions	Achieving congruence with customer needs and with technological and business opportunities
Mode of attainability	Buy or build (learning)	Build (learning)
Tripartite schema	Operate, administrate, and govern	Sense, seize, and transform
Key routines	Best practices	Signature processes
Managerial emphasis	Cost control	Entrepreneurial asset orchestration and leadership
Priority	Doing things right	Doing the right things
Imitability	Relatively imitable	Inimitable
Result	Technical fitness (efficiency)	Evolutionary fitness (innovation)

Table 2. Attributed capabilities for sensing dynamic capability

Dynamic capabilities (sensing)	
Author	Attributed capabilities
(Day and Schoemaker 2016; Breznik et al. 2018; Bojesson and Fundin 2021)	Peripheral Vision – Involves scoping which determines how wide to scan and the nature of the issues scanned. The scope is informed by past analysis, present issues, trends and forces
(Day and Schoemaker 2016)	Vigilant Learning – Outside of orientation for products and services, ensuring employees are empowered to share their voice on important matters that impact the business, suppressing biases, and triangulating perspectives for complex issues
(Warner and Wäger 2019)	Digital Scouting – Scanning for tech trends, screening for competitors and sensing customer-centric trends
(Warner and Wäger 2019)	Digital Scenario Planning – Analysing scouted signals, interpreting digital future scenarios, Formulating digital strategies

(*continued*)

'culture' related competency has been added to each tier in respect of the significance it holds in connection to the development of strategy (Tallman et al. 2021).

Table 2. (*continued*)

Dynamic capabilities (sensing)	
Author	Attributed capabilities
(Bojesson and Fundin 2021; Warner and Wäger 2019)	Establishing a long-term digital vision, enabling an entrepreneurial mindset, promoting a digital mindset
(Tecce 2007)	Research & Development selection of New Tech
(Tecce 2007)	Supplier, Complementor, and technology Innovation Tapping – building off the developments of others to create something purpose fit for the new business model

Table 3. Attributed capabilities for seizing dynamic capability

Dynamic capabilities (seizing)	
Author	Attributed capabilities
(Tecce 2007; Day and Schoemaker 2016 Breznik et al. 2018; Warner and Wäger 2019)	Delineating the Customer Solution and Business Model – Recognising and designing mechanisms to capture value. Probe-and-Learn Experimentation, developing real options for management to consider
(Tecce 2007; Warner and Wäger 2019; Bojesson and Fundin 2021)	Selecting Decision-Making Protocols & Strategic Agility – including financial model to govern decision making, agile resource allocation, agile strategic response
(Tecce 2007; Breznik et al. 2018)	Building Loyalty and Commitment – Managers form special networking teams for straightforward and focused networking activities
(Tecce 2007)	Establishing Boundaries for Compliment Controls and Platforms
(Breznik et al. 2018; Day and Schoemaker 2016)	Developing Strategic Partnerships – Firms must look beyond their own organisational and market boundaries, probing for insights from a wide array of peer companies, pre-cursors, and network partners
(Warner and Wäger 2019)	Balancing Digital Portfolio – portfolio management

The intention behind aligning capability and competency back to strategic models will facilitate the identification of appropriate tools to strengthen the coordination

Table 4. Attributed capabilities for transforming dynamic capability

Dynamic capabilities (transforming)	
Author	Attributed capabilities
(Breznik et al. 2018; Tecce 2007)	Governance – control mechanisms, appropriate management structure i.e., Chief Digital Officer
(Day and Schoemaker 2016; Breznik et al. 2018; Tecce 2007)	Redesign, Decentralisation and Flat Structures – Modularise/Decomposability
(Warner and Wäger 2019; Tecce 2007)	Continuous Improvement – Digital maturity workforce and readiness, digital knowledge management, digital ecosystems

Table 5. LEAD organisation tier competencies LEAD-ES0000BC

Organisation tier	Competency
Strategic tier	Mission development
	Vision development
	Strategy development
	Business planning
	Forecasting
	Budgeting
	Value management
	Culture assessment and design
Tactical tier	Strategic advice
	Strategic guidance & compliance
	Monitoring
	Reporting
	Evaluation and/or audit
	Policies, rules & guidelines
	Procedures
	Measurements

(*continued*)

between strategy, capability and competency. It will also provide 'upstream' and 'downstream' pathways from strategic models through to capabilities and competencies. This extends the work of Feiler and Teece (2014) who did not delineate where strategic models support the development of dynamic and ordinary capabilities. Furthermore, the tool will provide a practical application of devising dynamic capabilities from strategy which

Table 5. (*continued*)

Organisation tier	Competency
	Administration
	Communication
	Performance management
	Risk management
	Culture development and monitoring
Operational tier	Operational administration
	Issue management
	Operational planning
	Process management
	Operational oversight and monitoring
	Operational reporting
	Evaluation and/or audit
	Operational measurements
	Operational advice and/or guidance
	Processing
	Culture realisation

can support the development of business models (Warner and Wäger 2019). Affirming the relationship between dynamic capabilities, strategy, and business models thus facilitating the ability to create competitive advantage (Achtenhagen et al. 2013; DaSilva and Trkman 2014; Teece, 2018; Velu 2017; Warner and Wäger 2019).

2.3 Strategy Models Review

Academia has produced an extensive amount of strategy tools that facilitate the opportunity for strategy practitioners to create strategic models for a specific focus. Previous works exist on collating these tools into a form of grouping to help decipher the appropriate model for a given situation. However, there is no formal ontological work performed on the extensive array of models to inform a taxonomy that groups strategic models by their ontological nature. Moreover, the significance between strategy and its relationship to capability, competency, business model and implementation calls for further inquiry (Hoverstadt et al. 2020). An ontology related to the array of strategic models in connection to the pertinent strategy concepts will advance strategic literature.

In their twelfth edition of 'Exploring Strategy' (Johnson et al. 2020) group associated strategic tools through 'Strategic Position', 'Strategic Choices' and 'Strategy in Action'. Their text provides a comprehensive narrative on strategy, detailing critical perspectives on renown models and frameworks. The intention behind the book is to support

academic studies and strategic management curriculum delivery. The three broad categories are not designed to capture and group the pure ontological nature of strategic model concepts, however, it serves the purpose well of providing a critical perspective on the notion of strategy. Mintzberg et al. (2020) formed the ten schools of strategy, which provide a useful lens on working with strategy concepts. However, it does not intend, nor does it provide a discussion on the array of tools produced in the strategic management discipline. Other strategic management texts provide a narrative on the notion of strategy critically discussing approaches to strategic development and their individual perspectives on strategy (Johnson et al. 2020; Mintzberg et al. 2020; Baylis et al. 2018). Whilst there is a shortage of literature that attempts to provide a contemporary grouping on strategy models in relation to pertinent concepts, the work of Berg and Pietersma (2015) provide the most recent attempt. This alongside (Have, Stevens, Elst, Pol-Coyn and Walsh 2007) work has been used as a basis to examine the array of strategy models. Berg and Pietersma (2015) group 75 models across eight functional categories: models within the leadership, human resource, operations supply chain management procurement, finance, marketing and sales are disregarded as the models within do not focus on fundamental strategic concepts. Pertinent strategic concepts are considered as; (a) concepts that inform the positioning of an organisation within an industry, (b) concepts that inform how to compete within a competitive environment, (c) concepts that inform that functional deployment of resources with a link back to strategic concepts that drive how the organisation competes and (d); concepts that inform the overall future direction of an organisation (Prescott 1986; Chafee 1985; De Wit 2017). In addition to Berg and Pietersma (2015), and Have et al. (2007) also produced works on grouping strategy tools. This entails 70 models across strategy, organisation, functional process, people and behaviour and primary process. In alignment with the pertinent strategy concepts, models considered for this review are taken from the strategy and organisation groups. Models outside of these categories do not meet the criteria defined above.

In an attempt to build and extend the previous work, an ontological nature of the selected models will be determined. The 91 meta objects from the Business Ontology have been used as a basis to map the concepts contained in each of the models (Polovina et al. 2020). These objects have been formally described and placed within sublayers of the Business, Information and Technology layers. Semantic relationships between the objects have been described which facilitate the ability to relate concepts within and across the layers of the organisation (Polovina et al. 2020). In addition, a link back to competency and capability will be established to help strengthen the ability to exercise the usefulness in relating strategy to competency and capability since these drive effective business models and execution of strategy (Teece 2018).

Each selected model has been analysed according to three principles: (1) identify and map the nature of the objects back to the LEAD Business Ontology, (2) identify and map the relevant competencies from the LEAD reference content and (3) identify and map the connection to Tecce's (2014) dynamic and ordinary capabilities in accordance with the discussed attributes. The first principle facilitates the ability to delineate a link from each object back to Caine and von Rosing's (2018) strategy lifecycle phases. This provides an opportunity to integrate lifecycle phases into an extended strategy meta model, this is elaborated on in the results section.

In total, thirty-three models have been reviewed in alignment with the three principles. Due to constraints on the length of the article, two examples are provided in detail demonstrating the application of the principles. Table 6 lists the total models that have been analysed. In the results, additional models will be presented demonstrating the application of the three discussed principles (Fig. 1).

Table 6. Models selected for strategy analysis

Selected strategy models for analysis
5 Ps model of strategy implementation (Pryor et al. 2007)
7-S framework (Waterman et al. 1980)
Activity-based costing (Cooper and Kaplan 1988)
Agile strategy management process cycle (Lyngso 2017)
Ashridge mission model (Campbell and Yeung 1991)
Balanced scorecard (BSC) (Kaplan and Norton 2005)
Benchmarking (Watson 1994)
Big hairy audacious goal (BHAG) (Collis 1994)
Boston consulting group (BCG) Matrix (Boston Consulting Group 1970)
Business definition model (Abell 1980)
Blue ocean strategy – strategy canvas (Kim and Mauborgne 2014)
Business model canvas (Osterwalder et al. 2010)
Core competencies (Prahalad and Hamel 1990)
Formal strategic planning process (Armstrong 1982)
Greiner's Growth Model (Greiner 1998)
House of purchasing and supply (Kearney 2002)
European foundation for quality management (EFQM 1992)
Offshoring/Outsourcing (Aron and Singh 2005)
Organisational configurations (Mintzberg 1983)
Overhead value analysis (Berg and Pietersma 2015)
Porter's generic strategies (Porter 2004)

(*continued*)

2.4 Blue Ocean Strategy Canvas Example

See Tables 7, 8 and 9.

Porter's Value Chain Example

See Fig. 2 and Tables 10 and 11.

The Value Chain of Porter (2001) does not have a link to the Dynamic Capabilities mapping.

Table 6. (*continued*)

Selected strategy models for analysis
Porter's value chain (Porter 2001)
Porter's five forces (Porter 1997)
Scenario planning (Heijden 2006)
SWOT analysis (Andrews and Andrews 1980)
Strategy map (Kaplan and Norton 2004)
Value disciplines (Treacy and Wiersema 1995)
Internationalisation strategy framework (Lem et al. 2013)
Road-mapping (Farrukh et al. 2003)
Ansoff's product/market grid and geographic vector (Ansoff 1987)
Competing values of organizational effectiveness (Quinn and Rohrbaugh 1983)
Levels of control (Simons 1995)
Market attractiveness business activity (MABA) (Have et al. 2007)

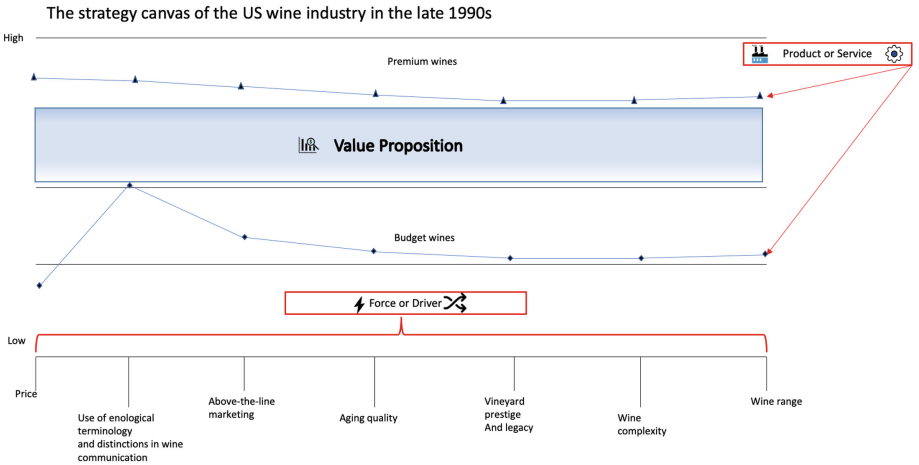


Fig. 1. Blue ocean strategy with concept to object visual layer (Kim and Mauborgne 2014)

