MASTER THESIS

Collaborating to Innovate: A Systematic Literature Review Towards a Framework on Digital Innovator Roles

Student Name:	*Miriana Caschera*
Committee members:	*Dr. A.C. Bos – Nehles (UT)* *Dr. M. Renkema (UT)* *Prof. T. Bondarouk (UT)* *Prof. A. Sammarra (UA)* *Prof. M. Mori (UA)*
Academic Year:	*2019 – 2020*
Date:	*28 – 08 – 2020*

UNIVERSITY OF TWENTE (UT) – ENSCHEDE, NETHERLANDS

Faculty of Behavioural, Management and Social sciences (BMS)
Master in Business Administration (MBA)
Major in Human Resource Management (HRM)

DOUBLE-DEGREE PROGRAMME (DDP) WITH
UNIVERSITY OF L'AQUILA (UA) – L'AQUILA, ITALY

UNIVERSITY OF TWENTE.

Abstract

Focus: In recent years, the role of digitalization and digital innovation have become more relevant. Important contributors to the innovation process relying on ICT technologies are innovator roles, commonly referred to as champions and promoters, which foster the creation, development and implementation of innovation products and services through their skill and expertise.

Purpose: The aim of this study is to build a framework on digital innovator roles, by identifying and understanding the innovator roles, functions, and interactions inside and outside their networks, which make the implementation of digital novelties achievable.

Design/Methodology/Research approach: Relying on a systematic literature approach, this study analyses 52 articles published in journals found through the Scopus and WoS search engines.

Findings: Results showed how the digital transformation process is not only related to the introduction of new digital tools, but the outcome of teamwork of people interacting to develop digital innovations, requiring new soft skills, stakeholders involvement and clear directives, highlighting the need for digitalization as a shared organizational culture.

Contributions: On a theorical level this work provides a comprehensive view of the role played by innovators in the successful achievement of digital innovations combined with the challenging and successful factors of digital innovations on which to base future empirical researches. On a practical level this study provides managers a framework to consider when aiming for digitalization processes and when recruiting employees or assigning them a specific task.

Originality/Value: Through a systematic and replicable approach, this study combines literature related to digitalization, innovator roles and networks of collaboration**.**

Article type: Literature review

Keywords*:* Digitalization, Innovator role, Champion, Promoter, Network, Collaboration, Digital Innovation

Table of Contents

1. Introduction

Etymologically speaking, the word "innovation" in the business context is defined as the "development of new products, designs, or ideas" (Cambridge Dictionary, 2020), often indicating something to renew (Jenssen & Jørgensen, 2004). From a practical perspective, firms that innovate are firms willing to grow at the production and competitive level (Miron, Erez & Naveh, 2004). Innovation in fact, is a crucial process firms can engage in when craving to emerge among the others and gain competitive advantage on the global market ensuring long-term success (Kamaşak & Bulutlar, 2010). It results from the interaction of promoters (champions), who through their willingness and ability in finding support, negotiation, building of alliances and encouraging employees, ensure this spreading (De Jong & Den Hartog, 2008). The interaction concept relies thus on a network of relationships in which they operate, as collaboration among these distinct roles is essential to successfully implement innovations (Reibenspiess, Drechsler, Eckhardt & Wagner, 2018).

1.1. Digital Economy

With the affirmation of the globalization and the technology that came along however, the economy has entered in a different era, defined as the *Digital Economy* (Tapscott, 1995), which has led to changes and the need to adapt and re-think the way in which business is done. The concept of Digital Economy was first advanced by Don Tapscott in 1995 when he realized the imminent changes in the business world due to the affirmation of the ICT, introducing the concept of "the networking of humans through technology" (Tapscott, 1995). Digital Economy refers thus to a new kind of economy which questioned the old vision of business models, relying on the digitalization of information and communication and the introduction of digital technologies, such as the internet and the World Wide Web (WWW), computers and open sources (Zimmermann, 2000; Yoo et al., 2010). By extent, this influenced the way of innovating, leading to the concept of *Digital Innovation* i.e. the implementation of an idea, product or service, such as platforms and digital products, that are improved or introduced thanks to the contribution of Information and Communication Technologies (ICT) in the process (Kamaşak & Bulutlar, 2010; Yoo, Lyytinen, Boland & Berente, 2010; Lyytinen, Yoo, & Boland, 2015).

Digitalization however can lead to different challenges, e.g. encountering users' requests and needs during the innovation processes, or in the implications for the firm structure dynamics given by the introduction of new platforms and communication channels (Yoo et al., 2010; Nylén & Holmström, 2015). This implies that there is a need to understand the underlying complexity added by the digital world to the actions operated by those people contributing to innovation, defined as digital innovations actors (Holmström, 2018) and to understand the skills they need to develop in order to follow a different approach and adapt to the changing world e.g. when setting up innovation teams, facilitating communications, and/or innovating in the sense of actually build or project a product or service through their know-how (Gemünden, Salomo & Hölzle, 2007; Nylén & Holmström, 2015).

1.2. Networks & Innovator Roles

A fundamental aspect to underline is what Tapscott (1995) defined as "networking of humans through technology". According to him in fact, technology is not only something exchanged, but a mean through which people can interact in the networks in which they are embedded, by combining knowledge and creating something new or improving what existing, in many contexts (Tapscott, 1995). The interaction and exchange aspects are particularly relevant when talking about collaborative networks, i.e. a type of network in which actors, such as people and organizations, collaborate to reach a common goal, despite being different e.g. in terms of geographical distribution, context, culture etc. (Camarinha-Matos & Hamideh, 2006). Here, information and resources are exchanged, activities are aligned, and it is worked jointly to create something or achieve specific objectives; one of these is represented by the willingness to innovate (Camarinha-Matos & Hamideh, 2006).

Therefore, it emerges the importance of those individuals who informally arise in an organization and play a dominant part in the innovation process, commonly defined as innovator roles (Hauschildt & Kirchmann, 2001). They contribute to the process by actively participate and promoting innovation within the different organizational stages (Chakrabarti, 1974; Howell, Shea, & Higgins, 2005), and the persistence and the effort they put in the process makes them pivotal in making an innovation successful implemented (Shon, 1963), as they show commitment and readiness to take risks in order to ensure the achievement of projects (Maidique, 1980). The definition of innovator roles or champion however is not unique and there is not a fully understanding of this particular role (Jenssen & Jørgensen, 2004), as it has changed through the years in accordance with the literature evolution in widening the area of

analysis. Indeed, for many years literature has focused on the definition of who the innovation champion is and the identification of its personality, behaviour, characteristics and roles, coming to the shared vision of the innovation champion as a single person covering multiple roles and tasks such as generating-, transforming-, implementing-, and commercializing an innovation (Chakrabarti 1974; Wolfe, 1995; Howell and Boies, 2004; Jenssen & Jørgensen, 2004; Howell, Shea, & Higgins, 2005; Rost, Hölzle & Gemünden, 2007; Battistella & Nonino, 2013; Mansfeld, Hölzle, & Gemunden, 2010; Fujii, 2017).

However, research on innovator roles was broadened by the German speaking countries research stream, who sustained instead the presence of different that contribute to a successful implementation of an innovation, i.e. promoter roles (Witte, 1973; Witte, 1977; Chakrabarti & Hauschildt, 1989; Hauschildt & Kirchmann, 2001; Gemünden, Salomo & Hölzle, 2007). Throughout the years many types of promoters have been identified and explored according to the type of barrier they overcome, the type of influence implemented, and the function displayed on the basis of their behavioural traits (Gemünden et al., 2007). Among them, the *power* promoter, who provides resources exploiting the hierarchical power and removing psychological barriers; the *expert or technological* promoter who removes technological barriers and contributes through the technical know-how; the *process* promoter, who shows organizational skills in creating connections between roles and lastly, the *relationship* promoter, who on the contrary, links with stakeholders outside the organization (Witte, 1973, 1977; Chakrabarti & Hauschildt, 1989; Gemünden et al., 2007). Recently, further figures were observed, e.g. the *opponent or challenger*, the *godfather*, a senior figure that guarantees the overcoming of obstacles through reputation, power, influence and support; and others seen as sub-types or combination of already existing promoters e.g. the "devil's advocate", who shows champion and challenger aspects (Battistella & Nonino, 2013; Smith, 2006).

