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DECLARATION

Hereby, I / *Selma Vaska* / assure that this dissertation is original and that it has not been previously used to obtain any academic degree at any other academic institution.

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Venice, June 2021

PREFACE

List of publications

This doctoral dissertation consists of three papers, two of the following have been published:

1. Vaska, S., Massaro, M., Bagarotto, E.M., Dal Mas, F. (2021) **Digital transformation of business model innovation: A structured literature review**, *Front. Psych*., Vol. 11, 35-57, doi: 10.3389/fpsyg.2020.539363

2. Vaska, S. (forthcoming) **Digital revolution and its impact on intellectual capital disclosure**, in Research handbook on Intellectual Capital and Business, edited by *John Dumay, Christian Nielsen, Morten Lund, James Guthrie, Maurizio Massaro*, UK, Edward Elgar Publishing.

Introduction

Background

The development of technology is changing the global landscape. New technologies have made the old ways of competing obsolete, posing new challenges and opportunities to every organization (Cohen et al., 2017; Li et al., 2018). The pervasive application of artificial intelligence (AI), Internet of Things (IoT), big data, cloud computing and blockchain technology is revolutionizing industries, creating a number of new business models, characterized by new service components, the value-added of which leads towards new competitive advantage. As a consequence, a series of innovations have entered into the scenario with new ways how to create and capture value, affecting this way organizations' strategy making.

The fundamental importance of digital technologies in the managerial context nowadays, has rapidly led the academic debate focus the efforts in making theoretical and managerial contributions related to digital transformation. In the literature, digital transformation or 'digitalisation' refers to "the integration of digital technologies into business processes" (Liu et al., 2011, pg. 1728). This integration of digital technologies has disruptive effects in structures and competences of organizations (George & Lin, 2017). Moreover, the ubiquitous inclusion of technologies in everyday life and organizations has diversified customer needs on the demand side, and on the supply side has changed power structures in inter-firm networks. In this context, companies are constantly seeking for new business opportunities (Wiggins & Ruefli, 2005). The opportunities include a wide variety of strategies that can be followed - from digitalizing specific parts of the company, to the company completely, or digital platforms with servitization. Therefore, the old business models are rendered obsolete while challenges of the high velocity environment increase the volatility of markets and industry boundaries.

Literature shows that the innovation of business models and transformation of businesses is challenging and sometimes, difficult. It has been often the case when companies have been captured with non-realized profits, even after diversifying the business. Although a new field of research mostly empirically driven, the literature has started to provide solutions to these challenges especially in the areas of strategy and technology and innovation management. Much research has started to identify and recognize the strategies to innovate business models in order to gain competitive advantage. The complexity of business transformation shows for many problems in innovating the business – in terms of relationships, operations, product and offering, and finally, technology management. The adoption of new technologies poses big changes in the way the transformation should take place and in the way it needs to be successful.

In this study, the digital transformation phenomenon is analyzed from a strategy perspective. The impacts on business model regarding the vale creation, delivery and capture are identified. The new challenges brought to the business communication and the role of communication in disclosing important information relevant for stakeholders, are presented with a conceptual study. In addition, a multi-case study is used to explore further how communication and online disclosure are used by potential investors to make sense of the uncertain conditions and make investment decisions based on legitimation judgements.

Research questions and papers included

Digital transformation phenomenon arises from the combined effect of new digital technologies such as social, mobile, analytics, cloud and Internet of Things (SMACIT) (Sebastian et al., 2017). The adoption and diffusion of these digital technologies with the uptake of Internet has brought about the shift from analog to digital within companies. This change in business landscape, market conditions and in the broader society asks for new strategic approaches and organizational structures, that brings relevant strategy research to the discourse (Teece, 2007; D'Aveni et al., 2010). Indeed, last decade has seen a growing research analyzing the impacts of digital technologies in many business functions. Research shows that digital infrastructure offers companies the ability to develop new business models (Rayna & Striukova, 2016; Berman et al., 2012), as they can re-appropriate existing resources and experiment with new forms of value creation mechanisms, while also providing greater value for all stakeholders (Tilson et al., 2010).

However, although digital transformation is a multi-faceted phenomenon, yet it is unclear *how does digital transformation enable the creation of new business models?* This question has been addressed recently in many conferences, academic journals and policy meetings. Research on strategic management has shifted its focus from a static to a dynamic view of business models, in order to capture market and technology changes that help in sustaining competitive advantage. Although business model innovation has no unified definition, it is seen as a "designed, novel, non-trivial changes to the key elements of the business model innovation and/or the architecture linking these elements" (Foss and Saebi, 2017). As a result, business models are recognized in the management research as a new unit of analysis that offer competitive advantage to firms (Berman et al., 2012). The current thesis includes three original papers that aim to answer this main question by contributing to strategic management, accounting and entrepreneurship research.

The first paper bridges discourses in digital transformation and business models to examine DT impact on BMI. Strategy literature has widely identified the impact of digital technologies in value creation, delivery and capture. However, there is still a knowledge gap on both fields and a review of the literature that summarizes these rapidly evolving studies from a strategy perspective is missing. In this paper, we conduct a structured literature analysis in a sample of 72 papers published in high-tier journals to review and critique the state of the art of research in digital transformation of BMI literature. Data were coded following the research protocol. The findings of this study propose that digital transformation sets the digital affordances and infrastructure baseline for firms' outside-in innovations and value co-creation in platforms and ecosystems. Thus, it is useful to consider that economic success "does not result only from the quality of the entrepreneur and its innovation, but also from its embeddedness in complex social networks" as Ferrary & Granovetter (2009, p. 337) state while analyzing start-ups. Similar considerations hold true also for established firms, which continuously cooperate with network partners for value creation (Pagani & Pardo, 2017).

The second paper takes the conversation forward by focusing on digital affordances and IT-interfaces as direct antecedents of business model innovations. Literature posits that IT-based affordances provide firms with new opportunities to shift operating from offline to online. Given this shift towards digital environments (Mithias et al., 2013), where firms embed in social networks, relationship capital becomes vital to build legitimacy and assemble resources (Srinivasan and Venkatraman, 2018). Additionally, recent literature on open innovation contends its foundations in relational capital, simultaneously facilitated by both other components of intellectual capital - human and structural capital (Barrena-Martiznes et al., 2020). Consequently, IC is responsible for

value creation (Mendoza et al., 2017, Gonzáles et al., 2017) in both small and large firms (Rossi et al., 2016), thanks to its intellectual material components of knowledge, experience, information, skills and capabilities. In line with literature and based also on our structured literature review findings, this conceptual paper considers digital mediums and technological developments as opportunities for firms to disclose information, communicate and build relationships with stakeholders. This article critically reviews previous studies on intellectual capital disclosure and provides new ways on how new business models that rely on digital mediums, can disclose IC in a way that is 'an integral part of the framework illuminating the value creation process of the firm' (Bukh, 2013, p. 49).

Following the rationale of strategic communication in digital mediums and its impact in reshaping the development of business relationships (Bresciani et al., 2018), the third paper focuses on crowdfunding as a new business model, triggered by Blockchain technology. Blockchain based business models have begun the transition to "Internet of values". Drawing on institutional and rhetoric theories, this study explores how legitimacy develops online among pledge funders, clarifying the rhetorical appeals used in the online communications of investor communities and how these appeals are used throughout the crowdfunding life. We fill this gap in the literature by shedding more light on the relation between potential investor and online legitimacy, taking legitimacy as a means of investing performance. Data were collected from an online medium that potential investors used to communicate about different Blockchain based projects. The conversations online were coded according to the three rhetorical accounts – namely logos, pathos and ethos - and the conversation between backers was constructed over a three-year timeframe to observe how potential investors perceive, manage and collect the group understanding in the context of online crowdfunding for hi-tech ventures. Our results provide the first empirical evidence on the potential rhetorical accounts effect of online discourse on the legitimation process generated online in microblogging platforms. Specifically, we find that logos and pathos accounts exert positive effects in gaining legitimation. Furthermore, empirical findings show the importance of academic research in crowdfunding literature and the legitimation theory in the online context.

Overall, this thesis contributes to knowledge in three ways. Firstly, it bridges digital transformation and business model innovation literatures to examine the impact of digital disruption on business model components and in the overall creations of new business models. Secondly, by critically reviewing the existing studies in ICD, it proposes and discusses the new opportunities created by digital technologies, through a framework that guides firms to strategically deliver and create new value by disclosing online IC. Thirdly, we give theoretical attention and empirical support to the rhetorical accounts' effect in gaining legitimacy. So, we shed light on online rhetoric and discourse and how it can be managed. This research increases our understanding on various opportunities enabled by digital transformation (being these technological developments or infrastructural advances) provides guidance to managers that are increasingly confronted with new ways in gaining sustainable competitive advantage.

The digital transformation of business model innovation: A structured literature review

Abstract

This paper has a two-fold aim: to analyze the development of the digital transformation field, and to understand the impact of digital technologies on business model innovation (BMI) through a structured review of the literature. The results of this research reveal that the field of digital transformation is still developing, with growing interest from researchers since 2014. Results show a need for research in developing countries and for more collaboration between researchers and practitioners. The review highlights that the field is fragmented among disruptive technologies, shared platforms and ecosystems, and new enabling technologies. We conclude that digital transformation has impacted value creation, delivery and capture in almost every industry. These impacts have led to the employment of a variety of new business models, such as those for frugal innovation and the circular economy.

Keywords: digital transformation, business model innovation, structured literature review, value creation, value delivery, value capture

Introduction

The phenomenon of digital transformation (DT) has become very popular in recent years (Fitzgerald et al., 2013; Kane et al., 2015). Digital transformation or "digitalization" is "the integration of digital technologies into business processes" (Liu et al., 2011, pg. 1728). The exploitation of digital technologies offers opportunities to integrate products and services across functional, organizational and geographic boundaries (Sebastian et al., 2017). As a consequence, these digital technologies increase the pace of change and lead to significant transformation in a number of industries (Bharadwaj et al., 2013; Ghezzi et al., 2015), since they have the 'power' to disrupt the status quo and can be used to drive technological change (Bharadwaj et al., 2013). Digital technologies have revolutionized the way industries operate (Dal Mas et al., 2020), introducing the concept of 'Industry 4.0' or the 'smart factory' (Lasi et al., 2014). Digital platforms have created a new way of operating for companies and organizations in a 'business ecosystem' (Presch et al., 2020), which has led to changing dynamics in value networks (Gray et al., 2013). Digital technologies have substantially transformed the business (Ng & Wakenshaw, 2017) and society, bringing fundamental changes through the new emerging approaches of the circular and sharing economy.

For strategy researchers, the three characteristics of digital technologies, namely - digital artefacts, digital platforms, and digital infrastructures (Nambisan, 2017a) create opportunities for a layered modular architecture and present to firms the strategic choice of following a digital innovation strategy (Yoo et al., 2010). This has drastically changed the nature of strategizing, since many digitized products offer new features and functions by integrating digital components into physical products (digital artefacts), and can simultaneously be a product and a platform (with related ecosystem). In this regard, the literature has coined the term "platfirms" to define those companies relying their business models (BMs) on a web platform (Presch et al., 2020). Moreover, digital infrastructures like data analytics, cloud computing and 3D printing are providing new tools for rapid scaling (Huang et al., 2017). Therefore, digitalization blurs the boundaries between technology and management, providing new tools and concepts of the digital environment that are changing dramatically the way firms face new managerial challenges, innovate, develop relationships and conduct business (Verma et al., 2012; Bresciani et al., 2018).

The new digital environment requires firms to use digital technologies and platforms for data collection, integration and utilization, to adapt to platform economy (Petrakaki et al., 2018) and to find growth opportunities to remain competitive (Subramanian et al., 2011). Besides, recent research shows that firms utilize external venturing modes (e.g. startup programs, accelerators) (Bagnoli et al., 2020) to develop dynamic capabilities (Enkel & Sagmeister, 2020). Digitalization is therefore seen as an entrepreneurial process (Autio et al., 2018; Henfridsson & Yoo, 2014), where firms in pursuit of digital transformation render formerly successful BMs obsolete (Kiel et al., 2017); Tongur & Engwall, 2014) by implementing business model innovation (BMI) which are revolutionizing many industries. Indeed, the literature suggests that in designing an appropriate BM, it can be possible to benefit from the potential embedded value in innovation (Björkdahl, 2009; Chesbrough & Rosenbloom, 2002). For instance, firms adopting digital technologies consider data streams to be of paramount importance and assign to them a central role in supporting their digital transformation strategies (Zott et al., 2011), in contrast to traditional BMs frameworks (Pigni et al.,

2016). For this reason, digital technologies inherently link to strategic changes in BMs (Sebastian et al., 2017) and consequently the development of new BMs (Hess et al., 2016).

In the digital context, BMs have become a new unit of analysis (Zott et al., 2011) to examine the changing effects of digital technologies on the way firms produce and deliver value through BMI. As the literature suggests, BMI provides opportunities in capturing profits in a system of networked activities (Amit & Zott, 2012; Zott & Amit, 2010), and in enhancing firm performance (Foss & Saebi, 2017). The role of the BM is essential in identifying the crucial aspects behind a digital strategy. Indeed, it helps firms in applying the digital lens to innovate their BM to create an appropriate new value (Berman, 2012). However, this process is still evolving (Ferreira et al., 2019) and many questions remain unanswered for entrepreneurs and managers, especially in relation to the integration of digital transformation strategies and business transformation strategies (Matt et al., 2015), in order to realize the 'digital business strategy' (Bharadwaj et al., 2013). Indeed, a recent study (Atluri et al., 2018) argues that digital transformation and the opportunities it creates for BMs in every sector are still in the beginning.

Given the increased interest in investigating the relationship between digital transformation and BMI in academia and its importance for practice as well, the purpose of this paper is to understand better what we currently know about the digital transformation of BMI. Specifically, our aim is to review and critique the state of research in the digital transformation of BMI literature, provide a comprehensive, holistic overview of the digital transformation of BMI covering many perspectives and outline avenues for further research. We adopt Teece's (2018) definition of BMs as "mechanisms for creating, delivering and capturing value" to reflect the value proposition, target segments, value chain organisations and revenue capture components (Foss and Saebi, 2017). For BMI we apply the definition by Foss and Saebi (2017): "designed, novel, non-trivial changes to the key elements of the business model innovation and/or the architecture linking these elements." According to this definition, BMI involves changes in the individual components and in the overall architecture of the BM.

From a theoretical perspective, this study contributes to these digitally-enabled types of BMI, which make the emergence of BMs a promising unit of analysis for undertaking innovation strategies. It also responds to the knowledge gap in the literature and enriches our understanding in digital transformation of BMs (Visnjic et al., 2016). In addition, the results of this study may help practitioners from a variety of industries who seek for guidance to understand how the digital transformation of BMI can be achieved, through value creation and capture (Casadesus-Masanell & Ricart, 2010). This study may help especially practitioners in incumbent firms, since digital transformation of their BMI is a highly complex process requiring a sequence of interdepended strategic decisions (Aspara et al., 2013; Velu & Stiles, 2013).

The paper is organised as follows: the next section explains the method of data collection and analysis used for the structured literature review. This is followed by the results of the study, answering the three research questions addressed in the methodology. The next section focuses on discussing the existing gaps in the literature and avenues for further research. The final section of the paper discusses the conclusions, contribution and implications for theory and practice.

Methodology

This paper adopts a structured literature review. According to Massaro et al. (2016), a structured literature review is "a method for studying a corpus of scholarly literature, to develop insights, critical reflections, future research paths and research questions." The structured literature review was adopted because "it is based on a positivist, quantitative, form-oriented content analysis for reviewing literature" (Massaro, Dumay, and Guthrie, 2016). This method follows a ten-step process that enables the researcher to "potentially develop more informed and relevant research paths and questions" (Massaro et al., 2016), advancing theory, which is the objective of the literature review (Webster and Watson, 2002).

We wrote a literature review protocol to guide us during the process of reviewing the literature. The protocol-driven approach offers researchers a framework to select, analyse and assess papers with the aim of ensuring robust and defensible results through reliability and repeatability (Massaro et al., 2016). In the further step, we defined the research questions that aim to bring new insights from the literature review. We identified the following research questions in the protocol document:

RQ1. How has the field of digital transformation developed over time?

RQ2. What is the focus of the literature on the digital transformation of BMI?

RQ3. How has digital transformation facilitated BMI in the literature?

The next step was to determine the type of studies to consider for the review. We decided on the keywords to use to search for articles and the criteria for article selection. Following the keywords used in previous studies in the digital transformation literature, we decided to search using "digital transformation", "digital disruption", "technolog* change", "organis* change", "disrupt*" and "business model". As the specific aim of this study is to offer a holistic understanding of the digital transformation of BMI, we purposefully focused on scholarly empirical research that provides insights into how digital transformation is impacting the innovation of BMs. Nodes for coding were determined based on previous SLR studies (F. Dal Mas, Garcia-Perez, et al., 2020; Francesca Dal Mas et al., 2019; Maurizio Massaro et al., 2015). According to these studies, nodes examine information related to authors, the time distribution of publications, country of research, the focus of the paper and methodology. We added nodes about industry sectors, the disciplines of the studies, theories used and potential impact on the value creation, delivery and capturing process. These nodes were added to gain deeper insights into the development of the field and suggest implications for further advancement. These nodes were integrated into a framework that served for the coding of the papers and the analysis of the results. The framework, with a description of parameters, is provided in Table 1.

Table 1. Classifying framework for literature review

Parameters	***Specifications/variables***
Bibliographical/Source-info	
Author	Author demographics
Time distribution of publications	Year article published
Journal titles	Where the article is published
Country/Region of research	Origin of the data
Industry sectors	Empirical setting of the article

Methodology	Computer modelling and simulation Conceptual paper Explanatory Exploratory Mixed method Special issue Viewpoint Theoretical viewpoint
Discipline	Economics Entrepreneurship Finance and accounting General management and strategy Information systems Innovation and technology Marketing OB and HR Operations Other
Focus of the paper	Disruptive technologies Shared platforms and ecosystems New enabling technologies
Theoretical perspectives	Theoretical Perspective Actor-network theory Dynamic capabilities Relational view Discovery-oriented, theories in use approach Grounded theory Interpretative cognitive theory Value-chain approach Digitalization level-Servitization Business Model Canvas Co-evolutionary perspective Portfolio theory Not specified
Impacts on value	Digital transformation and value creation Digital transformation and value delivery Digital transformation and value capture

After identifying the keywords and the framework for the study, we started the collection and selection of papers in a multi-staged process. Firstly, we searched in the SCOPUS database with the defined keywords in the protocol. This first search revealed 215 publications. In a second step, in order to control the quality of articles, we restricted the search to peer-reviewed journals in the Business and Management category that were ranked 3, 4 and 4* in ABS evaluation. With this

additional restriction, we did not take into consideration book chapters, book reviews and conference articles. In this second search, we, therefore, found articles published in peer-reviewed journals from 1996 to 2020, which reduced the number of publications to 126. After collecting all the articles, each paper was checked for the inclusion of keywords in the title, abstract and keywords, in order to ensure that the articles fit the research objective of the study. The criteria for article inclusion required the existence of string words about both digital transformation and BMs, which were connected by the Boolean operator AND. When screening publications, we found only a few articles about digital transformation, which were published before 2014. Other articles talked about digital transformation or disruptive technologies, but not about the impact or the connection with BMI. The articles which were not focused on both disruptive technologies and BMI were excluded. At the end of the process, 54 articles were excluded, and the final sample of publications included 72 research articles.

We used the NVivo12 software package for the analysis of the final list of papers. The folder with the selected papers was imported into the software. Each article was coded based on the same nodes as specified in the framework in order to reach the aim of the SLR and avoid researcher bias. We created nodes that were related to the bibliographical information of articles, methodology, discipline, the focus of the paper, and theoretical perspectives. These nodes were used to answer the first two research questions of our study. We created another node for the third research question, to code all the impacts of new enabling technologies on BMI.

After having coded all the papers, following the steps of the protocol, the research group shared the coding project among the members in order to verify that the coding complied with the research questions and the framework of the study and to ensure inter-code reliability. Next, analysis of the dataset developed insights and critique in the field of the digital transformation of BMI. Part of the work in this study was intended to advance the knowledge in the field of digital transformation, by highlighting gaps, identifying new avenues for research and raising new research questions.