Table 7. Matrix of LEAD Meta Objects to Blue Ocean Strategy Canvas Concepts

LEAD meta objects	Blue ocean strategy canvas concepts		
	Market space state	Product/service	Market offerings
Driver	X		
Forces	X		
Value proposition			X
Product		X	
Service		X	

Table 8. Summary of relevant LEAD competencies linked to Blue Ocean Strategy Canvas (only applicable in the Strategic Competency Tier)

Organisation tier	Tier competency	Blue ocean strategy canvas relevance
Strategic tier competencies	Mission development	
	Vision development	
	Strategy development	X
	Business planning	
	Forecasting	
	Budgeting	
	Value management	X
	Culture assessment and design	

Table 9. Matrix of relevant Dynamic Capabilities linked to Blue Ocean Strategy Canvas

Blue ocean strategy concept	Dynamic and ordinary capabilities			
	Sensing	Seizing	Transforming	Ordinary capabilities
Market space state	Screening for competitors (Warner and Wäger 2019)	N/A	N/A	N/A
Product/Service	Screening for competitors (Warner and Wäger 2019)	N/A	N/A	N/A

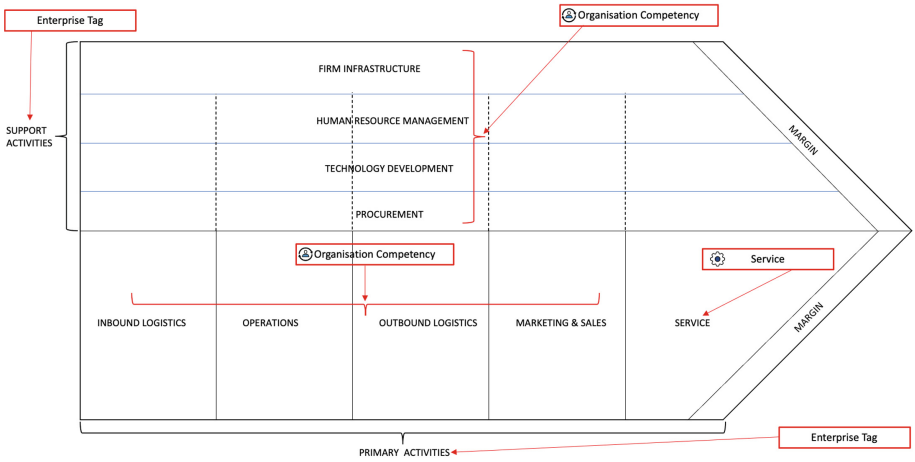


Fig. 2. Porter's Value Chain (2001) with concept to object visual layer and enterprise tag indication

Table 10. Matrix of LEAD Meta Objects to Porter's (2001) Value Chain Concepts

		Porters Value Chain Concepts								
		Firm Infrastructure	Human Resource Management	Technology Development	Procurement	Inbound Logistics	Operations	Outbound Logistics	M&S	Service
LEAD Meta Objects	Competency	X	X	X	X					
	Organisation				X					
	Service									X
Enterprise Tags	Primary Activities					X	X	X	X	X
	Supporting Activities	X	X	X	X					

2.5 Business Level Strategy – a Review of Industry Strategic Typologies

Academia has firmly established the strategy management discipline which now boasts an extensive amount of frameworks, concepts and models. Whilst, in contrast, the practice of strategy in industry uses far less frameworks; academia has played a role in informing and undertaking several modes of analysis on applied strategies.

To focus on the practice of strategy in industry, it is necessary to confirm the level of strategy concerned. Levels of strategy have been discussed by numerous scholars to help establish a premise in which a strategy seeks to make an impact. Determining the environment domain, how an organisation interacts within the domain and the internal adjustments made to remain competitive have been classified across three strategic levels. Namely corporate level strategy, business level strategy and functional level strategy

Table 11. Summary of relevant LEAD competencies linked to Porter's Value Chain (only applicable in the Strategic Competency Tier)

Organisation tier	Tier competency	Porter's value chain relevance
Strategic tier competencies	Mission development	
	Vision development	
	Strategy development	X
	Business planning	
	Forecasting	
	Budgeting	
	Value management	X
	Culture assessment and design	

(Mintzberg et al. 2005; Ohmae 1988; Prescott 1983; Chafee 1985; De Wit 2017). Corporate level strategy concerns itself with 'what business should we operate in? Whereas business or organisation level strategy is focused on 'how you compete in a given environment'. Functional level of strategy focuses on how resources are allocated to areas of the business. The focus of analysis for this article is primarily on business level strategy, as the majority of models analysed fit this profile.

During the late'70s and'80s, there was a significant academic surge in the analysis of identifying generic business strategy types applied in industry (Miles and Snow 1978; Porter 1979; Douglas and Rhee 1989; Prescott 1986; Treacy and Wiersema 1995). This analysis was mainly spearheaded through an empirical lens to support an understanding of the types of business level strategies used in practice. As a result of this endeavour, patterns have been identified in the way strategies are applied to compete in a competitive environment. These patterns are commonly referred to as 'strategic typologies' (Treacy and Wiersema 1995; Miles and Snow 1978; Douglas and Rhee 1989; Anwar and Hasnu 2016). A Typology represents a categorisation of general types associated with a specific domain. In the context of strategy, this enables the grouping of different strategy types to support the ability to compete within a given industry (Anwar and Hasnu 2017). Strategic typologies were first introduced following the work of Miles and Snow (1978), who produced business level strategic typologies based on their study of strategy across four industries. Subsequent literature discussing strategic typology often cite Miles and Snow (1978) using their research as a basis to further investigate the types of strategies used at a business level (Tavakolian 1989; Douglas and Rhee 1989; Slater and Narver 1993; Moore 2005; Blumentritt and Danis 2006; Anwar and Hasnu 2017). Regarded as the most validated classification of strategy (Anwar and Hasnu 2016), the Miles & Snow framework has been debated and interrogated in various business domains. They introduced four strategic typologies Defender, Prospector, Analyzer, and Reactor that represent strategic orientation for business level strategies (Miles and Snow 1978).

The Defender typology adopts an approach that focusses on enhancing efficiency with a heavy investment towards improving the production and distribution of products and services. There is an emphasis on current products and services in its attempt to

seal of the market. Whilst this can create a position difficult to dislodge in the market, significant changes in the market can cause disruption to this approach (Miles and Snow 1978).

With a somewhat opposite stance, the Prospector typology represents an approach that focuses on research and development, new product development and opportunities to penetrate new markets. Resources are heavily deployed to increase growth and revenue through product and service innovation (Miles and Snow 1978).

Residing between Defender and Prospector, the Analyzer typology is a combination of both with an emphasis on minimising risk and maximising profit. New markets are penetrated only when they are analysed and proven to demonstrate viability. In most cases, this would follow the entrance of a Prospector into a given market. Alongside this, a stable core maintaining current products and services ensures operating efficiency in stable market areas (Miles and Snow 1978).

The Reactor typology, unlike the other three, is reactive by nature and lacks consistency and stability in its strategic approach towards the environment of operation. It is described as a 'residual' strategy when neither of the other typologies are followed. The Reactor typology is commonly disregarded as a valid typology (Anwar and Hasnu 2016).

The typologies of Miles and Snow have permeated throughout the work of several strategy scholars. Notably, a significant amount of academic research has used their typologies as a vehicle to assess relationships between strategy and performance through analysing empirical data from the Profit Impact Market Survey (PIMS).

Initiating in 1970, the Profit Impact Market Survey (PIMS) was focused on quantifying the associated factors that differentiate business performance (Buzzell 2004). These factors included market condition, the current competitiveness of a business unit and adopted strategies that drive performance (Buzzell 2004). With foundational routes in Cambridge, Massachusetts and affiliations to the Harvard Business School, PIMS initiated its empirical analysis with General Motors (GE) in the 1960s. A large corporation with several business units, GE provided PIMS with access to data which enabled the analysis of corporate data that provided the platform to extend PIMS to other businesses across different industries. Indeed, PIMS extended to over five hundred companies, differing in size and industry including, samples from the Fortune 500 helping to establish PIMS as a dominant empirical source for strategy up to 1990 (Buzzel 2004). The evolution of PIMS enabled deeper analysis into "market share, relative product quality, capital intensity, capacity utilization, labour productivity and the growth rate of a business unit's served market." (Buzzell 2004). It also established 'PIMS Principles' that represent general relationships between strategic variables that contribute towards profitability and overall success for organisations (Buzzell and Gale 1987; Kotabe et al. 1991). The 'Principles' do not provide solution foundations for successfully operating a business; however, they do support a situational analysis that informs effective decision making (Jaworski and Varadarajan 1989).

Academic analysis of the results of PIMS provides insights into the nature and form of strategy within organisations. Ramanujam and Venkatraman's 1984 research laid a foundation for subsequent research streams that were performed on PIMS (Ramanujam and Venkatraman 1984). This article builds upon their defined 'Empirical Derivation of

Strategic Typologies' research stream. Whilst Ramanujam and Venkatraman's (1984) did not capture some of the later research surrounding strategic typologies, this stream of research is still relevant for the purpose of identifying the different types of generic strategies. This empirical lens approach extends to the work of Anwar and Hasnu (2017), who analysed patterns in strategic typologies across 307 joint stock organisations spreading over twelve industries in Pakistan. This represents a data sample outside the scope of PIMS, providing an opportunity to detect different generic typologies that may differentiate from the research performed on PIMS. The other research streams discussed by Ramanujam and Venkatraman (1984), focus on factors relating to marketing, performance and environmental drivers that influence strategy. However, the outputs associated with these streams do not delineate typologies, therefore they are disregarded in this article.

This article contrasts analysis from Galbraith and Schendel (1983), Prescott (1983), Douglas and Rhee (1989), Luoma (2015) and Anwar and Hasnu (2017) in the attempt to identify commonalities associated with strategy typologies. Each author's work aligns with the 'Empirical Derivation of Strategic Typologies' and therefore provides a basis to identify common patterns in strategic typologies. Discarded from the analysis is research that focuses on typologies around exit and sustainability strategies. Exit strategies detract from a strategic focus that attempts to sustain, compete or outperform within a competitive business environment. Sustainability strategy typologies warrant an independent focus building on the previous research that has identified typologies of this nature (Azzone and Bertelè 1994; Hart 1995; Nidumolu et al. 2009; Orsato 2006; Roome 1992; Gauthier 2017).

Galbraith and Schendel's Typologies. In Galbraith and Schendel's (1983) study into the patterns of strategy associated with the PIMS database, 1200 organisations were included in their analysis. They categorised the types of strategy according to a **consumer product focus** and **industry product focus**. The types of strategy associated with consumer products consisted of: (1) Harvest, (2) Builder, (3) Cashout, (4) Niche or Specialization, (5) Climber and (6) Continuity. Each of these strategies has distinct characteristics and associated patterns (Galbraith and Schendel 1983).

The Harvest strategy type emphasises 'disinvestment' and seeks effective means to apply cost efficiencies in the provision of consumer products. Driving the cost down on product distribution can influence cost savings with administration supporting a reduction in sales fulfilment. In some cases, this can facilitate discounted products for end consumers (Galbraith and Schendel 1983). Driving costs down through a strategic focus strikes similar contrast with Miles and Snow (1978) Defender typology and Prescott's (1983) Low-Cost strategy type. There is a strategic focus on reducing expenses incurred through operating processes to maximise profitability and return on investment (ROI). This aligns with the LEAD 'Cost Efficiency' typology. The Harvest typology represented 6% of the sample taken within the consumer product focused strategy typologies (Galbraith and Schendel 1983).

The Builder strategy type presents, somewhat, an opposite approach to Harvest through strategic intent towards investment into promotion and research and development. Strengthening organisation growth to increase market share is a strong intention with this typology. It shares characteristics with "…Hofer and Schendel's (1978)

'share-increasing strategies', Buzzell et al.'s (1975) 'building strategy, Utterback and Abernathy's (1975) sales maximization strategies and Vesper's (1979) multiplication strategy' (Galbraith and Schendel P13., 1983). All of this represents a notion of the 'Strengthening Growth' typology from the LEAD reference content which 'Refers to a positive change in market share and/or revenue, often over a period of time' (LEADing Practice 2022). The Builder typology accounted for 11% of the strategic typologies within the consumer product focus.