Following that, a further distinction is related to the type of innovation to be introduced: if the innovation means introducing a brand-new thought, a generalized innovator (i.e. universal promoter) should be picked, whilst if the role of these pioneers is that of innovating in the sense of upgrading something already existing, the better choice is to rely on specialized promoters (Rost, Hölzle & Gemünden, 2007). Collaboration within these roles is thus fundamental, as through collaboration the possibilities of positive outcomes are higher than when working alone (Fichter, 2009). Finally, a new hybrid type of contributors to innovation has been introduced, i.e. internal embedded users, indicating users with both internal and external characteristics, as they are people employed in a firm and users of the firm's product or service at the same time

(Schweisfurth & Herstatt, 2014). They act as boundary-spanners absorbing external knowledge, accessing richer resources (knowledge and social), using their capabilities in the whole innovation process from the beginning to the end (Schweisfurth & Herstatt, 2014).

1.3. Focus of the Study

The readjustments that come with the advent of the Digital Economy however, imply a re-definition of the classic concept of innovation, opening the path to new opportunities in business development (Garifova, 2015), making a focus on this area unavoidable and implying an adaptation and broadening of the current literature to the new aspects that come with this rise. Indeed, while on the one hand literature has analysed the innovator roles in innovation product projects, on the other digital innovation has been addressed only through a more general approach (Yoo et al., 2010; Lyytinen et al., 2015). Digitalization can bring challenges but also opportunities (Yoo et al., 2010), but there is thus a need to understand how digitalization influences innovator roles functions and characteristics, e.g. by exploring whether innovator roles operating in the digital field require different skills to achieve digital innovations or if, for instance, they coordinate differently from what already known. What is missing therefore is a link that connects these two research streams (Reibenspiess et al., 2018), i.e. the application of the innovator roles studies at the digital level, combining them also with the concept of networking. Thus, different concepts come into play, and, as said before, literature does not follow a unique stream, in particular when talking about innovator roles definitions.

It is in this context that this study relies. This work is based on an analysis at the (inter)organizational level, by looking at the interactions of people and organizations inside and outside their networks, and exploring these relationships from multiple perspectives, i.e. at the macro-level and individual level. The aim of this study is to build a framework on digital innovator roles, by focusing on the figure of innovator roles in the digital context, their functions and interactions, and investigating the linkages they create inside and outside the network in which organizations are embedded to make the implementation of digital novelties achievable. In other words, the study intends to *identify and understand the digital innovator roles and how do they interact and collaborate in their networks to accomplish digital innovations*.

Hence, in order to build the framework, this study adopts a Systematic Literature Review (SLR) approach on the past and current literatures, investigating how the main topics have been addressed until now, and the differences and similarities between them. On a theorical level

therefore, this work contributes to the understanding of the innovation field literature as it aims to provide a comprehensive view of the role played by innovators in the successful achievement of digital innovations combined with the challenging and successful factors of digital innovations on which to base future empirical researches. As innovators should collaborate in order to achieve the results aimed, this entails to build an efficient and effective network of relationships. On a practical level therefore, this study could help in the building of a successful organizational structure by providing managers a deep understanding of the digital innovator roles functions and characteristics and how they interact, that can help when recruiting new employers and when assigning them a specific task.

This paper is structured as it follows: first, as this is an SLR, a description of the methodology adopted will be provided, summarizing the principal characteristics of the sampling, data collection, data selection and elaboration techniques. On the basis of that, the overall findings will be presented, followed by the framework on digital innovator roles. Finally, implications, contributions, limitations of this study, and potential future researches will be provided in the last section.

2. Methodology

In order to build the framework on digital innovator roles, this paper relies on a Systematic Literature Review (SLR) approach, i.e. a research technique deriving its findings by analysing data from literature already reviewed and published (Jesson & Lacey, 2006). The reason behind this choice was given by the fact that although there are extensive studies on the topics at a broad level, attention on how they are interconnected is lacking: literature in fact has focused on what is digital innovation, who are promoters and what are their characteristics, but how these fields could be linked is missing. Thus, an in-depth analysis of the state of art in these fields can be made in order to find what aspects link them. Furthermore, the reliability of SLRs should be taken into account: a scientific literature selection process allows replicability, transparency and accuracy, not only by minimizing biases and enabling a comprehensive understanding of the topic and future developments, but also by providing a clear description of the researcher's rationale (Tranfield, Denyer & Smart, 2003).

2.1. Data Collection

To ensure trustworthiness, the selection of the articles included in this study had to meet prefixed requirements. Articles had to reflect relevance in the field, and therefore only articles published in relevant journals were chosen. In order to comply with this requirement, articles were searched through selective and reliable online search engines, namely SCOPUS™ and Web of Science™ (WoS). Regarding the aforementioned lacking interconnection of the topics, a first research was done attempting to combine them, but results were narrow, as only two articles emerged from the search. Therefore, to answer the research question, two separate searches were made, and the results were later discussed together.

The researches were done by using the specific terms and synonyms taken both individually and combined. It has to be noted that the words presenting alternative variants due to the English or American spelling, were included too. Boolean operators were used to combine keywords. Researches were related to the relationship between Digitalization and Digital Innovation, Collaboration within networks, (Digitalization and Networks from this point on, respectively), and Innovator Roles. The network aspect was kept fixed and maintained in both researches, by also using collaboration and teamwork as synonyms, while the digitalization and innovator roles aspects were separated. Hence, researches resulted in the following strings, which were used in the precise same way in both search engines in order to obtain comparable results:

- Research 1 (R1) = ("digital innovation" OR digitalization) AND (network OR collaboration OR teamwork).
- Research 2 (R2) = ("innovator role" OR "innovation role" OR "innovation champion" OR "product champion" OR "innovation promoter" OR "innovation promotor" OR "champions of innovation") AND (network OR collaboration OR teamwork).

2.2. Data Selection Criteria

The process of selection started by using the aforementioned keywords. It was established that to select a paper, they had to necessary appear in the title-, abstract, and/or in the keywords indicated by the author(s) of the paper. This however led to an amount of results still too broad to be analysed, which was thus refined through three main reducing steps. In order to do that, inclusion and exclusion criteria were applied. For instance, in order to create a comparable and reliable study, to select data, only English literature has been considered. Additionally, the articles were selected on the basis of a specific subject area, i.e. Management. Regarding the

time range instead, the criteria behind the choice of the starting year referred to when the key-terms appeared for the first time in significant studies. In this context, the challenge of connecting different topics arose, as the starting years could be significantly different: for instance, whilst the concept of "Innovation champion" goes back already to 1974 with Chakrabarti's works, regarding "Digital Economy" the first time the term has been introduced was in 1995 in Tapscott's book, who subsequently stimulated the research in the field. Thus, in order to have a more coherent and comprehensive outline of the innovator roles during the digitalization era, both researches were done by aggregating topics and time spans through an interval that ranged from 1998 to the most recent works of 2020. In summary, articles outside the 1998-2020 range, management field, not written in English or that did not contain the aforementioned keywords were excluded (first selection).

