<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th>(De)Mystifying the information and communication technology business model concept</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author(s)</strong></td>
<td>Clohessy, Trevor; Acton, Thomas; Morgan, Lorraine</td>
</tr>
<tr>
<td><strong>Publication Date</strong></td>
<td>2019-06-28</td>
</tr>
<tr>
<td><strong>Publisher</strong></td>
<td>Inderscience</td>
</tr>
<tr>
<td><strong>Link to publisher's version</strong></td>
<td><a href="https://dx.doi.org/10.1504/IJNVO.2019.10007891">https://dx.doi.org/10.1504/IJNVO.2019.10007891</a></td>
</tr>
<tr>
<td><strong>Item record</strong></td>
<td><a href="http://hdl.handle.net/10379/15451">http://hdl.handle.net/10379/15451</a></td>
</tr>
<tr>
<td><strong>DOI</strong></td>
<td><a href="http://dx.doi.org/10.1504/IJNVO.2019.10007891">http://dx.doi.org/10.1504/IJNVO.2019.10007891</a></td>
</tr>
</tbody>
</table>

Some rights reserved. For more information, please see the item record link above.
(De)Mystifying the information and communication technology business model concept

Trevor Clohessy*, Thomas Acton and Lorraine Morgan

Business Information Systems,
J.E Cairnes School of Business & Economics,
National University of Ireland,
Galway, Ireland
Email: trevor.clohessy@nuigalway.ie
Email: thomas.acton@nuigalway.ie
Email: lorraine.morgan@nuigalway.ie
*Corresponding author

Abstract: Modern enterprises are currently experiencing volatile and rapid information and communication technology (ICT) change. A key challenge for business leaders is to ensure their organisations are ready for that change. This is particularly challenging when it comes to emerging ICT that may disrupt the management of existing enterprise information systems or business processes. The business model has been cited as an effective tool which organisations can use to prepare for ICT related change. However, there is evidence to suggest that the business model remains largely a nebulous concept to most organisations. This is compounded by the siloed nature of existing business model research. Using a content analysis research approach, this paper provides a holistic review of contemporary academic literature to ascertain and classify the various approaches to the study of ICT enabled business models. The literature examined is classified into nine specific thematic descriptors which underpin these specific business models. A comprehensive definition is also developed for ICT business models. This paper therefore extends our understanding of the business model concept and can be used to guide and coalesce future research on illuminating how organisations can operationalise effective business models in order to leverage new digital ICT.

Keywords: business model; Information systems; information and communication technology; content analysis; thematic descriptors.

Reference to this paper should be made as follows: Clohessy, T., Acton, T. and Morgan, L. (Press) ‘(De)Mystifying the information and communication technology business model concept’, Int. J. Networking and Virtual Organisations, DOI: 10.1504/IJNVO.2019.10007891

Biographical notes: Trevor Clohessy is a post-doctoral digital transformation researcher and Lecturer at the NUI, Galway, Ireland. His research interests are digital transformation, cloud technologies, organisational ambidexterity, blockchain and business analytics. He obtained his PhD which focused on the impact of cloud-based digital transformation on information technology service providers. In conjunction to organising both national and international academic and practitioner workshops and panels, he is also a cutter consortium expert, an undergraduate awards computer science judge, an editorial advisory member of both the Irish Business Journal (IBJ) and IGI’s Handbook of Research on Architectural Trends in Service-Driven Computing, and a Director
1 Introduction

Fact is, inventing an innovative business model is often mostly a matter of serendipity – (Gary Hamel)

The above quote states a simple truth. Oftentimes some companies will stumble upon a business model which has their firms or services being coined as being digitally revolutionary (e.g., Uber, Amazon Go, Netflix, Ryanair, etc.). On other occasions companies will struggle perpetually to cultivate innovative business models due to the nebulous nature of the concept which is being currently compounded by the emergence of new digital technologies which require new business models. All businesses implicitly or explicitly deploy business models. The business model is a concept which goes far beyond the logic of what the organisation does and represents a construct which must be honed in order to not only to ensure that imitation by rivals is difficult but also to satisfy the finicky needs of modern technological savvy customers’ in order to constitute a source of competitive advantage (Cai et al., 2012; Clohessy et al., 2017b). Despite business model lineage dating back to an era where barter exchanges where commonplace, its meteoric rise to prominence, in business and academic spheres, has only manifested in the last decade (Teece, 2010). Recent advancements in nascent information and communication technologies (ICT) and the associated failure of organisations to fully capitalise on their capabilities over the past decade have highlighted the significance of the business model concept. During the 1990’s the arrival of the ‘new economy’ encompassing the commercialisation of the internet and corresponding advancements in ICT provided existing businesses, new entrants and customers with opportunities to exploit new virtual market places and rejuvenate economic prosperity.
In line with Moore’s law, as ICT capabilities became increasingly cheaper, innovative and ubiquitous, the opportunities for organisations to conduct business online and avail of innovative technologies increases due to a decrease in transaction costs which include overheads involved in procurement, processing paperwork, inventory management, supplier and buyer search, product comparison, communication, and travel (Amit and Zott, 2001; Tapscott et al., 2000). Applegate (2001) equates the initial frenzied manner in which organisations approached the internet and technological advances to the way ‘fortune seekers of the 1800s prospected for gold’. Concurrent to the lionisation of the internet and new technological advancements, business models were thrust into the limelight by organisations and academics alike in their attempts to answer such questions as: does the internet create new business models, does the internet render traditional business models obsolete or how can traditional business models be adapted to align with the virtual market place? Following the collapse of the dot.com bubble in the early 2000s, it became apparent that there had been a widespread misconception amongst organisations pertaining to business models and their usage on the internet, where many held the myopic mantra that “a company did not need a business strategy, or a special competence, or even any customers, all it needed was a web based business model that promised wild profits in some distant, ill-defined future” (Magretta, 2002). Fast forward over a decade later and there is a plethora of evidence to suggest that companies are still struggling to operationalise effective business models which can leverage new digital ICT (e.g., cloud computing, virtual and augmented reality, 3D printing etc). One reason for this is that while the business model concept has been rigorously put under the microscope in recent years, there is still no general consensus on “a common and widely accepted language that would allow researchers and practitioners, who examine the business model construct through different lenses, to draw effectively on each other’s work...as a result the business model literature is developing in silos according to the phenomena of interest to the respective researcher” (Zott et al., 2011). These ‘phenomena of interest’ encompass research areas such as: e-business and the use of technology in organisations, strategic aspects (e.g. value creation, competitive advantage, firm performance, and innovation and technology management). There is a need for increased clarity and further research (see Clohessy, in press; Clohessy et al., 2017a) into the business model construct as “the business model remains a theoretically underdeveloped (and sometimes it is quite evident that the commentary contained within the information systems literature pertaining to the business model concept is disjointed and opaque overloaded) concept, which may raise doubts concerning its usefulness for empirical research” (Zott et al., 2011). Thus, the primary research question which this paper seeks to elucidate is:

- **What are the main thematic indicators which underpin the ICT business model concept?**

The main contribution of this paper is the identification of nine specific thematic descriptors which underpin ICT business models. We also use these thematic descriptors in order to provide a comprehensive definition for ICT business models. This paper is in line with the concept of ‘consumable research’, as proposed by Robey and Markus (1998), being both academically rigorous and relevant to practice.

The remainder of the paper is structured as follows: Section 2 discusses the theoretical underpinnings of the business model concept and Section 3 outlines the
research method. This is followed by a discussion pertaining to the study’s research findings in Section 4. Finally, the paper concludes in Section 5.

2 The business model: theoretical underpinnings

Research which has focused on the conceptual underpinnings of the business model concept argue that transaction cost economics, resource based view of the firm, dynamic capabilities and Schumpeterian innovation represent fundamental antecedent research pillars which have shaped our current understanding of what a business model is today (Morris et al., 2005; Osterwalder, 2004, Teece, 2010). Thus, the aim of the ensuing subsections is to discuss each of these research pillars in greater detail.

2.1 Transaction cost economics

Osterwalder (2004) argue that “part of the relationship between technology and business models stems from the business model concept’s roots in transaction cost economics (TCE)”. According to Zott and Amit (2007) organisations can create value by increasing customer’s willingness to pay or by enhancing transaction efficiency (e.g., reducing supplier and partner costs). The total value created represents the value created for all the business model stakeholders and constitutes the upper limit that the principal organisation may capture. The concept of transaction cost economics, originally conceived by Coase’s (1937) in his article ‘the nature of the firm’ and was later developed as a theoretical framework by Williamson (1975), is primarily focused on cost minimisation with transaction efficiency and boundary decisions perceived as major source of value such as superior efficiency, reduced costs and so on (Morris et al., 2005; Wang et al., 2012). In accordance with this theory, an organisation is presented with two options for organising their business activities: a hierarchical internal structure or market relationships with external partnering organisations. Whereas a hierarchical structure supports the management of internal activities within the firm, market relationship transactions support the management of external activities conducted between multiple entities (e.g., buyers, sellers, and so on). Those organisations that can effectively economise on the costing of transactions can be expected to derive more value from transactions (Amit and Zott, 2001). Trust, reputation and transactional experience also lower the costs of exchanges between partnering organisations (Williamson, 1975). According to Peppard and Rylander (2006) transaction cost theory provides a medium for understanding the impact of modern nascent ICT’s and the associated transformation that takes place within industries. However, transaction cost theory is not without its critics whereby it has been argued that it: fails to focus on vertical integration decisions (Barney and Clark, 2007), places an over-emphasis on efficiency to the detriment of other of value creation mediums such as innovation, and largely orients itself “towards explaining broad patterns of economic organisation rather than persistent differences in financial performance” (Argyres and Zenger, 2012).

2.2 Resource based view

There is now general consensus that resource based theory (RBT), the term RBT has now replaced the term RBV by many academics, is one of the most salient theories for
explaining and predicating organisational relationships (Barney et al., 2011). RBV, building on Schumpeterian theory of value creation, is concerned with how a specific organisation’s unique bundle of resources and capabilities can produce offerings which in turn lead to value creation and sustained competitive advantage (Barney, 1991). According to Barney (1991) resources constitute tangible and intangible assets utilised by an organisation in order to implement their strategies. Resources may comprise of financial, physical, individual and organisational capital features that an organisation possesses. Capabilities on the other hand may be viewed as those features of on organisation that enable it to exploit its resources in implementing strategies. RBV is buttressed on two salient assertions:

1. That the resources and capabilities of rival organisations may differ (resource heterogeneity).

2. That these differences are durable (resource immobility) (Mata et al., 1995). ICT has been identified as a potential salient source for adding value and creating sustained competitive advantage by enabling organisations to reduce costs or differentiating its offerings (products and services) thus increasing revenues (Mata et al., 1995).

RBV is often utilised by organisations in the planning stage of the outsourcing process in order to assist with the decision process for selecting a particular ICT software vendor (Perunović and Pedersen, 2007). Organisations that do not possess technological resources and capabilities which are valuable, rare, inimitable, and non-substitutable can acquire such offerings through external outsourcing (Barney, 1991; Henderson and Venkatraman, 1999; Mata et al., 1995).