The Cashout strategy is focussed on maximising profit from an existing product range and strengthening an organisation's competitiveness during this process. The reason for the term 'cashout' is because patterns associated with this typology evidence low investment into research and development which leads to a limited emphasis on product improvement. However, it shares characteristics with the 'Generic Profit Strategy' (Hofer and Schendel 1978) and 'Profit Maximizing' strategies (Kotler 1965) that emphasise generating the most profit from sales distribution activities. This again reflects the 'Strengthening Growth' typology which includes success factors that seek to optimise revenue and services (LEADing Practice 2022). It is important to note that different success factors are associated with the Cashout and Builder, although they share the same 'Strengthen Growth' typology. The Cashout typology represented for 17% of the strategic typologies within consumer product focus.

The Niche typology represents a focus on quality and innovation, taking similar Contrasts with 'performance maximizing' from Utterback and Abernathy (1975) as well as 'specialization' from Vesper (1979). There is an emphasis on enhancing excellence associated with product and service delivery alongside research and development to facilitate innovation and transformation. This typology matches the rationale behind two typologies from LEAD, 'Increase Operational Excellence' and 'Improve Competitiveness' (LEADing Practice 2022). Operational excellence focuses on the continuous improvement of processes to support efficiency and standardisation where applicable (Ross 2006). Improving competitiveness focuses strategic direction towards gaining an advantage within the market through enhancing product and service provision (Luoma 2015). The Niche typology accounts for 9% of the strategic typologies within consumer product focus.

The Climber typology typifies a strategic focus that emphasises cost efficiency. Whilst steady profitability is observed in organisations that adopt this typology, this is pursued through the guise of cost consciousness. Comprising on high quality and product prices is evident with the negative values associated Cost Posture and Quality (Galbraith and Schendel 1983). The strategic focus that seeks to minimise expenses relating to resources and time to support enhanced ROI represents a 'Cost Efficiency' typology within the LEAD reference content. The Climber success factors relate to a reduction of costs across administration and sales informing the positive output associated with Climber's Cost Structure output. This typology accounts for 9% of the strategic typologies within consumer product focus.

Representing 47% of the strategic typology within the consumer product focus is the Continuity typology. Here there is little evidence of organisations displaying a proactive strategic direction, rather a focus is emphasised on business continuity and the ability to react to competitors or market conditions (Galbraith and Schendel 1983). This typifies

a ‘Lower Risk’ typology from the LEAD reference content which seeks to reduce the possibility of low performance and loss of profits (LEADing Practice 2022). Success factors also relate to enhancing insight into competitor activity which is integral to the Continuity typology.

The strategic typologies associated with industrial products consist of (1) Low commitment, (2) Growth, (3) Maintenance and (4) Niche or Specialization. The low commitment typology represents low and negative output towards strategic posture and strategic direction. This signifies minimum low risk and emphasis on cost efficiencies. Drawing some comparison with the Harvest and Climber typologies. Therefore, sharing characteristics from the Lower Risk and Cost Efficiencies strategic typologies from the LEAD reference content (LEADing Practice 2022). The Low commitment typology accounts for 17% of the strategic typologies within industrial product focus.

The Growth typology represents a strong commitment towards expanding market position with notable investment. Measures against promotion and strategic postures are high and there are similarities with the ‘Builder’ typology for consumer products. Characteristics from the Strengthen Growth LEAD typology are evident with traits common to increasing revenue and market share over a period of time (LEADing Practice 2022). The Growth typology accounts for 25% of the strategic typologies within industrial product focus.

The Maintenance typology shares characteristics with the Continuity and Cost Reduction typologies. There is a focus on cost efficiencies as well as maintaining market position. Additional contrasts can be drawn from Utterback and Abernathy’s (1975) ‘cost minimizing’ strategy that applies the same emphasis. This typology represents 49% of the strategic typologies within the industrial product focus and takes characteristics from the Lower Risk and Cost Efficiencies strategic typologies from the LEAD reference content (LEADing Practice 2022).

The Niche or also referred to as the Specialisation typology focuses on superior quality and high pricing posture. There is a narrow product line as the emphasis is on quality rather than quantity. This has similar traits to the ‘Increase Operational Excellence’ and ‘Improve Competitiveness’ LEAD typologies (LEADing Practice 2022). It also resembles its equivalent typology in the consumer product focus and accounts for 9% of the typologies.

Galbraith and Schendel’s typologies cover all five LEAD typologies. There is no evidence to suggest an additional typology beyond that which has been aligned.

Prescott Typologies. Prescott (1983) critiqued typologies in connection with how organisations strategically deploy resources to compete within a competitive environment. He confirms the typology studies of Miles and Snow (1978), Miller and Friessen (1977) and Porter (1979) confirming patterns of strategy application that imply how resources are deployed. Porter (1979) refers to the patterns as strategic groups that divide the differences amongst firms competing in a competitive environment. ‘At the business level, decisions must be made concerning both the thrust (such as marketing or production or R&D) and level (how much to each area) of resource deployments (Prescott P205, 1983). The level refers to the relative amount in relation to measures such as financial investment, assets and employees. The combination of ‘thrust’ and ‘level’ is termed a

strategic profile (Prescott 1983). This essentially builds on the previous typology study and provides another analytical lens to the study of strategic types.

Prescott's (1983) study confirms 5 strategic typologies: (1) Differentiation: Market Share Domination, (2) Differentiation: Follow the Leaders, (3) Focus: Low Costs, (4) Prestige Market and (5) Differentiation: Low Quality Product.

Typology (1) represents a strategic focus that reflects growth and a dominant market share within a competitive environment. Typical characteristics display commitment towards high quality and significant breadth of product and service lines (Prescott 1983). This typology shares characteristics with Galbraith and Schendel (1983) Builder typology which also aligns with patterns confirmed by Hofer and Schendel (1978), Buzzell et al. (1975), Utterback and Abernathy (1975) and Vesper (1979). With clear evidence of optimising products and services through a high-quality endeavour and increasing growth through penetrating new segments of the market, the Differentiation Market Share Domination shares attributes of the 'Strengthen growth' typology from the LEAD reference content.

The Follow the Leaders typology shares similarities with Market Share Domination, however, there is a distinction between the two as there is less emphasis on the product breadth, product quality and relative market share (Prescott 1983). This typology boasts low direct costs indicating an emphasis on process improvement. Therefore in relation to the LEAD typologies, there appears to be a dual nature in the organisational strategic 'thrust'. Process improvement includes increasing efficiency in the execution of processes that support product and service delivery (Von Rosing et al. 2014). Whilst enhancing processes, the opportunity to reduce operating costs through efficiency savings is present. The 'Operational Excellence' typology has characteristics that emphasise process improvement (LEADing Practice 2021). Due to the traits associated with Market Share Domination, there is reason to also assign the 'Strengthen Growth' Typology.

The Focus: Low-Cost typology typically has a narrow product and service line along with traits of low manufacturing expenses to revenue, receivables to revenue and marketing expenses to revenue. This typology draws a contrast with Porter's Cost Leadership which also focusses on exploiting sources of cost advantage (Porter 1997). There is a salient theme that also suggests the Low-Cost typology exercises characteristics to defend its position within a niche market, something that Miles and Snow (1978) also group under their Defender Typology Strategy. The LEAD 'Cost Efficiency' typology has attributes that align with the Low-Cost typology, this includes exploring the reduction of all costs associated with the cost of products and services sold, administration and taxation.

The Prestige Market typology is focused on high product quality, demanding a relatively high price. It draws on some similarities with Porter's (2001) Differentiation typology, where attention to a premium price is underpinned by an organisation positioning itself around a select number of attributes that a customer segment deems important (Porter 2001). The quality and uniqueness justify the premium price. Like the Niche typology from Prescott (1983), this aligns with the 'Increase Operational Excellence' LEAD typology, however, there isn't a high emphasis on innovation through research and development. Therefore, it doesn't align with the 'Improve Competitiveness' like the Niche typology.

The Differentiation: Low Quality Product represents the majority of organisation samples from Prescot's research. It is difficult to assign this to a LEAD typology as the only distinct characteristic is associated with the low quality variable. However, what is clear from the research is that there is an associated low market share with this characteristic. This indicates that there isn't a strategic thrust to penetrate new markets or increase revenue to support growth. If there is little emphasis on product quality, then an organisation does not compete on the prestige of its product. There is a slightly above average indicator for the investment intensity, this is not towards the quality of the product which then leaves options for service and product fulfilment which is a characteristic of the LEAD Operational Excellence typology. This is the closest alignment although there are attributes from this typology that do not represent the Low Quality product focus such as strengthening development.

In summary of the five generic strategy typologies, Prescott (1983) indicates that the patterns associated with strategic types serve as a basis for examining performance in different environments. Within the typologies, the variables enable further insight into the factors that impact performance across metrics such as market share and ROI.

Chafee Typologies. Chafee'S (1985) three models of strategy are built upon the empirical and theoretical discourse on strategy between 70s and mid 80s. She grouped together specific variables that exhibit attributes and behaviours associated with strategy, integrating scholarly perspectives on strategic types (Chafee 1985). This resulted in (1) Linear Strategy, (2) Adaptive Strategy and (3) Interpretive Strategy.

The Linear Strategy model contains attributes that emphasise penetrating markets with new or enhanced products and services. The associated measures such as product diversity and market share are also found with 'Builder' and 'Growth' (Galbraith and Schendel 1983), 'Differentiation Dominant Market Share' (Prescott 1983), 'Innovator' (Douglas and Rhee 1989) and 'Strengthen Presence' (Luoma 2015). All instances mentioned aligning with the LEAD Strengthen Growth typology that has distinct characteristics relating to the above-mentioned.

Striking an effective balance between the opportunities and the risks present within the environment, the Adaptive Strategy model exhibits attributes that seek to enhance competitiveness. This entails product quality, positioning and differentiation within a strategic thrust that is commonly found within niche business environments (Chafee 1985). These attributes are also found in 'Customer Value through Competence' and 'Structural Renewal' (Luoma 2015), 'Nicher' from both Douglas and Rhee (1989) and Galbraith and Schendel (1983). The LEAD Improve Competitiveness typology is accordingly aligned with the Adaptive Strategy model.

The final model Chaffe (1985) examines strategy from a participant perspective, meaning there is more emphasis on evaluating perspectives from those involved in developing and influencing strategy. There is a focus on harnessing relationships, attitudes and the culture of the organisation. This approach moves away from the traditional measures of strategy and has relations with (Hoverstadt et al. 2020) 'strategy manoeuvres' which pays attention to the key interactions between organisations and actors to inform the success of strategy formulation and execution. However, Chaffe's (1985) interpretative model is vague in terms of a strategic thrust and is more centred on qualitative analysis of participants to examine and inform culture development. The results of such analysis

could inform the progression of an 'Operational Excellence' typology because once a co-created culture is identified then the integration and standardisation of this can be progressed. However, this work isn't evident and there is a lack of a direct strategic thrust therefore no LEAD typology is aligned.

Douglass and Ree Typologies. Douglas and Rhee (1989) examined 437 organisations across different industry settings from the PIMS database. At the time of their research, there had been little attention to the strategic typology patterns outside of U.S. Their study extended the analysis of patterns within Europe alongside U.S. They identified six strategic typologies: (1) Quality Broadliner, (2) The Innovator, (3) Integrated Marketer, (4) Low Quality, (5) Nicher and (6) Synergist.

The Quality Broadliner had strategic thrusts in its broad market scope and high product quality. Distinct characteristics demonstrated emphasis on increasing market share and enhancing their competitiveness through their product quality. High revenue and ROI are evident within this typology which represented 15% of the sampled businesses (Douglass and Ree 1989). This typology shares characteristics from Builder (Galbraith and Schendel 1983) Growth and Market Share Domination (Prescott 1983) typologies. All of which align with the Strengthen Growth LEAD typology. In addition, it is necessary to align Quality Broadliner with the Improve Competitiveness typology due to its significance with maintain high quality.

The Innovator typology shares characteristics with the Market Share Domination from (Prescott 1983), they both emphasise breadth in the product and service line. This is the smallest represented organisation sample. It has a focus on the introduction of new products which aligns to the LEAD Strengthen Growth typology, boasting characteristics of supporting growth through the introduction of new products and services.

The Integrated Marketer is described as very similar to the Quality Broadliner, evidencing broad market scope and high product quality. The difference being high levels of vertical integration enhancing the customer centric processes. This, therefore, shares characteristics from two LEAD typologies Strengthen Growth and Improve Operational Excellence.

The Low Quality typology has low performance across the key variables. It has low product quality, market share and ROI. There is some resemblance to Prescott's (1983) Differentiation: Low Quality of Product, however, there is no evidence of intensity in the investment of customer centric processes so there is no justification to align with the Operational Excellence typology from LEAD. As there are no distinct features that suggest a new strategic typology nor, alignment to an existing one, it is not assigned.