In addition, having used different search engines, this led to redundant articles in both sources. Therefore, the lists were compared, and duplicates were manually excluded (second selection). Then, a third manual selection was done by reading the titles and abstracts of the narrowed list. In fact, despite containing the keywords proposed, many publications did not fully focus on the topics of this study. Thus, papers not consistent with the purpose of this study were excluded, as to be suitable, the studies had to answer one of the following questions, e.g.

- What aspects lead to digital innovation implementations?
- What are the benefits and challenges of digital innovation implementations?
- Which innovator roles and functions can be identified in innovation projects?
- How do they interact inside and outside the network in which firms are integrated?

This led to a potential list of selected articles, which was narrowed one list time by looking at the availability of the paper. Indeed, some papers were not available in full text from the principal academic databases and were excluded too. This iterative process led from the initial 3188 results to a final list of 52 eligible articles included in the SLR and analysed in depth. **Figure 1** summarizes the literature selection process.

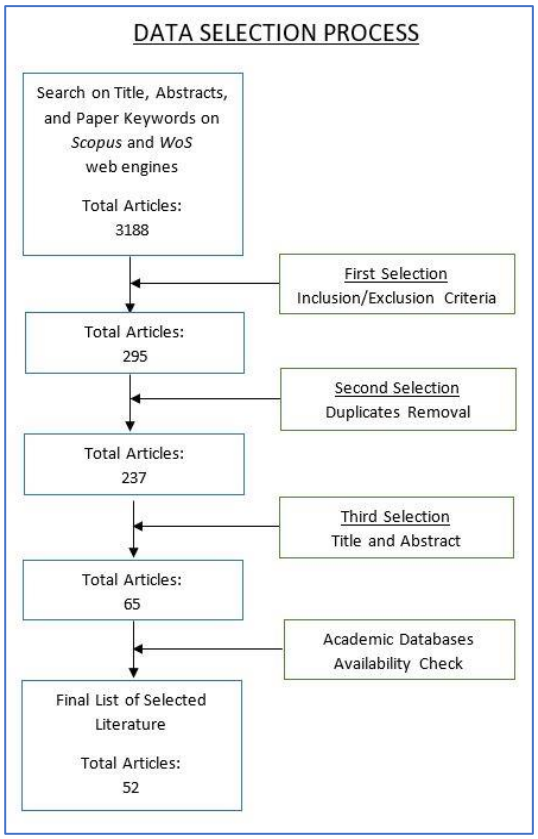


Figure 1

2.3. Data Extracted

A total of 52 articles were extracted; 29 articles are related to R1, while 23 to R2. To examine them, first, a descriptive analysis was made. Data was retrieved and elaborated from the Scopus and WoS databases. Looking at the distribution represented in **Figure 2,** it can be noted that although the time span considered started in 1998, the articles extracted in this study are mainly taken into account from 2005. In particular, the articles are mainly distributed in the decade 2010-2020 for both researches and clustered in the last 4 years for R1 (Digitalization). Furthermore, articles were represented by considering the amount of times they have been cited in other published articles: in total, the 52 articles have been cited 996 times, as shown in ***Figure 3***. Finally, an overview of the countries and regions where data included in the articles was collected is displayed in ***Figure 4.*** The chart shows how the three main countries where data was collected are Germany, United Kingdom and United States.

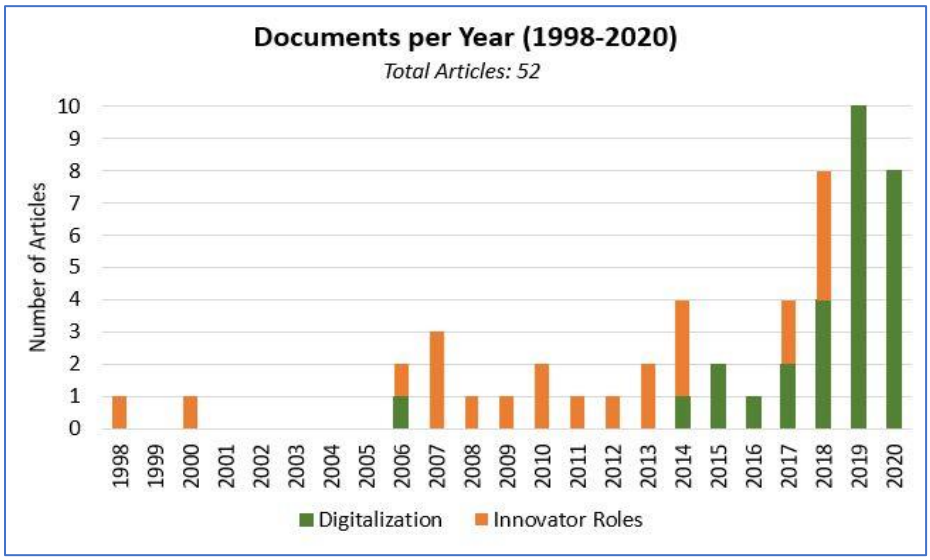
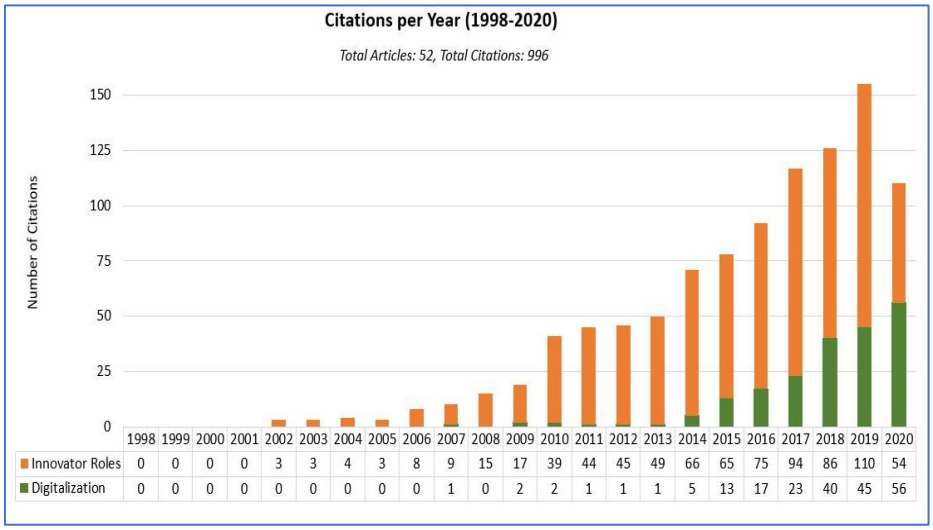


Figure 2



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Innovator Roles	0	0	0	0	3	3	4	3	8	9	15	17	39	44	45	49	66	65	75	94	86	110	54
Digitalization	0	0	0	0	0	0	0	0	0	1	0	2	2	1	1	1	5	13	17	23	40	45	56

Figure 3

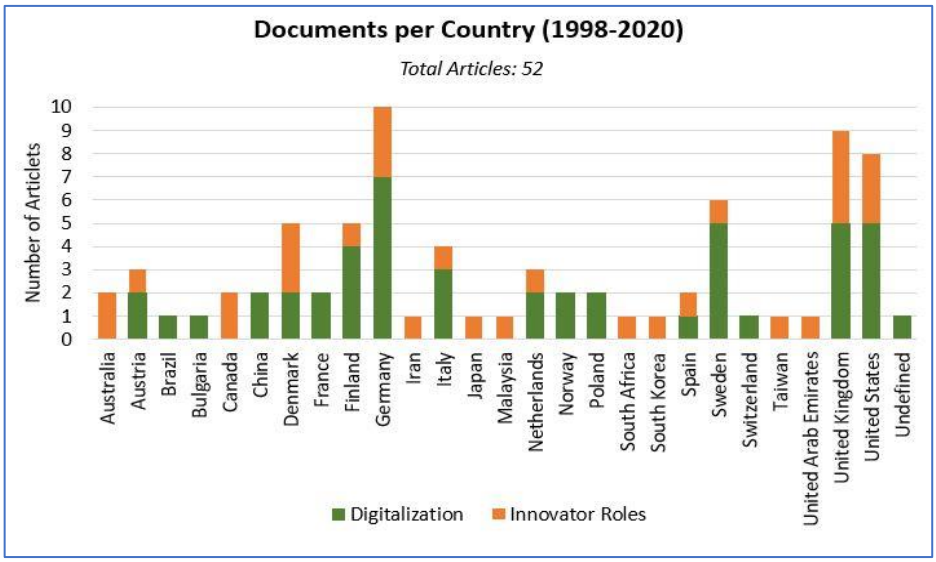


Figure 4

2.4. Data Classification

The narrowed list of 52 articles was examined through a content analysis, following an inductive research approach. In order to do that, each paper was analysed individually, and a classification was made following the scheme indicated in **Table 1**.