2.3 Dynamic capabilities

Whereas the RBV of the firm is predominantly concerned with the sustainability of competitive advantage and value appropriation (Barney, 1991), dynamic capabilities relates to strategic and organisational routines which enable management to adapt and alter their resource base (e.g., obtain and discard resources, integrate them together, and recombine them, in order to cultivate new value creating strategies) (Eisenhardt and Martin, 2000). The concept of dynamic capabilities compliments the notion of RBV of the firm. Teece et al. (1997) define dynamic capabilities as an organisation’s ‘ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments’. The dichotomy between these opposing views of dynamic capabilities can lead to difficulties which will be addressed later. Teece et al. (1997) argue that the dynamic capabilities framework is well suited to the rapidly evolving technological landscape which encompasses unpredictable changing business environments and markets. IS researchers have devoted considerable attention to how ICT can facilitate reconfiguration by improving dynamic capabilities and agility (Bradley and Byrd, 2007; Pavlou and El Sawy, 2010). Teece (2007, p.1320) proclaims that the main ambition of the dynamic capabilities framework is nothing more than to explain “the sources of enterprise level competitive advantage over time and provide guidance to managers for avoiding the zero profit condition that results when homogeneous firms compete in perfectly competitive markets”.

(De)Mystifying the information and communication technology

5
2.4 Schumpeterian innovation

The concept of value creation made its first appearance in economic literature as far back as the 1930s. Schumpeter (1934) discussed value being created through a process of innovation. The author identifies technology as a key enabler during the innovation process which enabled organisations to recombine resources and resulting offerings to produce new and innovative offerings providing a salient foundation for creating new markets and production methods. The overall aim of this process is to transform markets which in turn can enable economic development (Amit and Zott, 2001). However, modern ICT broadens this concept of innovation as innovative ICT can enable the creation of new forms of collaboration and strategic exchanges rather than simply creating new production methods. This section discussed the antecedent theoretical underpinnings to the business model concept. Specific limitations are inherent to these concepts which render the business model concept as a more suitable lens for examining the impact of ICT on organisations. However, given the nebulous nature of ICT business models and the siloed nature of extant research, further research is required to coalesce and demystify the concept. In the next section we provide an overview of the research methodology operationalised in this study.

3 Methodology

We conducted a comprehensive analysis of the literature in order to produce a systematic deductive analysis of the business model concept. An effective literature review not only makes a significant contribution to cumulative culture but also “creates a firm foundation for advancing knowledge. It closes areas where a plethora of research exists, and uncovers areas where research is needed” (Webster and Watson, 2002). The first step in our analysis of the literature encompassed the sourcing of relevant research resources via scholarly databases and manual searches. To ensure the consistency and reliability of the search process we used a three stage literature mapping protocol (see Figure 1) as prescribed by Kitchenham and Brereton (2013) to search, select, appraise and validate the extant. For the initial Stage 1, we conducted a rigorous search of the academic literature was undertaken in all subject areas across all years (until 1 April 2016) using seven prominent databases to produce a research resource set which was representative of the current status of enterprise personal analytics research: EBSCOhost, JSTOR, ProQuest, Google Scholar, PubMed, Scopus, and Web of Knowledge. This selection of databases was informed by the multidisciplinary nature of business model research. To support the manual search, an automated search based on citation analysis (also referred to as snowballing) was performed. Relevant research sources identified from full research papers were also collated. Next, the researcher applied an identical search and select protocol for the IS literature domain.
All research papers were imported directly into an EndNote database. Using EndNote’s ‘find duplication’ feature seventy duplicates were removed. The remaining research sources were further filtered using Stage 2 and Stage 3 of the mapping protocol. Stage 2 selection processes encompassed a decision making process to include or exclude relevant research papers from the data extraction process. The “final decision took place when the research sources were read in parallel with data extraction and quality assessment. Stage 3 search and selection took place in parallel with data and quality extraction from the research sources identified in Stages 1 and 2 and comprised three main tasks: search process validation, backward snowballing and researcher consultation” (Kitchenham and Brereton, 2013). With a strong focus on ICT related business model research papers, Stages 2 and 3 resulted in the removal of: irrelevant research articles (e.g., analytical chemistry, astrophysics, mathematics etc.), further duplicates not picked up by EndNote (e.g., surnames and first names misplaced), materials no longer accessible, questionable sources (e.g., credibility of resource could not be verified) and research papers where the business model concept was only briefly mentioned and not the main theme of the content. A final total of 35 research papers remained in the EndNote database for further analysis. We used NVivo 10 software as a means of systematically classifying and analysing the content of the 35 research papers in order to reveal insights on the business model concept. Content analysis has been defined as “a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding” (Stemler, 2001). Furthermore, “research using qualitative content analysis focuses on the characteristics of language as communication with attention to the content or contextual meaning of the text” (Hsieh and Shannon, 2005). As such, we chose to engage in conceptual rather than in relational analysis as conceptual analysis allowed us to examine the literature for presence, frequency, and centrality of concepts (Indulska et al., 2012).
4 Discussion: business model thematic descriptors

According to Osterwalder and Pigneur (2010) the starting point for any concrete discussion on business models should commence with a shared understanding of what a business model is. Thus, in this section a comprehensive discussion is provided on conceptuallyising the business model concept. Following a content analysis of the examined literature, nine common descriptor themes were identified (Table 1). For the purposes of this study we refer to them as ‘business model thematic descriptors’. The next sections provide an overview of each of these nine business model descriptors.