The smallest organisation sample was made up of the Nicher typology. Focussing on a low breadth product line with high quality, this typology facilitates an above average financial performance. Market share is low due to the niche of the product. However, there is an emphasis on maintaining competitiveness through continuous improvement of product quality. This has similarities to the Niche/Specialization typology of Galbraith and Schendel (1983) from a perspective of increasing quality through research and development. The LEAD Improve Competitiveness typology fits the Nicher profile through the strong characteristic of meeting or exceeding customer expectations through product quality.

The largest representation from the sample size is the Synergist typology representing 30%. This typology displays a distinct focus on shared marketing expenditure evidencing the endeavour to create effective partnerships and synergies. This is a characteristic of the Strengthen Growth typology from LEAD which places emphasis on seeking growth through partnering. Whilst operating in a narrow market, this endeavour supports growth within the competitive environment.

Although the work of Douglas and Rhee (1989) took samples from outside the U.S, there is no identification of additional typologies.

Luoma Typologies. Luoma'S (2015) study on the relationship between strategy and performance deviated away from the previous study on strategic typologies that assumed established frameworks such as Porter's (1979) Generic Strategies and Miles and Snow (1978) typologies. His research design employed an endogenous approach to deriving typologies rather than underpinning the development of strategic types with predefined strategic groups. The organic framing of typologies included (1) Effective and improving operations, (2) Structural renewal, (3) Dynamic networks, (4) Strengthening presence, (5) Social and ecological awareness and (6) Customer value through competence.

The Effective and improving operations typology relates to business process improvement and its connection to financial performance. Driving efficiency is essentially transforming the existing into a better state that should drive costs down (Ross et al. 2006). This trait is evident in 'performance maximizing' from Utterback and Abernathy (1975). The vertical integration indicated by Douglas and Rhee (1989) highlights the importance of process integration for customers, this is accommodated by business process improvement. These similarities are all aligned with the Improve Operational Excellence typology from LEAD.

Luoma's (2015) Structural renewal has an organic mix of different strategic focus points. On one hand, there is brand and reputation management, and market positioning related to the Improve Competitiveness LEAD typology. In addition, there is a focus on structural changes and change management which aligns with some of the characteristics of the Improve Operational Excellence LEAD typology, specifically improving resource management. Therefore, it is fitting to align the Structural Renewal strategy type with both LEAD typologies.

The Dynamic Networks, again, represent an organic mix of aligned typologies. With an emerging theme connected to wider impact through connected networks, this instantiates the Strengthen Growth typology which contains a characteristic that increases growth through partnering. Besides this, there is also an emphasis on digital security which is aligned with the Lower Risk typology.

A clear alignment to the LEAD Strengthen Growth typology is evident with the Strengthening presence type of Luoma (2015). Penetrating new markets for growth and developing an international presence is radiant with this strategy type.

Luoma's (2015) Social and Ecological Awareness strategy type is themed around sustainability. The strategy reference content of LEAD does not have a specific adherence to corporate sustainability. Whilst there isn't a specific fit for this typology it is certainly an instantiation of strategic typology that must be considered. Corporate sustainability is a force for large organisations across sectors and industries (Gauthier 2017). There have been considerable developments towards how organisations tackle sustainability

and these warrant independent research focused on sustainability strategic types due to the complexities and advancements in corporate sustainability (Gauthier 2017).

Customer Value through Competence has a dual focus. Firstly, an endeavour to enhance customer experience and quality of service and product that all represent customer value. Secondly, the continuous development of competencies across the workforce feed into the creation of customer value. This dual focus aligns with two of the LEAD typologies, Improve Competitiveness which has characteristics of enhancing customer satisfaction and loyalty alongside improving service and product quality. The Improve Operational Excellence typology is also aligned due to the development of the workforce which can link to competencies that contribute towards creating customer value.

Anwar and Hasnu Typologies. Anwar and Hasnu (2017) used the Miles and Snow (1978) typologies as a vehicle to assess the different strategic patterns in 307 joint stock firms across twelve industries in Pakistan. Building on their study in 2016, they contributed a classification of hybrid strategies to Miles and Snow typologies building upon the pure typologies i.e. Defender, Prospector, Analyser and Reactor. Firms lying between 'Defender' and 'Analyzer' are classified as 'Defenders-Analyzers-Like'. Whilst organisations lying between 'Prospector' and 'Analyzer' are classified as 'Prospector-Analyzer-Like'. Hybrid strategies represent a combination of strategic orientations that enable effective adaptation to unpredictable environmental change. In contrast, pure strategic typologies are generally better suited to more stable market conditions (Anwar and Hasnu 2016). The underlying nature of typologies still takes from Miles and Snow (1978), albeit having a blend between two typologies. This implies alignment to the following LEAD typologies; Cost Efficiency, Improve Competitiveness, Improve Operational Excellence and Strengthen Growth which all have traits linking back to the Miles and Snow (1978) typologies.

2.6 Summary of Academic Strategy Typologies

Evidently, typologies of strategy have provided a means for organisations to focus resources in a strategic manner within a competitive environment. Empirical research on organisation performance related to strategic typologies, reveals patterns in the way organisations strategically deploy their resources. The reference content from LEAD appears to align with the majority of typologies critiqued above. However, there are some limitations that need to be considered in its application.

Firstly, Prescott's (1983) notion of 'Strategic Profiles' indicate the importance of distinguishing between the strategic **thrust** and **level** of investment. Level of investment enables the ability to embed essential measures and capabilities into business level strategy such as the amount of investment, leveraging of existing assets and human resource management. The LEAD typologies focus on the 'thrust', i.e., where do we increase our strategic focus for competing? Undertaking business level strategic planning without considering Prescotts's 'level', may prove ineffective and force changes to be made after exerting time in pursuing typology paths.

Secondly, none of the authors in their critique of typologies discussed generic strategies in the context of government local authorities. The empirical research covered

organisations across various sectors and industries that warrant the need to gain a competitive advantage. Government local authorities do not compete in most services they provide as in many cases there are no paying customers (Cohen 2001). This presents an opportunity to develop additional typologies befitting for governments and local authorities that encompass a more civic societal premise.

Finally, sustainability strategic typologies are also absent in empirical research. Therefore, the patterns discussed do not resonate with an organisation's sustainability agenda. Previous studies exist on sustainability typologies (Azzone and Bertelè 1994; Hart 1995; Nidumolu et al. 2009; Orsato 2006; Roome 1992; Gauthier 2017) and the critical review offered in this article does not contribute to that body of knowledge. Any application of the LEAD typologies will need to consider the above limitations. Whilst they may accelerate the pace in which an organisation progresses in business level strategy work, there will be additional work required outside the typologies when strategising for sustainability and government local authorities.

3 Methodology

An inductive approach to the theory development has been employed across the thirty-three strategy related models and the academic derived strategy typologies. A deductive approach was applied to analysing the generic typologies using the LEAD strategy typologies as a basis to contrast the academically derived strategy typologies from industrial research. Secondary research on dynamic capabilities was used as a basis to group attributes connected to Sensing, Seizing and Transforming.

The development of a map (listing of concepts), matrix (intersecting concepts where they relate) and model (producing a view from the matrix contained) led to the creation of the extended Strategy Meta model. The matrix was engineered in a spreadsheet that facilitated the ability to apply filters, facilitating several options for shortlisting models to support a specific contextual outcome.

4 Results

The results have been structured according to the intended outcomes derived through the applied inquiry methods. Alongside this is the addition of a tool that has been generated from the results, accelerating the ability to analyse and select relevant models that support the strategic endeavour. Furthermore, insights and connections to Caine and von Rosing's (2018) Strategy Lifecycle is also presented.

4.1 Strategy Models – Ontological Concept Confirmation

The analysis of thirty-three models informed the mapping of specific objects that spread across the business and information layers of the organisation. In total thirty-nine objects have been mapped to represent the nature of the models. The size of the artefact that contains the mapping is too large to display as a single view, therefore a selected sample of models will be used throughout this section to demonstrate mapping across all three principles.

Figures 3 and 4 are views that display (1), the examples of models mapped against objects and (2), the representation of objects spread across the two of the core reference layers and their respective sub-layers i.e., Business and Information (core layer), Value, Capability, Service, Process and Application (sub-layer).

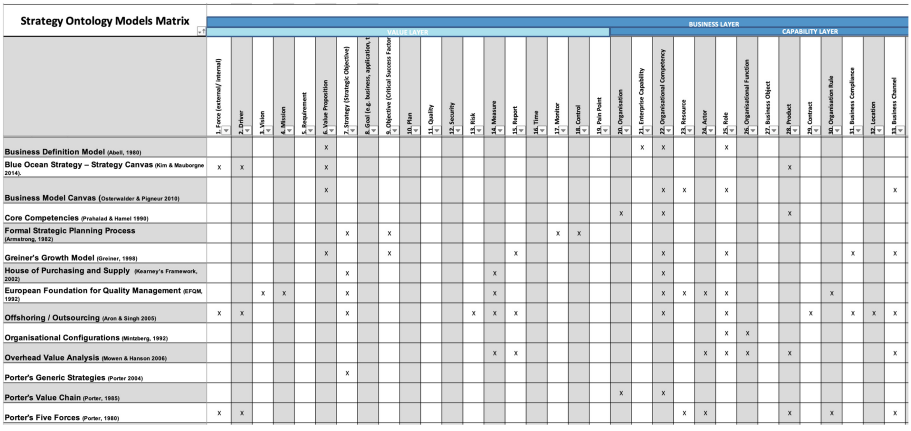


Fig. 3. Models mapped to LEAD objects, core business and domain reference layers

Table 12. (*continued*)

Model and author	Enterprise tagging list
Greiner's growth model (Greiner 1998)	Cost categorisation, performance model practices, operating model practices
Porter's value chain (Porter 2001)	Supporting activities and primary activities
Scenario planning (Heijden 2006)	Critical forces & drivers, scenario uncertainty (low/high)
SWOT analysis (Hill and Westbrook 1997)	Revenue opportunity, value opportunity, critical forces & drivers
Value disciplines (Treacy and Wiersema 1995)	Outperforming practices, best practices
Internationalisation strategy framework (Lem et al. 2013)	Integration, Coordination
Road-mapping (Farrukh et al. 2003)	New customers, supporting activities
Market attractiveness business activity (MABA) (Have et al. 2007)	Customer segmentation

Strategy Ontology Models Matrix	Enterprise Tagging														
	ROI Opportunity	Revenue Opportunity	Value Opportunity	Customer Segments	Performance	Operating	Critical Forces & Drivers	Scenario Uncertainty (Low/High)	Outperforming Practice	Best Practice	Integration	Coordination	New Customers	Supporting Activities	Primary Activities
Business Definition Model (Abell, 1980)				x											
Blue Ocean Strategy – Strategy Canvas (Kim & Mauborgne 2014).															
Business Model Canvas (Osterwalder & Pigneur 2010)															
Core Competencies (Prahalad & Hamel 1990)															
Formal Strategic Planning Process (Armstrong, 1982)															
Greiner's Growth Model (Greiner, 1998)					x	x									
House of Purchasing and Supply (Kearney's Framework, 2002)															
European Foundation for Quality Management (EFQM, 1992)															
Offshoring / Outsourcing (Aron & Singh 2005)															
Organisational Configurations (Mintzberg, 1992)															
Overhead Value Analysis (Mowen & Hanson 2006)															
Porter's Generic Strategies (Porter 2004)															
Porter's Value Chain (Porter, 1985)														x	x
Porter's Five Forces (Porter, 1980)															

Fig. 5. Models mapped to enterprise tags

Strategy Ontology Models Matrix	33. Business Channel	34. Business Media	35. Business Workflow	36. Portfolio	37. Programme	38. Project	39. Service Construct (setup and del	40. Business Service	41. Service Flow (incl. output/input)	42. Service Rule	43. Service Channel	44. Process	45. Event	46. Gateway	47. Process Flow (incl. input/output)	48. Process Rule	49. Application Component	50. Application Module	51. Application Feature	52. Application Function	53. Application Task	54. Application Service	55. Information Object	56. Application/System Flow	57. System Measurement	58. Application/System Report	59. Application/System	60. Application Role	61. Application Rule	62. Application Compliance (inc. Sec	63. Application Media	64. Application Channel
LEAD Objects							SERVICE LAYER					PROCESS LAYER					INFORMATION LAYER / APPLICATION LAYER															
Business Definition Model (Abell, 1980)																																
Blue Ocean Strategy – Strategy Canvas (Kim & Mauborgne 2014).								x																								
Business Model Canvas (Osterwalder & Pigneur 2010)	x						x	x				x																				
Core Competencies (Prahalad & Hamel 1990)								x				x																				
Formal Strategic Planning Process (Armstrong, 1982)																																
Greiner's Growth Model (Greiner, 1998)	x									x																	x					
House of Purchasing and Supply (Kearney's Framework, 2002)												x																				
European Foundation for Quality Management (EFQM, 1992)																																
Offshoring / Outsourcing (Aron & Singh 2005)	x																										x					
Organisational Configurations (Mintzberg, 1992)																																
Overhead Value Analysis (Mowen & Hanson 2006)	x		x			x						x																				
Porter's Generic Strategies (Porter 2004)																																
Porter's Value Chain (Porter, 1985)																																
Porter's Five Forces (Porter, 1980)	x							x																								

Fig. 4. Models mapped to LEAD objects, core business, information and domain reference layers

Not all models contained the 'Strategy' object, however, all models had objects within the Business Layer of the LEAD Enterprise Ontology. Five of the models have an object in the Information Layer providing an ontological link from strategy to digital applications. One of the models had a broad concept of technology so in practical application, it may entail connecting to the Technology layer, however for this example it has been mapped to an object within the Information layer.