In particular, articles were categorized first by looking at the article ID, i.e. author(s), year of publishing, title, and publishing journal; then, to acknowledge the suitability for the study, by reading the papers individually, a further classification was done by looking at the focus of the study. Then, another classification was made by focusing on type of *Digitalization* examined (R1) and *Innovator role(s)* observed (R2). A further categorization was made by underlining the sampling and the research method, data collection and analysis used. In the last column, the main findings were highlighted. The ultimate aim of this study is to answer the research question while contributing to this research field. Thus, only results that were considered relevant were included in the classification scheme. The in-dept content analysis of both researches can be found in ***Appendix I and II.***

Table 1 - Literature Classification Scheme

Article ID	Focus of the study	Digitalization or Innovator role(s) Observed	Sample	Data Collection and Analysis	Main Findings

2.5. Data Analysis

The main findings were further coded and analysed. The coding was made following an inductive coding approach: starting from the study area, the data extracted was interpreted by the author, deriving themes and concepts, making theory later emerge from it (Thomas, 2006). The aim of this work was to focus on innovation champions roles and interactions, inside and outside the organization, which make the implementation of digital novelties achievable. In order to reach this goal, sub-research questions were identified to guide this study. Thus, a first labelling was made following these sub-questions, by interpreting the main findings on the basis of shared content aspects, which resulted in eight sub-categories. Later on, an additional grouping was made, that mainly corresponded to the research they are originated from, i.e. R1 or R2. As a result, three main categories were identified, namely Digitalization (R1), Innovator

Roles (R2) and Networks, which instead included results from R1 & R2, as it was a common query included in both researches. ***Table 2*** shows the coding scheme adopted, describing sub-categories, their identification code, labels, and the corresponding category.

Table 2 – MAIN FINDINGS CODING TABLE

DESCRIPTION	CODE	SUB-CATEGORY LABEL	CATEGORY LABEL
Aims behind the use of digital tools, determinants of digital innovation employments, positive outcomes achievable	DTP	Digital Transformation Process	Digitalization (R1)
Aspects and elements required to successfully achieve digital innovation	DIS	Digital Innovation Success Factors	
Digital transformation seen as a shared vision rather than only a process to implement digital tools	DCV	Digital Culture Vision	
Definitions, categorization, and main traits of different innovator roles	IRC	Innovator Roles Characteristics	Innovator Roles (R2)
Skills and aspects that make the presence of innovator roles effective	IRE	Innovator Roles Effectiveness	
Characteristics, successful factors, and challenges of establishing collaboration networks	NCD	Collaborative Networks	Networks (R1 and R2)
Factors fostering the creation, development and sharing of knowledge within networks.	NKE	Knowledge Exchange	
Challenges emerging from interactions with the stakeholders in the network, functions within the organizations, contextual factors	NCI	Challenges in Networks	

3. *Findings of the Literature Review*

Once the 52 articles were categorized, coded, and analysed a total of eight main themes emerged. This section presents what found through the categorization and coding of the articles (***Table 2***), by separately presenting the categories (*3.1*, *3.2*, *3.3*) and the main concepts that characterize each sub-category. These concepts will be later integrated in *Section 4* to build the framework on digital innovator roles.

3.1. Digitalization (R1)

3.1.1. Digital Transformation Process

Although digital solutions are unique in each company (Rocha, Mamédio, & Quandt, 2019), overall the need to create, foster, implement and use digital tools seemed to be mainly linked to companies' need of performance and efficiency improvement (Melander & Pazirandeh, 2019) e.g. through the automatization of processes, which reduces development costs and at the same time ensures increased quality (Rocha et al., 2019). Nevertheless, the positive outcomes and employment of digital tools are manifold. Digitalization helps in communication and collaboration, customer relationships, workplace distribution (Caniglia, John, Bellina, Lang, Wiek, Cohmer & Laubichler, 2018; Hardwig, Klötzer & Boos, 2019). It also reduces boundaries and allows richer knowledge exchanges (Caniglia et al., 2018; Hardwig et al, 2019; Bouncken & Barwinski, 2020), and allows environmental sustainability, problem-solving, approachable solutions for both customers and companies, time and money saving, transparency (Hardwig et al, 2019; Melander & Pazirandeh, 2019).

Digital transformation should be seen as a step-by-step gradual process adapting to the evolving market (Cichosz, Wallenburg & Knemeyer, 2020), promoted through a 4-level approach i.e. understanding of the potentialities, functionality exposition, collaboration, and transformation and commitment (Garzoni, De Turi, Secundo & Del Vecchio, 2020). Innovation is thus a customer-centric process based on teamwork, interactions with employees and partners, value creation for stakeholders, engagement (Cichosz et al., 2020). Hence, shifting from lower to high levels of digitalization increases the opportunities for an extended network of innovation and multiple relationship with actors (Beliaeva, Ferasso, Kraus & Damke, 2019), but only if linked with other conditions (Goduscheit & Faullant, 2018): indeed, companies can have similar innovations, but the strategies used to implement digital tools and other factors taken into

account e.g. intellectual property, legitimization, support from institutions, user friendly tools, leads to different outcomes (Remneland Wikhamn & Knights, 2016). Finally, the extent of digitalization can depend on the type of firms considered: Heim, Kalyuzhnova, Li & Liu (2019) highlight the differences between them, i.e. a low and undeveloped level of ICT tools for basic services, lack of controls and funding, undeveloped skills in SMEs; medium level of ICT use but lack of specialists in the sector, emergent collaborations in state-owned national company; high level of ICT integrated and exchanged, collaborations, high skills but shortage of specialists due to expatriation.

Thus, when considering a digital transformation process, although positive outcomes are commonly underlined, as many aspects came into play, e.g. context, type of firm, strategy adopted, leading to different way to achieve them rather than a shared and unique solution.

3.1.2. Digital Innovation Success Factors

Digital tools should be introduced only after inter-firm knowledge and communication has been translated in clear measures (Baraldi, & Nadin, 2006). Digital innovations thus require not only structural hard skills, but also new skills to succeed, that is soft capabilities e.g. communication, teamwork, conflict management to support collaborations, and solving-problems competences to overcome technological-, organizational and infrastructural barriers (Papadonikolaki et al., 2019; Baccelli, & Morino, 2020; Cichosz et al., 2020). New capabilities refer also to the need of specific skilled people to address data dematerialization from physical to digital (Tronvoll et al., 2020). Indeed, interaction, collaboration, and coordination are key aspect reducing rigidity and influencing digital tools implementation (Baraldi, & Nadin, 2006; Schmidt et al., 2019) e.g. in the case of company interaction, incentives from regulatory bodies measures (Hedman et al., 2015; Baccelli, & Morino, 2020) or HRM measures supporting digitalization (Schmidt et al, 2019).