Results

RQ1. How has the field of digital transformation in BMI developed over time?

This section provides an overview of the development in the field of the digital transformation of BMI. It reports the findings related to the descriptive features of this emerging field of research.

Author demographics

The list of analysed articles shows that there does not seem to be any author domination in the field in terms of the number of publications. Ghezzi and Li are the only authors who published three papers. Several scholars contributed to the research field with two articles each (Bogers, Bose, Frank, Frattini, Gupta, Mangematin, and Wang). All the other authors have published only once in the field of digital transformation of BMI. Most of the articles are co-authored. The analysis of the 198 authors of the 72 publications reveals that most of the articles were written by academic scholars. There are no articles written mainly by practitioners, and collaboration between

practitioners and scholars comprised just a few of the publications. More specifically, these collaborations were carried out in very new topics such as platform-based ecosystems and intelligent goods in closed-loop systems. This implies a close relationship between the research field and practitioners, despite the wide practitioner-academic divide. This divide can result from paywalls in publications, and would be helpful to hold common conferences, encourage more engagement with practitioners and provide open-access journals to overcome it. Otherwise, the growing divide between academics and practitioners results in field fragmentation, as subgroups will form on both sides of the divide. Greater collaboration between practitioners and academics is thus needed in the future to shape this field of study (Serenko et al., 2010). These demographics also suggest that four authors in this field of research have remained focused on exploring further aspects of BMI driven by digital transformation. For instance, Ghezzi published about strategy making and BM design in dynamic contexts in 2015 in Technological Forecasting and Social Change and in 2017 he published in the Journal of Business Research. This trend of republishing after two years in a different journal from the first is also demonstrated in articles by Bogers (2016). The lack of specialisation by researchers might also fragment the field further. In the future, more scholars should remain focused on further exploring other aspects of digital transformation impacts on BMI.

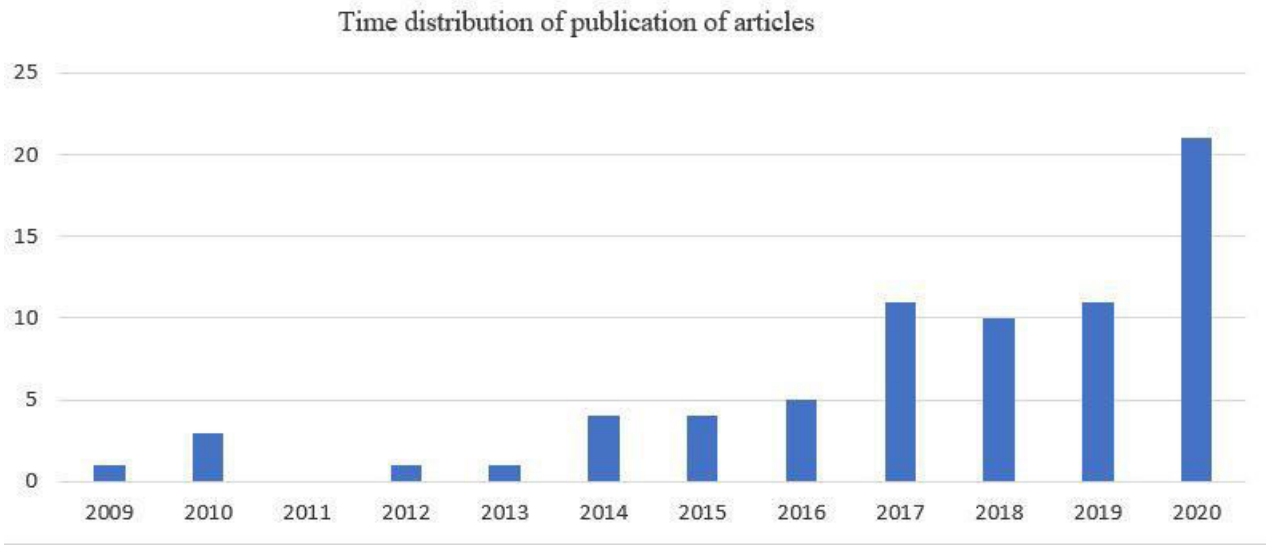
Time distribution of published articles

The analysis shows that the first article about the digital transformation of BMs was published in 2009. This article was part of a case study of Kodak (Lucas and Goh, 2009), which missed the digital photography revolution when faced by disruptive technology. As can be seen from Graph 1 below, only five papers were published within the next four years (until 2013) after the first paper was published. These first papers dealt mostly with a general understanding of the opportunities and barriers created by disruptive technologies on BMI (Chesbrough, 2010), such as, for example, in the case of latecomers that can capture value through a secondary BM (Wu et al., 2010). Publication on the topic remains poor and scattered until 2013 and research continues to highlight the importance of technological discontinuities in the creation of disruptive BMs and the challenge of dominant industry logics (Sabatier et al., 2012). Only Simmons et al. (2013) studied the role of marketing activities in inscribing value on BMI during the commercialisation of disruptive digital innovations in industrial projects. Interesting enough, the production of knowledge is particularly active in 2020, which, at the time of the research, saw the articles published in Scopus as of mid-September. Twenty-one meaningful papers were listed in 2020, considering that the year was not finished yet and several more might be in press, forthcoming, or still to be indexed.

In the past three years, there has been a growing number of articles published in this field of enquiry, with 42 articles out of 72 articles published between 2018 and 2020. The greatest interest in publishing about the digital transformation of BMI was recent, where 53 articles (almost 74 percent of the total sample) were published since 2017. The gradual increase in publications reflects the need to carry out more research in this field, as the impacts and issues related to digital technologies become apparent in many industries. This is shown in articles published during 2014 – 2015, which try to explore the effects of digitisation on incumbent BMs in more depth. Researchers investigated these effects in the publishing industry (Øiestad and Bugge, 2014), and with a special interest in understanding organisational or sectoral lock-ins in creative industries (Mangematin et al., 2014) and the newspaper industry (Rothman and Koth, 2014). To overcome the challenges of

strategy formulation and implementation in dynamic industries, Ghezzi et al. (2015) suggest a framework for strategic making and BM design for disruptive change.

Graph 1. Time distribution of publication articles



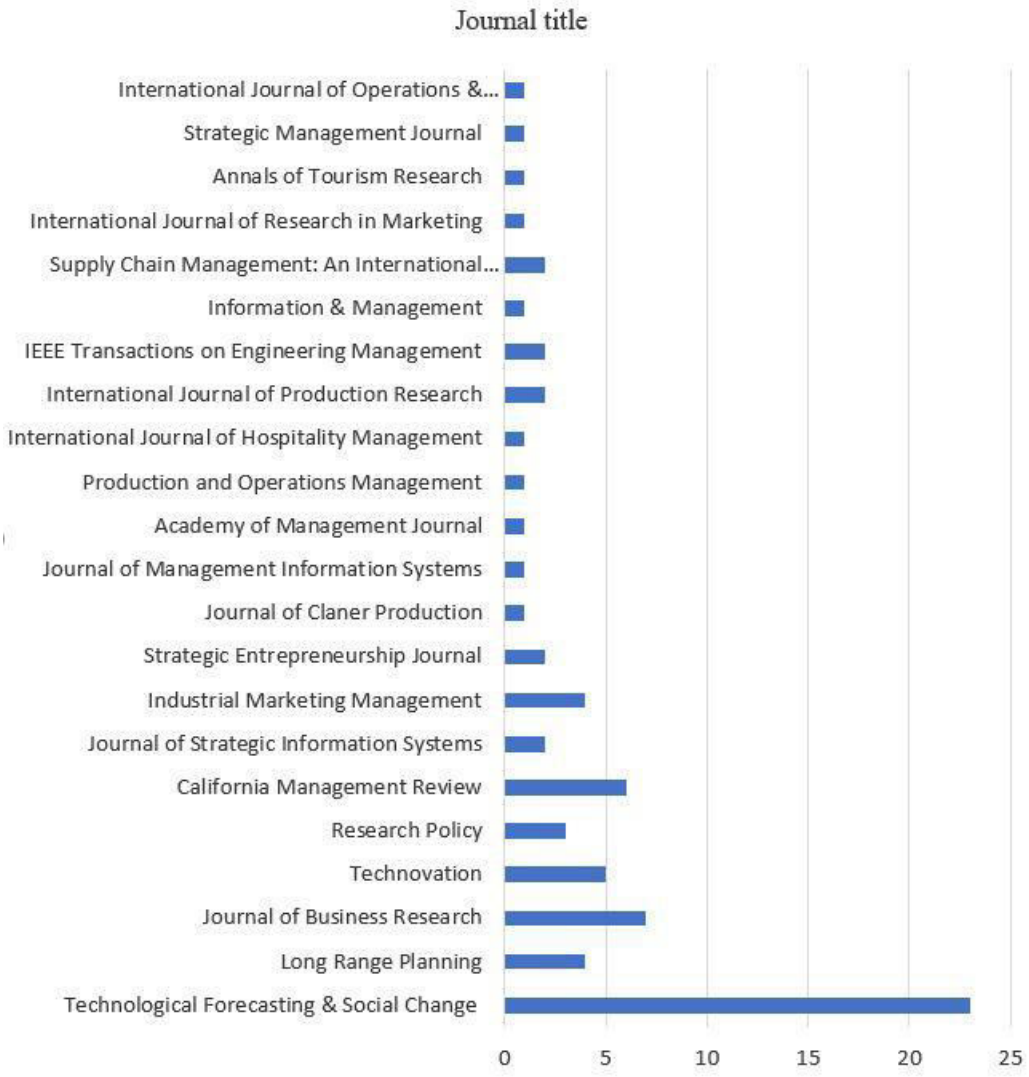
The analysis again reveals the practitioner-led nature of research in this field. As demonstrated above, the time distribution of the articles highlights the relevance of studies in the field. Over time there has been a continuous change in the researched topics, shifting from the impact of disruptive technology on incumbent BMs to the impact of digital technologies on the BMI of digital start-ups. This implies that the field shows characteristics of pragmatic science, where society benefits from the best combination between the relevance of the topic and the rigour of findings (Anderson et al., 2001). The high concentration of the distribution of publications in recent years reveals both the importance of the topic and the increased interest of researchers in this novel field of enquiry. These insights from the analysis of the distribution of articles inform us about the nascent stage this field of enquiry, with rapid growth in 2014. Serenko et al. (2010) consider three indicators to define field maturity: co-authorship patterns, the role of practitioners and enquiry methods. According to these indicators, we observe that the publication of multi-authored manuscripts increased after 2014, especially in 2016-2017. We further observe more collaboration with practitioners during the 2016-2018 period. In terms of enquiry methods, as a newly emerging scholarly domain, the articles mainly develop theoretical frameworks, revealing the early stage of the field.

Moreover, addressing the topic of the academic-practitioners divide (Bartunek, 2007), the topic seems ideal as an opportunity to gather academics and professionals working together and create some exchange zones to foster a dialogue (Romme et al., 2015). While scholars struggle to find robust data to develop sound theories, managers are the ones who see the potential of disruptive digital technologies and their real-world applications, including new BMs.

Journal title

We identified the journals in which these articles were published and their distribution in each journal.

Graph 2. Journal title distribution

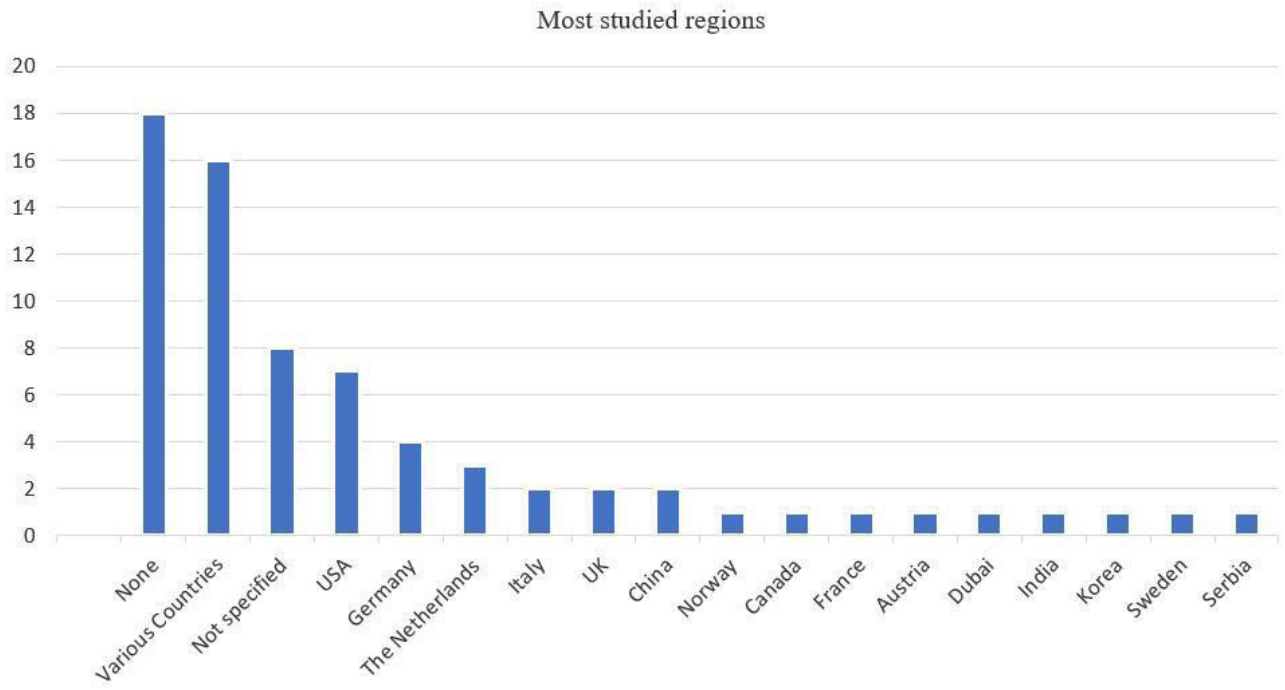


Our analysis shows that a total of 22 journals were captured in this review of literature. The Technological Forecasting & Social Change journal takes the lead for the majority of articles published (23 articles, 32 percent). The three other journals with a higher number of publications than others are Journal of Business Research, California Management Review, and Technovation. These journals have published respectively seven, six, and five articles, for a total of 18 articles (25 percent). The remaining of articles were spread over the rest of the journals, and a diverse range of disciplines. This topic seems to be practitioner-led, and with greater relevance recently for businesses, policy makers and society. This is demonstrated in the Technological Forecasting & Social Change journal, firstly by Sung (2018), suggesting policy implications regarding Industry 4.0 in Korea. Jia (2016) examine the commercialisation efforts of a UK-based 3D printing technology provider to evaluate the financial viability of innovative BMs.

Country of research

Part of our analysis was to identify and describe the geographical regions where studies have been conducted. Graph 3 gives a classification of the countries that have been studied in the field of digital transformation of BMI. The left side of the graph includes studies carried out in developed countries, and the right shows developing countries. The results show that most of the research in this field is conducted in developed countries, and within this, the digital transformation of BMI has been studied mostly in USA and Germany. This concentration of research mainly in these two countries may be the result of governmental efforts, as in the case of German government support for Industry 4.0, or the EU-funded DIGINOVA digital project for advancing innovation in digital making (Potstada et al., 2016).

Graph 3. Country of research



According to the analysis, other countries in Europe reflecting the same interest in researchers are the Netherlands, Italy and the UK, with two publications in each country (except for the Netherlands, which accounts for three articles). In contrast, emerging and far-east countries are very under-represented, with China publishing two papers, India and United Arab Emirates with one article each. This implies that emerging and far-east countries in general are either ignored or poorly analysed, despite the presence of several digital firms (let us think about the giant multinational companies like Alibaba, Wechat, or Huawei in China). While there may be publications written in languages different than English or in books or journals not indexed on Scopus, more research is needed in these countries to define the boundaries of theorisation in the digital transformation of BMI, which will lead to a better understanding of this phenomenon. As Ghezzi and Cavallo (2018) argue, generalisation and the relevance of findings depends on the peculiarity of the context under examination. For this reason, a replication of research in other

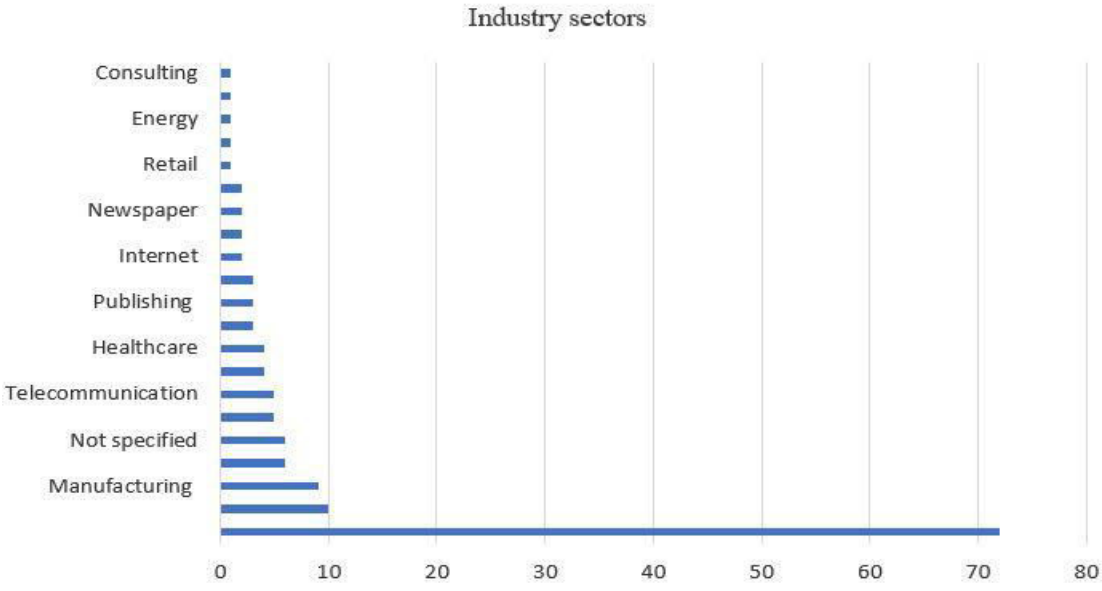
(mature) contexts should be carried out (Ghezzi and Cavallo, 2018). This will overcome the problem of generalisability with a single geographic region (Simmons et al., 2013).

Industry sectors

In order to enhance our understanding of industry influences on the digital transformation of BMI, we classified the articles according to the industry sectors in which their empirical setting was based. As depicted in Graph 4, the articles are based in 18 different specific industries, with several papers referring to multiple sectors together, or not identifying one defined field under investigation.

The results also indicate an almost equal spread of articles among industries, and that there is no concentration in only a handful of industry sectors. Nevertheless, we can identify two groups of industries that are represented by a higher number of articles: manufacturing (9 articles) and creative industries (6 articles). A closer examination of these industries shows that the manufacturing industry mainly dealt with consumer goods manufacturing, while creative industry sectors were represented by the accommodation industry and digital game industry. Most remaining articles were spread across the broad range of industry sectors. The focus on only a few industries can be a limitation for the generalisation of findings. There is a need to study other industries, such as design, architecture, advertising and the fashion industry (Mangematin et al., 2014), which currently do not appear on our list.