Table 1 Business model descriptors and number of occurrences in reviewed literature

<table>
<thead>
<tr>
<th>Business model thematic descriptor</th>
<th>Number of occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>General definition</td>
<td>29</td>
</tr>
<tr>
<td>Value capture (cost and revenue structure)</td>
<td>27</td>
</tr>
<tr>
<td>Value configuration (resources, assets, core competencies)</td>
<td>25</td>
</tr>
<tr>
<td>Classification scheme: taxonomy, typology, reference model, ontology</td>
<td>25</td>
</tr>
<tr>
<td>Customer relationship</td>
<td>22</td>
</tr>
<tr>
<td>Value proposition</td>
<td>19</td>
</tr>
<tr>
<td>Value creation (internal and external)</td>
<td>16</td>
</tr>
<tr>
<td>Value chain/network</td>
<td>13</td>
</tr>
<tr>
<td>Strategy</td>
<td>13</td>
</tr>
</tbody>
</table>

Source: Table A1 and Table A2 – see Appendix

4.1 General definition

Drucker (1975, p.49) discusses the maelstrom organisations can often encounter when attempting to answer what seems at an initial glance to be a very rudimentary question, ‘what is our business’. The author proclaims that “nothing may seem simpler or more obvious than to answer what a company’s business is…..the question looks so simple it is hardly raised….however the right answer is usually anything but obvious”. Despite business models being one of the most discussed terms, it is one of the least understood, (Alt and Zimmermann, 2001; Dubosson-Torbay et al., 2002; Gordijn et al., 2000; Osterwalder et al., 2002; Zott et al., 2011). Calia et al. (2007) argue that proposed definitions for a business model are largely ambiguous however there are those that, due to their empirical foundation and conceptual robustness, are more accepted than others. Zott et al. (2011) contend that academics in the various management domains utilise the term business model ‘to explain different phenomena’ thus resulting in the construct representing not a single concept but a multitude of concepts.

The discourse pertaining to business models in the e-commerce, IS, computer science, strategy, innovation, technological and management literature varies dramatically (Chesbrough and Rosenbloom, 2002; Mahadevan, 2000; Osterwalder and Pigneur, 2002; Pateli and Giaglis, 2003; Rajala et al., 2003; Zott et al., 2011). Some authors generally discuss business models while others refer to the ‘new economy business models’ or ‘internet business models’ or ‘e-business models’. The rise of the internet in the mid-1990s also encapsulated the emergence of online business models concepts.
However, the business implications associated with conducting commerce online, specifically the effect on traditional business models, were still nascent and unchartered (Magretta, 2002; Osterwalder and Pigneur, 2002; Rappa, 1999). Magretta (2002) highlighted how the term business model was amongst the “most sloppily used term in business…often stretched to mean everything and end up meaning nothing”.

Chesbrough and Rosenbloom (2002) provide a comprehensive operational definition for a business model whose main function was to act as a mediator between the technological and economic domains in order to create value. They highlighted the significance of organisations having a comprehensive understanding of the cognitive role of the business model in order to successfully ‘commercialise’ early stage technologies. They also provided guidelines for organisations, whose current business models did not accommodate early stage nascent technological platforms, to assist them in capturing value. The nuanced distinction between a business model and a strategy is also highlighted. A business model focuses on the creation of value for a customer and the moulding of the business model in order to realise that value, whereas, a strategy is concerned with robust value capture and sustainability mechanisms which are necessary in order to outperform current and de novo competitors. Chesbrough and Rosenbloom (2002) call on organisations to conduct business model experimentation with the initial business model being viewed as a ‘proto-strategy’ which evolves iteratively through the trial of alternative business models and through a process of ‘heuristic logic’.

Osterwalder et al. (2002) propose a definition for a business model following a comprehensive review of the literature in order to investigate the ‘semantics’ of the term. The aforementioned authors surmise how a business model represents a conceptual view of how an organisation does business and also define how a meta-model consists of the terminology utilised to delineate the view. A business model is defined as the “blueprint of how a company does business. The translation of strategic issues, such as strategic positioning and strategic goals, into a conceptual model that explicitly states how the business functions. The business model serves as a building plan that allows designing and realising the business structure and systems that constitute the company’s operational and physical form” (Osterwalder et al., 2005). Subsequently, Ostwerwalder and Pigneur (2010) further developed this definition to describe how a business model “describes the rationale of how an organisation creates, delivers and captures value”. In their analysis of 1,000 of the largest organisations in the USA, Weill et al. (2005) define a business model as comprising two salient elements and concluded, based on financial performance measures, that certain business models do in fact outperform others. Rajala and Westerlund (2007) define a business model, in the context of IS and business literature, as a method “of creating value for customers, and the way in which a business turns market opportunities into profit through sets of actors, activities and collaboration”. Teece (2010) define a business model as the conceptual business logic pertaining to the implicit assumptions an organisation makes regarding customers, behaviour of revenues and costs, rival organisation responses and changing user needs in order to yield a profit from an offering.

The content analysis (see Tables A1, A2 – Appendix) revealed that there is an extensive muddying of the waters and very little consensus amongst academics pertaining to a universal definition for a business model. Definitions range from the explicit to the implicit with some verging on being ‘tautological’ (Currie, 2004). Terms such as revenue model, strategy, e-business model and business model are used interchangeably.
Additionally a business model has been referred to as component, assumption, architecture, method, concept, framework and logic. Serrat (2012) asserts that the e-business model literature offers generic, broad, or narrow typologies that singly or jointly provide incomplete and confusing pictures of the perspectives, dimensions, and core issues of the business model concept depending on the lens used”. Shafer et al. (2005) argues that the business fraternity have been reluctant to accept any of these definitions mainly due to a lack of consensus amongst authors with the “viewpoint of each author driving the definition term; by peering through different lenses, authors are seeing different things”. Diversity in such definitions can create substantial challenges for organisations when attempting to communicate their business model in a simple, concise and clear manner. Additionally, this ambiguity can often manifest as confusion in organisations that then run the risk of either adopting a naive ethos that their current business models can be simply transitioned to an e-based business environment or deploying misguided, untested, impotent business models that are destined for failure.