Additionally, involvement of long-term oriented parties, committed and motivated people increases the chances of success as they are able to disrupt potential barriers (Wallin et al., 2015; Cichosz et al., 2020). Moreover, customers involvement could be positive, by recognizing their demands and act consequently; however, firms should not blindly depend on them, as they could have limited perceptions (Goduscheit & Faullant, 2018). Successful innovations emerge when firms rely on trust and reputation of affirmed linkages (Tronvoll et al., 2020), and when innovation capability, clarity, flexibility, change adaptation, understanding of roles and processes (Wallin et al., 2015; Tronvoll et al., 2020). Boundary spanning tools are

also elements that lead to success, as they act as knowledge integrators and as understanding bridges between experts, playing an integral part in the digital innovation process (Papadonikolaki et al., 2019; Pershina et al., 2019).

Therefore, to successfully achieve digital innovation, new capabilities are required: these relate especially to soft skills such as communication, solving problems and technical expertise. Involvement of other stakeholders in the project, clarity, flexibility also positively contribute to digital innovation achievement.

3.1.3. Digital Culture Vision

One particular aspect that explicitly and implicitly emerged from the articles is the need to have an integrated strategy in order to innovate. According to the authors, although digital transformation is important, it does not refer to just a tool (Papadonikolaki, van Oel & Kagioglou, 2019) but as a vision that should be shared in the overall organizational and corporate culture, by defining goals with clarity and design the work accordingly and coherently (Hardwig et al., 2019; Schmidt et al., 2019; Cichosz et al., 2020; Garzoni et al., 2020). When tools are integrated in the organizational strategy, the objectives foreseen are achievable (Papadonikolaki et al., 2019). Perception about potentialities and requirements are shared by respondents (Schmidt et al., 2019), but there is a need to individualize digital tools in accordance with the firm that is implementing it, understanding the organization and local context and adapting boundaries to the common goal (Verstegen et al., 2019). The vision should be thus aligned also with the specific context in which firms are embedded, as it allows a balance of inequalities across the network (Caniglia et al., 2018) and supports digital changes in the whole ecosystem (Tronvoll et al., 2020). In order to innovate, the broad strategic orientation should guide the network strategy with a clear and defined approach (Jaag & Finger, 2017; Melander & Pazirandeh, 2019) and network communities, human- and social capital, and other companies' involvement are fundamental, (Papadonikolaki et al., 2019), along with general guidelines and regulations (Verstegen et al., 2019), an understanding of value creation (Wallin, Harjumaa, Pussinen & Isomursu, 2015) and a successful interaction between individuals and community (Verstegen et al., 2019).

Thus, a fundamental aspect that leads to digital innovation achievement relies in how a process should start: an integrated digital strategy and a shared vision in the organization should be enacted, adapting directives and guidelines accordingly.

3.2. Innovator Roles (R2)

3.2.1. Innovator Roles Characteristics

What emerged from the articles is the fundamental role of champions and promoters in improving the process (Awais Ahmad Tipu, 2014) and that to be successful they however require additional support from management, departments when they are solo workers, and colleagues when in teams (Coakes & Smith, 2007; Awais Ahmad Tipu, 2014; Maier & Brem, 2017). The literature included in this SRL identifies and defines innovator roles differently, e.g. product or project champion, innovation champion, expert- or technology promoter, power promoter or godfather of innovations or champions' manager, process promoter, relationship or network promoter, by also dividing it in the sub-categories of technological- and market relationship promoter; they also defined new figures that contribute to innovation, e.g. moderator, facilitator broker, intermediary, innovation sponsor, or showing alternative championing- and roles particularly relevant for the innovation process (Kessler, 2000; Gupta, Cadeaux, Dubelaar, 2006; Yang, 2007; Coakes & Smith, 2007; Gemünden, Salomo & Hölzle, 2007; Musa et al., 2008; Elliott & Boshoff, 2009; Fernández, Luisa Del Río, Varela & Bande, 2010; Tao, Garnsey, Probert & Ridgman, 2010; Ettlie & Rosenthal, 2012; Lee & Guthrie, 2011; Battistella & Nonino, 2013; Klerkx & Aarts, 2013; Awais Ahmad Tipu, 2014; Goduscheit, 2014; Hemmert, Bstilier & Okamuro, 2014; Beretta, Björk, & Magnusson, 2017; Khalili, 2017; Maier & Brem, 2017; Matschoss & Heiskanen, 2018; Sergeeva & Zanello, 2018).

Innovation managers are characterized by imagination and courage, external focus, decisiveness, domain expertise, and involvement, and interaction with employees and management (Musa et al., 2008; Beretta et al., 2017). They need centrality to be connected and the absorptive capacity to absorb the knowledge and skills shared by other actors; in the digital context this can be divided in IT use for knowledge search (product design, cost reduction, market commercialization) and relational search (gaining market information through collaborative relationships) (Lee & Guthrie, 2011; Hensen & Dong, 2020). Innovator roles are motivated by monetary rewards, showing individual intrinsic- and professional extrinsic motivation; when in networks supporting innovation process and knowledge exchange, social intrinsic and extrinsic motivation are also shown (Battistella & Nonino, 2013). Being informal roles, they have to gain legitimization which is earned with trust credibility, and close interaction with the community (Beretta et al., 2017); this community orientation also reflects

the reason they are more effective when operating in groups, teams and subdivisions (Coakes & Smith, 2007; Klerkx & Aarts, 2013).

Seeing the similarities and differences of innovator roles, the categorization should be seen as more nuanced, as, people presenting more of one characterises and a combination of skills can emerge, creating sub-roles (Maier & Brem, 2017). Soft skills are the core strength of champions and promoters as they encourage innovation linking and connecting firms both in internal- and external networks, provide their technical expertise, are constantly informed about regulations and change in the markets (Awais Ahmad Tipu, 2014; Tao et al., 2010; Lee & Guthrie, 2011; Maier & Brem, 2017), establish collaboration relationships mediating trust mechanisms e.g. tie strength, reputation, contractual safeguards, partner relationships (Hemmert et al., 2014), inspire creativity and innovation, encourage the shared vision and common goals, provide support, and encourage projects by fostering idea sharing though communication channels (Khalili, 2017). Additionally, mentors and facilitators contribute to the innovation fostering by establishing a collaborative workplace (Yang, 2007), intermediaries support champions, negotiate rules to make new firm enter the market and remove barriers (Matschoss & Heiskanen, 2018).

Innovator roles can thus differ in how they are categorized or identified, but they present similar characteristics: constant interactions between them and with stakeholders, closeness to community, informally earned credibility and trust and soft skills e.g. communication, conflict management and barrier removals.

3.2.2. Innovator Roles Effectiveness

In order to be effective, (product) champions thus require specific skills e.g. communication, expertise, rather than specific qualifications. Indeed, champions and sponsors were found in different work positions, e.g. head of product development, head of marketing and business development, general management (Ettlie & Rosenthal, 2012; Awais Ahmad Tipu, 2014). However, a further difference in champions employment can be found by looking at the organizational culture of the firm: firm following an engineering culture present multiple champions whose roles are usually played by operations managers, while in entrepreneurial culture based firms, a sole champion understanding innovations potentialities comes from GM or R&D and engineering (Ettlie & Rosenthal, 2012). Hence, the employment of innovator roles does not depend on the qualification, but on other factors. They are more suited in a specific area of interest by looking at their expertise and skills (Gemünden et al., 2007; Goduscheit,

2014), or taking into account the company size (Maier & Brem, 2017). For instance, while in small and medium sized companies is employed one innovation manager fulfilling multiple roles, in large ones there is no champion and the need for specialized skills leads to the creation of innovation management teams (Maier & Brem, 2017). Management support is an important aspect for innovation (Kessler, 2000; Awais Ahmad Tipu, 2014), but the role played by innovator roles is also fundamental. Their effectiveness comes from their leadership and the trust they earned (Hemmert et al., 2014), but they also have to be aware of both potentiality and drawbacks of innovations to enact a successful strategy (Elliott & Boshoff, 2009).