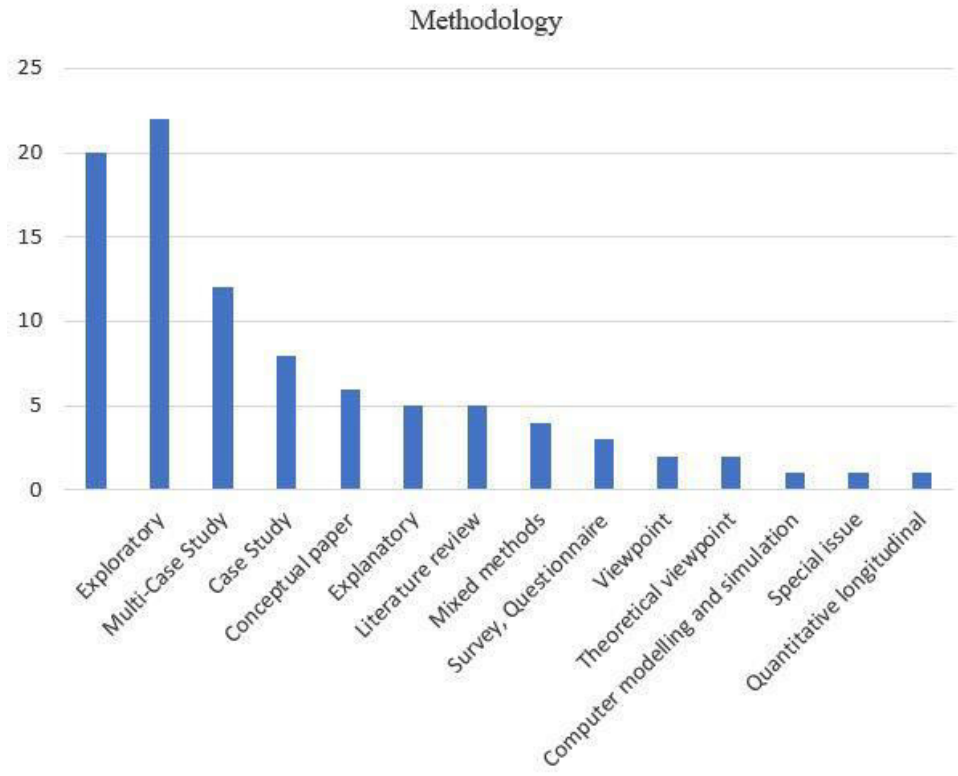
Graph 4. Industry sectors



Research methods

Most studies conducted so far on the digital transformation of BMI have used an exploratory approach.

Graph 5. Methodology



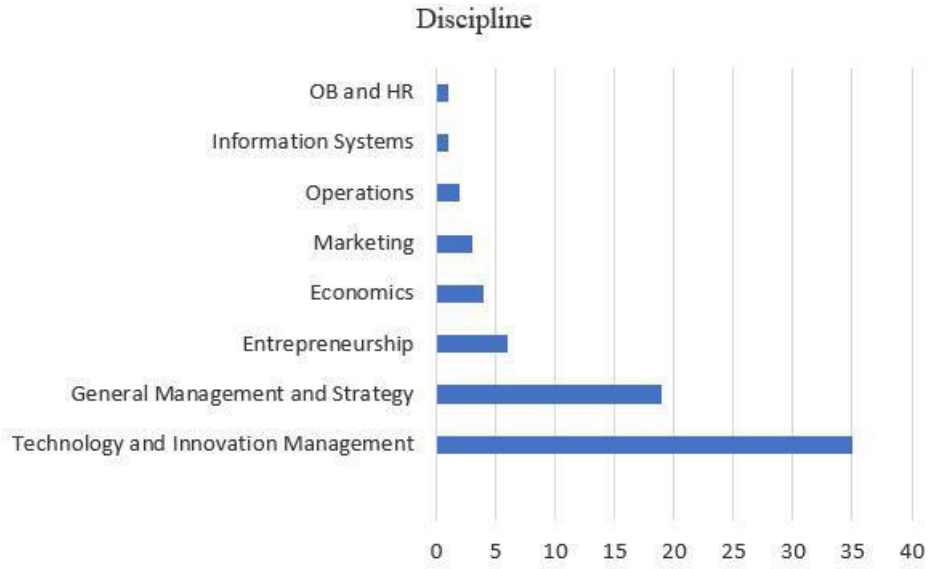
These studies aimed at achieving a first understanding of the phenomenon of digital transformation of BMI, which is indicated by the extensive use of qualitative research. This finding relates to the fact that digital transformation is a new phenomenon. Consistent with this, Li (2018) argues that we are facing a methodological challenge in the investigation of new emerging trends since these trends "are still at very early stages of development with limited empirical presence". For this reason, the author suggests using new research methods such as research prototyping and fictional design.

Few longitudinal studies have been carried out. This creates a need for future longitudinal studies, which will help in better understanding the sharing economy and peer-to-peer platforms (Akbar and Tracogna, 2018). The contributions of these studies mainly consist of offering frameworks and propositions derived from explorative research. There have been no further empirical studies to support or refute the suggested propositions. Few papers investigate the relationship between digital transformation and BMI following an explanatory methodology. A considerable number of papers (8 papers) are conceptual or theoretical viewpoints. These insights suggest that the field of research in the digital transformation of BMI has the potential to be restricted to a single paradigm. The absence of positivist research will prevent the wider acceptance and development of the field.

Disciplines

Most of the research is undertaken in the disciplines of technology and innovation management, general management and strategy, and entrepreneurship. Few studies are from the disciplines of economics, information systems, marketing and operations.

Graph 6. Disciplines



This might primarily be because the purpose of our study is too focused and bridges two different topics: digital transformation and MBI. The other reason might be these three disciplines are more concerned with the impact and implications of the phenomenon of DT. The dominance of only a few disciplines relates also to the journals that are interested in publishing on this topic. Since most of the articles have been published in Technological Forecasting & Social Change, California Management Review, the Journal of Business Research and Technovation this affects the disciplines that will be covered by research. The low presentation of articles focusing on operations and entrepreneurship is unexpected, however. This suggests that the field of digital transformation of BMI is fragmented between three major discipline areas, and the predominance of single-discipline research is noted. The fragmentation of the field has implications for the conceptualisation and research methodology for the progression of the digital transformation of the BMI field.

RQ2. What is the focus of the literature on the digital transformation of BMI?

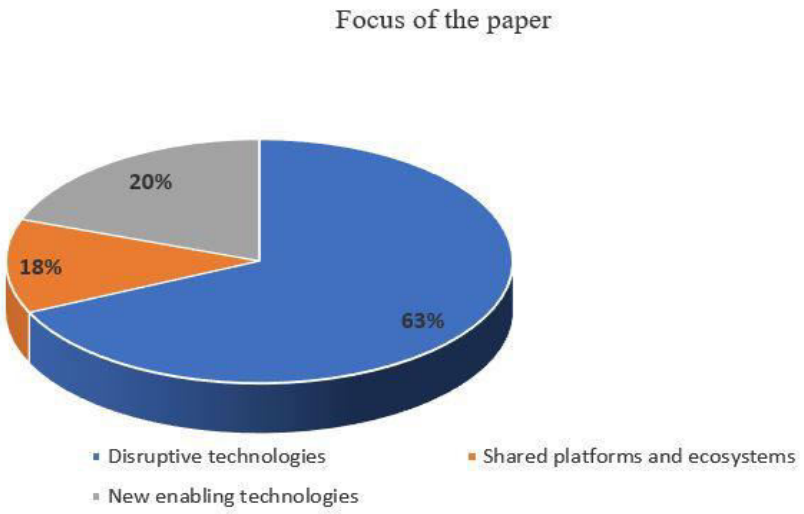
Main focus

The literature on digital transformation is dispersed between disruptive technologies, shared platforms and ecosystems, and new enabling technologies such as Big Data, the Internet of Things (IoT), Industry 4.0, Cloud computing and digital fabrication (DF). Disruptive technologies in the literature refer to technologies that have the potential to introduce new product attributes, which could become a source of competitive advantage (Christensen, 1997); while a platform is defined as "any combination of hardware and software that provides standards, interfaces, and rules that enable and allow providers of complements to add value and interact with each other and/or other

users" (Teece, 2018). Taken together, the platform innovator(s) and complementors constitute an ecosystem (Teece, 2018).

The majority of research in this field (49 articles, 63 percent) has focused on understanding the impacts that new disruptive technologies have on industries, identifying the areas of transformation in activities, processes and BMs. Only few articles focus on understanding how the process of transformation takes place by drawing on different disciplines and theories.

Graph 7. Focus of the paper



An analysis of articles about disruptive technologies reveals that in earlier years, the literature (2009-2010) was focused on the challenges and opportunities created for incumbent BMs by these technologies. Some of the articles focus on the challenges faced by incumbents when managing radical technological change. As Chesbrough (2010) notes, there are many "opportunities and barriers in business model innovations" from technological advances. For instance, the case study of Kodak identified organisation structure and culture as playing a crucial role in overcoming core rigidities to create new value from disruptive technologies (Lucas & Goh, 2009). Rothmann and Koch (2014) took a very divergent perspective, showing that the digital transformation of BMI fails when companies follow the same old strategic patterns and remain path-dependent. From 2013 focus shifted to ways to overcome these challenges. For example, Karimi and Walter (2016) argue that the adoption of a disruptive BM requires firms to give groups autonomy and allow risk-taking and proactiveness. Kapoor and Klueter (2013) suggested overcoming a firm's inertia associated with prevailing incumbent BMs by investing in research and development through alliances and acquisitions.

Nevertheless, disruptive technologies bring opportunities to firms who understand how environmental changes necessitate BM modifications. Wirtz et al., (2010) argue that the Web 2.0 phenomenon, based on social networking, interaction orientation, user-added value and customisation/personalisation serves as a value offering to traditional internet-based BMs (content, commerce, context and connection). Another opportunity considered in the literature relates to the introduction of disruptive technologies from advanced economies into emerging economies through

a second BMI by latecomer firms (Wu et al., 2010). Firms can also use different tactics (compensating, enhancing and coupling) to reconfigure their value propositions (Bohnsack and Pinkse, 2017). Table 2 summarizes the challenges and opportunities of disruptive technologies, according to some of the contributions analyzed.

Table 2. Challenges and opportunities of disruptive technologies

Author	Opportunity	Challenge
Lucas and Goh (2009)		Organisation structure and culture
Kapoor and Klueter (2013)		Overcoming firms' inertia associated with prevailing incumbent business models
Wirtz et al. (2010)	Web 2.0 serves as a value offering for traditional Internet business models	
Wu et al. (2010)	Second business model innovation by latecomer firms	
Bohnsack and Pinkse (2017)	Compensating, enhancing and coupling tactics to reconfigure value propositions	

The second most important topic analysed, as shown in Graph 7, focused on shared platforms or "platfirms" and ecosystems as new BMs for digital enterprises. Table 3 below summarises the focus of some of these studies and their findings. We can see that shared platforms and ecosystems are a very recent focus, studied between 2017 and 2018, however, we note that the literature has addressed a number of broad issues which relate to an initial understanding of platforms, starting with their classification into five typologies (Muñoz and Cohen, 2017), and the investigation of the role played by platforms in dealing with disruption (v. Alberti-Alhtaybat, Al-Htaybat, and Hutaibat, 2018) and BMI (Gupta and Bose, 2018). Our results show that there is an important focus on financial aspects of platforms and ecosystems. For instance, Teece (2018) and Helfat and Raubitschek (2018) focus on aspects of profiting from innovation, while Khuntia et al., (2017) consider the relationship between the evolution of service offerings and the financial viability of platforms. Analysis of the data also indicates a focus on the managerial issues and success factors of these digital platforms. Since digital enterprises operate in a highly dynamic environment, lean startup approaches (LSA) have been studied within the strategic agility context. LSAs can be employed as agile methods to enable digital entrepreneurs to innovate BMs (Ghezzi and Cavallo, 2018). Piscicelli et al. (2018) identified the success factors of sharing platforms: the identification of a significant market friction, building of a critical mass of users before implementing a correct pricing level and structure, addressing the hurdles of competition and regulation, and positive interaction fostered between users.

Table 3. Focus of literature on shared platforms and ecosystems

Author (year)	Aim of the study	Results
Muñoz and Cohen (2017)	Typologies of sharing business models	Crowd-based tech business models, collaborative consumption business model, business-to-crowd business model, space-based business model (low-tech), and Utopian sharing outlier business model
v. Alberti-Alhtaybat et al. (2017)	Dealing with disruption	Building a unique business model based on technological innovations and agility
Gupta and Bose (2018)	Business model transformation in pioneering digital firms	Technological affordances help companies to strategically learn to adapt to operating environment
Piscielli et al. (2018)	Success factors for P2P goods-sharing platforms	Business model design and execution; Ability to experiment and innovate business model
Ghezzi and Cavallo (2018)	Lean startup approaches (LSA) and BMI in digital startups	LSAs are agile methods for BMI for digital startups under conditions of environmental dynamism.
Khuntia et al. (2017)	Influence of service offerings evolution in operational maturity and financial viability of HIE	Shifting over time from transaction fees, to subscription or hybrid revenue based models
Helfat and Raubitschek (2018)	Profiting from innovation in digital platform-based ecosystems	Innovation, scanning/sensing, and integrative capabilities
Teece (2018)	Profiting from innovation in the digital economy	Understanding of relevant complements, good BM design, supportive governmental policy
Kamalaldin et al. (2020)	Profiting from digital servitization	Understanding the relational components that can create value
Khanagha et al. (2020)	Profiting from innovation in the digital economy	Understanding the contribution of platforms to competitive advantage

The results shown in Graph 7 indicate that research is also led by recent arising interest in big data (Urbinati et al., 2018), cloud computing (Nieuwenhuis et al., 2018) and closed-loop systems in the circular economy (Rajala et al., 2018). These new enabling technologies allow firms to apply new BMs in support of sustainability issues. The growing intelligence of goods generates novel BMs which rely on the intelligence of ecosystems within the activities for resources, by shaping closed-loop systems (Rajala et al., 2018). Firms are also engaging more in frugal innovations, allowing them to carry out resource-constrained innovations for emerging markets (Winterhalter et al., 2017).

To conclude, this section develops insights regarding the focus of the literature. The literature that is focused on disruptive technologies advances disruptive innovation theory by proposing culture, organisational structure and cognitive leadership intentions as important factors affecting company responses to disruptive innovation. However, there is still a missing link in understanding the moderating role of disruptive technologies, based on their digital infrastructure and this requires more research into the conditions and the extent of BM transformations (Gupta and Bose, 2018). The literature also shows that shared platforms and ecosystems, as well as new enabling technologies, are a very recent focus. In contrast to articles about disruptive technologies that focus on challenges and opportunities, articles about shared platforms consider a broad number of issues from typologies to managerial and financial aspects. Nevertheless, the results show that few articles focus on one topic and the focus shifts quickly, leaving topics under-investigated. This finding highlights the need for more research on topics that are under-investigated and represented by only a few studies. The scattered nature of the field might affect the accumulation of knowledge, as studies do not focus on previous findings.

Theoretical perspectives

Theory development is essential for the proper advancement of knowledge in any field of research (Kuhn, 1970). To develop a better understanding of theoretical perspectives in the field of digital transformation of BMI, we analysed the articles and determined whether a theoretical perspective was apparent in each. We further analysed articles that reflected theoretical perspectives and identified whether the theory was an existing one or a new theory. The results of this analysis revealed that the majority of articles (47 articles, 65 percent) was not based on any discernible theory.

Of the articles with an apparent theoretical perspective, we observed that the majority had adopted theoretical perspectives. Recent contributions (e.g. Akbar and Tracogna (2018); Teece (2018); Helfat et al. (2018); Vendrell-Herrero et al., 2017)) have started questioning and seeking more theoretical frameworks in order to explain and understand the digital transformation of BMI. Interestingly, disruptive innovation theory (Christensen, 1997) was the most popular with five contributions, and other theories were adopted only by single studies. The theory of disruptive innovation was initiated by Christensen (1997) to explain the replacement process of a mainstream innovation by innovations that are cheaper than those on the market and of inferior performance. In this dominant view within the field, which originates from a technological and innovation management perspective, DT is studied at an organisational and individual level of analysis. These researchers incorporate disruptive innovation theory in their studies to show how value generated from technology can be accelerated. For instance, the case study of Kodak (Lucas and Goh, 2009) recognises culture and organisational structure as crucial elements in creating new value when disruptive technologies are introduced in an industry. Osiyevskyy and Dewald (2015) concentrate on the strategic decisions of managers and argue that responding to ongoing disruption with experimentation depends on a leader's explorative intentions.

More recent articles that relate the digital transformation of BMI to disruption theory concern topics based on managerial practices of inspiring and managing disruptive innovations in digital entrepreneurships, such as collaborative open foresight (Wiener, 2018) and knowledge management (v. Alberti-Alhtaybat et al., 2018). As v. Alberti-Alhtaybat et al. (2018) note about the logistic company Aramex that "current study seeks to illustrate their approach to logistics and their mindset

regarding disruptive technologies, which is reflected in their particular business model". Also, for instance, Wiener et al. (2018) argue for collaborative open foresight as a new managerial solution for inspiring disruptive innovations.

We highlight other theoretical perspectives that provide a variety of perspectives on the digital transformation of BMs. Simmons (2013) takes an actor-network perspective, to demonstrate that the digital transformation of BMI is a social process facilitated by the negotiation between the network of partners involved. Other researchers use different theoretical perspectives to understand DT of BMI. Akbar and Tracogna (2018) develop their research on transaction cost economics theory to explain the impact of transaction features on the emergence of sharing platforms. Teece (2018), and Helfat and Raubitschek (2018) ground their profit from innovation framework on dynamic capabilities theory. Teece (2018) builds on the recent importance of digital platforms, standards, appropriate regimes, complementary assets and technologies to show that the mobilisation of relevant resources and platform capabilities is an important dynamic ability in managing complements in the ecosystem in order to capture value from it. Similarly, Helfat and Raubitschek (2018), suggest that integrative capabilities are important for designing and orchestrating the alignment of activities and their products with other partners in ecosystem BMs. Finally, Gupta and Bose (2018) identify the factors impacting digital transformation of BMs based on affordances theory, and attempt to develop a theory of strategic learning for digital ventures, as digital technologies offer firms the potential to develop strategic learning while they adapt continuously to their operating environment. Interestingly, more recent papers (Gupta & Bose, 2019; Trabucchi et al., 2019) rely on the business model canvas framework (Osterwalder & Pigneur, 2012) to analyze in-depth the variables of innovation which lead to competitive advantage and communication with the external stakeholders.

These findings suggest that the digital transformation of BMI was firstly related to disruptive innovation theory in the literature and that recently this trend is appearing again. The only difference is that while previous research addresses digital transformation as an extension of the disruptive theory that brings challenges and opportunities to the BM of incumbents, considering digital transformation a consequence of disruptive innovation, recent research relies on disruptive theory and is more focused on practices and methods to manage and inspire disruptive innovations.

To conclude, these theoretical insights suggest that digital transformation has brought a new conceptualisation of BMs and new ways for value creation and capture. According to the transaction cost theory, sharing platforms are dominating as BMs, where the transactions between the parties have resulted in the creation of ecosystems. The creation of ecosystems and sharing platforms has pushed research into disruptive innovation theory to emphasise the commercialising value of disruptive technologies. Simons' article brings a new perspective to our understanding of digital transformation in companies, taking into consideration the moderating role of social aspects in creating value from digital transformation at a firm level. Further research should investigate which social aspects in the network of actors make more contributions to value creation. We also lack an understanding of how the social relationships of the actors in a network contribute value delivery and capture. This perspective of actor-network theory can be very helpful in studying sharing platforms and ecosystems, outside the boundaries of the firm.

Researchers suggest numerous ways for managing disruptive innovation in ecosystems and among firms – through coordination building (Teece, 2018), the implementation of strategic learning processes and structures (Gupta and Bose, 2018), involvement in collaborative open foresight

projects (Wiener, 2018), leveraging strategic partnerships through knowledge management (v. Alberti-Alhtaybat, Al-Htaybat, and Hutaibat, 2018) and using agile methods that enhance strategic agility (Ghezzi and Cavallo, 2018). The digital transformation thus emphasises not only competition but also collaboration, closing the gap between stakeholders. Referring also to what we discussed previously in the focus of the literature section, digital transformation is enabling companies to work towards issues of sustainability by engaging them in circular and sharing economy approaches. BMs have thus become an open tool for everyday changes related to technological improvements and knowledge management concerning stakeholders and sustainability issues. The digital transformation of BMI now includes technological developments, relationships with stakeholders and sustainability issues in its framework. Our analysis, therefore, suggests that the digital transformation of BMI is a bridge that links the value of strategic innovation management required to solve problems to stakeholders, technology development and sustainability issues, with their opportunities to create and capture value. Further analysis may include the psychological aspects of the various stakeholders, who represent primary actors in the ecosystem, and who may still feature competing interests in the use of the DT and its outputs.

RQ3. How has digital transformation facilitated BMI?

This section combines the results of the literature review to understand better the impact of digital technologies on value creation, and the capture and delivery of BMs. In the literature, digital technologies "are regarded to play a critical role in facilitating business model innovations in different sectors" (Li, 2018). New enabling technologies create new ways of doing business for companies and lead to the implementation of new ways of creating, delivering and capturing value.