4.2 Value configuration

As evidenced by Table 1, a recurring theme emanating from discourse pertaining to business models revolves around the concept of value configuration. It has been argued passionately that technological innovations that are deployed in a vacuum may not enable an organisation to fully capitalise on the inherent potential of the technology and that effective business models are essential in order to unlock the commercial value embedded within a specific technology. Slywotzky (1996) discuss the concept of value which refers to an outside – in process which commences with determining the needs of the customer and working back into the organisations capabilities and direction. Betz (2002) defines the value dimension of as the “standard by which management and other employees set priorities and judge the importance of activities”. Hedman and Kalling, (2003) argue that IS’s provide a platform for an initial unrefined input resource. The ability of IS to be of economic value is largely dependent on “a firm’s ability to trade and absorb IS resources, to align (and embed) them with other resources, to diffuse them in activities and manage the activities in a way that creates an offering at uniquely low cost or which has unique qualities in relation to the industry they compete in”. Shafer et al. (2005) assert that concepts of value creation, value capture, value chain/value networks constitute salient distinct functions which can determine positive value configuration which in turn can ensure the long term viability of an organisation. These concepts must be “clearly delineated as quite often organisations that create value through the use of a new process or technology fail to fully capture the value resulting in an unenviable situation where the value is either lost or shared with other competitors and users” (Lepak et al., 2007). Thus, in the next subsections each of the concepts which were identified by the content analysis as constituting salient components in the value configuration process are discussed.

4.2.1 Customer relationships

Drucker (1975, p.54) posed the question, what constitutes value to a customer? The author argues that the main aim of any business is to create customers. Customers constitute the foundation of any business and play a pivotal role in the long term sustainability of an organisation. In order for a business to create customers, an
organisation must be competent in the two main functions of a business which are marketing (distinguishing the unique function of the business) and innovation (provision of superior economic goods and services). Ultimately the role of a business model for a technological innovation is to “ensure that the technological core of the innovation delivers value to the customer” (Chesbrough and Rosenbloom, 2002). According to Shapiro and Varian (1998) the success or failure of a business venture rather than being driven by the value underlying an offering is increasingly being determined by customers’ expectations. Strategy, in terms of strategic positioning, formulating of strategic partners, aggressive pricing and capitalising on complimentary products, plays a pivotal role in establishing a loyal customer base (Shapiro and Varian, 1998). Currie (2004) opines that many organisations will continue to flounder until “they address a perennial issue in business: how to create value for the customer”. Teece (2010) argues that it is imperative for organisations in modern business environments, which continue to be moulded by global advances in ICT, adopt a customer-centric focus due to the increasing availability of low cost technology solutions. In order to ensure a sustainable competitive business model an organisation needs to “distil fundamental truths about customer desires, customer assessments, the nature and likely future behaviour of costs, and the capabilities of competitors” during the business model design stage (Teece, 2010). Recent advancements in ICT have caused a power shift in the favour of the customer who now expect information services to be provisioned free of charge, thus creating a conundrum for many organisations pertaining to how they intend to deliver and capture value from their customers (Teece, 2010). Thus, it can be asserted that organisations who adopt a ‘fidelicerta merces’ mantra towards their customers can stand to reap substantial success in comparison to those organisations that disregard the customer.

4.2.2 Value proposition

Organisations operating in voracious business environments are constantly striving to meet customer’s multifarious demands by developing unique innovative value propositions in their endeavours to yield a profit. A value proposition can be described as the promise of value that is embedded in an organisation’s offering and the belief that a customer will experience that value. A value proposition, from the perspective of a customer, “describes how an organisation will create differentiated sustainable value to targeted segments” [Kaplan, (2004), p.38]. Kaplan, (2004) asserts that it is imperative that the value proposition should effectively communicate the unique nature of the organisation’s offering to their customers. For example, particular features and functionalities embedded within an organisations offering that modern technology-savvy customers value. The development of unique differentiating customer value propositions is a pivotal element of business models. Organisations provisioning the same offering may decide to form a joint-venture in order to co-develop offerings which represent a unique value proposition in the eyes of the customer (Kaplan, 2004). According to Teece (2010) technological change, and in particular innovative technology, possesses the capacity to satisfy customer needs via novel and superior modes. A well-designed business model creates value propositions “that are compelling to customers, achieves advantageous cost and risk structures, and enables significant value capture by the business that generates and delivers products and services”. Osterwalder and Pigneur (2010) describe a value proposition as constituting an aggregation, or bundling, of
products or services that create value for a particular customer segment. In its most rudimentary form the value proposition embodies the reasoning of why customers choose one offering over another. Value propositions can be inherently innovative and disruptive or represent add-ons or plug-ins for existing products or services. Values may be quantitative (e.g., service speed, price) or qualitative (e.g., offering design, customer experience). The following value propositions can contribute to the value creation process:

1. novelty
2. performance
3. customisation
4. price
5. design
6. brand/status
7. getting the job done
8. accessibility
9. risk reduction
10. cost reduction
11. convenience/usability (Ostwerwalder and Pigneur, 2010).

4.2.3 Value creation

There is a general consensus amongst researchers that cogent business models can result in superior value creation (Magretta, 2002; Morris et al., 2005; Zott et al., 2011). Organisations can create significant value operating in a manner which differentiates themselves from competitors such as developing unique core competencies, unique capabilities, unique business processes/work practices and so on (Porter, 2001; Porter and Millar, 1985; Shafer et al., 2005). The concept of value creation has been well traversed in business literature. According to Morgan et al. (2013) the process of value creation may be conceptualised from either a contingency perspective or a single universal perspective. From a contingency perspective, Raymond (2001) proclaims that ICT offerings possesses two distinct sources of economic value: use value and sales value. The use value of a ICT is its economic value as a tool, and, the sales value of a program is its value as a sellable commodity. Porter (2001) defines economic value “as nothing more than the gap between price and cost, and it is reliably measured only by sustained profitability”. In order to build a sustainable value proposition, the software vendor must understand the use value of the software. For example, business users are generally most interested in the business value of software, whereas users playing computerised games are interested in the entertainment value of that game software. In both cases, we see that understanding of customers’ needs and preferences is a key issue in the development of a business model. Morgan et al. (2013) argues that “value creation is also a universal dimension of recent conceptions of a business model...[whereby] value creation necessities identifying a
relevant customer segment, the value proposition for each and how the business will provide that value”.