The mapping of model concepts to objects disambiguates interpretations and definitions of the concepts that are present in all the models documented. This provides the basis to establish the relations (semantics) between each of the objects, thus enabling a deeper understanding of how pertinent objects connected to strategy relate to each other. The construct of the semantics has been informed through semantics in Caine and von Rosing (2018) and OMG's Business Model Motivation. These semantics are visible in the Extended Strategy Meta Model in Sect. 4.6.

It was necessary to utilise 'Enterprise Tagging' in addition to the concept of Object mapping as nine of the models had pertinent concepts within them that required documentation. These concepts (Table 12) were not part of the 91 objects from the LEAD ontology, however, they still needed to be captured. Nine of the models mapped to selected concepts from the Enterprise Tagging list (Fig. 5).

Table 12. Sample models mapped against enterprise tags

Model and author	Enterprise tagging list
Activity-based costing (Cooper and Kaplan 1998)	Cost categorisation
Business definition model (Abell 1980)	Customer segmentation

(*continued*)

4.2 Correlation with Strategy, Competencies and Capabilities

The mapping of concept to object in addition to the LEAD competency mapping provided insight into a categorisation of the model type. Sixteen out of the thirty-three models that contained the 'Strategy' object were found to either inform the positioning of an organisation within an industry or, insinuate how it should compete within a given environment, thus supporting the development of the future direction. Each of these models had links back to competencies in the strategic tier. These were grouped under a 'Strategy Model' category (Table 13).

Table 13. Caine strategy model categorisation

Model category group	Model and author
Strategy model	5 Ps Model of Strategy Implementation (Pryor and Anderson 2007; Toombs and Humphreys 2007)
Strategy model	7-S Framework (Waterman et al. 1980)
Strategy model	Agile strategy management process cycle (Lyngso 2017)
Strategy model	Ashridge mission model (Campbell and Yeung 1991)
Strategy model	Balanced Scorecard (BSC) (Kaplan and Norton 2005)
Strategy model	Formal strategic planning process (Armstrong 1982)
Strategy model	House of purchasing and supply (Kearney's Framework 2002)
Strategy model	European foundation for quality management (EFQM 1992)
Strategy model	Offshoring/outsourcing (Aron and Singh 2005)
Strategy model	Porter's generic strategies (Porter 2004)
Strategy model	Scenario planning (Heijden 2006)
Strategy model	Strategy map (Kaplan and Norton 2004)
Strategy model	Value disciplines (Treacy and Wiersema 1995)
Strategy model	Internationalisation strategy framework (Lem et al. 2013)
Strategy model	Ansoff's product/market grid and geographic vector (Ansoff 1987)
Strategy model	Levels of control (Simons 1995)

Fifteen out of the thirty-three models that did not contain the 'Strategy' object still had the same nature of the Strategy Models. They each had links back to the Strategic Tier competencies. The main difference between them and the Strategy Models was that they did not contain the 'strategy object' and therefore a practitioner would not be able to create instances of strategy objectives when working with these models. A Strategic Model category was given to these fifteen models (Table 14).

Table 14. Caine strategic model categorisation

Model category group	Model and author
Strategic model	Activity-based costing (Kaplan and Cooper 1998)
Strategic model	Big Hairy Audacious Goal (BHAG) (Collin and Porras 1994)
Strategic model	Boston Consulting Group (BCG) Matrix
Strategic model	(Boston Consulting Group 1970)
Strategic model	Business definition model (Abell 1980)
Strategic model	Blue ocean strategy – strategy canvas (Kim and Mauborgne 2014)
Strategic model	Business model canvas (Osterwalder et al. 2010)
Strategic model	Core competencies (Prahalad and Hamel 1990)
Strategic model	Organisational configurations (Mintzberg 1993)
Strategic model	Overhead value analysis (Mowen and Hanson 2006)
Strategic model	Porter's Value Chain (Porter 2001)
Strategic model	Porter's Five Forces (Porter 1979)
Strategic model	SWOT Analysis (Hill and Westbrook 1997)
Strategic model	Road-mapping (Farrukh et al. 2003)
Strategic model	Competing values of organizational effectiveness (Quinn and Rohrbaugh 1983)
Strategic model	Market Attractiveness Business Activity (MABA) (Have et al. 2007)

Two out of the thirty-three models informed the functional deployment of resources with a link back to strategic concepts that drive how an organisation competes. These models had a majority of LEAD competencies residing in the tactical tier as opposed to the strategic tier as with the case for the Strategy and Strategic Models. A 'Strategic Tactical Model' category was given to these models (Table 15 and Figs. 6 and 7).

Table 15. Caine strategic tactical model categorisation

Model category group	Model and author
Strategic tactical model	Benchmarking (Watson 1994)
Strategic tactical model	Greiner's growth model (Greiner 1998)

Strategy Ontology Models Matrix	Strategic Tier Competencies								Tactical Tier Competencies													
	Mission Development	Vision Development	Strategy Development	Business Planning	Forecasting	Budgeting	Value Management	Culture Assessment and Design	Strategic Advice	Strategic Guidance & Compliance	Monitoring	Reporting	Evaluation and /or Audit	Policies, Rules & Guidelines	Procedures	Measurements	Administration	Communication	Performance Management	Risk Management	Culture Development and Monitoring
Business Definition Model (Abell, 1980)							X															
Blue Ocean Strategy – Strategy Canvas (Kim & Mauborgne 2014).			X				X															
Business Model Canvas (Osterwalder & Pigneur 2010)				X	X	X	X															
Core Competencies (Prahalad & Hamel 1990)			X				X															
Formal Strategic Planning Process (Armstrong, 1982)			X								X		X									
Greiner's Growth Model (Greiner, 1998)				X			X				X	X		X					X			
House of Purchasing and Supply (Kearney's Framework, 2002)			X		X	X	X								X	X			X			
European Foundation for Quality Management (EFQM, 1992)	X	X	X					X				X		X		X			X		X	
Offshoring / Outsourcing (Aron & Singh 2005)			X	X			X	X		X	X	X		X	X				X		X	
Organisational Configurations (Mintzberg, 1992)			X					X														
Overhead Value Analysis (Mowen & Hanson 2006)			X		X																	
Porter's Generic Strategies (Porter 2004)			X	X			X															
Porter's Value Chain (Porter, 1985)			X	X																		
Porter's Five Forces (Porter, 1980)			X	X																		

Fig. 6. Sample models mapped against strategic and tactical competencies

Strategy Ontology Models Matrix	Operational Tier												Caine Categorisation			
	Issue Management	Operational Planning	Process Management	Operational Oversight and Monitoring	Operational Reporting	Evaluation and/or Audit	Operational Measurements	Procedures2	Operational Advice and/or Guidance	Processing	Culture Realisation		Strategy Tool	Strategic Tool	Strategic Tactical Tool	Strategic Operational Tool
Business Definition Model (Abell, 1980)														X		
Blue Ocean Strategy – Strategy Canvas (Kim & Mauborgne 2014).														X		
Business Model Canvas (Osterwalder & Pigneur 2010)		X	X											X		
Core Competencies (Prahalad & Hamel 1990)														X		
Formal Strategic Planning Process (Armstrong, 1982)													X			
Greiner's Growth Model (Greiner, 1998)				X											X	
House of Purchasing and Supply (Kearney's Framework, 2002)			X										X			
European Foundation for Quality Management (EFQM, 1992)			X								X		X			
Offshoring / Outsourcing (Aron & Singh 2005)													X			
Organisational Configurations (Mintzberg, 1992)														X		
Overhead Value Analysis (Mowen & Hanson 2006)														X		
Porter's Generic Strategies (Porter 2004)													X			
Porter's Value Chain (Porter, 1985)														X		
Porter's Five Forces (Porter, 1980)														X		

Fig. 7. Sample models mapped against operational competencies

Each of the thirty-three models was mapped against LEAD tier competencies and dynamic capability traits where applicable. All models that mapped to the 'Sensing' dynamic capability trait were grouped as Strategy or Strategic models. Further analysis is required to discover potential pathways or patterns that relate to the competencies, capabilities and resulting models. The tool (further discussed in 4.6) has limitations in pattern discovery subject to the filtering capability (Figs. 8 and 9).

All models had links back to the competencies whereas six out of the thirty-three models had no link back to dynamic capabilities. Seven of the models had links back to 'Ordinary Capabilities' emphasising operational excellence through best practices and

Strategy Ontology Models Matrix	Sensing						
	Peripheral Vision (Day and Schoemaker 2016; Breznik et al., 2018; Bojesson & Fundin, 2021) - Involves scoping which determines how wide you scan and the nature of the issues you scan for. Scope is informed by past analysis, present issues and trends and f	Vigilant Learning (Day and Schoemaker 2016; Tecce, 2007) - Outside in orientation for products and services, ensuring employees are empowered to share voice on important matters that impact the business, surpressing biases, triangulating perspectives	Digital Scouting (Warner & Wäger, 2019) - Scanning for tech trends, screening for competitors, sensing customer-centric trends	Digital Scenario Planning (Warner & Wäger, 2019) - Anaylzing scouted signals, interpretating digital future scenarios, Formaulating digital strategies	Digital Mindest Crafting (Warner & Wäger, 2019; Bojesson & Fundin, 2021) - Establishing a long-term digital vision, enable entreprenurial mindset, promoting a digital mindset	R&D and selection of New Tech (Tecce, 2007)	Supplier, Complimentor, and technology Innovation Tapping(Tecce, 2007) - building off the developments of others to create something purpose fit for the new business model
Business Definition Model (Abell, 1980)		Outside in Orientation					
Blue Ocean Strategy – Strategy Canvas (Kim & Mauborgne 2014).			Screening for Competitors				
Business Model Canvas (Osterwalder & Pigneur 2010)		Outside in Orientation					
Core Competencies (Prahalad & Hamel 1990)							
Formal Strategic Planning Process (Armstrong, 1982)							
Greiner's Growth Model (Greiner, 1998)							
House of Purchasing and Supply (Kearney's Framework, 2002)		Outside in Orientation					
European Foundation for Quality Management (EFQM, 1992)						Research and Development	
Offshoring / Outsourcing (Aron & Singh 2005)			Screening for Competitors				
Organisational Configurations (Mintzberg, 1992)							
Overhead Value Analysis (Mowen & Hanson 2006)							
Porter's Generic Strategies (Porter 2004)							
Porter's Value Chain (Porter, 1985)							
Porter's Five Forces (Porter, 1980)			Screening for Competitors				

Fig. 8. Sample models mapped against sensing dynamic capability attributes

Strategy Ontology Models Matrix	Seizing						Transforming			
	Delineating the Customer Solution and Business Model (Tecce, 2007; Day and Schoemaker 2016 Breznik et al., 2018; Warner & Wäger, 2019) - Recognising and designing mechanisms to capture value. Probe-and-Learn Experimentation, developing real options for ma	Selecting Decision-Making Protocols & Strategic Agility (Tecce, 2007); Warner & Wäger, 2019; Bojesson & Fundin, 2021) - including financial model to govern decision making, agile resource allocation,	Building Loyalty and Commitment (Tecce, 2007; Breznik et al., 2018) - Managers form special networking teams for straightforward and focused	Establishing Boundaries for Compliment Controls and Platforms (Tecce, 2007)	Developing Strategic Partnerships (Breznik et al., 2018; Day and Schoemaker 2016) - Third, firms must look beyond their own organizational and market boundaries, probing for insights from a wide array of peer	Balancing digital portfolio (Warner & Wäger, 2019) - portfolio management	Governance (Breznik et al., 2018; Tecce, 2007) - control mechanisms, appropriate management structure i.e., Chief Digital	Redesign, Decentralisation and Flat Structures (Day and Schoemaker 2016; Breznik et al., 2018; Tecce, 2007) - Modularise/E	Continuous Improvement (Warner & Wäger, 2019; Tecco 2007) - Digital maturity workforce and readiness, digial knowledge management, digital ecosystem	Reward Systems (Warner & Wäger, 2019)
Business Definition Model (Abell, 1980)	Delinate Customer Solution									
Blue Ocean Strategy – Strategy Canvas (Kim & Mauborgne 2014).										
Business Model Canvas (Osterwalder & Pigneur 2010)					Strategic Partnerships					
Core Competencies (Prahalad & Hamel 1990)										
Formal Strategic Planning Process (Armstrong, 1982)										Culture (seek commitment)
Greiner's Growth Model (Greiner, 1998)							Management Structure	Decentralise		
House of Purchasing and Supply (Kearney's Framework, 2002)										
European Foundation for Quality Management (EFQM, 1992)			Building loyalty and Commitment							
Offshoring / Outsourcing (Aron & Singh 2005)										
Organisational Configurations (Mintzberg, 1992)										
Overhead Value Analysis (Mowen & Hanson 2006)								Decentralise		
Porter's Generic Strategies (Porter 2004)										
Porter's Value Chain (Porter, 1985)										
Porter's Five Forces (Porter, 1980)										

Fig. 9. Sample models mapped against seizing and transforming dynamic capability attributes

process management. As the majority of models are linked to both competencies and capabilities, a strong correlation back to strategy is confirmed (Fig. 10).