Digital transformation and value creation

The value creation sub-component of the BM describes the products and services offered to the customer. The review of the literature shows that digital transformation is enabling companies to create new value in a diversity of ways. We identify below four means of value creation and explain each of them.

First, digital transformation allows firms to create new value through the revision and extension of their existing portfolio of products and services. For example, newspaper and book publishing industries adopted a servitisation strategy to offer digital products to customers (Øiestad and Bugge, 2014). This extension of products and services relates specifically to the dematerialisation of physical products and the switch from product to service logic. In fact, dematerialisation and service logic have impacted the pharmaceutical industry through new approaches such as personalised medicine, nanobiotechnology and systems biology, providing new therapeutic principles in this industry (Sabatier et al., 2012). Other cases in the literature include firms in the retail industry which have created new value by adding a new BMs through online retailing (Kim and Min, 2015).

Secondly, digital transformation enables firms to understand customer needs better and offer new value propositions in accordance with what they want. One type of value proposition creates high personalisation with customers. For instance, novel value propositions can provide a high level of

involvement for the customers in value co-creation through additive manufacturing and 3D printing technologies, as in the manufacturing industry (Bogers et al., 2016). High-value creations are also based on new BMs that rely fully on recent technological developments such as smart apps, drones, 3D printing and crowdsourcing delivery to create new value for customers, through new services. The adoption of these digital technologies has transformed companies in the logistics industry into technology enterprises, which sell "transportation and logistic solutions without being encumbered by heavy investments in assets" (v. Alberti-Alhtaybat, Al-Htaybat, and Hutaibat, 2018). In contrast, other value propositions aim to satisfy only the necessary needs. In this case, firms offer new value propositions and even create new markets by addressing the needs of low-income customers in emerging economies (e.g. resource-constraints innovations in the healthcare industry) (Winterhalter et al., 2017).

Third, we notice a tendency of some industries, such as financial services, hospitality and automotive services, healthcare to employ disruptive technologies on their BMs, in order to find solutions for sustainability issues and a sharing economy approach. For instance, the automotive industry is adopting sustainable mobility (Bohnsack and Pinkse, 2018), creating new sources of value by offering a superior product or service (e.g. car-sharing services, mobile applications), or by coupling their products with other services (Bohnsack and Pinkse, 2018). Similarly, embedding the sharing economy approach in the financial services industry is bringing new innovations for processes and services (Gomber, 2018), leading to digital banking services, products and functionality which enhance customer experience (Gomber et al., 2018).

Fourthly, we witness the creation of new value through digital platforms or "platfirms" (Presch et al., 2020) and ecosystems. DT provides the necessary digital infrastructure for everyone to connect to different actors in networks. For example, in the USA, DT has created new Health Information Exchanges (HIE) organisations, using multi-sided digital platforms to offer information exchange services between different actors in the industry (Khuntia et al., 2018). In the telecommunication industry, the diffusion of data content through mobile devices and the innovation of network infrastructure technology has resulted in a mobile telecommunication ecosystem. In the hotel industry, the emergence of booking platforms (booking.com) and sharing platforms (Airbnb), have brought new value propositions to customers, which are cheaper and more authentic.

Digital transformation and value delivery

Value delivery describes the way the activities and processes in a company are employed to deliver the promised value to the customer. The review of the literature reveals a significant change in the way value is delivered in digitally enabled BMs. Digital transformation has challenged core competencies, activities, capabilities and the roles of firms (Nucciarelli et al., 2017; Teece, 2018; Ghezzi et al., 2015).

Firms are first required to examine their core competences to align themselves with the shift to digital formats and servitisation (Øiestad and Bugge, 2014). Their new competencies should include knowledge of digital technologies in order to manage relations with customers efficiently and to use the interactivity of digital channels (Li, 2018). Firms should be open to incorporating new disruptive technologies in order to continuously innovate their operations (v. Alberti-Alhtaybat, Al-Htaybat, and Hutaibat, 2018).

Second, rapid changes in the new ecosystem business environment introduce the need for new capabilities and more emphasis on specific existing capabilities. New capabilities are necessary to

deal with changes in the value chain and ecosystem business environment. For instance, in the pharmaceutical industry, firms need to deploy specific assets and capabilities that relate to the orchestration and management of information flows in the network. Previous literature has highlighted the presence of projects relying on new digital technologies (in that case, the blockchain) to distinguish authentic drugs from fake ones (F. Dal Mas, Massaro, et al., 2020). Integrative capabilities help companies capture value in ecosystems and leverage their assets (Helfat and Raubitschek, 2018). In other industries (e.g. telecommunication) marketing capabilities have to deal with decreased costs and technical abilities to deal with changes in the ecosystem. Firms need to be "agile" and leverage platforms and strategic partnerships.

Third, DT implies a change in the activities and processes of the firm. When firms get involved in projects about sustainability, manufacturers in the automotive industry implement environmentally-friendly processes of manufacturing. This undertaking has led companies and suppliers to collaborate on open innovations projects, such as the "Mobility Scenarios for the Year 2030 – Materials and Joining Technologies in Automotive Engineering" (Wiener et al., 2018). The other example involves processes of frugal innovations in the healthcare industry, which are designed to reduce cost in all value chain activities (Winterhalter et al., 2017).

Fourthly, DT has impacted the role of firms in the industry. The shift in the role of actors in the industry results from the entrance of new players. For example, the entrance of new players (web companies) in the telecommunication industry affects value delivery (Ghezzi et al., 2015).

Digital transformation and value capture

The value capture of the BM involves the revenue model and its financial viability by focusing on revenue streams and cost structures. The literature review suggests that DT creates various new for firms to decrease costs and increase revenue.

Firms capture value by new enabling technologies. Big data provides companies with the means to reduce uncertainty in decision-making (Urbinati et al., 2018), to optimise processes and increase the efficiency and quality of products and services (Loebbecke and Picot, 2015). These attributes help firms identify new sources of value in other markets and to reduce the costs of adopting BMs over time.

Firms can capture value from superior value propositions. This is demonstrated in industries such as logistics, where customers pay for superior service and solutions, or resource-constraint innovations, for the superior quality of a service network. In the pharmaceutical sector, firms capture value through new value propositions, for which companies deliver service to patients. In creative industries, premium prices are based on the exclusivity and personalisation level of the service offered (Li, 2018).

DT allows firms to capture value on platforms by leveraging new technologies and improved customer intimacy (Gomber et al., 2018). Research shows that value capture is influenced by the advancement of services provided, however, and transaction-based revenue models are not appropriate revenue models for achieving viability over time.

Future research avenues

Based on the results of our literature review, in this section we discuss the gaps identified in the literature and suggest future research avenues that are relevant for theorising. We suggest future research avenues, following the previously identified impacts of digital transformation on the new ways of creating, delivering and capturing value.

Future research into value creation

Research is needed into understanding how companies should manage the trade-off between the cannibalisation of existing products and investing in new advanced services for their customers. It remains unclear how companies can develop numerous value propositions for customers that are personalised and always require the co-existence of existing products and product-centric services. The impacts that adding or extending of BMs have on existing BMs are unclear.

It is essential for the manufacturing industry to understand how manufacturers can manage the customisation of products and control the value co-creation process with customers (Bogers et al., 2016). In this avenue of research, it would be necessary to consider also the impact of future technological development on value co-creation; for example how the combination of digital fabrication and Web 2.0 would create new means of value co-creation.

Further research is needed to identify how new BMs emerge and how value creation is formed in the creative industries, by researching the different interactions among, for instance, crowdfunding platforms, entrepreneurs and the crowd. There is a lack of knowledge about the effects that crowdfunding platforms have on value creation activities. It would be useful to understand how the collaborative and competitive dynamics of crowdfunding platforms create value for firms.

It remains unclear how agile practices can help firms to create value from digital technologies and customised services. Future research should also consider the application of agile practices in traditional industries. As firms in traditional industries in the context of ecosystems need to carry out more innovation with other firms, this opens an avenue for further research on how agile practices could become a source of value creation.

There is a need for much more research on understanding the role of single technologies such as the Internet of Things (IoT), Cloud computing, artificial intelligence, Big data and the blockchain. The application of these technologies in practice will bring direct knowledge for understanding the dynamics of value creation processes as a source of competitive advantage.

Value creation should also be studied regarding how to create value by generating content from customer data. There is still a call for further research into how firms should exploit all this information through analytics that will help them to design better value propositions for customers, according to their needs.

Value creation for customers should also be analyzed stressing the psychological impacts. New insights and inputs come, for instance, from the healthcare sector in dealing with the recent COVID-19 pandemic, with terminal patients relying only on telemedicine to get in touch with their dear ones (Ritchey et al., 2020; Wakam et al., 2020), fostering new possible BMs for firms operating in that field.

Another avenue for further research is to define the boundary conditions under which BMs should be innovated, how often and how this will impact value creation. Firms learn from the intense and continuous interaction with the high dynamism of the environment and need to undertake changes

in the BMI. However, there is still a lack of research defining the boundary conditions driven from the technological advancements that impact value creation in the BMI.
Lastly, it is important to understand the role of new technologies in sustainable issues. It is still unclear how to create new value in the circular economy and from industries where sustainability plays a crucial role, for example, in the retail industry. The link between DT and pro-environmental behaviours of customers, especially from a psychological perspective, appears as a pretty new and promising stream of research (Yusliza et al., 2020).

Future research into value delivery

There is a need for more research on ecosystems. The recent review shows how roles and interdependencies in the ecosystem change remain unclear. New activities, roles and capabilities should be identified to enhance our understanding of how firms should orchestrate the new relationships in the ecosystem. Knowing how to develop the abilities to manage the delivery network is essential for key players.
The culture shift to advanced servitisation requires more research. This is especially necessary for manufacturing companies that now provide digitally advanced services instead of products. This kind of mental shift is difficult for employees and remains a challenge for companies regarding how its delivery network should be organised. The cultural shift is especially important for distribution channels that call for digital servitisation.
More research is also needed on understanding the new capabilities required for manufacturing firms that are involved in digital fabrication. More simulation studies should be carried out to better understand how supply chains will be designed for 3D printing.
There should be more research into identifying the role each technology has in enabling firms with new capabilities and roles. These results will offer a clear idea of the technology they should invest and how it should then be related to new capabilities. The attitude towards the use of technologies has been considered by the literature as a soft skill, rather than a technical one (F. Dal Mas et al., 2021; Maria Teresa Lepeley, 2021; Maurizio Massaro et al., 2014). The open debate concerns how much these skills can be learned, or at least fostered. Further investigation is needed to understand how such skills may be empowered through education in order to facilitate delivery and the translation of knowledge. In this regards, psychological aspects related to the attitude towards new technologies may be taken into consideration, following an interdisciplinary perspective.

Future research on value capture

Our results show that investing in digital technologies is costly and undertaking the digital transformation of a firm requires a culture shift. Further studies should investigate how investments in technology relates to the feasibility of revenue models and value capture. Sometimes capturing value from investments in new technologies does not fully exploit the revenue.
Future research should increase our understanding of the value capture of ecosystems, where investments are high. Still, the profits captured by each collaborator actor in the ecosystem are only a fraction of their investment (Teece, 2018).

In the manufacturing industry, the paradigm shift to digital fabrication requires more research into understanding whether value capture is higher for the manufacturer or for the retailer. This can be important in deciding who can invest more in additive manufacturing and 3D printing technologies. The types of revenue models that should be applied during the evolution of the services are still unclear. There is a need to carry out longitudinal research to explore further the best fit of the revenue models along the lifecycle of the product-centric services (Khuntia et al., 2017).

Conclusions

This paper uses a structured literature review to provide insights into the development of the field of digital transformation of BMI, to understand the impact of digital transformation on BMI and to provide avenues for further research. The review of the literature shows that the digital transformation of BMI is a new field of research with a growth in interest from researchers from 2014. As there is an increased interest from researchers we expect a growing number of publications in the field. Our results show that this field of research has no dominating authors, implying that few authors remain focused on exploring further aspects of BMI driven by digital transformation. This hinders the knowledge-building process in the field, as only a few authors make use of prior findings to build cumulative knowledge. Indeed, we observe that topics have shifted over time from a focus on incumbents to digital start-ups and from disruptive technologies to new enabling technologies. This reveals the practitioner-led nature of research in this field, although there is a wide divide between academics and practitioners. For this reason, we suggest more collaboration between academics and practitioners, which will help the field to move from an early stage of maturity towards a mature stage. Collaborations may be facilitated by joint forums, think tanks, interventionist research by academics into firms, publications of the main research results in practitioners' sources like magazines, financial journals, or internet blog posts.

Our results suggest a need for research in developing and emerging countries, especially those from Asia, as they are significantly under-represented, despite their massive contribution to technological solutions. The manufacturing and creative industries dominate research. This raises the need to study other industries such as design, architecture, advertising and the fashion industry (Mangematin et al., 2014), and creating more contents in those sectors, like healthcare, which is relying on DT to cope with the several global challenges, including the recent COVID-19 pandemic (Cobianchi et al., 2020; F. Dal Mas, Piccolo, et al., 2020; C. J. Wang et al., 2020). The extensive use of qualitative methodology also suggests that the potential of the field be restricted to interpretive theory building. This calls for more deductive test theory, which might be found if the field involves more interdisciplinary research in the future.

Our review shows fragmentation of the field between disruptive technologies, shared platforms and ecosystems, and new enabling technologies. The focus of research has been mainly on the understanding of impacts that new disruptive technologies have on industries, identifying the areas of transformation in activities, processes and BMs. Few studies focus on understanding how the process of transformation takes place by drawing on different disciplines and theories. These insights reveal the scattered nature of the field and a quick shift of topics, leaving them under-investigated. Future research should, therefore, be based more on previous findings, thus helping with the accumulation of knowledge and the identification not only of practical gaps but also theoretical gaps.

We suggest that digital transformation has brought a new conceptualisation of BMs to the value creation and capture mechanisms. The review of articles provides a variety of theoretical perspectives on the digital transformation of BMs. Disruptive innovation theory is the dominant theoretical perspective, based on which we propose that the digital transformation of BMI is a bridge that links the strategic management of a company's disruptive innovation required to solve problems with stakeholders, technology development and sustainability issues to their opportunities to create and capture value. There is a need for further research grounded on theoretical perspectives of dynamic capabilities and actor-network theory.

The results of our study show that digital transformation has impacted value creation, delivery and capture in almost every industry, although some fields are more investigated than others. DT enables firms to co-create value with customers through customised manufacturing; through the adoption of servitisation strategies and extension of the existing portfolio of products and services; the creation of new value through digital platforms and ecosystems; and finally allows firms to address solutions to sustainability issues and even address the very specific and particular needs of customers to enhance their experiences. These changes in value creation have required companies to examine their competences, roles, activities and capabilities. Firstly, firms should possess first-hand knowledge of digital technologies to manage relations with customers efficiently. Secondly, firms should be prepared to shift their roles as new players enter the ecosystem. Thirdly, involvement in sustainability projects, frugal innovation, and circular economy requires a change in activities and processes. Fourthly, integrative capabilities have become necessary for firms to deal with changes in the value chain and ecosystem environment. The adoption of new enabling technologies allows firms to reduce uncertainty in decision making and capture value from improved customer intimacy and superior service.

To advance research on DT of BMI, we also suggest some future avenues with regard to impacts of DT on value creation, delivery and capture. The identification of these theoretical gaps can be argued to help the advancement of literature on the DT of BMI.

Our study has limitations. Firstly, this paper considers only research published in leading journals, listed in the ABS classification with 3, 4 and 4*. This can be a limitation due to missing results published in other journals that might be relevant for the aim of our study. Secondly, there are some implications from the conclusions of this study. The results are valid only for the specific time period we consider in this study, until September, 2020. As we previously saw, since research in the field is experiencing high interest and an increasing number of contributions yearly, future research works could modify our findings. The conclusions derived in this research are based on exploratory research, where sometimes a single case study approach is followed (Wiener et al., 2018), or sharing platforms are evolving over time (Piscielli et al., 2018) and where IT industry is characterised by short innovation cycles (Nieuwenhuis et al., 2018). Nevertheless, this research into the digital transformation of BMI can provide practitioners with new insights about the phenomenon, and will help them to continually innovate their BMs and remain competitive, as new technologies become more ubiquitous.

The digital revolution and its impact on intellectual capital disclosure

Abstract

In this book chapter, we analyse the impact of digital disruption on intellectual capital disclosure (ICD). Digital disruption has brought tremendous changes to company communication opportunities. In these conditions, digital technologies challenge the disclosure of ICD. Concerning this chllange, we provide an analysis that sees ICD as a communication process. Communicator, message, channel, audience, and conversation are proposed. Existing studies are analysed using a Structured Literature Review methodology, and findings are discussed using the lens of digital disruption to search for new research opportunities.

Keywords: value communication, intellectual capital, disclosure, digital technologies.

Introduction

The number of studies on intellectual capital disclosure (ICD) published in leading journals in the accounting field has increased over the last two decades (Serenko and Bontis, 2013; Dumay and Cai, 2015). Despite the growing number of papers in the field, several authors have raised concerns about the development of the research field. For example, Dumay and Cai (2014) discuss how, despite the growing number of the papers, citations of publications that focus on ICD are decreasing, due to the reduced innovation in the research field and the increase in what Dumay (2014) calls "copycat research" studies. Similarly, Cuozzo et al. (2017, p. 9) note that ICD published papers continue to "fixate on general issues, largely drawing their analysis from the corporate reports of publicly listed companies." Following this research line, we argue that those comments open the door to re-focus existing research on ICD, rather than advocating for the research field, and reaching a dead-end (Goebel, 2015).

According to Cuozzo et al. (2017), a company annual report has been the "norm in past ICD research," however, the development of computing and information technologies as well as the globalisation of the markets, has brought changes to the way companies innovate, operate and communicate with their parties. According to Kenney et al. (2015, p. 1.) digitalisation "has induced an ongoing societal transformation that may ultimately prove to be as significant as the original industrial revolution" and communication makes no-exception since there are major trends "that are not only disrupting technology but are completely changing the way we communicate" (Newman, 2014).

ICD must follow those changes (Massaro et al., 2017) since digital technologies allow companies to develop new communication channels, providing different outlets for disclosing their IC for different purposes. For example, new technologies allow companies to engage stakeholders with a dialogic approach where the company and the stakeholder interact (Merkl-Davies and Brennan, 2017). Similarly, new technologies not only create new ways for companies to communicate but allow the development of what Dumay and Guthrie (2017) call "involuntary disclosure", where the stakeholders talk to each other. In this context, it becomes crucial to critically analyse research in ICD and provide new perspectives on the research field in the digital age, focusing on the impact of digital technologies in providing new venues and new ways of developing ICD.

This book discusses how the digital revolution is providing new opportunities for ICD research. The chapter is organised as follows. The next section presents the framework used. More precisely, the chapter analyses the communicator, the message, the channel, and the type of conversation used in previous studies. The following section presents the results of a structured literature review (Massaro et al., 2016) showing for each dimension how previous studies discussed the topic of ICD and debating the new opportunities provided by the digital era. The book chapter ends with our conclusions.

IC disclosure and the digital revolution: A framework of analysis

The number of ICD studies has been increasing in recent decades (Sharma et al., 2013). Despite the development of what Dumay (2016) calls "true believers" in ICD research, many studies have found that ICD in annual reports has not increased in recent years, and that instead, the disclosure of IC (Intellectual Capital) is stagnant or even decreasing (Singh and Kansal, 2011; Joshi et al., 2011).

These results are developing a new sceptical approach to ICD, and several reasons for this have been suggested. Some authors have concluded that the low level of ICD is due to its voluntary nature (Brüggen et al., 2009; Borghei et al., 2016). Dumay (2016) discusses the difference between IC report, disclosure, and divulgence. Haji and Anifowose (2017, p. 373) find that companies use "specific disclosure strategies to respond to external pressures" building a strategic legitimacy. These new trends and the development of a sceptical approach to ICD have raised the problem of strengthening the scale, scope and quality of ICD research (Md Zaini et al., 2018).

Building on this research line, we conceptualise ICD as a communication process and discuss how new technologies are providing new ways of analysing ICD. The term "communication" means any "form of words, tables, graphs and pictures using a variety of genres, channels, and media, to discharge accountability or aid decision-making" (Brennan and Merkl-Davies, 2018, p. 555). The idea of corporate communication is relevant in the digital age as it encompasses the dialogic process of information flowing in both directions by the means of a variety of communication channels and media. Digital technologies and social media therefore require researchers to use a new way of thinking about IC communication.