A further aspect is linked to the strategic and effective distribution of promoters during the process, e.g. employing relationship- and process promoter during initial stages to connect with stakeholders and promote the project, and once started, to also include the expert promoter which provides the expertise (Goduscheit, 2014). A good division of labour reduces development costs, along with transparency, faster processes, lower top management involvement, gathering of external resources, higher organizational capability e.g. open control and virtual communication (Kessler, 2000). Successful innovations however require clarity in communication (Goduscheit, 2014), which can be achieved through the use of digital tools e.g. virtual based channels (Kessler, 2000), and facilitated by innovation brokers through informal relationships, complementarity between champions, shared vision and network linking (Lee & Guthrie, 2011; Klerkx & Aarts, 2013).

Therefore, the main aspect characterizing effective innovator roles does not rely in their qualification, but in how their soft skills are developed and used, e.g. in the case of leadership, support. Additionally, the strategic distributions of these roles along the process influence their effectiveness.

3.3. Networks (R1 & R2)

3.3.1. Collaborative Networks

Firms can engage in alliances with suppliers, customers, universities and institutes, associations, and governments, and across industry and boundaries (Melander & Pazirandeh, 2019), building an innovation network and participating to innovation projects for multiple reasons (Makkonen & Komulainen, 2018). Networks originate thus from the need of collaboration to obtain benefits and overcome obstacles, e.g. to eliminate barriers, obtain new knowledge, resources, access to funding, product development, to gather a specific type of

innovativeness lacking in a firm, access to complementary competences and infrastructures, closeness to customers and employees or to gain legitimacy (Gemünden et al., 2007; Elliott & Boshoff, 2009; Goduscheit & Faullant, 2018; Muhos, Saarela, Foit & Rasochova, 2018; Schroth & Häußermann, 2018; Beliaeva et al., 2019). In networks resources are exchanged and technologically integrated (Heim et al., 2019), but it is the purpose of a collaboration that determines the type of partnership chosen e.g. equity participation alliances or value creation networks, balancing financial and technological inequalities across countries (Goode, 2017; Heim et al., 2019; Hornuf, Klus, Lohwasser & Schwienbacher, 2020). As an example, incremental innovations-oriented firms may follow a linear technology process, operating in the short-medium term and relying on formal research of resources to increase existing knowledge, while to achieve radical innovations the process could be complex and in the long-term, creating new knowledge relying on open collaborations (Schroth & Häußermann, 2018).

They thus emerge from the formal and informal relationships links (Sergeeva & Zanello, 2018; Rocha et al., 2019) between stakeholders, firms, and innovator roles. They are dynamic, complex, and evolving systems that eventually lead to change in firms and markets, especially when they are community oriented and focused on innovation projects (Coakes & Smith, 2007; Klerkx & Aarts, 2013), and given their importance they also require governance capability (Sergeeva & Zanello, 2018). Partnerships can be established by looking at the financial soundness and reputation of a firm, the academic- and technical expertise background, legal- and exchange conditions, trust, reliability and previous collaborations, regional networks affiliation (Lee & Guthrie, 2011; Schroth & Häußermann, 2018), and can be further exploited by making use of dedicated communication channels to promote ideas (Sergeeva & Zanello, 2018) and facilitated by network of-pattern inclusion in product development process (Henfridsson, Mathiassen & Svahn, 2014). Moreover, alliances can be encouraged by considering potential cost savings opportunities, roles, and responsibilities (Sergeeva & Zanello, 2018) and intellectual simulation and communication (Coakes & Smith, 2007). Further benefits are given by the link of networks and innovator roles, as here champions informally emerge, identified by members of the networks, gaining consensus, being supported and can socially connect and interact, fastening idea promotion and innovation processes (Coakes & Smith, 2007; Matschoss & Heiskanen, 2018). Additionally, innovation is the outcome of resources and knowledge integration (Goduscheit & Faullant, 2018), but also a result of teamwork between champions displaying innovation projects potentialities, and the corporation and managers who create policies and give incentives to foster them (Musa, Ismail & Othman,

2008). Support is thus fundamental, as unstable partnerships can lead to conflicts and collaboration conclusion (Hornuf et al., 2020).

Networks therefore informally emerge driven by different goals. Among them, is commonly underlined the need for resources, knowledge, and barrier removal, which could not be achievable when working individually. Alliances and partnerships play thus a pivotal role in innovations, as through them collaboration linkages are established, encouraging communication and positive outcomes, e.g. cost reduction and resources gathering.

3.3.2. Knowledge Exchange

Knowledge is created, developed, and exchanged in innovation networks (Coakes & Smith, 2007) and its externalization allows projects development inside and outside the industry for members of the network (Sergeeva & Zanello, 2018). Knowledge can mainly be divided according to how this is exchanged, in explicit- and tacit knowledge, where the latter can be further classified in technological potential knowledge, a complex informal communication relying on affirmed allies, and operational process knowledge, which is instead based on a more personal interaction and clear instructions (Bouncken & Barwinski, 2020). Communication and informal conversations foster knowledge exchange (Kessler, 2000; Yang, 2007; Cichosz et al., 2020), but they are not the only means. For instance, knowledge enhancing comes from accumulation of roles, work group, immediate superiors, organizational climate (Gupta et al., 2006; Yang, 2007), and the social identification through the sense of community and shared values (Shared Digital Economy), which allows exchanges even without strong ties (Bouncken & Barwinski, 2020). Additionally, network cross-functional teams reunite members of different knowledge and expertise (Fernández et al., 2010) and make possible to learn about competitors (Awais Ahmad Tipu, 2014). Also, alliances enhance personal formation as knowledge is shared faster in the network and for firms this is a cheaper alternative to formal courses (Elliott & Boshoff, 2009). At the same time training and learning change too, as multiple actors e.g. student, teachers and social actors who interact and communicate across contexts, use technologies to do it (Caniglia et al., 2018).

Knowledge creation, development and exchange therefore is an important aspect emerging from collaborations establishment, as it allows to rapidly share information, communication, and expertise improvement.

3.3.3. Challenges in Networks

Introducing a new innovation however comes with challenges. One is represented by firms already present in the market. They see new innovations as threat to their technology, fearing the possibility of becoming obsolete (Autio & Lumme, 1998). They thus enact mechanisms to decelerate their growth and keep the regime stable through the interlink of its existing actors and with rules that inhibit radical innovations (Autio & Lumme, 1998; Matschoss & Heiskanen, 2018). This approach however may be unsuccessful, as the introduction of new alliances weakens the existing linkages and makes new innovations achievable, progressively changing the regime exploiting new requirements and negotiations (Matschoss & Heiskanen, 2018). Moreover, collaborations are threatened by conflicting expectancies, trust issues, legal aspects, reluctancy to data sharing, unrecognition of potential benefits (Melander & Pazirandeh, 2019; Schmidt, Veile, Müller & Voigt, 2019), which consequently implies extended processes, conflicting approaches, and negotiations (Schroth & Häußermann, 2018).