4.3 Relationship with the Strategy Lifecycle

The strategy lifecycle developed by Caine and von Rosing (2018) outlined six high level phases that frame typical strategy development work. These phases, namely (1) Analyse & Understand, (2) Options and Design, (3) Develop, (4) Execute, (5) Govern and (6) Continuous Improvement; contain steps that orientate action necessary within a specific phase. These steps call upon specific objects and it is through this that further

Strategy Ontology Models Matrix	Ordinary Capabilities	No Link to Capabilities
Business Definition Model (Abell, 1980)		
Blue Ocean Strategy – Strategy Canvas (Kim & Mauborgne 2014).		
Business Model Canvas (Osterwalder & Pigneur 2010)		
Core Competencies (Prahalad & Hamel 1990)		Missing
Formal Strategic Planning Process (Armstrong, 1982)		
Greiner's Growth Model (Greiner, 1998)		
House of Purchasing and Supply (Kearney's Framework, 2002)		
European Foundation for Quality Management (EFQM, 1992)	Operating excellence and best practice for process	
Offshoring / Outsourcing (Aron & Singh 2005)		
Organisational Configurations (Mintzberg, 1992)		Missing
Overhead Value Analysis (Mowen & Hanson 2006)		
Porter's Generic Strategies (Porter 2004)		Missing
Porter's Value Chain (Porter, 1985)		Missing
Porter's Five Forces (Porter, 1980)		

Fig. 10. Sample models mapped against ordinary capability attributes

insight can be drawn. The thirty-nine objects identified from the strategy models review provide the opportunity to delineate a link back to the Strategy Lifecycle. The steps identified by Caine and von Rosing (2018) have been contrasted with the thirty-nine objects, resulting in labelling of strategy phases for each object. This is visible in the Extended Strategy Meta Model, Sect. 4.4.

4.4 Extended Strategy Meta Model

A total of thirty-nine objects were mapped from the concepts that consisted of the thirty-three models. These objects informed the development of an Extended Strategy

Meta Model, building on the meta model presented in Caine and von Rosing (2018). The semantic relations between the thirty-nine objects are derived from Caine and von Rosing (2018) and the Business Model Motivation (OMG 2015). The objects are placed across the core reference and domain ontologies. They are labelled by their architecture layer disposition. Each architecture layer is referenced back to either Corporate, Business and Functional level strategy. This provides useful insight into how the architecture layers relate to the different levels of strategy. Execution is assigned to the service and process domain ontologies as the nature of this relates to the implementation of intended services derived from strategic development. Information and Technology enablement is assigned to the Application domain and Technology core reference layer as they essentially enable the services and processes from an information, application and technology perspective. This satisfies the importance of ensuring that strategy informs technical requirements and alignment between business and technology (Nelson and Nelson 2003).

The legend denotes the type of models that integrate the objects, Strategy Model (S), Strategic Model (SM) and Strategic Tactical Model (STM). In addition, integration of the competencies associated across the Strategic Tier (C1), Tactical Tier (C2) and Operational (C3) are identified with each object. Furthermore, insight into creating a strategic path towards developing dynamic capabilities is noted through Seizing (D1), Sensing (D2) and Transforming (D3). Figure 11 displays a visual interpretation of the legend which explains the modelling notation applied (Fig. 12).

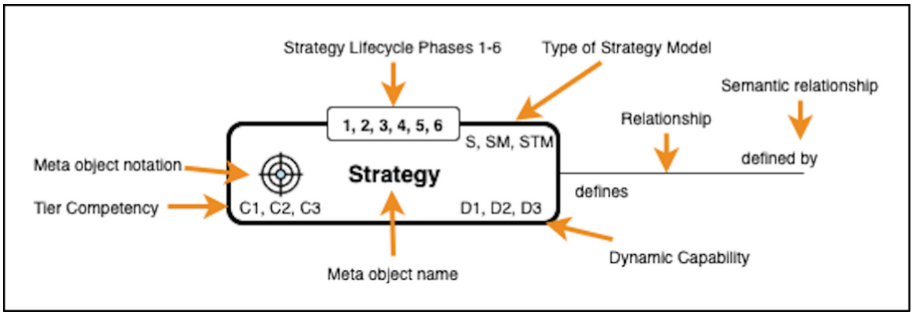


Fig. 11. Model notation for extended strategy meta model

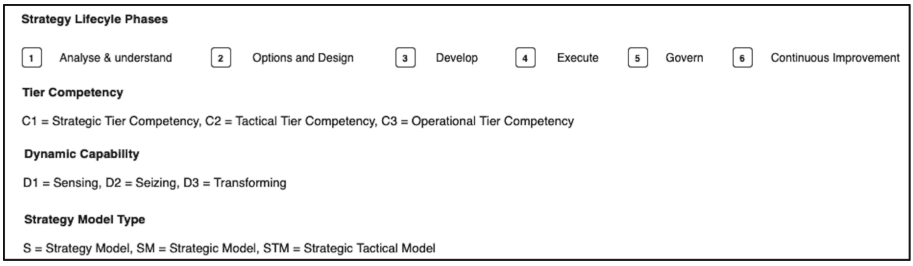


Fig. 12. Legend for extended strategy meta model

Due to the size of the Extended Strategy Meta Model, it has been divided into three figures (Figs. 13, 14 and 15).

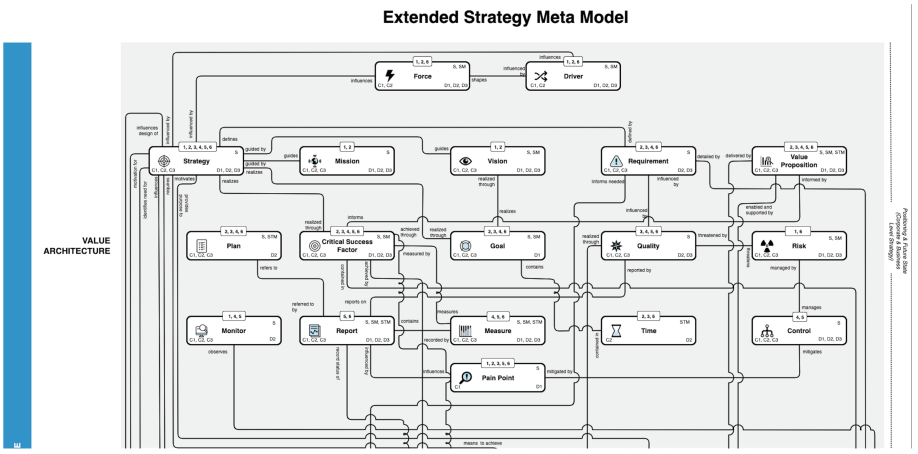


Fig. 13. Value layer of extended strategy meta model

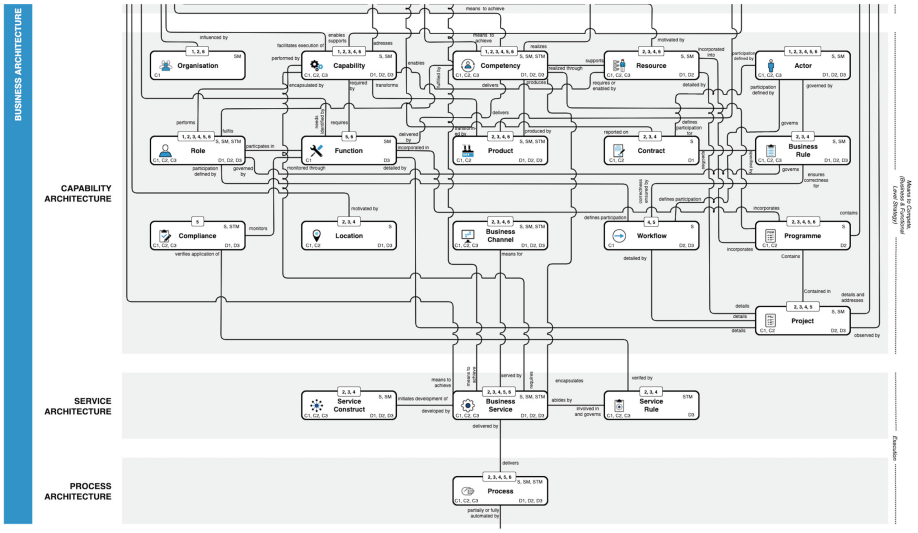


Fig. 14. Capability layer of extended strategy meta model

4.5 Patterns with Strategy Typologies

A summary of the analysis with strategic typologies (Table 15) confirms that generic business level strategies have a strong correlation with the LEAD Strategy Taxonomy

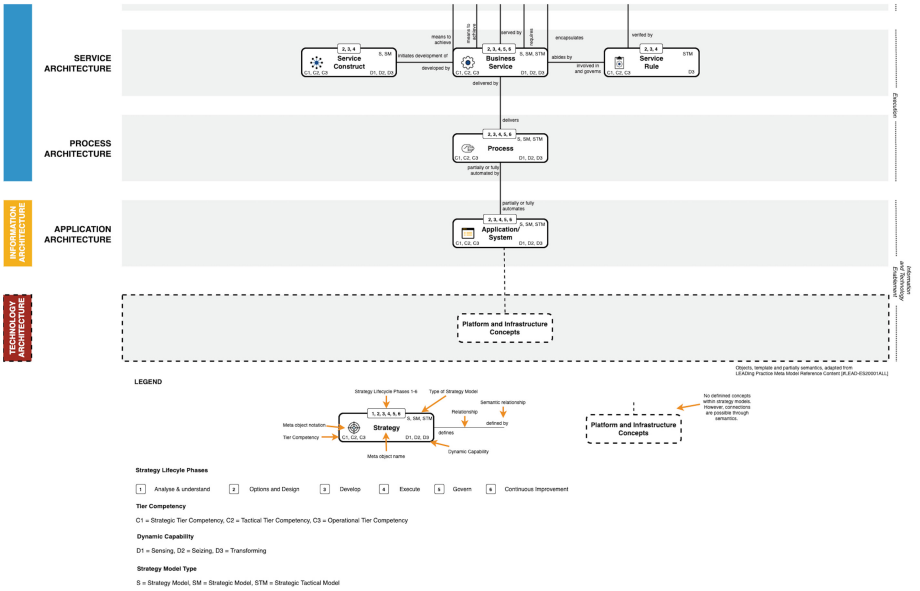


Fig. 15. Service, process and application layer of extended strategy meta model

reference content. Since each of the generic typologies represents an instance of the 'Strategy' object, it provides a useful basis to help direct strategic intent at the business strategy level. Models that incorporate typologies will form a type of Strategy Model as it contains the strategy object.

Table 16 displays a summary view of the academic typologies and their link back to LEAD typologies.