According to Littlejohn et al. (2017, p. 51) communication is a research field that remains at the crossroad of many theories, however, "it is natural … to start with the individual as we begin to think about communication." The communicator, therefore, represents the first element when we start thinking about communication, and existing theories have considered the innate biological or psychological factors of the communicator, the process of communication and the relationship between the communication and the context where the communication occurs (Littlejohn et al., 2017). In analysing how digital technologies can improve ICD, we must therefore discuss how the communicator has been included in existing studies, focusing on the new opportunities provided by digital innovation.

If the communicator is the initiator of the communication, the message "is at the heart of the communication process … [and] communication scholars have looked at all aspects of messages, including how messages are conceptualised, structured, delivered, and interpreted" (Littlejohn et al., 2017). Interestingly, the digital revolution is bringing together new opportunities for shaping the message in different forms, such as audio, picture, and even videos. In addition, information technologies provide companies with new communication channels. When analysing how digital technologies are affecting ICD, an important aspect is related to the new opportunities provided for embedding the message in different formats and disseminating it via different communication channels.

Finally, specifically addressing the topic of corporate communication, Merkl-Davies and Brennan (2018) discuss the need to move from a monologic to a dialogic approach using tools such as blogs. Based on this idea, Massaro et al. (2017) discuss how ICD could involve the company allowing stakeholders to communicate with each other using opportunities provided, for example, by internet stock message boards. All in all, the digital revolution is providing new forms of communication that could move not only from monologic to dialogic approaches, but also from corporate-centred to stakeholder-centred approaches.

IC disclosure and the digital revolution: Existing studies and new research opportunities

This section leans on the above-mentioned theoretical framework and presents the results of a structured literature review (Massaro et al., 2016) conducted on the topic of ICD. Our review takes a critical approach to looking at the empirical evidence in this field by focusing on scholarly empirical research. For this book chapter we selected articles using a protocol-driven methodology. The starting point of our study was to search in the SCOPUS database for academic articles with the terms "intellectual capital" and "disclosure" in the title, abstract or keywords. We included the ISSN of the journals ranked 2, 3, 4 and 4* in the ABS journal ranking for 2018. One hundred and eighty one papers were retrieved with these keywords and the ranking criteria. We then limited the search to publications within the business, management and accounting categories. This new criterion reduced the sample of academic articles to 178, which were published in the period 2000-2019 (19 July). We then read the articles thoroughly, and coded them using an in-vivo approach to complete the communication framework based on communicator, message, channel, audience and conversation. Table 1 summarises the results of the structured literature review.

Table I. Framework

Variables	Description	Frequency
Communicator	Company	112
	Investor	1
	Third-party	6
Message	Overall approach of IC: HC + RC + SC	9
	Specific aspects of IC: HC or IC or SC	110
Channel	Annual reports	71
	Other forms of reports	39
	Website	7
	Management commentary	1
	Conference and roadshow presentations	1
Audience	Stakeholders in general	102
	Investors	14
	Financial analysts	2
	Sell-side analysts	1
Conversation	Monologic	116
	Dialogic	2
	Polylogic	1

Each node was then analysed focusing on the new opportunities that the digital revolution can bring to innovate each aspect of the traditionally analysed ICD. The following sub-sections describe the results of our analysis, discussing the new research opportunities provided by the digital revolution.

Communicator

The overview of the framework presented in Table I shows that previous research has been mainly focused on three groups of communicators: the public (mainly universities, e.g. Low et al., 2015; Ramirez et al., 2016) and private listed companies (e.g. Cabrita et al., 2017; Rodrigues et al., 2017), investors (e.g. Massaro et al., 2017) and third parties (such as sell-side analysts). To a lesser extent, research has tried to understand IC disclosure in specific business fields such as football clubs and professional accounting firms (e.g. Lardo et al., 2017; Duff, 2018; Duff, 2016). Compared to private listed companies, research in the public sector is still limited, and few have concentrated on local governments (Rossi et al., 2018). Previous studies have therefore addressed different kinds of organisations, leaving room for improvements in areas such as SMEs and build entities.

Following the framework results, traditional studies focus on the company as the main communicator, with only six studies focusing on the role of third parties (e.g. Abhayawansa and Guthrie, 2016; Flöstrand, 2006). However, the development of new technologies offers investors the possibility to directly participate, developing what Dumay and Guthrie (2017) call involuntary disclosure. In this line of reasoning, Massaro et al. (2017) find that internet stock message boards are an example of a new media where there are examples of involuntary disclosure on a daily bases. Nevertheless, while company motivations to disclose their IC have been widely analysed, the investors' motivations to share their knowledge about specific companies remains under-investigated and provides new research opportunities.

Many authors focus on contingency factors to explain the variation in IC disclosure across firms (Biscotti and D'Amico, 2016). For instance, previous studies have shown that the amount of disclosure depends on firm age, size, level of leverage and board independence (White et al., 2007). García-Meca and Martínez (2005) also find that firm size, profitability and leverage are highly influenceable factors that affect IC disclosure strategy during presentations to analysts. Similarly, other studies focus on country-specific factors, investigating listed companies in different countries. For example, Brennan (2001) concludes that Irish and Australian contexts are very similar when it comes to reporting practices. Her study showed that in Ireland, similar to Australia, companies had no reporting framework in use and their IC disclosure in AR was general, expressed in qualitative terms. Similarly, Vergauwen and van Alem (2005) show that ICD varies significantly across countries, especially because of country-specific regulation and auditor conservatism. Finally, Abdolmohammadi (2005) and Sonnier (2008) find that industry significantly affects ICD, and that new industries and high-tech companies disclose significantly higher levels of IC information than the traditional sector. In all, these studies focus on the company as the main communicator and discuss contingency factors that affect communicator behaviour in terms of ICD.

Moving the communicator from the company to other groups presented in Table 1, drives the need to better understand the main contingency factors that affect ICD. The proliferation of new digital

technologies and their adoption by companies has also brought new challenges for traditional ICD communicators (Koehler, 2014). Companies have progressed in using Web 2.0 technology, and research on the use of interactive technologies shows that social networks such as Facebook and Twitter are used to disclose information about CSR and sustainability issues (Araujo and Kollat, 2018). What pushes companies to use those media to disclose their IC is still under-investigated, however. Cultural factors, as well as a manager's characteristics, might influence company decisions about how to use new technologies, adding new perspectives to the most common theories, such as agency, stakeholder, signalling and legitimacy theory (An et al., 2011) to better explain the reasons that communicators choose specific communication media.

Several communicator characteristics, such as CEO innovativeness and openness could affect the choice of the communication media. For instance, Suárez-Rico et al. (2018) posit that disclosure via new outlets depends on corporate governance characteristics (board size, gender diversity and board effectiveness). According to this study, young board members and high-tech industries tend to adopt media technologies to disclose information.

Message

The purpose of the conveyed message in corporate communication is to provide information, influence the audience (Lee, 1982, p. 153), or to engage in a dialogue (Lavoie, 1987, p. 580). According to this explanation, we analyse the messages identified in our framework in relation to IC disclosures and identify opportunities raised by digital technologies for IC research. Generally, the literature shows that companies have aimed to provide information and influence their audience through their ICD (e.g. Melloni, 2015; Dumay, 2012; Yi and Davey, 2010). We argue that new emerging digital tools and social media provide companies with opportunities to engage in dialogue with their stakeholders.

Traditional means of communication, such as annual reports and press releases, are more suited to informative or persuasion communication (Brennan and Merkl-Davies, 2018). The literature shows that these traditional means tend to report rather than disclose, in contrast to Dumay's (2016) recommendation - less reporting and more disclosing. Persuasion communication is used in generally optimistic non-financial information, offering "one side reports of good news, deliberately avoiding any bad news" (Dumay, 2012, p. 9-10). These characteristics led Haji and Anifowose (2017) to raise concerns about the quality and quantity (Castilla-Polo and Gallardo-Vázquez, 2016) of company reports. Preparers can manipulate the disclosed information (Dumay, 2012), making comparisons more difficult - for example expressing ICD in discursive terms rather than numerical (Melloni, 2015). Companies might disclose IC information opportunistically, following their impression management strategy to enhance corporate image.

We observe that traditional means of communication are used to communicate well-understood issues and standard data (Brennan and Merkl-Davies, 2018). To date, previous studies show little disclosure of IC (Dumay, 2016), which is generally of poor quality (Guthrie and Petty, 2000) and does not satisfy the needs of stakeholders (Beattie and Thomson, 2007). IC disclosure is a routine process, which is straightforward and follows the accountability guidelines of reporting, especially in university settings (Low et al., 2015). These characteristics mean that disclosure is monotonous and without substance (Brown and Dillard, 2014). For example, in their 31 year longitudinal study

of Marks & Spencer, Campbell and Rahman (2010) found that over the years factual reporting was replaced by more opinion and judgement. Intellectual capital is crucial for achieving long-term organisational objectives, however, and requires appropriate information to support stakeholders in their decision making process (García-Meca and Martínez, 2005).

Appropriate information about IC resources is a combination of relevant data given in text, numbers and figures, alongside narrative explanatory notes (GRI, 2002). For instance, La Torre et al. (2018) show how technology tools such as XBRL have the potential to go beyond corporate reporting and provide stakeholders with relevant, flexible, and accurate information. XBRL, as an internet-based accounting language, allows companies to disclose information in a variety of formats, organising it and enhancing stakeholder understanding about it. XBRL can thus be used as a common format, that enables comparability and the analysis of integrated information.

Digital means of communication, such as online communication and social media, allow the communication of ambiguous information that relates to the performance of complex issues (Lodhia and Stone, 2017). This is evident if we compare Shareef and Davey (2005) with Lardo et al. (2017), which uses social media metrics from Twitter, Instagram, Facebook and Google Plus. The results of the former study show that football clubs report IC components poorly in their annual reports - external capital and human capital are the highest, while internal capital is the lowest. Lardo et al. (2017) show that social media metrics in the football industry are determinants of human and relational capital, which correlate positively with market capitalisation, revenue and fee transfer. Similarly, human and structural capital are disclosed in annual reports for Portuguese banks, while relational capital finds higher disclosure in websites (Cabrita et al., 2017). These results show how the ICD message can be split between different channels to serve different purposes, but more research is needed to better understand the phenomenon.

Finally, new technologies allow companies to develop a more interconnected message. The use of visuals, a default feature of social media, such as graphs, pictures, photographs and videos, are powerful means with which to address sophisticated and unsophisticated users (Davison, 2015). Media includes a variety of formats, from pure texts to graphics and animations, which provide stakeholders with cues (Lodhia, 2012). The hashtags (#) or cashtags ($) on Twitter, with hyperlinks included in certain posts, make information searches easier and direct attention to important information, which can be useful for further elaboration. Moreover, the interactivity of ‘likes’, ‘retweets’ and ‘replies’ engages the stakeholders in conversations and information dissemination. For example, in Facebook and LinkedIn users can share pictures, videos and audio (Kaplan and Haenlein, 2010). This ‘real-time’ dissemination of information and the frequent updates of disclosures supplement the information in a company’s websites (Lodhia, 2012). Social media therefore allows companies and stakeholders to disclose more information about IC and have a better understanding of its value. Future research could investigate the tone and language used around corporate events on social media (Debreceny, 2015).

Channel

The production and dissemination of information about intellectual capital has become one of the dominant research topics in the literature of ICD (Giacosa et al., 2017). Research on this topic has mostly been based on annual reports, as the primary source for IC disclosure (Guthrie and

Abeysekera 2006; Wang et al., 2016), however, IC literature shows that organisations provide intellectual disclosure on multiple reporting platforms other than mandatory annual reports and integrated reports, such as press/media releases, websites and social media mediums (Haji and Anifowose, 2017). Research dealing with these other sources is very marginal and accounts for only a few studies; for example in environmental and social reports (Cordazzo, 2005), corporate reports (Striukova et al., 2008), strategic reports (Bini et al., 2016) and management commentary (Catalfo and Wulf, 2016). The problem with these sources, as researchers point out, is the rarity of dedicated IC documents (Dumay, 2016, p. 176), and their tendency to withhold information instead of disclosing it (Schaper et al., 2017).

This debate therefore calls for "intellectual capital researchers to look for new and innovative data sources" (Cuozzo et al. 2017, p.14), which can be supplemental to annual reports (Goebel, 2015). Many IC researchers suggest investigating IC disclosure beyond annual reports and considering the potential of other dissemination channels (Abeysekera, 2006; Dumay and Tull, 2007; Cuozzo et al., 2017). Indeed, this will help to avoid replicating research conducted in annual reports (Dumay and Cai, 2014), which are criticised for being backward-looking and one-way means of communication (Dumay, 2016). In recent years, the application of the same methodology and analysis from the same sources has meant there is no new knowledge in the field (Dumay and Cai, 2014). For instance, De Silva et al. (2014, p. 157) found, through a longitudinal study in AR of New Zealand companies between 2004 and 2010, that there was no significant increase in IC reporting.

In support of this debate, recent studies investigate innovative data sources such as IPOs Garanina and Dumay, (2017) and LinkedIn (Pisano et al., 2017). Specifically, answers to the calls digital raised by Dumay and Garanina (2013) can be found in digital mediums such as the internet, LinkedIn and social media (Facebook, Instagram) in capturing and studying the dynamics of intellectual capital disclosure in ecosystems, communities and countries. Researchers should be more sophisticated in capturing the dynamics of market developments in the new technological environment, where some companies disclose their IC in integrated reporting, and others in the ecosystem with their competitors and collaborators, including ICD about stakeholder engagement. Given the challenging environment and interactive discourse mediums, Dumay (2016) argues that integrated reports may yet provide a limited view of companies. Instead, the author emphasises the "dynamic" and "followed" role of disclosure on websites (p. 179).

The rise of social media and its adoption across society has played an important role in turning interactive disclosure into an increasingly vital element of organisational communication strategies. Social media platforms play an important role as outlets for voluntary disclosure and as channels for information dissemination (Blankespoor et al., 2014; Lee et al., 2015; Jung et al., 2018). More than a disclosure avenue, social media is a direct and immediate means for information dissemination which bypasses the third-party media (Blankespoor et al., 2014). It provides companies with a rich setting in which to present themselves to their stakeholders. Web 2.0 platforms are used as an extension of dissemination channels where firms build their desired corporate image. Compared to traditional documents; social media tools are linked to websites with more detailed information, with webcasts and multimedia presentations. Future research should investigate the impact of social media adoption on markets and IC disclosure (Debreceny, 2015).

The media is a source of data that is untapped for studying IC disclosure in every context, and where researchers can reveal more information than companies disclose (Cuozzo et al., 2017). For example, there are other information intermediaries on the internet, such as financial analysts, who uncover information by subscribing to the Financial Times, the Wall Street Journal and Bloomberg.

Massaro et al. (2017) analysed the IC disclosure messages of investors who regularly participated on internet-based message boards, such as Yahoo! Finance and TheLions, where they disseminate private information from managers. Similar comments have been made by Dumay (2016) and Cuozzo et al. (2017) about university websites contributing to new IC knowledge for the public sector. Digital technologies and innovations in communication are providing great opportunities for universities to have international visibility through their websites (Rossi et al., 2018). This is true, given that universities as communicators of IC use to report via a variety of traditional mediums, such as AR (Ramirez et al., 2016), quality evaluation reports (Berardino & Corsi, 2018) and social reports (Sangiorgi and Siboni, 2017), where universities have been found not to disclose valuable information (Ramirez et al., 2016).

Audience

The purpose of IC disclosure is to provide stakeholders with relevant information that will assist them in the decision making process. Bearing in mind this purpose, scholarship during these three decades of research in IC disclosure has accepted the need to understand the usefulness of IC disclosure by accepting the perceptions of stakeholders, investors, financial and sell-side analysts, however, the literature provides contradicting results. Most studies have found IC disclosure to be important for information analysts in the estimation of bank value (Brown et al., 2015; Chen et al., 2014). It is especially valuable information for sell-side analysts in forming their perception about company prospects (Abhayawansa et al., 2015) and to "subdue the pessimism with an unfavourable recommendation, increase credibility of favourable recommendations and distinguish sell from hold recommendations (Abhayawansa and Guthrie, 2012, p. 398). Garcia-Meca (2005) also found from the presentations of Spanish companies, and analyst reports that IC disclosure is widely provided, and they use this information for their decision-making purposes. Other studies have found that non-accounting information is not relevant for sell-side analysts (Campbell and Slack, 2008). These contradicting conclusions may be result of AR limitations in disclosing IC, as they are backward-looking and subject to manipulations.

We agree with Dumay (2016, p. 168), who argues that we "need to abandon reporting and instead concentrate on how an organisation discloses 'what was previously secret or unknown', so that all stakeholders understand how an organisation takes into consideration its ethical, social and environmental impacts". Indeed, considering digital technologies and social media developments, stakeholders nowadays value the information and communication from a variety of sources more, as it is more timely and more relevant than that found in reports published yearly. Research has shown that ICD made through social reports includes a significant level of ICD, helpful for both decision making and stakeholder needs (Sangiorgi and Siboni, 2017). The online disclosure of information allows stakeholders to be aware of the value creation process, which, in turn, is reflected in good relationships with stakeholders in providing support and approval for the business. Web-based disclosure is accessible by the stakeholder community at a low cost (Cormier et al., 2009). Digital technologies are accommodating, especially for small shareholders who do not have access to private information, compared to large shareholders. The use of internet technologies is thus rapidly increasing both the scale of accounting information disclosed and the ways

stakeholders receive and use that information, leading to an 'explosion of firm-related Internet content' (Saxton, 2012, p. 293).

The use of the internet and social technologies is driven by stakeholder demand. Campbell and Rahman (2010), as well as Holland and Johanson (2003), posit that users need to have greater disclosure of IC and new means of providing it. The evidence also shows that stakeholders prefer using the internet to receive corporate information (Saleh and Roberts, 2017) and respond to web-based communications. Online disclosure provides stakeholders with timely information and material (Abeysekera and Guthrie, 2005). This allows stakeholders to have the information they need and to be aware of the value creation process. The rich features of internet technologies facilitate personalised information, tailored to the user's needs. Other features such as alerts for relevant information and the 140 character limitation mean that information must capture the attention of stakeholders (Saxton, 2012). The search capability facilitates the extraction of required information according to people's needs.

Conversation

According to the US Securities and Exchange Commission (SEC), when the conversation between companies and stakeholders is effective, it results in stronger relationships with stakeholders. SEC (1998, p. 4, 57) suggests that stronger relationships imply a dialogic communication. In considering these specifications for our framework, we observed that conversation between companies and stakeholders has been monologic, mainly based on corporate, financial and narrative reporting. The literature shows that companies, universities, accounting firms and financial analysts are involved in a one-directional process of IC disclosure through annual reports and CSR reports with their stakeholders. Communicators have disclosed IC to stakeholders using different means of communication. As noted in previous sections, the literature in IC has seen disclosure as a one-way process, where the communicator transmits the message to their audience and ignores contextual factors. Disclosure in formal mediums of dissemination sees the audience as a passive recipient.

In the digital age, it is very important for companies to establish effective channels of communication with their stakeholders. Social media is an effective way to communicate with a wider range of stakeholders. Media richness helps in communication effectiveness. The use of social media creates a dialogic communication between the company and stakeholders. In contrast to the one-way communication of annual reports, social networking platforms, due to their real-time interaction, relational and global characteristics, allow companies to create dialogic communication and build relationships with their audiences (Kent and Taylor, 1998). According to our framework, there are only a few studies showing a dialogic communication with the audience. For example, Cormier et al. (2009), Lardo et al. (2017) and Pisano et al. (2017) have already started to investigate websites as a potential medium for organisations to improve their relationships with stakeholders (Pisano et al., 2017).