4.2.4 Value capture

Chesbrough and Rosenbloom (2002) explored the role of the business model in capturing value from early stage technology platforms and identified that a salient function of a business model is to “commercialise innovative ideas and technologies…unlocking the value potential embedded in new technologies and converting it into market outcomes”. Their longitudinal study of the Xerox Corporation is a prime example of an organisation, which successfully captured value from an early stage technology, which had been previously shunned by other organisations, by deploying an effective robust business model. The aforementioned authors argue that merely creating value from a technological platform is not sufficient to ensure that an organisation profits from their business model. Once an organisation has successfully identified an effective value chain to deliver a service or product, it is incumbent to also develop a strategy to appropriate a portion of the value by developing an appropriate business model or ‘architecture of revenue’ (Chesbrough and Rosenbloom, 2002). The aforementioned authors assert that the extant literature is strewn with examples of how organisations experience substantial difficulties when attempting to adopt, manage and execute early stage technology platforms.

Teece (2010) highlights how the mechanisms for capturing value in modern business environments have changed dramatically since the industrial era where the concept of capturing value was relatively straightforward. Organisations merely had to package “its technology and intellectual property into a product which it sold, either as a discreet item or as a bundled package” (Teece, 2010). Advancements in technology have enabled the creation of alternative assumptions pertaining to costs and revenues (see Morgan et al., 2013). However, determining how to capture value from innovative technology represents a salient consideration in business model design. Teece (2010) asserts that the use of an innovative technology does not necessarily guarantee business success. Designing a competitively sustainable business model is essential when organisations attempt to morph ‘technical success into commercial success’. Organisations must not only revaluate their value propositions which they intend to present to their customers but also consider how they intend to capture value from providing new forms of offerings. Organisations will run the risk of failing to capture value from new offerings should they operationalise an impotent ineffective business model (Teece, 2010; Zott et al., 2011; Osterwalder and Pigneur, 2010).

As evidenced by the literature, both the cost structure and revenue streams represent salient components of a business model which enables firms to effectively capture value. Teece (2010) discuss how an organisation’s long term success and longevity is dependent on the successful implementation of “commercially viable architectures for revenues and costs”. Osterwalder and Pigneur (2010) provide the following widely cited delineations of costs structures and revenue models. The cost structure describes the total costs involved to operate a business model. The aforementioned authors contend that business model activities such as delivering creating, delivering and capturing value, maintaining customer relationships and so on all incur costs. Costs can be calculated by following the delineation of key resources, key activities and key partnerships. Revenue streams originate from value propositions which have been successfully provisioned to customers. Two categories of revenue streams exist:
1 Transaction revenues which result from one-time customer payments.
2 Recurring revenues yielded from the on-going delivery of value propositions to customers or the post hoc provision of customer support services.

Profits are yielded from created earnings which are calculated by the formula: Revenues – Costs. Osterwalder and Pigneur, (2010) affirm that organisations can use multiple revenue streams which cater for each customer segments. Each individual revenue stream can operationalise two categories of pricing mechanisms:
1 fixed pricing (based on static variables)
2 dynamic pricing (prices change based on market conditions).

4.2.5 Value chain/value networks
According to Iyer and Henderson (2010) advancements in technology has paved the way for organisations to consider extending service orientated concepts to value chain activities. Modern day ICT service industry organisations are facing substantial challenges in terms of rapidly changing markets, fluctuating customer demands, increased availability of low cost technology and complex networks of stakeholder relationships. When comparing the concept of the value chain and value networks, fundamentally the main question being posed by organisations is ‘how do we create value?’ Organisations, utilising Porter and Millar’s (1985) framework, would have answered ‘along the value chain’. However, as organisations increasingly migrate to virtual market places, traditional linear concepts fail to provide lucid and coherent comprehension of the value concept. A value network may be defined as “a set of relatively autonomous units that can be managed independently, but operate together in a framework of common principles and service level agreements” (Peppard and Rylander, 2006). Allee (2009) define a value network, in the context of the software industry, as “any purposeful group of people or organisations creating social and economic good through complex dynamic exchanges of tangible and intangible value”. Tangible exchanges are comprised of formal structured or contractual interactions for the sole purpose of generating revenue. Intangible exchanges comprise informal supporting interactions. The author contends that this definition can be applied to value creating activities that occur internally in a value network and to activities that occur externally of the value network. Hamel (2000, pp.93) argues that an organisation can successfully manoeuvre against rivals by deploying ‘revolutionary’ innovative business models where value is created and captured in value networks comprising suppliers, partners, distribution channels, coalitions and end customers, is an essential business model component which surrounds an organisation amplifying the organisations resource. An organisation can create unique relationships with members of a value network and ultimately the success of a business model will largely be dependent on the position an organisation decides to assume in a value network (Morris et al., 2005; Shafer et al., 2005).