Table 16. Academic derived typologies mapped to LEAD typologies

Academic typologies		LEAD strategy typologies				
Author	Typology	Strengthen growth	Improve competitiveness	Lower risk	Cost efficiency	Improve operational excellence
Galbraith and Schendel (1983)	Harvest				X	

(*continued*)

Table 16. (*continued*)

Academic typologies		LEAD strategy typologies				
Author	Typology	Strengthen growth	Improve competitiveness	Lower risk	Cost efficiency	Improve operational excellence
Galbraith and Schendel (1983)	Builder	X				
Galbraith and Schendel (1983)	Climber				X	
Galbraith and Schendel (1983)	Cashout	X				
Galbraith and Schendel (1983)	Niche		X			
Galbraith and Schendel (1983)	Continuity			X		
Galbraith and Schendel (1983)	Growth	X				
Galbraith and Schendel (1983)	Maintenance			X		
Galbraith and Schendel (1983)	Low commitment			X	X	
Prescott (1983)	Differentiation dominant market share					X
Prescott (1983)	Low cost				X	

(*continued*)

Table 16. (*continued*)

Academic typologies		LEAD strategy typologies				
Author	Typology	Strengthen growth	Improve competitiveness	Lower risk	Cost efficiency	Improve operational excellence
Prescott (1983)	Prestige					X
Prescott (1983)	Low quality					X
Douglas and Rhee (1989)	Quality broadliner	X	X			
Douglas and Rhee (1989)	Innovator	X				
Douglas and Rhee (1989)	Integrated marketer	X				X
Douglas and Rhee (1989)	Low quality	No assigned typology				
Douglas and Rhee (1989)	Nicher		X			
Douglas and Rhee (1989)	Synergist	X				
Luoma (2015)	Effective and improving operations					X
Luoma (2015)	Structural renewal		X			
Luoma (2015)	Dynamic networks	X		X		
Luoma (2015)	Strengthen presence	X				
Luoma (2015)	Social and ecological awareness	Nothing present in the LEAD strategy taxonomy that relates to sustainability typologies				
Luoma (2015)	Customer value through competence		X			

(*continued*)

Table 16. (*continued*)

Academic typologies		LEAD strategy typologies				
Author	Typology	Strengthen growth	Improve competitiveness	Lower risk	Cost efficiency	Improve operational excellence
Chafee (1986)	Linear strategy	X				
Chafee (1986)	Adaptive strategy		X			
Chafee (1986)	Interpretive strategy	Model is vague and more centred on qualitative analysis from participants to examine and inform culture development				
Miles and Snow (1978)	Defender				X	X
Miles and Snow (1978)	Prospector	X				
Miles and Snow (1978)	Analyzer		X			
Miles and Snow (1978)	Reactor	No assigned typology				
Anwar and Hasnu (2017)	Defender				X	X
Anwar and Hasnu (2017)	Prospector	X				
Anwar and Hasnu (2017)	Analyzer		X			
Anwar and Hasnu (2017)	Defender & Analyzer		X		X	X
Anwar and Hasnu (2017)	Prospector & Analyzer	X	X			

4.6 A Tool for Grouping Models Related to Strategy Development

The ontological work carried out on the strategy models has been engineered in a spreadsheet. The structure of the information takes the form of a matrix (rows and columns) listing the models for each row and the concepts they relate to across each column. Each concept can be filtered which lists the models relating to a specific concept.

Based on the contextual setting, the strategy practitioner can accelerate their ability towards selecting the most appropriate model to work with dependent upon strategic nature, organisation tier competencies, dynamic capabilities or specific meta objects (Figs. 16, 17, 18 and 19).

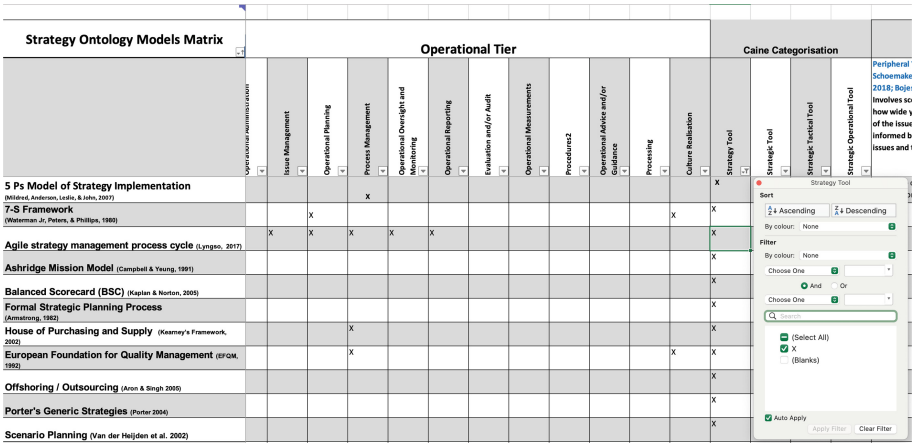


Fig. 16. Caine categorisation filtered on strategy tools

5 Discussion

5.1 Strategy Models – Ontological Concept Confirmation

The results from reviewing the thirty-three models formalise concepts associated with strategy models. The formalisation links back to the LEAD Enterprise Ontology, attributing defined objects to each of the concepts. This removes ambiguity when interpreting any of the concepts, as a formal definition is presented for each object. With a formal description in place, it is possible to communicate meaning that is consistent across different stakeholders who have a common interest in the objects concerned (Borst et al. 1997). The ontological mapping was essential as this provided the basis to orchestrate relations (semantics) between the concepts supporting the ability to develop an extended meta model. Another derivative of the mapping was the ability to understand which objects contribute towards the development of competencies and dynamic capabilities. Furthermore, the confirmation of objects enabled a connection back to the strategy lifecycle (Caine and von Rosing 2018), extending insights into the objects that play a role through the lifecycle of strategy development.

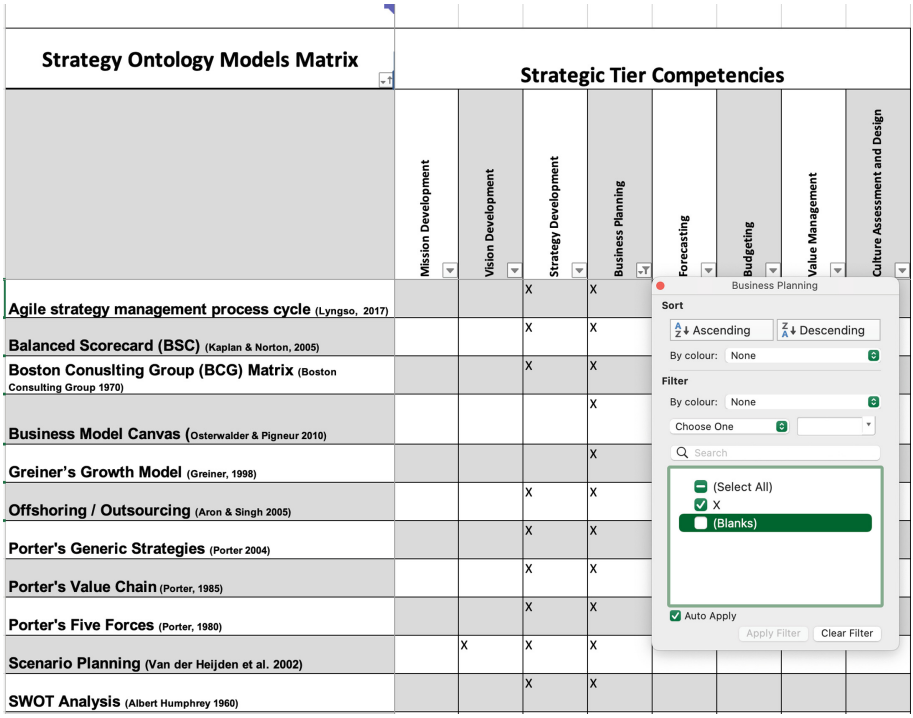


Fig. 17. View of models filtered on organisation tier competencies

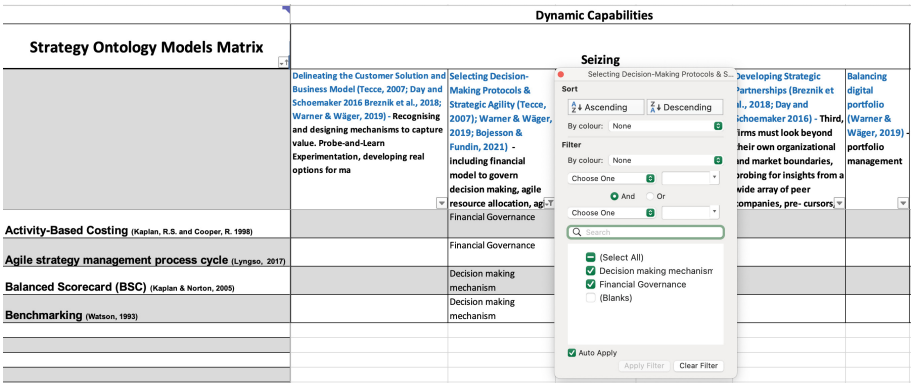


Fig. 18. View of models filtered on seizing dynamic capability attributes

5.2 Correlation Between Strategy, Competency and Capability

The analysis of the reviewed models affirmed a correlation between organisation tier competencies, dynamic capabilities and strategy. More specifically, a delineation of models that support the development of competencies and dynamic capabilities enables

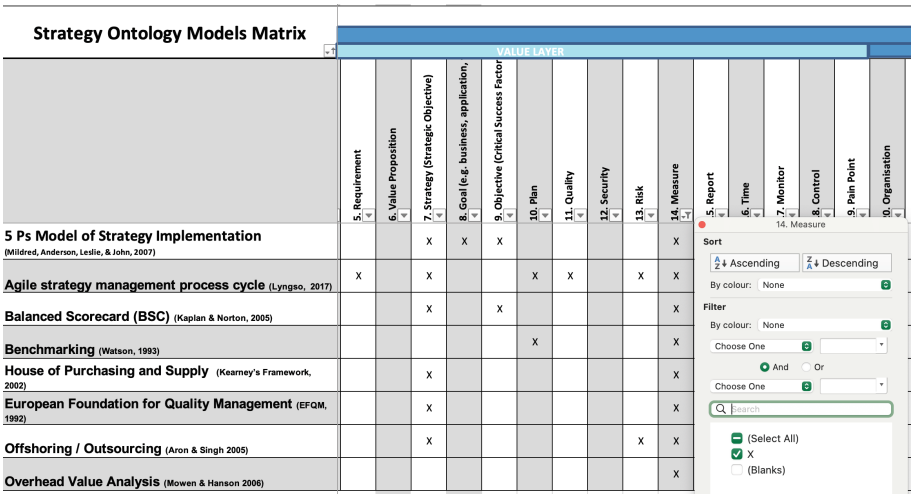


Fig. 19. View of models filtered on the 'measure' LEAD object

the ability to strategically align organisations to increase performance and enhance competitiveness.

The analysis revealed that each of the thirty-three models had links back to organisation tier competencies, however, six of the models had no link back to dynamic capabilities. Practitioners need to consider this when undertaking strategic development as failure to strategically align dynamic capabilities can result in the inability to 'do the right things' that enable a response to volatile markets (Warner and Wäger 2019). Furthermore, within the context of industry 4.0 and the additional emphasis on the significance of dynamic capabilities, ensuring strategic alignment is imperative to avoid execution failure (Warner and Wäger 2019).

The grouping of model types derived from the analysis supports the ability to accelerate the selection of models that inform (a) the positioning of an organisation within an industry, (b) insinuate how it should compete within a given environment or (c) the deployment of functional resources. These categories align with corporate, business and functional level strategies. Whilst the majority of the models fell under categories (a) and (b), it was necessary to differentiate these from the basis of whether they contained the 'Strategy' object. Throughout the lifecycle of working with strategy it is imperative that we create instances of strategic objectives, models without the 'Strategy' object don't allow this to happen.

Models under category (a – Strategy) and (b – Strategic) support the development of either corporate or business level strategy. Whereas category (c – Strategic Tactical) supports the development of resource allocation and business operations. In contrast to the categorisation of Berg and Pietersma (2015), the grouping applied highlights where their work has not considered the nature of the 'Strategy' object within models. This can cause confusion as their grouping of models under 'Corporate and Business Level Strategy' disregards models such as 7-S Framework (Waterman and Phillips, 1980) which contains the 'Strategy' object and has enough competency traits to sit

within the category (a – Strategy). Rather, Berg and Pietersma (2015) group this under Organisation and Governance. Have's (2007) categorisation also negates the ontological nature of models and places the 7-S model under the 'Organization' category even though a 'Strategy' category is present in his work.

The ontological nature of a model helps to remove ambiguity, which in turn supports a consistent sharing of meaning. The grouping of the Market Attractiveness Business Activity (MABA) model is an example of where Berg and Pietersma (2015) and Have et al. (2007) highlight gaps related to ontology. The MABA is a model that supports strategic development as it facilitates the 'Sensing' capability through scoping markets and screening for competitors. It does not contain the 'Strategy' object but it does inform where to position the business and at a high level, how to compete. Therefore, it is classed as a 'Strategic Model'. Have et al. (2007) class this as a strategy model, inconsistent with the categorisation of the 7-S Framework, whereas Berg and Pietersma (2015) categorise this under 'Marketing and Sales'.