Social media's rich characteristics expose companies to an enormous audience, which has led to the new accounting perspective of corporate communication (Bonsón and Flores, 2011). There are benefits from corporate communication for both companies and stakeholders. The internet-based tools, especially in social media, enhance interactivity not only between the company and stakeholders but between stakeholders as well, favouring two-way communication (Morsing and

Schultz, 2006), dialogic and contextual engagement. Dialogic communication helps companies maintain their relationship with stakeholders (van Wissen and Wonneberger, 2017). The ability to like, retweet or comment on a social media post, creates dialogue between stakeholders and personalises dialogue about the IC communication process and the capacity to create connections. This gives stakeholders a greater ability to learn more about the specific IC information in which they are interested. For instance, day traders find group connectivity valuable (Sprenger et al., 2014). Future research could examine the role played by real time interaction between stakeholders on Twitter and the IC information generated. Interactivity between the stakeholders and company mediates the dissemination of information and reduces its asymmetry (Saxton, 2012). Researchers could study the value of connectivity in ICD further, based on media dialogue.

Technology is allowing companies to create what Guthrie et al. (2004) call a "social contract" with the communities in which they operate. As such, a wider disclosure of IC helps companies to strengthen their legitimacy. Websites have been suggested by researchers as a useful means with which to enhance communication with stakeholders (Bisogno et al., 2014). For universities, websites are suggested to be a more useful tool to enhance communication with stakeholders (Bisogno et al., 2014). New technologies create mutual benefits for companies and stakeholders, by engaging with their stakeholders (Abitbol and Lee, 2017) and as a dialogical tool for communicating information (Etter, 2014).

Conclusions

The development of technologies is associated with drastic changes in the way companies operate. All these changes mark a turning point in the field of intellectual capital disclosure. ICD is also experiencing a "digital turn" as organisations are constantly directed to become more digital, and the use of digital tools has become part of the workplace. Non-financial information is thus crucial, because of the impact digital technologies have on the networking relations between companies, especially when digital innovations are becoming an important part of companies. IC is therefore a fundamental source of value creation and the achievement of organisational objectives (Striukova et al., 2008).

A very hot debate in the development of the field involves "the production and dissemination of information about intellectual capital" (Giacosa et al., 2017; Castilla-Polo and Gallardo-Vázquez, 2016, p. 150). Narrative reporting has returned to the central topic in the accounting research agenda with the movement of integrated reporting, and with business models. Greater narrative disclosure within the annual report remains a debate among researchers and accounting academics. While the accounting literature is interdisciplinary, borrowing from many other literatures, such as business models, economic theories, and strategic management, a linguistics perspective is not considered. We are committed to the extension of IC narrative reporting to digital mediums. We view narrative reporting through the lenses of social accounting (Roslender and Nielsen, 2017) not limited to shareholders and managers.

In this paper we argue that the availability of new emerging technologies and communication tools will open up new possibilities for future research in ICD, as we move towards ecosystems and stakeholder engagement (Cuozzo et al., 2017). The results of this study show that disclosure through digital channels is becoming a new practice in companies, in order to provide stakeholders with timely and reliable information that may be material to the decision making process. Nowadays companies rely on specific media characteristics to increase corporate communication effectiveness, as the quality and the utility of IC disclosure depends on the effectiveness of the reporting process. In fact, internet-based communication technologies can improve IC disclosure. Social media has become an important medium for voluntary and involuntary disclosure between companies and stakeholders. Information technology has shaped the disclosure landscape by creating a dialogue between companies and their stakeholders through dialogic and polylogic accounting systems. Research investigating digital technologies and ICD is in its early stages, however, and future studies should consider the potential of digital technologies for disclosing more IC information.

Rhetoric discourse, sensemaking and online legitimation in new blockchain ventures: A comparative case study

Abstract

This paper describes the role of online rhetoric discourse in legitimating blockchain-based ventures. Since 2017, Initial Coin Offerings (ICOs) have been a new phenomenon in the global market, triggering a profound institutional change. As an innovative and low-cost method used to raise capital, ICOs have become a very attractive online mechanism for entrepreneurs to invite potential investors to support their blockchain-based ventures. In this paper, we analyse the discursive rhetoric adopted by online backers to make sense in a situation of asymmetric information and uncertainty. Logical judgments are important in acquiring legitimacy over the venture's lifetime, while pathos and ethos appeals help in maintaining this legitimacy. The three valuation elements of logical justifications are shown to be human capital, the white paper and the business idea. Working product, partnerships and listings in solid exchanges greatly help to gain normative legitimacy.

Keywords: Blockchain, initial coin offering, crowdfunding, legitimation, rhetoric discourse.

Introduction

Digital technologies have 'transformed the nature of uncertainty inherent in entrepreneurial processes and outcomes, as well as the ways of dealing with such uncertainty' (Nambisan et al., 2017). Nowadays, the entrepreneur and potential investors (backers) communicate through IT-based platforms in the digital presence (Gawer & Cusumano, 2014; Nambisan, 2017). Online networks and communities present a digital context for backers in which they share comments and 'like' somebody else's ideas (Lehr & Sharafat, 2017). Backer communities are built in different forums like bitcointalk.org, Medium and Reddit. Investor's comments on these forums reflect idiosyncratic assessment, and, overall, the varying experiences and perceptions of investors help to increase the neutrality and reliability of the information. Research shows that while experienced backers tend to assess information more systematically, inexperienced individuals tend to make more emotionally-based evaluations due to a lack of expertise and technical knowledge (Yang et al., 2013). Anecdotal evidence and the literature on backer motivations (Davis et al., 2017; Hu et al., 2015) suggest that both rational and emotional reasons motivate backer investments.

ICOs are based on blockchain technology and are a novel type of funding mechanism for new digital ventures. They are smart contracts based on blockchain technology and designed to raise money without intermediaries (Momtaz, 2020), therefore 'cutting out the middleman' and democratising capital accession and innovation (Mollick & Robb, 2016). ICOs share similarities to IPOs (about the security release), crowdfunding (publicly open to individual investors) and venture capital (early-stage investments; Dell'Erba, 2018). In contrast to the IPOs, which are a playing game, ICOs are a one-shot game offering an investment return over short and long time periods. These investments take place in online platforms where the crowd funders connect and interact with project creators and support their fund open calls for launched projects. Entrepreneurs presell their products to the crowd and leverage the crowd power to further develop their products.

The new business models may put potential investors and broader society show resistance or scepticism towards the changes in the status quo. The main reasons new ventures remain unfunded are scepticism and uncertainty about the success of new projects (Casamatta & Haritchabalet, 2014; Chen et al., 2009; Kirsch et al., 2009). This scepticism and lack of legitimacy related to operating a digital entrepreneurship (Nambisan, 2017) may derive from the lack of widespread acceptance of the technology (Van Lente et al., 2013) or may relate to the peripheral operating position in a field (Henfridsson et al., 2014; Wright & Zammuto, 2013). The literature also shows that the inability to obtain legitimacy may also be due to the failure to conform to certain normative, structural and cognitive norms within a field (Suchman, 1995) or to the failure to continuously communicate conformance to changing norms (Garud et al., 2014). In the new digital context in which it is interesting to understand how actors legitimise the new business models and ideas, a rhetorical perspective is central to understanding the way actors judge, make sense, influence (Elsbach, 1994) and shape the social structure.

The crowd of backers in the ICO is a mass of disconnected and independent individuals who connect to the entrepreneurs via the digital platforms to fund the backers on the other side. Crowdfunding allows individual investors to directly fund entrepreneurs even with very small amounts of money. The crowd backers invest in business projects and ideas that are based on new digital business models (Kraus et al., 2019). Backers and investors in these ICOs rely on incomplete information to assess entrepreneurial endeavours. These blockchain projects are in the early development phase (Belleflamme et al., 2014), and decisions are based on the information disclosed

in white papers (Ahlers et al., 2015), on the website and on other social network channels. Research shows that backers face insecurities in their investment decisions in assessing the credibility of the entrepreneur and the quality of the project. Yet these studies do not capture how backers signal and judge project quality, make sense and support the creation of new digital ventures.

Recent research on crowdfunding projects has found that information revealed through the collective evaluation of individuals (e.g., Mollick & Nanda, 2016) can have a profound impact in challenging information asymmetry for early-stage ventures. We consider the polylogic communication in bitcointalk.org and other mediums as an opportunity to investigate the collaborative sense-making activity in the scenario. We use the lens of rhetoric to understand the potential investor's sensemaking in creating and sustaining new institutional forms (Solomon, 2004; Suddaby & Greenwood, 2005). Through a qualitative work examining three case studies, we use Aristotle's work on rhetoric to show how this engagement of the crowd takes place. According to Aristotle, we are social beings who can live well because of our capacity to recognise and influence the structures, relations and evolution by which we institute our social behaviour and, as suggested by Green (2004), can be used to please other's interests, to justify an action as effective or efficient, and appeal to socially accepted norms to improve venture performance. Aristotle identified three elements in his work on rhetorical practice: logos, ethos and pathos.

In the growing research area of crowdfunding (Short et al., 2017), we are the first to consider the discourse strategies with respect to online venture legitimacy. We contribute to how actors through discourse modify and shape institutions (Barley & Tolbert, 1997). We find ICOs to be a perfect context in which to understand how discourse and social action are used to make sense in uncertain situations, coordinate social action online and reach reliable decisions. Online social networks and communities have an increased relevance for crowdfunding. This relates to the innovative ability of the online community (Baldwin et al., 2006; David & Shapiro, 2008; von Hippel, 2005) for which research has shown the concrete role of crowds in the creation of new ventures.

Literature review

ICOs as a type of crowdfunding of projects

The ICO phenomenon has been very popular in financial markets worldwide since 2017 and has gained momentum as an alternative form of financing. These high-tech ventures focus on attracting online investor crowds to fund their projects. Entrepreneurs of new ventures fund their projects by drawing on the crowd, using the Internet as a platform (Belleflamme et al., 2014; Mollick, 2014). Crowdfunding and research on this phenomenon have changed peer-to-peer finance and investor behaviour. This is because the external online network gathers 'soft' information, strengthens social capital and improves the likelihood of obtaining capital (Lin et al., 2013); it also signals peer-to-peer credit markets with information asymmetry. Research in this phenomenon has shown increased interest in the topic with regard to how online discourse helps to construct the structural and cognitive dimensions of social capital.

Anecdotal evidence shows that although the ventures have the same conditions of uncertainty and incomplete information, some ventures have higher acceptance than others in the market, some

keep a constant market value and others lose their value over a short timeframe. Evidence has shown that these patterns are related to herding and bystander behaviour among funders (reactions of other backers; Kuppuswamy & Bayus, 2013). Crowdfunding projects are shown to have a large failure rate (raising only 30% of their goal with amounts that average $900 in pledges) and only a small percentage are successful (only 3% raise 50% of their goal for the amount of $7825). The existing information asymmetry between entrepreneurs and potential backers creates the need for entrepreneurs to disclose credible information to give potential backers the possibility to evaluate the potential of crowdfunding projects (Ahlers et al., 2015; Mollick, 2014). In the information gap situation, the research stream on signalling theory (Spence, 1973) suggests that potential backers evaluate the projects' characteristics, such as patents (Baum & Silverman, 2004; Hsu, 2007) and the leading team, for example, the board governance (Sanders & Boivie, 2004), which increase the likelihood of funding for start-ups. In the crowdfunding context, the information challenges are many and unique (Ahlers et al., 2015; Mollick, 2014), beginning with the short time window in which the funding takes place within the online interface for projects that are not well developed and are in the early stages (Belleflamme et al., 2014) and the uncertainties about the viability of the project in the future.

Legitimacy and institutional theory

A central question for organisation theory is understanding how the new organisational forms come to life (Daft & Lewin, 1993; Hannan & Freeman, 1986). The emergence of new organisational forms trigger social conflict (Eisenstadt, 1980) and understanding how they are created and how actors seek to accept or deny legitimacy to new ventures is important. According to institutional theory, language is used within organisational fields to achieve shifts in institutional logic. A shift in logic is the criteria used to assess the legitimacy of new venture forms to emerge and survive. The institutional logic shift is considered a profound change in establishing a new venture and is the product of sustained symbolic work in which backers construct 'legitimating accounts' (Creed et al., 2002) by linking innovations to cultural views (Meyer & Rowan, 1977). Based on previous literature from this perspective, new ventures are a consequence of negotiations and contests between backers, offering their political views on interpreting contradictions imbedded in dominant institutional logics to further their interests (Fligstein, 1997; Seo, 2002). In this way, the legitimacy is set and dominant. Rhetorical strategies are a significant tool to shift dominant institutional logic and institutional change at large and to legitimate entities through the deliberate use of language to construct congruent and incongruent new and old attributes.

Legitimacy

In essence, legitimacy is produced by human agents or groups of humans (Zimmerman & Zeitz, 2002) whose relational assessments or actors' perceptions in a field decide on the effectiveness of the venture (pragmatic); the fit with collective values, means and purposes (normative legitimacy);

and the 'recognizable, taken-for-granted behaviour' (cognitive legitimacy) for a given social context (Scott et al., 2000, p. 238). Performance and effectiveness are not enough to build legitimacy – compliance with norms is necessary (Ashforth & Gibbs, 1990). Instead, cognitive legitimacy is present in all institutionalised practices, innovations and ventures – unquestioningly and seen as a social fact (Suchman, 1995). Radical institutional changes by definition lack cognitive legitimacy. New digital blockchain ventures as radical institutional changes lack legitimacy and are subject to active evaluation of their appropriateness (Bitektine & Haack, 2015, 2015; Tost, 2011). The construct of legitimacy has been shown to be a relational and social practice (Deephouse & Suchman, 2008) built from the interactions of human actors through the use of symbols and narratives. Although previous studies have not shown legitimacy to be attributed to technological artefacts, in a digital venture, the digital entrepreneur has to be involved in communication with potential investors in a new medium – the digital platform – with fluid and porous boundaries (Nambisan, 2017b).

Rhetoric

Rhetoric theory suggests that actors have attention and cognitive limits (Richards, 1965); therefore, individual resistance and group conformity hinder change efforts, for example, the support of new business models. The rhetoric is how social actor's cognitive limits enable language to shape both the means and ends of their actions (Richards, 1965). Aristotle (1984, p. 25) defined rhetoric as the ability to make sense of the conditions of everyday life and noted three elements of this dialectic reasoning in search of the truth – logos, pathos and ethos.

Appeals based on logos affect the logical part of the mind and tend to elicit the methodological calculation of the importance and success of the venture in the future (Simon, 1945). For this reason, logical pleas have a slower impact on getting the backer's attention but can sustain their persuasiveness and their effect on diffusion. Pathos impacts the emotions of other individuals and the resulting social action can elicit powerful but unsustainable actions/conditions. These appeals are used to justify a particular course of action based on a listener's sense of greed or fear. Emotional appeals have a strong capability to attract attention, trigger the imagination and direct action away from the status quo (King & Kugler, 2000). Although the emotional appeals are initially strong and persuasive, their power may be exhibited only for short-term conditions (Abrahamson & Fairchild, 1999). Pathos and logos appeal to the audience's self-interest and build and construct pragmatic legitimacy. Ethos justifications impact the moral or ethical sensibilities of socially-accepted norms. Therefore, they produce moral legitimacy which 'rests not on judgments about whether a given activity benefits the evaluator, but rather on judgments about whether the activity is the right thing to do' (Suchman, 1995, p. 579). It requires sacrificing self-interest for honour, tradition or justice and is often elicited by the character or credibility of the speaker (Herrick, 2001).

According to the literature (Green, 2004), when the sequence of the three accounts is combined, they shape the speed and extent of innovation diffusion. The literature suggests that highly diffused innovations start with pathos, are followed by logos, and then end with ethos accounts. Since pathos pleas are based on emotions, they are more adept at the beginning of innovation diffusion to capture

the willingness and limited attention of potential backers. However, emotional inertia can help only in liberating social inertia and is unlikely to persist. This is where logos appeals provide the backers with persuasive arguments that help them to continue in adopting the new ventures. By emphasising measurable results, efficiency and effectiveness, logos accounts sustain persuasive power longer than do pathos ones. This happens because these arguments tend to be more socially accepted and admired by others. When innovation is in the middle stages of diffusion, logos justifications can serve to promote the belief that the innovation works well and achieves the stated objectives, which motivates the other backers to continue to support it. Finally, ethos appeals have the longest-lasting persuasive effects as they become the synonyms for what is right and good. Therefore, they can sustain the diffusion of innovations that might have lost emotional or logical appeal. More specifically, a pathos account may initiate change by directing behaviour away from the status quo, while logical justifications are necessary to link behaviour and actions to effective outcomes and, therefore, implement it. Ethos appeals lock in the new behaviour and hinder it from moving, thereby sustaining the innovation.

Methods and empirical context

Research design and sampling

Due to the novelty of the crowdfunding phenomenon, we employ a qualitative research strategy. In the digital contexts in which 'business decision-makers and practitioners operate has been accompanied by a transition to more complex research methodologies, which seems to favour recourse to qualitative methods of investigation', this approach has been supported (Gummesson, 2006, pp. 170–171). In alignment with our interest in examining the discourse strategies and legitimation stages in the ICO context, we decided to conduct multiple case studies (Yin, 2003; Eisenhardt 1989). This research approach is adequate in addressing the 'why' and 'how' questions (Yin, 2003) in unexplored and novel problems and allows us to discover and theorise about conceptually vague phenomena (Eisenhardt, 1989), aiming toward rich data descriptions, in-depth understanding of the problem and generalisability of the findings. Since we are interested in understanding the legitimation of new ventures, we deploy the longitudinal dimension of case studies (Langley et al., 2013) to capture and theorise these temporal dynamics, zooming in on the interaction between the backers and their environment as the unit of analysis.

We adopted a systematic approach and searched for new ventures that implemented blockchain technology in their business models and also had significant differences between them during their lifetimes to provide us with high variation across firms. Specifically, we selected ventures that had shown a constant value for their token (performance), those with a drastic decrease in token value and, lastly, ventures with a growing token value. The theoretical sampling resulted in three cases that followed significantly different paths during their ICOs' life. A combination of these three types of companies will provide us with a deep understanding of elements assessed by backers with regard to each venture. In this way, we would increase concept understanding and achieve construct validity, minimising any bias.

Selection and description of cases

In the case selection phase, we initially identified the ventures which fit our criteria of token performance during the timeframe. We selected our cases following a replication logic, choosing the best fit representatives such that if we had to repeat the study, we would come to similar results. Second, ventures had to have an approximately similar launch time to be able to use similar timeframes for comparability. Our three cases are hi-tech ventures operating in the blockchain community, their business models rely on blockchain technology and they launched their campaigns to the public in 2017.

VouchForMe (previously InsurePal) is a Slovenian company co-founded in 2017 by Matt Peterman (CEO) and Tom Volk. Initially, the venture aimed to revolutionise the insurance industry through the use of blockchain technology and combine it with a social proof methodology to reduce its cost (from 30% up to 70%) and produce a positive impact on society. Although only founded in 2017, the idea to revolutionise the insurance industry began in 2015, and in 2016, the core team was assembled and their innovative approach was patented. In 2018, the company addressed the problem of higher prices or 'penalties' which responsible people have to pay to subsidise for the risk resulting from people who make poor decisions. According to their white paper and the online website, the venture shares examples of how blockchain technology is used to bring social proof and benefit society. At the core of the social proof is the individual, who puts himself/herself at financial risk to vouch for his/her friend. The friend is aware of the voucher and will behave responsibly. The target of this new business model is millennials since they have little money and need to pay high premiums.

Our second case, the Basic Attention Token (BAT) is a venture that has kept its token value but with considerable volatility. The company stays behind the Brave Internet browser, intending to reshape the digital advertising industry by 'blocking ads and trackers', in this way removing the middleman from advertising. The San Francisco-based exchange group has focused a lot on the development of the project. The utility token of BAT is well-integrated into the Brave platform and is used to pay users for watching and focussing on advertising and to pay the content creators. The BAT company has established partnerships with Dow Jones Media Group and the Wall Street Journal.

The case study of Chainlink presents the venture offering decentralised oracle service. The aim is to connect smart contracts with data from the real world so that blockchains on smart contracts can access data outside their networks. Chainlink addresses this native communication problem of smart contracts with external systems by introducing oracles. According to their white paper, Chainlink provides on-chain components to gain external connectivity through their decentralised oracle network. Chainlink provides the long, technical explanations about on-chain and off-chain architecture in its 38-page white paper. A special focus in the white paper is oracle security and Chainlink's proposal of a multi-layered security architecture with a novel protocol to protect against freeloading. The venture also provides a roadmap in the white paper for how Chainlink will harness technological and infrastructural advances. The white paper is co-authored by a faculty member at Jacobs Institute at Cornell Tech. On the venture's website, there is a presentation of the eleven team members (composed mostly of software engineers) and seven advisors.