Challenges appear also during the development process e.g. complexity, lack of resources, technology adoption, power and trust conflicts, resistance to change (Baraldi, & Nadin, 2006; Cichosz et al., 2020). Cybersecurity was also found challenging, with regard to the costs for constant maintenance, data protection and data security breaches (Hardwig et al., 2019; Cichosz et al., 2020; Westerlund, 2020). Other factors can be related to excessive monitoring and frequent involvement and interruptions from top management, which reduce knowledge sharing through control, rules, and regulations and, along with bureaucratisation, increase development costs (Kessler, 2000; Yang, 2007); however, other articles mention how a lack of monitoring could weaken collaboration (Rocha et al., 2019) implying thus the need for a monitoring balance. Moreover, incorrect or absent use of tools, lack of integration, increased skills requirement (Hardwig et al., 2019), improper actions of champion, can negatively influence innovation networks, for instance when they do not clearly communicate, leading to confusion about objectives, hierarchy power and functions to accomplish (Klerkx & Aarts, 2013).

Additionally, in inter-organizational projects dividing functions within people is harder (than intra-organizational) and collaborations are more challenging (Goduscheit, 2014), also due to conflicts emerging from cross-domain partnerships lacking of reciprocal understanding (Pershina, Soppe & Thune, 2019). One reason is given by continuous change of promoters, partnerships and readjustments during the process that frustrate people working on innovations and may also lead to conflicts if not combined with constant communication (Klerkx & Aarts,

2013; Goduscheit, 2014; Pershina et al., 2019). Aspects such as socio-economics conditions and infrastructural limitations (Baccelli, & Morino, 2020), type of company and country status may negatively influence innovation too: indeed, in local adaptation subsidiaries there is low degree of innovativeness which can be seen with regard to understanding of tasks and R&D innovation, lack of projects managers, and a low degree of interaction with headquarters, reducing also the local decision making power (Zhou, Velamuri & Dauth, 2017). Also, emerging countries are continuously building their reputation on the network to engage external suppliers and funding allies, as they do not have a long history of partnerships, while facing barriers from their country culture, e.g. lack of government support, low understanding of digital potentialities, lack of corporate structure adaptation, lack of (Hemmert et al., 2014; Rocha et al., 2019).

Despite it could lead to positive outcomes, entering a network thus does not come without challenges. Main obstacles are represented by firms already existing in the market, the complexity arising due to functions conflicts, confusion, and lack of clarity in communication, and the role played by contextual conditions e.g. type of company or country status.

4. A Framework on Digital Innovator Roles

Analysing the articles, it could be said that digital innovations are the result of interconnected elements: they are the starting point and the conclusion of an innovation process, as while on one hand they unique solutions of companies (Rocha et al., 2019) resulting from the realization of an innovation project, they are also needed to help and facilitate communication throughout it (Caniglia et al., 2018; Hardwig et al., 2019). Digital tools are mostly used for communication support and efficiency improvement, helping also in responding to stakeholders' requests (Sergeeva & Zanello, 2018; Melander & Pazirandeh, 2019). Clarity, trust, reputation, and boundary-spanning tools positively influence digital innovation implementations (Hemmert et al., 2014; Wallin et al., 2015; Zhou et al., 2017; Tronvoll et al., 2020). Knowledge creation, development and sharing are common aspects found, that originate from informal conversations and communications between innovator roles and stakeholders, but also from teamwork, organizational climate, shared values, and alliances and partnerships in the network (Kessler, 2000; Gupta et al., 2006; Yang, 2007; Bouncken & Barwinski, 2020; Cichosz et al., 2020).

Furthermore, what emerged from the articles is the fundamental role played by champions and promoters in the digital innovation process, as they are constantly interacting in both internal

and external networks (Musa et al., 2008; Beretta et al., 2017). ***Figure 5*** illustrates the integration of the findings of this study, building a representative model of the framework combining literature on digitalization, innovator roles and networks.

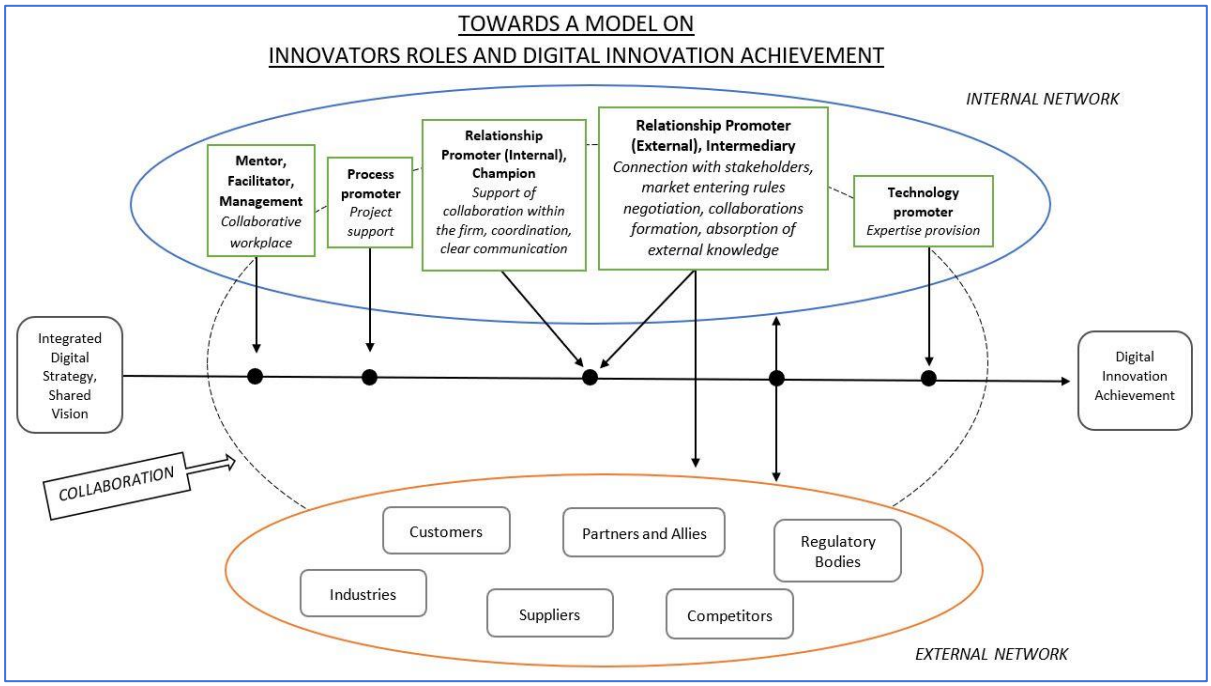


Figure 5 *shows a representation the digital innovation process. Starting from an integrated digital strategy in the organization, different innovator roles from the internal network (firm) come into play during the various stages of the process, exerting their functions. Once connections with the external network are established through the intermediary role, a collaboration relationship between innovator roles and external networks is shown (dash line), ultimately leading to digital innovation achievement.*

A successful digital innovation process starts from the strategy adopted (Remneland Wikhamn & Knights, 2016) and an integrated digital culture, which is clearly shared and integrated in organizations and aligned with the context in which firms are embedded (Hardwig et al., 2019; Papadonikolaki, van Oel & Kagioglou, 2019; Schmidt et al., 2019; Verstegen et al., 2019; Cichosz et al., 2020; Garzoni et al., 2020). Encouragement is given by mentors and facilitators that contribute by establishing a collaborative workplace (Yang, 2007) and by champions fostering creativity, support (Khalili, 2017). Alongside integrated culture, an important aspect is played by networks. They are the result of relationships and interaction between innovator roles internally, and between innovator roles and stakeholders e.g. firms, customer, governments, externally. Here, innovator roles informally emerge, interact, and gain legitimacy (Coakes & Smith, 2007; Matschoss & Heiskanen, 2018). A further element to take into account is their strategic distribution, based on the area of expertise, company size and role needed

during the stages (Gemünden et al., 2007; Goduscheit, 2014; Maier & Brem, 2017). According to Goduscheit (2014), during the first phases, the process promoter should be introduced, as it has the function of promoting the project and fostering the digital innovation process. Here, the shared vision aspect is underlined, as promoters engage and stimulate digitalization when they have an organization culture that allows it.