4.3 Strategy
According to Teece (2010) a good business model will allow an organisation to effectively deliver value to customers while concurrently capturing a portion of the value
created in order to yield a healthy profit margin. However, it is not sufficient to have only an effective business model. In order to protect the resulting competitive advantage stemming from new business model design and reduce instances of imitation and replication organisations need to ensure the effective coupling of strategy and business model analysis. The intent of strategy emanates from the definition proposed by Chandler (1962), “the determination of the basic long term goals and objectives of an enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out these goals”. It has been argued that in order for digital organisations to perform effectively in a networked economy, an “understanding of the role and relevance of strategy is necessary for effective competitive behaviour” (Mansfield and Fourie, 2004). According to Al-Debei and Avison (2010) the business model concept, in modern organisations, is not operationalised in a vacuum but in fact intersects with the business strategy and business processes which include their supporting IS (people and ICT). Thus, creating a unique strategic, operational and technology mix. The business model serves as a “conceptual tool of alignment to fill the gap between corporate strategy and business processes including their IS, and to provide a crucial harmonisation among these organisational layers” (Al-Debai and Avison, 2010). In recent years, organisations have their realigned their IS/IT strategic objectives to provisioning and/or sourcing lower cost, flexible, resilient supply and delivery options as a means of responding to the impacts of globalisation and the associated cost pressures (Mohdzain and Ward, 2007).

4.4 Classification schemes

As highlighted in section 4.1, there is little consensus amongst researchers with regards to a general acceptable definition for a business model. Adopting a classification scheme approach can assist researchers in their endeavours to comprehend and organise recondite concepts such as business models (Neuman, 2003). Thus, many authors altered their research focus from defining business models to decomposing the business model into salient ‘components’, ‘atomic elements’, ‘pillars’, ‘functions’ and ‘attributes’ (Amit and Zott, 2000; Dubosson-Torbay et al., 2002; Hamel, 2000; Osterwalder, 2004; Petrovic et al., 2001; Weill and Vitale, 2001). According to Bailey (1994, p.1) the process of classification may be defined as “the ordering of entities into groups or classes on the basis of their similarities…it is crucial that the defining characteristics of the phenomenon be identified”. The author identifies ten advantages of a robust classification scheme which catalogues and positions entities within the problem domain and which also depicts the relationships between the entities. Two fundamental approaches to classification include taxonomy and typology. The main difference between the two concepts is that a typology is inherently conceptual whereas taxonomy is primarily empirical [Bailey, (1994), p.6]. Early academic literature, primarily on the use of business models in the ecommerce arena, focused on the development of classification schemes, taxonomies and typologies in order to classify e-business models. Initial classification attempts involved the use of two ranking criteria (Linder and Cantrell, 2000; Rappa, 1999; Tapscott et al., 2000; Timmers, 1998). One of the most cited e-business model classification schemes is provided by Timmers (1998), who argues that a systematic approach for defining architectures for e-business models may be achieved via the identification of value chain elements (value chain de-construction) and determining appropriate methods to integrate information along the value chain (value
chain re-construction). The author proposes eleven classifications of business models based on functional integration and the degree of innovation. While some of these were just a reimplementation of traditional business models others where new and innovative in their inherent ability to add value through the integration of information flows. Rappa (1999) identified twenty nine business models grouped within nine categories. The models are classified according to revenue and value chain position. The combinational nature of the individual business models enabled organisations to implement a number of the models in order to form an overall internet strategy. The author argues that the classification scheme should not be taken as a panacea for all internet transactions and called for further research in order to concrete comprehensive business model taxonomy. Rappa (2004) proposes a taxonomy comprising nine major categories of business models which in turn classify thirty eight subcategory business models. The utility model is based on metred usage commonly referred to as a ‘pay as you go’. The author asserts that “metering customer usage is one characteristic that figures prominently in the utility business model and sets it apart from other models”. Tapscott et al. (2000) utilise a ‘value map’ approach to discuss five business models ranked based on economic control (low/high) and value integration (self-organising to hierarchical). The aforementioned early attempts at classifying business models in pursuit of a comprehensive unique classification scheme have been described as being inadequate (Dubosson-Torbay et al., 2002) and too myopic in that they ignore fundamental aspects involved in conducting business over the internet such as supply chain characteristics (Mahadevan, 2000).

A typology may be defined as a “mental map of classification that allows for easier recognition of complex subjects and enables readers to classify them into fewer categories” (Lam and Harrison-Walker, 2003). Weill et al. (2005) classified the business models of 1,000 US organisations, based on an analysis of their revenue streams and financial performance indicators, in order to determine if certain business models out performed others. The aforementioned authors present a comprehensive typology consisting of two dimensions. The first dimension describes what rights are being sold and comprises four basic business models archetypes. The second dimensions describe the types of assets involved and comprises four salient asset types. Elements inherent to both dimensions can be combined to form another sixteen unique variations of these basic models. A unique characteristic of the business model concept resides in its inherent ability to be ‘potentially comparable across industries’ (Weill et al., 2005).

Osterwalder et al. (2005), present a business model concept hierarchy comprising several levels;

- **Level 1** definitions and meta-models
- **Level 2** taxonomies
- **Level 3** instance. Levels 1 and 2 are described as being inherently conceptual.

Level 3 pertains to literature which discusses concrete real world business model examples or discusses the ‘conceptualisation, representations, and descriptions’ of real world business models. The aforementioned authors argue that whist IS management literature is synonymous with producing conceptual models and frameworks, few of these have been ‘translated’ into software-based business tools. Thus, the main contribution that can be derived from researching the business model concept in the IS domain resides in the “creation of concepts and computer assisted management tools that help managers to capture, understand, communicate, design, analyse, and change the business logic of
their firm”. However, in order for this to occur, further research in the IS domain is warranted in order to rigorously define meta-models of business models (reference models or ontologies).