Data collection and analysis

We relied on secondary data in our empirical study. We support the idea that research methods must consider the new technological tools 'for the production, acquisition, and sharing of information, particularly the Internet' (Guercini, 2014, p. 663). Data were gathered from a variety of sources (Yin, 1984): the online websites of companies, the investors' websites, white papers and interviews on YouTube (videos). The data were collected in two stages. First, we gathered and analysed ventures' white papers, their financial transactions on the token value in the coinmarketcap website. In light of recent research findings that ventures can gain legitimacy through social media (Castelló, Etter, & Nielsen, 2016), we then used the bitcointalk.org forum as a source of online information to gather our data. Blogs can be the primary source of data, as new ventures use blogs to communicate interactively with their audiences, creating a bidirectional medium (Lockwood & Dennis, 2008). In this uncertain situation, online comments on the platforms present unique collective sensemaking through the sharing of perceptions and opinions (Rindova et al., 2007). Moreover, these platforms are also depicted to be a 'collective flow of knowledge among community participants' (Faraj et al., 2016, p. 668) which provides fertile ground for studying the social dynamics of legitimation efforts. Every comment becomes a permanent record that cannot be hidden or altered. Every comment represents individual idiosyncratic assessments with heterogeneous opinions and experiences. Heterogeneous comments from multiple backers increase the neutrality and reliability of the information that helps in informed decision making. If the overall sentiments are positive, the assessment endorses project quality and founder quality.

We collected 2,913 comments, 259 for ChainLink, 693 for Basic Attention Token, and 1,961 for InsurePal/VouchForMe, respectively. These comments were first coded based on the accounts that we aimed to use – logos, pathos and ethos. Then we analysed all the codes to describe the crowd sensemaking and how their collective efforts led to a justification of pragmatic, normative and cognitive legitimacy. A summary with some selected codes is presented in the Appendix.

Results

In this section, we present the findings of the data, describing for each case study the crowds' sensemaking over three time phases – the presale period, the ICO day and post-ICO. Based on the coded and analysed data, these three time periods will further enable us to reach the conclusions to our addressed question.

Findings

Basic Attention Token (BAT)

Presale period

Communication starts with the raising of a question about whether others who know this project have information and what their investing suggestions are. The backer also discovers the investment that has been undertaken and his future investing plans. The backer uses a logos appeal to start the conversation and to involve the others in discussing what they think about the opportunity to invest or not in this project (in absolute terms) or in other projects (in relative terms). He expresses his plans and personal opinions about the BAT project and makes some suggestions for future investments using an ethos appeal to try to make himself appear credible and serious. His persistency and surprising emotion show, on the one hand, his consideration for the project, and on the other hand, he invites the others to express their ideas about this project. To some extent, this shows the need for community legitimacy and, at the same time, it engages others in the discussion.

Other backers join the conversation using logical rhetoric in which their judgments mostly rely on browser performance and the general idea of the business model. This seems to be very intuitive and is based on the experience and direct contact with the product and the venture. What raises a concern among backers is the lack of an official announcement. What we notice during the pre-ICO logic pleas that are used for the product is the idea behind the problem the venture wants to undertake (some of the backers also bring their doubts into the scene about this). The logical and pathos pleas communicate success about the project ICO, white paper, long term investment, wish and gamble. Criticisms are of the use and whether or not to list on some exchanges; changes made on the hard cap and considered as greed.

The conversation prior to the ICO focused on the future of the project and on trying to understand the success of this project through examples of a recent project (mobile go ico which is nearing its finish has raised approx. $30m to date). The making sense of uncertainty covers logic rhetoric combined with pathos, recalling attention paid to what is happening in the market and maybe trying to explore what is hidden behind the idea of not advertising the project in bitcointalk.org.

Part of the discussion was also a blend between ethos and pathos, which balance each other and somehow show the need to be part of a community and to legitimise their behaviours. Questions like ‘Are you guys in? Any tips?’ show great consideration for others’ opinions and decisions. This approach seems to lead to more interpersonal relationships between the potential investors and to build a group of like-minded people. It seems that this welcoming question has received many replies. The answers are a combination of logic and pathos. The logical part includes the simple comparison with previous successful ICOs (like golem and mobilego) with some logical and pathos about the intellectual capital behind the project, as a trustworthy person, with connections and skills to pay the bills. The pathos part is evident when describing the market like ‘a bull market running on illogical FOMO…[…] Just ride the bubbles up and down’. There is a belief in the connections and skills of the BAT CEO, which many backers call ‘the guy behind BAT’. The predictions are that it is going to be successful because of the person behind and because they already have a product (the browser).

The ICO day

When some doubts and uncertainties were raised on the ICO day, the crowd makes intensive use of logos appeals by comparing the BAT project to other ICO projects – generally lacking a working

product. BAT brings a new application to an industry that is in a change process at a time when people's interest in blockchain technology is growing. At the same moment, some backers use pathos accounts to make references and explain ICO doubts along with everything else in life with the term 'the gamble experience' and go with the 'flow of currencies'. According to them, the concept and the development team are great. In promoting the ICO more and breaking the tradition, they refer to 'the crypto world' and the 'smart people' belonging to it. These claims blended with logical and emotional accounts imply practical justifications for project value in which elements such as 'crypto world' and 'smart people' are presented to legitimate the continuity between the past and future of investment opportunities.

The post-ICO

They try to overcome scam doubts by mentioning the importance of team members (as an indication of assurance). They comment about the performance and exchange listings as factors impacting performance. Additionally, there are no follow-up comments from those who raised doubts and were critical. They provide facts and bring new perspectives on project seriousness to convince that this is not a scam – mentioning the BAT policy-detailed white paper, people behind the project. There are continuous posts on achievements to show the team is working hard and bringing the project forward. They go deep and open the project 'puzzle' to start determining if they should trust the project or not. In these conditions of uncertainty, we see a strong collaboration among the backers to help in making sense of project evaluation. They evaluate the added value it brings by cutting out the 'middle man', looking at the performance, some others think it may need five years until it reaches mass adoption. However, rich rhetoric describes the values of blockchain technology and the changing world which puts the project as a first mover in this industry. From an investor perspective, the project is open and transparent – fair and honest.

In the next four months (July, August, September and October), the crowd of backers tries to understand token performance. To complete their analysis of incomplete information and doubts, they need to understand how token markets function with exchange listings and other tokens, not only to understand whether or not the project is a scam but also to profit from the investment. The arguments account for three perspectives. First, they explain that 'price does not tell the story… depends on solid user base' and, therefore, this token should be a 'long-term hold' and the price spikes only show the price action. According to them, the project will be successful because team members and the head of the team have industry experience and the project is interesting in the eyes of investors (Guardian article). The only criticism of the team was for bad marketing to heighten awareness. Second, they mentioned that the release of the Mercury project showed a hard-working and dedicated team. Third, the project is closely related to the changing needs of society and privacy will be important. Over this period of six months, the backers tried to build pragmatic and normative legitimacy.

In November and December, the data show that backers mentioned 'great team' and 'working product' as reasons to invest in the project. As others say, price is a market decision, and some prefer to invest in real projects while others in speculative ones. In addition to criticism for more updates from the team, backers shared positive opinions and no uncertainty about the project. Backers based their opinions on human capital, expressing that 'the person behind the project is the creator of Javascript'. The product is also considered to 'be a revolution on the online markets' and, for these reasons, someone suggested 'Think to hold, because the price will increase'. These reveal

statements reveal increased credibility towards the project and well-articulated reasons for believing in project success.

During January of the next year, the arguments that were used appealed to normative legitimacy. The partnership with 3NYC that was announced in the forum brought enthusiasm to the backers. This was reenforced by a backer who said that YouTube has 8,000 publishers, thus drawing attention to the growing market and developing a normative legitimacy. As a backer added to the discourse, the price will increase as only a few projects have a working product and this is an indicator of a serious and good venture. Moreover, the arguments for human capital mentioned their crucial role in this market: 'Persons who developed have proved themselves in the technological atmosphere'. However, the crowd acknowledged the fact that prices can't change quickly. February raised the question of whether it is worth investing in the project and why there was no price increase. The popularity of the browser is still a problem, leading to doubts about whether the world will be ready for this. From April on, there were posts shared from BAT about the Dow Jones partnership. This showed a connection and collaboration among backers. Backers thought that more than a coin, it is a statement. Some doubts were raised about how publishers will be rewarded. In May, information will continue to be shared about some other partnership. Figure 1 presents the BAT's performance over time.

Figure 1. Basic Attention Token performance 2017-2020
Source: coinmarketcap

The ChainLink

The presale

The vocabulary developed about the Chainlink project (ICO on 19 September) demonstrates accounts of logos and pathos appealing to normative legitimacy. The first conversations share strong facts about the project. Backers add to the discourse some new and important perspectives about the project without raising any particular doubt or complaint. The project presents to backers a working prototype/proof of concept that connects smart contracts to the external world, a project the team has been working on for four years. Its crucial value stands on the partnership it already

has with the start-up SWIFT and adoption by 11,000 banks showing a strong point for moral legitimacy. Additionally, backers account for the importance of human capital – an engineering director for Facebook and his YouTube videos in which he explains the project. The backer initiating the post thinks the project will do very well and would like to participate in their ICO. From the market perspective, they share the very positive news of being listed in Binance.

The ICO day and post-ICO

Concerning the ICO day, it ended in 5 minutes and reached a hard cap of $32m. The team was congratulated and some backers mentioned 'crazy high' pre-requirements for investing were a smart technique to make the price more stable. The majority of backers had a high appreciation for the project, thinking it has the potential for success if you are smart investors and know where Smart contracts are heading. When doubt was raised by someone, backers provided advocacy for the venture and for the managing team to be more focused on work than on sharing information. Backers remained positive for future developments and, therefore, are buying now, before hitting major exchanges; applied to new exchanges would be a great benefit. However, this was not being talked about much (Reddit, sclack, bitcointalk).

In October, we observed interactions among backers with few dialogues to share opinions and learn from each other's experiences. First, they pointed out the need to have a community manager who they can ask for recent information. Second, the announcement that Sergey (CEO & Founder of Chainlink) would be presenting tomorrow's Smart contract and the partnership with SWIFT bank payments led a backer to think that 'LINK will pump after proof of concept with SWIFT is live'. This doubt didn't seem to be a problem for the other backers. They expressed their positive consideration about Chanlink – the price will increase and there is room for development, which is quite an interesting situation; others certainly think it has a great future and long-term investment after the partnership with SWIFT, a winner start-up. A backer with 18 months of experience in following this token development put 90% of its portfolio into it and will hold the token for at least one year. Another backer agreed and even clarified the FUD issue by suggesting other backers base their decisions on 'the great partners chainlink is working with, such as SWIFT, SONY, AXA, CONFIDO, FACTOM. A backer reinforces its pragmatic legitimacy in the market as a necessary innovation (what XRP failed to do) in the payment industry (priced $124 million), which will make it a serious actor in this industry. Although "markets don't buy tech…they buy hype", backers believe that over time people will understand that tech is more important than hype as the cryptomarket is quite new for everyone. So people buy up hype because it's a nice quick investment. People who are in cryptocurrency from the beginning know that tech has more value than the hype or the current value of the coin/contract. Chainlink needs to be a little bit more social, that's the only remark I've got'.

In November, December and January, a few conversations and themes were raised. Following the previous months' discourse, backers continued to share their positive impressions of the project for being a 'promising project' and 'long-term investment', not forgetting to indicate that 'at the moment nobody appreciate the technology behind this token'. Chainlink could be used to conduct the insurance pay-out through integration into a banking system. The main focus and concern that was addressed during the three months was the need for direct communication with the developers. There were many worries from the backers about the official ANN of ChainLink, about the little activity in this forum. The backers would like them to handle the bitcointalk channel. This might be one of the best-undervalued projects right now and has slowly been gaining traction and has a good

price trend after being listed in the Binance exchange. That's one area that is lacking, media/marketing coverage. Backers seem to be strongly connected to the project and are even, in a backer's words, 'willing to do anything to raise the level of awareness for Chainlink'. Indeed, the backer invited others to join the community of ChainLink in Cheddur app, which has added ChainLink to help and support new users to learn about ChainLink and join the community. The activity on the ChainLink profile (via user reviews and addresses) helps it rank higher in search results and make it more likely that newcomers will discover the project.

In the next months until June, there was little communication and no follow-up conversations with interactions among members. The months of February, March and April (2018) were characterised by backer complaints about having scarce information and no updates on the project. Backers complained that there is scarce information about this coin, in their eyes it looks like a promising project but with zero involvement. Some backers shared active channels in gitter and Reddit about the project. Some commented that they think the project is promising, and the last comment was to share the good news on hiring a new developer in the project and the comment: 'Chainlink testnet released. Now we have a working product!! To the moon!!!' The release of testnet had an impact on price and resulted in a better ranking in the CMC, from 90-110 to 70-90. Other comments simply thought that this looks like a promising project based on its current results, on the white paper and plans, and on solid exchanges, so there would not be a volume problem, and on 'super advisory team' with a link to the team members. Few talks also occurred in May, mostly the sharing of announcements from other sources, such as about its listing in Coinbit and the announcement from DataDash that this project is listed first as an undervalued coin (link doesn't function). An important thing here is the announcement which aimed to add value to the whole crypto community by providing an analysis of cryptocurrencies. This website gives an overview of conversations on bitcointalk and prices like those from marketcap.

Few communications occurred in the forum for the rest of the year. In June and July, backers tried again to make sense of the situation and to focus on explaining the added value of chanlink in the banking industry. Following logos accounts, they tried again to show the necessity of 'oracles' in the banking industry in which middlewares of smart contracts need to receive data from off-chains. Therefore, smart contracts that serve as 'accelerants' connecting disparate systems through the Chainlink network should be paid by link tokens. The network empowers the existence of this new business model and oracles should be paid according to what they offer. There seemed to be reflecting posts on the value of this token, which is seen as the biggest advantage of the project by supporting the value being developed by a team of talented programmers. In fact, on 29 July 29, a backer seems to have commented on the increase in price by 30%–35% with: 'Going to the moon? Bye!', inferring a much waited-for price. The August announcement of the partnership with five banks showed the backers that the project was receiving normative legitimacy. This was a sign even for a backer that 'people have started to wake up as smart contracts are the essence of Blockchain'. Backers further added to the conversation the idea that although the project has not been marketed, the token ranks 60th.

Looking at the data, the year 2019 was again a year with little communication for the first five months. Communication was more active in June. Over the first five months, backers used the forum to share articles that will help them be informed about project developments. A backer decided to post a summary of the reasons why Link will have important developments in the coming weeks, which mentioned the value proposition of the project, the 70% of price during the

last month, the decentralised oracle network in which it operates, the amazing website, the white paper, and fundamentals; another backer added the LiveCoinStats with live prices. Three other posts were started in June with great news and noted 'are you ready for this?' that a Hybrid cloud application with ethereum will collaborate with Chainlink to produce Google service. These partnerships were confirming information to rule out uncertainties, and backers thought that these were huge news items, with a 'fresh breeze coming to get ready to make big party after this'. The rest of the months continued with only posts from partnerships with several companies like IoTex to deliver real data to Blockchain, QuarkChain, with Etherum events and Crypto APIs, with aelf block with which it will provide connectivity to other networks in the Chainlink ecosystem.

These collaborations increased the credibility of the project and built cognitive legitimacy. This was reflected in one backer's comment in September stating 'ChainLink is among many people's favourite for a meteoric rise in the next bull market'. The project has performed on these many integrations and backers think it has great prospects. In November, these backers even became venture 'ambassadors' by writing review articles in other languages, promoting the project and the team. Articles that were shared seemed to have the aim of sharing the satisfaction of having invested in a very successful project. Another article taken from Forbes explained that big coins have value. Backers agreed that the token had been having an impressive gain and had been the best performer, with a strong position in the market. According to one backer, since there is still demand, there is also room to grow. Figure 2 presents ChainLink's performance over time.

Figure 2. Basic Attention Token performance 2017-2020
Source: coinmarketcap

InsurePal (IP) – VouchForMe (VFM)

Pre-sale

The forum started with a communication from the venture company itself on 1 December 2017 entitled 'Distributed social proof insurance'. The post was created one month and 15 days before the ICO. The managing team started with a presentation of the venture, in which they included the website of the venture, the white paper, the light paper (summary of the white paper), a telegram discussion, Facebook, Twitter, LinkedIn and Github. The first awareness of the project was in

December. We observed that over several weeks, the crowd has started to make sense of different issues. Backers made use of logos accounts to create a broad view of the venture by addressing many questions, doubts and criticisms to the venture. Further, in the first week of communication in the forum, backers tried to understand and clarify the idea of social proof. During the second week when it seemed that the innovative idea of the project was well articulated and understood by the crowd, backers followed an economic logic to understand the competitors, proof, building the idea of insurance, the vision and the business plan.

In the third week, the backers moved from a broad understanding of the project and an awareness of its value to the sharing of facts about the project to be assured that the project was not a scam. The rhetoric referred to a pathos account, considering the project 'LEGENDARY' while sharing a Telegram screenshot that showed the actual use of the token in the market. Other backers continued to blend logos and pathos appeals to show the value-based of insurance in crypto challenging a $7 billion industry; it is changing society without invading privacy. It will improve the missing trust in the industry and will be part of the decentralised economy. The crowd received information from the venture that their business model has three pillars: social proof, patent and building the Internet of insurance. The business model extends to many industries, even to all blockchain business transactions. From an economic perspective, they understood the three pillars of competitive advantage over competitors. We saw an increased interest from backers in sharing videos in which this value-based rhetoric appeals to emotional articulation with 'great video' and 'interesting project'. The white paper, experienced team and top developers were mentioned. They also mentioned participation in conferences and the achievement of awards as indicators of acceptance and of being valued in society, building pragmatic and normative legitimacy. They articulated the reasons to trust the project based on strategy, vision and mission as well on the good platform. The justifications seemed to use logos appeals and economic profitability justifications. Additionally, some other backers relied on the venture videos and made use of pathos accounts by thinking that this is a big and awesome project, with super marketing coverage and they are happy to ensure business relations. This blend of both logos and pathos accounts seems to have convinced backers of the appropriateness of the innovative project.

The data show that near to the end of the month, the announcements of two company collaborations (Matterum and McAfee) and a collaboration with a well-known person in the ICO world, Charlie Shrem, grew the credibility of the project and the discourse made use of pathos and ethos accounts to express their opinions. Backers gave emotional evaluations for the project showing involvement with it, claiming to be 'great to promote this project in the country' or 'glad to promote something that will change the world' and 'unique idea'. They congratulated the team for being very PRO in answering all the questions. This is the investment of the year, a good and steady project. Some people also indicated an increasing interest in the project based on the number of Telegram group members, which, as one backer wrote, had reached 2,300 members. Backers seemed to evaluate the project on two dimensions, the current facts and future facts. Current facts accounted for the 15 years of co-founders' experience, the worldwide patent and the soft cap reached before expected. The pathos accounts in this forum were used as a sign to officialise their judgments with articles that summarised the five reasons to invest in InsurePal and also another article in which InsurePal was listed among the four best ICOs. Concerning prospects, backers based their claims, as one of the backers expressed, 'definitely making history', on the popularity of the project in the media, the plans, the roadmap and the white paper.

The ICO day

The ICO day was defined as 'craziest ICO' and as 'epic' and 'legendary' in order to express the 1 min and 20 seconds it took for tokens to be sold out. Beyond many complaints on ICO fairness and the venture, a considerable number of backers shared a positive opinion about the venture, sometimes advocating for it with statements such as 'easy to get in by following the instructions'.

The post-ICO

The post-ICO communications on the forum made use of a combination of logos and pathos accounts to show their evaluation of the venture. Except for someone criticising the venture for only engaging in marketing and having a poor business plan, backer judgements remained very positive. Data showed that new backers were expressing an interest in buying on exchange listings, and that current investors in the venture would hold the tokens and buy more based on future venture achievements. Based on backers' comments, it seemed that backers now wanted to have the platform release to be certain of their investments. This was obvious from the high number of comments about the professional team, the stability of tokens and the high token demand in the market. Several backers made use of pathos accounts to express that they would hold tokens in a promising project like this, this is a revolution in the insurance industry. The crowd's pathos appeal had the tendency to be activated after every new bit of information shared by the co-founders about interviews or conferences. These updates seemed to lower the level of uncertainty felt by backers and engage them more with the venture. This was obvious when the venture shared with them an interview with the co-founders talking about the future of the venture and the presence of the venture in two conferences in Moscow and Davos in Switzerland. The disclosure of new venture developments increased the credibility and emotional engagement for success, as in the statements 'big things will happen soon' or 'bright future'.