Using a common ontology as a basis for selecting tools disambiguates concepts. It places a common foundational understanding of the nature of the models we are working with as it formalises the strategy concepts within the models.

5.3 Relationship with the Strategy Lifecycle

The Strategy Lifecycle (Caine and von Rosing 2018) positions a framework that facilitates the ability to work through the lifecycle of strategy. The steps and artefacts identified in each of the phases were generated from patterns and practices gained from practitioner industry experience. The integration presented in this article provides a more rigorous academic approach building on the analysis of thirty-three models associated with strategy, a critical review of Tecce's (2007) dynamic capabilities, LEAD Organisation Tier Competencies and an ontological grouping of models linking back to objects. Whilst this article does not present a lifecycle view, the extended meta model provides the basis to extend and enhance Caine and von Rosing's (2018) work virtue of the rigour that underpins the extended strategy meta model.

5.4 Extended Strategy Meta Model

The extended Strategy Meta model formalises the concepts (objects) taken from the models and establishes relations between them. It produces an overview of objects and relations pertinent to the strategic management field. It provides insight into how the objects support strategic positioning (Corporate Level Strategy), how to compete in a given business environment (Business Level Strategy) and deployment of strategically aligned resources (Functional Level Strategy). The model encompasses the notion of competencies and capabilities with reference to the patterns associated with LEAD Competency reference content and Tecce's (2007) Dynamic Capabilities. This provides a strategic insight into the models and objects associated with translating strategy into capabilities and competencies supporting the development of competitive advantage (Warner and Wäger, 2019). By virtue of the ontological mapping to the thirty-three objects, it extends the strategy metal model produced by Caine and von Rosing (2018).

There is now a clear link across the three core layers (Business, Information and Technology), whereas the model produced by Caine and Von Rosing (2018) only covered the business layer. Having an ontological view across the three layers is imperative with the increasing emphasis on aligning business with IT (Ilmudeen et al. 2019).

The extended Strategy Meta model satisfies the basis of ontology application. It removes ambiguity and supports a shared meaning when communicating strategy concepts. Each of the objects has formal descriptions and relations that link back to different models. The integration of models within the extended Strategy Meta model supports enterprise modelling through an object-orientated approach. Models can be engineered (decomposed) by selected objects which can then be used across maps, matrices and models. The ability to reuse objects in different artefacts enables the ability to develop an integrated enterprise modelling environment where different stakeholders can effectively share meaning across integrated artefacts.

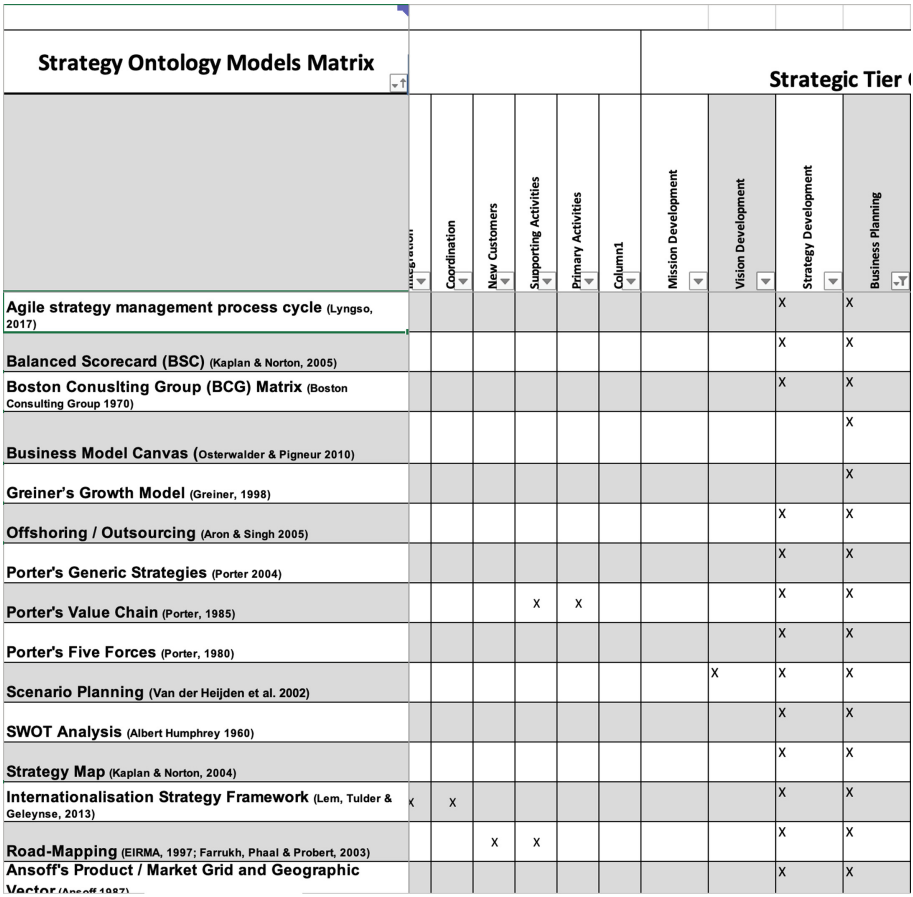
The semantic relations depicted in the extended Strategy Meta model afford the opportunity to apply formal concept analysis to validate the relationship through dependency pathways. This will provide a logical assessment of the constructed semantics outside of this article.

5.5 Patterns with Strategy Typology

The contrast of typologies analysed from industry through academic research draws on similar patterns identified through the analysis of patterns by LEAD. With few exceptions, the typologies of LEAD correlate with those discovered from academic research. Strategy typologies accelerate the ability to set strategic direction. The typologies fit within the 'business level' strategy and therefore inform the allocation of resources that filter through to functional level strategies. This supports the integration of strategy and aligns resources with strategic intention, reducing the probability of strategy execution failure (Caine and von Rosing 2018). Each of the typologies instantiates an instance of the strategy object, therefore the engineering and reuse of strategy can be facilitated across different artefacts. To this end, strategy effectively works across the different layers of the organisation (Polovina et al. 2020).

5.6 Tool for Grouping Strategy

The complexity of concepts suffices the need to have the ability to quickly shortlist models based on a defined criterion. Whilst working through the lifecycle of strategy practitioners need to consider several factors that influence their development. Models and frameworks are there to help accelerate the ability to develop views that inform the execution of strategy across corporate, business and functional levels. The ontological mapping and matrixing to competencies and capabilities provided the ability to apply filtering that groups the different types of strategy models. The developed tool facilitates an efficient shortlisting of specific strategy related tools that support a given agenda. For example, if the strategy context requires practitioners to develop artefacts that can support business planning, then filtering on the 'business planning' competency will list all relevant models that support this agenda (Fig. 20).



Strategy Ontology Models Matrix							Strategic Tier			
	[illegible]	Coordination	New Customers	Supporting Activities	Primary Activities	Column1	Mission Development	Vision Development	Strategy Development	Business Planning
Agile strategy management process cycle (Lyngso, 2017)									X	X
Balanced Scorecard (BSC) (Kaplan & Norton, 2005)									X	X
Boston Conuslting Group (BCG) Matrix (Boston Consulting Group 1970)									X	X
Business Model Canvas (Osterwalder & Pigneur 2010)										X
Greiner's Growth Model (Greiner, 1998)										X
Offshoring / Outsourcing (Aron & Singh 2005)									X	X
Porter's Generic Strategies (Porter 2004)									X	X
Porter's Value Chain (Porter, 1985)				X	X				X	X
Porter's Five Forces (Porter, 1980)									X	X
Scenario Planning (Van der Heijden et al. 2002)								X	X	X
SWOT Analysis (Albert Humphrey 1960)									X	X
Strategy Map (Kaplan & Norton, 2004)									X	X
Internationalisation Strategy Framework (Lem, Tulder & Geleynse, 2013)	X	X							X	X
Road-Mapping (EIRMA, 1997; Farrukh, Phaal & Probert, 2003)			X	X					X	X
Ansoff's Product / Market Grid and Geographic Vector (Ansoff 1987)									X	X

Fig. 20. Business planning strategy related models

The flexibility to determine the criterion for filtering for specific objects or competencies is extensive. Moreover, the need to strategically inform the development of dynamic capabilities is supported by the ability to filter upon designated attributes connected to sensing, seizing and transforming (Tecce 2007). As digital transformation is supported by the ability to enact dynamic capabilities (Warner and Wäger 2019), the tool acts as a facilitator in aiding the selection strategy models that support a strategic digital agenda (Fig. 21).

Strategy Ontology Models Matrix	Sensing		
	Vigilant Learning (Day and Schoemaker 2016; Tecce, 2007) - Outside in orientation for products and services, ensuring employees are empowered to share voice on important matters that impact the business, surpressing biases, triangulating perspectives	Digital Scouting (Warner & Wäger, 2019) - Scanning for tech trends, screening for competitors, sensing customer-centric trends	Digital Scenario Planning (Warner & Wäger, 2019) - Anaylzing scouted signals, interpretating digital future scenarios, Formaulating digital strategies
House of Purchasing and Supply (Kearney's Framework, 2002)	Outside in Orientation		
Strategy Map (Kaplan & Norton, 2004)	Outside in Orientation		
Value Disciplines (Treacy & Wiersema, 1995)	Outside in Orientation		
Ansoff's Product / Market Grid and Geographic Vector (Ansoff 1987)	Outside in Orientation	Scanning for tech trends	

Fig. 21. Sensing (vigilant learning) dynamic capability attributed related strategy models

6 Conclusion

The objective of this article was to advance strategy ontology by analysing strategy models that inform the development of strategy across corporate, business and functional levels of strategy. This analysis facilitated the confirmation of strategy concepts (objects) and their relations that semantically connect them across the layers of the enterprise. The critique of competencies and capabilities and their connection back to strategy, enabled the matrixing of their attributes back to specific strategy models thus, providing strategic insight into the relevant models that support competency and capability development.

Moving beyond corporate strategy requires an emphasis on strategically informing how the organisation will compete within a given market. Strategy typologies help to accelerate strategic direction and associated resources (Anwar and Hasnu 2017). This article confirmed the patterns associated with LEAD strategy typologies and the academic analysis of strategic typologies. The five confirmed typologies provide a basis to accelerate business level strategy and can be used within strategy development scenarios when there is a requirement to establish a strategic thrust that informs the functional deployment of resources.

The resulting extended Strategy Meta model capitulates the objects, semantics and their link to the development of competencies and dynamic capabilities. The patterns identified across the thirty-three analysed models informed an effective grouping across three categories (Strategy, Strategic and Strategic Tactical). This was indicated on each of the objects, further informing the nature of models that fall under these categories. Due to the ontological mapping of concepts to objects, a link back to Caine and von Rosing's (2018) Strategy Lifecycle is included in the extended Strategy Meta model, further informing which objects are triggered across the six lifecycle phases (Understand, Design, Develop, Execute, Govern and Continuous Improve). The principles of ontology application, namely Communication, Interoperability and Systems Engineering are satisfied and summarised through the extended Strategy Meta model. Communication is enhanced through a foundational shared meaning, objects are defined along

with semantics providing the basis to share consistent meaning across strategy concepts. Interoperability is evidenced through the integration of categorised models that facilitate the reuse of objects across different artefacts. The ability to engineer concepts related to strategy can be gained through each object within the extended Strategy Meta model. An example of this is through the five confirmed strategy typologies which create instances from the strategy object.

The developed tool accelerates the ability to work with strategy concepts that can adapt to different strategic contexts. Strategy practitioners need to be agile and flexible when undertaking strategic development work. The tool is efficient and can be a basis for providing value for stakeholders who require insight into models that can assist their strategic endeavour.

Further research will be undertaken to test the application of the advanced strategy ontology presented in this article. Validation of the dependencies with the semantic relations will be undertaken through formal concept analysis. The nature of the ontology work presents several opportunities to further examine pattern dependency. Examples may include example, object relationship dependency in connection to the categorised models, competencies in relation to mapped objects and dynamic capabilities in connection to mapped objects.

A case study drawing upon the need to engineer strategy and relate pertinent strategy concepts will facilitate a test of the advanced strategy ontology. Further research is required to examine whether the objects and relations can facilitate practical strategic work throughout the lifecycle of strategy.

To this end, an assessment of whether the advanced strategy ontology can inform the development of effective views that enhance the ability of stakeholders to drive their strategy development will be carried out. This will extend evidence on the potential value that can be attained through the use of an advanced strategy ontology.

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