Following a comprehensive review of the business model literature, Zott et al. (2011) identified a number of novel emerging business model themes which include: the business model is a new unit of analysis which is separate from the product, organisation, industry and network, a business model is centred on a focal organisation whose boundaries go beyond those of the organisation, business models represent a holistic, system level approach at characterising how an organisation does business, the concepts of value creation and capture and the activities that take place between the focal organisation and its partners constitute salient elements in a business model. These aforementioned emerging themes can serve as a salient impetus for a more uniform study of business models (Zott et al., 2011).

An ontology has its lineage in an esoteric branch of philosophy where it constitutes a systematic form of being or existence (Gruber, 1993; Gruninger and Lee, 2002). One of the most cited definitions is provided by Gruber (2008) who asserts that ontology is an ‘explicit form of conceptualisation’. It can be understood as a description (like a formal specification of a program) of the concepts and relationships in a particular domain. Borst (1997) define ontology as ‘a formal specification of a shared conceptualisation’. The author contends that this definition emphasises that there must be general consensus on the conceptualisation specified as it will increase the usability of the ontology. In contrast, if there is no general consensus the ability to reutilise ontology will be negatively impacted (Borst, 1997). Building on an earlier business model framework (e.g., Osterwalder and Pigneur, 2002), Osterwalder (2004) propose a comprehensive metal model ‘e-business model ontology’ (BMO), comprising nine interconnected building blocks which are buttressed on four main pillars: product value proposition, customer interface, infrastructure management and financial aspects. The framework is largely influenced by relevant IS research, business management literature (Markides, 2013) and by the balance scorecard [Kaplan and Norton, (1992), p.2000]. The author refers to his modelling approach as a ‘domain ontology’. This approach is very amenable to the business model ontology as “it aims at defining the concepts and their relationships in the business model domain” (Osterwalder, 2004). More recently, Osterwalder and Pigneur (2010) have proposed the business model canvas (BMC) which represents a widely cited and utilised strategic management tool aimed at assisting organisations design new business models or document existing business models. The main difference between the Osterwalder’s (2004) BMO and the BMC is that that the value configuration building block present in the BMO has been replaced with a key activities building block in the BMC.

5 Conclusions

Hopper (1990) discusses the strategic significance of the unprecedented advancements in ICT for organisations, proclaiming that “the consequences of falling behind are so irreversible, companies must either master and remaster the technology or die”. The author predicted that innovative technology would level the competitive playing field for many organisations thus making it increasingly difficult to achieve competitive
differentiation. However, astute organisations could outmanoeuvre rivals and achieve a competitive advantage by ensuring that specific ICT is comprehensively assessed prior to full deployment in order to determine if the technology is capable of leveraging upon the organisation’s existing advantages and traits. One method to assess a nascent ICT is to use the business model as a lens in order to decipher its impact on the organisation. However, the business model is still considered a nebulous concept. Consequently, this paper provided an overview of the main business model thematic descriptors that were identified following a comprehensive content analysis of thirty five widely cited business model research papers. As evidenced by Tables A1 and 2A – Appendix, there is a lack of consensus with regards to:

1. a business model definition
2. the key building blocks of a model.

However, the content analysis enabled us to concrete the role of an ICT business model. This content analysis also highlighted the multi-faceted nature of the business model concept (Zott et al., 2011; Osterwalder and Pigneur, 2010). In its most rudimentary form a business model represents the blueprint of how an organisation conducts business. A number of recurring themes emerge from content analysis which are used to frame a business model definition for the purposes of the following study which have enabled us to coin the following definition for an ICT business model. First, an ICT business model describes the internal business modus operandi (operational and managerial infrastructure) required to operationalise the business model. Second, an ICT business model encompasses the ability of an organisation to create and capture value, via internal and external activities, and generate revenue. Third, a common business model descriptor is that it must be capable of delineating the organisation’s position within a value creating network and the relationships with partnering stakeholders (actors) (e.g., customers, suppliers and so on). Fourth, an ICT business model encompasses value propositions and offerings. Fifth, resources (assets and capabilities) are required to develop and implement a business model. Finally, in order to transform an ICT business model into viable sustainable business, it must be operationalised concurrently with an effective competitive strategy with both elements necessitating review on a periodic basis.

From a theoretical perspective this study makes the following contributions to the extant research on ICT business models:

1. It provides a detailed overview of the various approaches operationalised in 35 widely cited ICT business model research studies.
2. It discusses nine specific thematic indicators which underpin ICT business models.
3. It provides a comprehensive definition for ICT business models.

From a practice perspective, our findings suggest that ICT organisations, both provision and adoption perspectives, should use the nine thematic indicators to engage in business model experimentation as a means for harmonising their organisation’s strategies with the disruptive and/or innovative idiosyncrasies of ICT-based digital transformation. For instance, IBM use an in-house business modelling technique (Clohessy et al., in press) to assess the impacts in terms of benefits, challenges and workarounds of emerging ICT such as cloud computing, artificial intelligence, cognitive computing, virtual bots and so on.
As next steps, we encourage both theoretical and empirical research into the ICT business model concept. While it is felt that the sample of publications is representative of the ICT business model literature, there may be some bias associated with the narrow focus of the research resources under review. Additionally, there are potentially research resources that investigate similar phenomena, but discuss it with different terms, and thus, were difficult to find. We found throughout our survey of the literature that the only consistency pertaining to the concept of ICT business models is inconsistency. It is because of these inconsistencies, a more holistic such as our approach is imperative when researching the concept of ICT business models.

Funding Acknowledgements

This work was supported with the financial support of the Science Foundation Ireland grant 13/RC/2094 and co-funded under the European Regional Development Fund through the Southern and Eastern Regional Operational Program to Lero – the Irish Software Research Centre (http://www.lero.ie).

Appendices/Supplementary materials are available on request by emailing the corresponding author or can be obtained under https://www.scribd.com/document/357761713/Business-Model-Paper-Appendices-IJVNO.

References