In February, there were two discourse communities of backers – those who wanted to see more progress soon and those who were concerned with what the venture will be in the future. However, the opponent group of backers was not very active, letting their comments be discrete. The venture's proponents shared an emotional connection and engagement with it. They shared articles and mentioned the key success elements which, according to them, will make the difference, especially the distributed social proof methodology. The interaction between backers was high and appreciated in the forum; they found it a place to understand things and bring creative ideas forth. For instance, they tried to explain the concept of how it will reduce the price for policyholders and 'will be the next industry game'. They thought that the application of social proof in the network application will lead to exponential expansion. The cooperation with the Slovenian government and participation in conferences provided the backers with enthusiasm and they thought the venture had achieved awesome progress. In the following months up until June, the crowd continued sharing posts from different mediums to show their appreciation for the team, the business idea and the belief that time will show that in the next years, IP will change the insurance tech industry. The data showed backers to be engaged with venture innovation in the insurance industry.

In July, the venture announced a new bitcointalk forum to present the new website and a new name for the venture, InsurePal. This new name was chosen to better represent their aim to be adopted in many industries worldwide, and not only the insurance industry. In contrast to the previous ventures, the data showed a missing follow-up conversations, discrete opinions with only logos accounts. For instance, "stable and progress is going on regarding white paper plans, love it", or "in few years with adoption and fresh platform VouchForMe will land on Venera for sure".

individual power and not much interest to be engaged as a community in conversation. This also led to no knowledge being produced. Generally, the first comments expressed positive sentiments and more pathos blended with logos accounts. For instance, 'stable and progress is going on regarding white paper plans, love it', or 'in few years with adoption and fresh platform VouchForMe will land on Venera for sure'. Some backers expressed their doubts and disappointment, 'I hope marketing of new platform will start when it will be released. Vouchforme will need adoption and liquidity'; others showed they were waiting for new progress from the venture, 'just bought IPL in Hitbtc, I will store them and wait for the platform so I can use them'. VFM updated the crowd that it is keeping up the pace of promoting the social proof blockchain model across the globe and invited the crowd to address their questions in the AMA (Ask Me Anything) session on Reddit. Figure 3 presents the VouchForMe performance over time.

Figure 2. VouchForMe performance 2017-2020
Source: coinmarketcap

Discussion

In our case studies, we examined three blockchain ventures operating in different industries and applying ICOs as a funding possibility to develop their projects. The ICO crowdfunding projects lacked cognitive legitimacy, and this legitimacy has been shown to be similar to the adoption and diffusion of innovations (Rossman, 2014). When a new business model becomes more popular, it gains legitimacy (Johnson et al., 2006). We shed light on how the forum community interacted, coordinated and funded the ICO in crowdfunding to generate products and services. The data show that backers dedicated a lot of time and energy online in verbal activities. We observed that in the sensemaking process, they were involved in justifying venture existence through arguments (Bakhtin, 1981; Billing, 1996). Legitimacy in these forums was built step by step in an evolutionary way, which we have divided into three periods: the pre-sale, second period or post-ICO, and third period. In accordance with what was communicated between the backers in the forum, we take

price volatility in the market as a proxy for legitimacy. We analysed the logos, pathos and ethos accounts. We identified three logos-based rhetoric strategies used by backers.
Logos discourses are logical and encompass deep analysis. Moreover, they were created in relation to the good values of technology and change. Logos appeals were also used to raise doubts and criticisms. Here, we observed that based on these very good analyses shared by the backers, the venture was able to build on its knowledge. This helped to build a stronger community in the forum, which created more pragmatic legitimacy for the venture. This could be because of the persuasiveness over time that is socially accepted and admired (Putnam & Mumby, 1993). This social aspect should produce judgements of relational and pragmatic legitimacy.

Building on project characteristics (pragmatic)

A logos account is used to initially justify the effectiveness of the project by relying on two assessment criteria: the project elements and the economic profits. The identified elements on which the backers based their judgments are the aim of the project, human capital, the white paper, the business idea and the working product. In situations in which doubts were raised, the crowd made comparisons to other ICO projects and considered the working product a credible sign of seriousness and success. Other cases have shown that backers base their judgments on other elements, such as the developers' working experience, product adoption by the market, the venture's listening in the cryptocurrencies market exchange and appreciation for teamwork. An additional effort to build pragmatic legitimacy was to use pathos accounts and refer to popular keywords such as crypto world, smart people, great top developers, decentralised business model and the worldwide social proof patent.
At the same time, other backers related to the economic benefits and appealed to pragmatic legitimacy (Suchman, 1995). In their rhetoric, backers are interested in profits, which will be the result of a smart investment in a project which smart investors understand as a necessary innovation in the economy. The crowd claimed to be motivated by a strong belief in a successful future and the need to buy before the price increased after being listed in many exchanges, thereby expressing a positive evaluation for the project and forecasting positive developments. These elements show that the project gained pragmatic legitimacy.

Raising collective awareness on diverse views of the project (normative)

Initially, actors supported the idea of the project based on the general idea that they were serving society. Over time, we observed that a strong collaboration among members is necessary for them to make sense of the project's real value by bringing their perspectives into the analysis. Raising questions creates the possibility of unpuzzling the project and enriches the conversation. In addition to continuing to base their judgments on elements such as the detailed white paper, the project policy and the seriousness of the people behind the project, their uncertainty was lowered when they knew that the team was working hard, such as when there were updates with articles, videos or conferences. Backers understood the high communication activity in the group as a sign of high interest in the project, along with the number of people joining other mediums like Telegram and

the reaching of the soft cap. To overcome uncertainty, backers think in the long term, predicting normative legitimacy for the future and remembering that it may take some years for it to be adopted in the market.
Normative legitimacy is also built when collaborations with other companies or well-known people are published in the online mediums used by backers. Our results suggest that this type of information empowers the backers and makes them feel part of the success and that they are changing the world for the better. This was shown in several backers' comments in which they were 'glad to promote something that is changing the world' or 'definitely making history'. Concerning normative legitimacy, backers judged the partnerships with other companies and collaborations with well-known people in the ICO field as a fit with collective means and purposes in the society. The arguments raised in favour of market changes and the new logic these business models were introducing appeal to normative legitimacy (Suchman, 1995).

Motivations for free market (cognitive)

The support of backers after the project had gained normative legitimacy rested on the 'core values' and the 'greater good' that overcame the economic legitimacy offered by the ventures' innovative business model. The grand idea behind it and its vision were the very points to be highlighted and evaluated. The most common phrases of 'market decentralisation' and 'blockchain technology' became the 'institutional vocabulary' that appeared in the three cases and that helped them gain cognitive legitimacy. For instance, some investors justified their investment based on the idea that blockchain is 'cutting out the middle man' to change the world and is the first mover in this industry. For this reason, it is more important to build a solid user base; otherwise, the market price will not be realistic. The backers clarified the connection that the project and other variables have with the market. To them, price is a market decision, and some preferred to invest in speculative projects and some in real ones. What seems to be crucial is that the project addresses privacy, an important changing need for a society that also looks interesting in the eyes of investors. The release of other projects is a certainty element which shows a hard-working team and a project with a future.
These arguments encounter the public interest and social welfare. The meanings of the vocabulary used were on the normative and moral legitimacy that drew on the 'new goals of technological societies' as a way to reinforce the idea that these innovations will serve the grand goals of the new economy and society. Actors try to distinguish the power of these models for the society, relating it to the new economy we have been anticipating and creating possibilities for those people who have always been complaining and looking for new solutions that affect not only the personal interest of some people but also the whole economy.

Pathos and ethos

This institutional change that backers are trying to agree upon occurs as a 'consequence of negotiations and contests over which logic, and thus the criteria by which organisational legitimacy is assessed, will dominate' (Suddaby & Greenwood, 2005, p. 36). However, some arguments are complemented by ethos and pathos appeals. We observed that backers started to use the pathos and

ethos accounts after having built the logos justifications. The use of pathos appeals primarily began in the ICO day when some of the backers showed their emotions on both sides – when they invested (positive) and when they could not invest (negative or showing disappointment). These situations attracted many backers to be involved in the conversations and share their experiences. The data reveals that most appear to be positive pathos appeals, and when these appeals express negative emotions, there is the tendency to 'ignore' them or not to continue the follow-up conversation for those messages.

We observed that over time there is a consistency between the use of pathos and ethos accounts with backer's collective concerns. Initially, when ventures are building pragmatic legitimacy, backers show their appreciation for the project and the team. For instance, one backer found blockchain to be a valuable technology and that the ventures' innovative project has the potential to implement this technology in real life, implying the practical usage of the project: 'I love the business case of BAT because it shows the value of Blockchain technology. BAT is finally one of the few projects that has the potential to implement the Blockchain technology functional to the mainstream'. Some other comments blend pathos and ethos accounts to express both the importance of this technology from the expert perspective: 'Link tech is awesome, and this coin has a huge value (as VB suggests). […] People who are in cryptocurrency from the beginning know that tech has more value than the hype or the current value of the "coin/contract". Chainlink needs to be a little bit more social, that's the only remark I've got'.

Over time, rhetorical arguments seemed to support the conversation and strengthen the legitimacy that had been built. Backers continuously shared facts and articles with an emotional note. Pathos was used for information dissemination with article links and photos taken from other blogs, institutions' official pages and even private venture groups. There were cases in which these shared messages triggered further communication and helped to build pragmatic and normative legitimacy. Moreover, backers started to build a moral case by relating projects to the social and political problems and recognising these models as solutions that would bring needed changes in some industries. For instance, this impression was expressed as:

> 'I like this idea a lot, actually […] If this can be both secure for the average person and easy to trade for BTC or fiat it will be huge. The key here for me is taking control of advertising from the Alphabet Incs of the world'.

Others relate to the future of the digital economy to emphasise the social and collective interests: 'The future of blockchain is an identity without authority. The crypto is expanding from digital trading to something that will become a parallel economy, constituting fundamental changes'.

In sum, the pathos and ethos accounts over time have been used to establish the practical and economic value of these innovations and to help them maintain legitimacy.

Rhetoric and online legitimacy

Our analysis has provided the rhetorical strategies actors make use of online to legitimate innovative business models. The data reveal that actors mostly used logos-based arguments throughout time. Initially, actors made use of three rhetorical strategies based on logos accounts: the projects' characteristics, the collective awareness of the different views of the project, and the

arguments that helped actors enhance the project's comprehensibility (Suchman, 1995) and respectively established pragmatic, normative and cognitive legitimacy.

According to the literature, initial legitimacy acts as a validity cue and encourages subsequent adoption, which further increases legitimacy. Validity cues, that is, information that influences perceptions of an entity's validity (Haack & Sieweke, 2018), are powerful in predicting subsequent actions (Haack & Sieweke, 2018), as it exists as a social fact (Haack & Sieweke, 2018; Johnson et al., 2006) independent from individual evaluations (Bitektine & Haack, 2015; Haack & Sieweke, 2018). We see that backers use constant communication and verbal activity to reach collective purposes, such as the identification of views, analysis of specific issues, and understanding and supporting the new venture's business models. There are many arguments (validity cues) used by backers to describe the development of the world and elicit future action. Backers provide justifications through communication that rationalises and legitimises the new ventures (King & Kugler, 2000; Strang & Meyer, 1993; Tolbert & Zucker, 1996). From the rhetorical perspective, the reasons the backers gave in conversations with themselves and others to rationalise the success of new ventures (Hirsch, 1986) in a way links claims with justifications. Rationality means to be persuasive.

The extant research on crowdfunding depicts the backers of the funds as relatively independent members with legitimation assessments that are sensitive to social cues Navis & Glynn, 2011) and who often 'exhibit herding behavior' (Pontikes & Barnett, 2017, p. 140). Our findings are in line with these results, and we see that the crowds in each venture have shaped their judgments, resulting in ventures that have gained normative legitimacy.

Concerning pathos and ethos rhetoric, data suggest that over time, their function is to reinforce the legitimacy that has been gained. In the initial phases, the pathos and ethos appeals refer to specific elements of the project. Over time, when pragmatic and normative legitimacy is built, these rhetoric appeals in most of the cases did not stand alone but were associated with links that provided other sources, such as photos or articles. The crowd reinforced normative legitimacy by showing screenshots of market token use, mentioning parts from articles. Backers prove their decisions to be right based on articles, telegram communications and videos which provide rich exposure to venture information.

Conclusions

This paper provides both theoretical and empirical contributions. It contributes to answering the question of 'How is legitimacy built online in a digital platform like bitcointalk.org?' Our study illustrates how collective efforts and discourse make sense out of and legitimate new ventures by 'transition[ing] from an abstract idea to a concrete social entity' (Clough et al., 2018, p. 241). We provide dynamic insights into crowdfunding developments since the online pre-sale campaign communications until the present day, overcoming the static research drawbacks (Clough et al., 2018; McMullen & Dimov, 2013). More specifically, we observed through a multiple case study

how backers' discourses and the rhetorical accounts are used to persuade the backer's online community to accept and legitimise new ventures in the absence of information. We examined three new, highly innovative ventures operating in the blockchain context that are using ICOs as a means of financing.

We observed that in trying to make sense of uncertainty, backers made use of the three rhetorical accounts – logos, pathos and ethos. Initially, in the early stage of the venture announcement, backers make use of logic rhetoric to explain and analyse the profitability and predict future success. A discourse based on logos allows potential investors in the crowd to identify their validity cues. Backers base their first judgements on three validity cues – project leaders and team, the white paper and the business idea. In making sure of venture success, the findings suggest that comparisons with other ICOs and the existence of a working product are signals of seriousness. Moreover, partnerships and listings in several exchanges have an effect in establishing pragmatic legitimacy. In ventures which lack a final product, results show that direct communication with the venture is valued by backers and assures them the team is working for the project. Additionally, communication with backers that is initiated prior to the ICO day helps in crowd building and engagement. The case of IP showed how backers can become venture advocates and ambassadors, promoting the project.

In the post-ICO period, other doubts arise. Backers make their valuations and judgments considering the profitability of the project and the added value it will bring to society. Results indicate that normative legitimacy is built by combining two appeals. Venture announcements for new developments signal profitability to backers in terms of investment and seriousness in following the project's aims. At this stage of uncertainty, backers use as validity cues in their logical justifications the quality of the white paper, the necessity of innovation in the market, collaboration with partners and solid exchanges, among other things. Instead, the pathos appeals are used to express the excitement for changes to the society, such as 'cutting out the middle man', decentralisation of insurance or appreciation for the professional team. When these logical justifications combine with pathos appeals, normative legitimacy is established.

In the last period, backers judged the previous venture achievements and new developments. While logos judgments in this phase were shown to be important in deciding cognitive legitimacy, pathos appeals helped ventures hold on to the previous legitimacy and overcome any doubts that were raised.

This study answers the calls for understanding signalling and the decision-making process in crowdfunding (Busenitz et al., 2005; Higgins et al., 2011). The contribution of this paper is in understanding signals, online communication and sensemaking in the virtual setting in conditions of high uncertainty. We show how the use of rhetoric secures in shifts institutional logic, adding therefore to institutional theory. We see that the persuasiveness of the justifications helps others to more easily and effectively make sense of what is happening and helps new, innovative ventures become accepted or taken for granted. In this very uncertain context, we discover how the ventures become accepted and legitimated by their audience through linguistics, that is, the rhetorical perspective. This study reconsiders the 'default presumption' that the market governs access to resources (Clough et al., 2019, p. 247) and is in line with other studies which have found that the crowds' community legitimacy derives from the community's logic (Fisher et al., 2017).

CONCLUSIONS

The current thesis contributes to a better understanding of digital transformation of BMI from a strategy perspective. Many of the prevailing assumptions regarding the ways firms create and capture value are being changed because of technological advancements. This thesis applied literature review analysis and qualitative based methods to understand the strategical impacts of DT on business model innovations - referring its value creation, delivery and capture components; and by investigating this theoretical gap this study generates insights and suggestions on new strategical ways to manage changes and possibilities of digitalization. The main question was: *How does digital transformation enable the creation of new business models?* The first article addressed this question by forming the links between digital transformation and business model innovation, in order to identify the impact of digital transformation in value creation, deliver and capture. The second paper builds on literature findings and proposes a new theoretical perspective of ICD by conceptualizing it a communication process in digital mediums. The third paper extended the idea of online polylogic communication by exploring how rhetorical accounts are used to legitimate new business models, Blockchain-based.

Overall, the current thesis contributes to theory and practice in three areas: strategic management, intellectual capital and entrepreneurship. First, the literature review filled this knowledge gap in literature by providing the state of the art between these two different discipline areas – digital transformation and business model innovation. Results showed that digitalization has impacted value creation, delivery and capture in almost every industry. In addition to these impacts, digital technologies have facilitated the creation of a variety of new business models, such as those for frugal innovation and the circular economy. Furthermore,

many of the prevailing assumptions regarding the ways firms create and capture value are being changed from the adoption of digital technologies and digitalization is facilitating rapid changes to firms and industries. In this regard, findings show that boundaries of the firm are blurring – as digital affordances have led towards digital platforms and ecosystems. Therefore, DT is leading towards external audiences, making the connection between firms and customers stronger, customized and very highly dependent on each other. This is reflected on Open Innovation paradigm with crowdsourcing and recently also crowdfunding, where end-users are at the center of value co-creation. All these theoretical findings extend strategy literature in digital contexts. Results are relevant and very important for managers and marketing managers when considering to undertake changes and build strategies. Provided that interdependence between actors in ecosystems is very strong; agility, dynamic capabilities and the management of these social networks become relevant factors to consider.

Taking into consideration these results from literature review, the second paper focuses on the importance that social networks and ecosystems hold for firms' strategy development. Pervasive use of digital technologies and the prevalence of digitally-embedded ecosystems as business models to foster innovation and to remain competitive in the market, emphasize the importance of Intellectual capital in the knowledge-intensive economy. In support to this line of reasoning, recent literature on open innovation as well contends its foundations in relational capital, which are simultaneously facilitated by both components of intellectual capital – human and structural capital (Barrena-Martínez et al., 2020). Based on these, we propose that in the digital realm where transformation of processes, activities and competences are rapid because of technological advancements, communication with partners to hold accountable about business developments are

crucial value. Therefore, we provide a new strategic perspective of intellectual capital by conceptualizing firm's Intellectual capital disclosure as it being a communication strategy that creates value by building relationships with their stakeholders. We show through the framework the opportunities offered by digital mediums to communicate their IC disclosure and create value for their business models. Digital content, in this case ICD presents a new innovative way to deliver value through digital mediums. In addition, the widespread adoption of SMACIT technologies (social, mobile, analytics, cloud, and Internet of Things) (e.g., Sebastian et al., 2017) has expanded possibilities how firms share information and create value, engage with their stakeholders, enhance their visibility and awareness and meet audiences' needs.

We contribute to the field of ICD by making use of relevant developments in the strategic management literature and busines models. Through online disclosure, firms will have it possible to put forward the narrative-based reporting following Beattie and Smith (2013) suggestion to go towards integrated information discourse in the form of a story, with the aim of value creation process, similarly to what company managers used to communicate to institutional investors in the past (Holland, 1998). Moreover, we address Bukh's call (2013, p. 55) for more research on the way companies 'perceive the company's busines model and communication on strategy and value creation'.

Third, we further explore how communication between actors in online digital mediums takes place. We draw on rhetoric theory to understand how actors use communication online t make sense out of uncertainty and legitimate disruptive business models. Findings reveal logical judgements to be important in acquiring legitimacy over the venture's lifetime, while pathos and ethos appeals help in maintaining this legitimacy. Human capital, white paper and business idea are the three valuation elements of logical justifications. Working product, partnerships and listings in solid exchanges greatly help to gain normative legitimacy. This article contributes theoretically and empirically to the entrepreneurship literature. It provides with a dynamic view of how justifications shape and lead to social acceptance of new business models.

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