During initial stages, the relationship promoter should also be introduced (Goduscheit, 2014). This seems to be the most important function during the process: thanks to their expertise and trust earned, innovators exploit their skills establishing collaborations, supporting innovations (Hemmert et al., 2014; Beretta et al., 2017; Khalili 2017). Here, it is highlighted a dual aspect of promoters establishing relationship and coordinating. The first aspect is related to the internal network in which they are embedded, i.e. the organization. At this point, to successfully achieve digital innovation, the main function is to foster the improvement process, product or service by coordinating and clearly communicate, understanding directives and guidelines and act accordingly (Goduscheit 2014; Wallin et al., 2015), as a lack of clarity could lead to confusion and threaten innovation implementation (Klerkx & Aarts, 2013; Goduscheit, 2014; Pershina et al., 2019). On the external level, the positive outcomes of alliances emerge. Engaging in collaboration networks, knowledge sharing, access to funds and resources, barriers removal, legitimacy, and closeness to stakeholders can be achieved (Gemünden et al., 2007; Elliott & Boshoff, 2009; Goduscheit & Faullant, 2018; Muhos et al., 2018; Schroth & Häußermann, 2018; Beliaeva et al., 2019). Here, the intermediation role importance is underlined. Promoters' soft *s*kills e.g. communication and resources gathering (Kessler, 2000) reduce barriers and foster digital innovations (Papadonikolaki et al., 2019; Baccelli, & Morino, 2020; Cichosz et al., 2020). Relying on reputation and tie strength built (Hemmert et al., 2014), they establish collaborations, connect with stakeholders and overcome market entrance barriers by negotiating rules and regulations; they thus link the internal and external networks (Awais Ahmad Tipu, 2014; Tao et al., 2010; Lee & Guthrie, 2011; Maier & Brem, 2017; Matschoos & Heiskanen, 2018). Following that, a linkage is now established and the external network stakeholders and thus come into play, contributing to the digital innovation process with their knowledge and resources. Finally, once collaborations are established and knowledge exchanges have been enacted, according to Goduscheit (2014), the technology (expert) promoter should be included in the process, as it provides the needed technical expertise to achieve the project goal.

Although innovator roles can be strategically distributed along the process and the division of functions leads to cost reduction and process fastening (Kessler, 2000), innovation success is

not the result of champions acting individually, but rather the result of their combination and collaboration (***Figure 5**, dash line*), both between innovator roles internally and with the linkages established with partners in the external network (Musa, Ismail & Othman, 2008). Developing digital innovation comes from gaining support from management, regulatory bodies measures, and customers (Hedman et al., 2015; Schmidt et al, 2019; Cichosz et al., 2020; Baccelli, & Morino, 2020). Also, the findings in this study revealed a new aspect when considering innovator roles, i.e. the fact that a good innovator is not found in a particular managerial or work position, but instead in the skills and expertise shown e.g. communication (Kessler, 2000; Gemünden et al., 2007; Goduscheit, 2014). The main function of innovators seems to be thus that of connecting the internal and external networks and fostering innovation by encouraging teamwork of promoters and collaboration within firm and with partners. In addition, other factors can influence their involvement, e.g. the company size or the company culture (Ettlie & Rosenthal, 2012; Maier & Brem, 2017); as a consequence, this leads to the presence of a sole champion or multiple innovators. Furthermore, linking the innovator roles literature to the networks one, a further aspect emerged: effective innovator roles are close to community and centrally connected (Lee & Guthrie, 2011; Beretta et al., 2017), being able to exploit their position to link to stakeholders.

5. Contributions & Implications

To the knowledge of this author, this is the first study using a systematic literature review approach to investigate the relationship between digitalization, innovator roles and the role played in networks. Contributions are thus manifold: this study broadens the innovator roles literature underlying how additional roles fostering innovation can be found, and how innovator roles are more nuanced than the established categorization, as champions and promoters can embody multiple characteristics. Moreover, the role played by networks as been emphasized, showing how to fully understand innovator roles, literature should focus on their characteristics and also on the way they interact both internally and externally. Furthermore, this work underlines the challenges and successful factors of digital innovation, highlighting the importance of the shared organizational culture aspect, which could be further widened in future studies.

This study contributes to the field also from a practical perspective, as firms willing to digitalize their process or to introduce a new digital product or service could take into account the results of this study and adapt their strategy accordingly. A first aspect is related to the understanding

that digital innovation is not merely a tool or process (Papadonikolaki et al., 2019), but a way of managing. This means thus that although technological tools can be similar across firms and industries, the strategy adopted makes the difference. Thus, firms should acknowledge that digitalization improves efficiency and facilitates communication only if this is part of a broader and contextualized strategy and managers should design the organization work according to their vision, clearly sharing it with employees, in order to make them aware of what are the functions and tasks to fulfil (Jaag & Finger, 2017; Hardwig et al., 2019; Melander & Pazirandeh, 2019; Schmidt et al., 2019; Cichosz et al., 2020; Garzoni et al., 2020). Management should thus possess the expertise to acknowledge the potentialities of an innovation when presented (Elliott & Boshoff, 2009), and to create directives and regulations aimed to the integration of digital concepts in the organization. They could also consider introducing communication channels in order to obtain feedbacks from customers, employees, and stakeholders to have a comprehensive view and adapt their strategy accordingly.

Another strategic shift could rely on the distribution of those innovators. This study highlighted how positive outcomes emerge from their strategic distribution along the process, related to their technical expertise, company size or role function needed (Gemünden et al., 2007; Goduscheit, 2014; Maier & Brem, 2017) and their strategic position on the network e.g. closeness to community and central connection (Lee & Guthrie, 2011; Beretta et al., 2017). Managers could take this aspect into account when organizing work, or to identify those employees that could be potential innovators e.g. network linkers. Moreover, highlighting the positive outcomes achievable when engaging in external collaboration and teamwork as well (Musa, Ismail & Othman, 2008), manager could consider a shift in their strategy despite their current contextual condition (Ettlie & Rosenthal, 2012; Maier & Brem, 2017), supporting and encouraging the rise of more innovators rather than a unique champion fulfilling multiple roles. Also, managers could take into account this study focusing on the required skills aspect: acknowledging that communication skills are the main new soft skills required (Kessler, 2000), along with technical expertise (Gemünden et al., 2007; Goduscheit, 2014), firms willing to innovate could hire people showing these capabilities or may consider developing those of employees already working in the firm.

6. *Limitations & Directions for Future Research*

This study does not come without limitations. A first limitation is related to the articles included in the systematic literature review. The introduction of more articles linking digitalization and

innovator roles could have provided a more comprehensive framework. Secondly, the criteria chosen to select the articles could have influenced the results, as contributing articles not presenting the research words defined in the abstract, title and paper keywords could have still been relevant. Also, the keywords and the eligibility of the narrowed list of articles were evaluated by the author and could have thus been biased. Different keywords and their combinations could lead to more accurate findings. Third, the generalizability of the findings could be questioned. This is due to the fact that not all the articles presented a large sample that could be considered as generalizable, some of them were one-case studies. In addition to that, innovator roles' categorization was different throughout the articles, and many of them referred to them only as champions, therefore not all findings could depict a comprehensive and unique representative view of each innovator role. Finally, by looking at the distribution of the countries in which the studies were conducted, the majority were carried in advanced countries. As the results showed, differences emerge related to socio-economic and cultural context, thus discussing about the challenges and strengths of digitalization may not be applicable to underdeveloped-, emerging-, and advanced countries to the same extent.

Following the aforementioned limitations, this study opens the path for further researches. For instance, a similar research could be that of replicate the study by changing or using less strict criteria and broadening the results by including more articles. Additionally, more studies should be focused on the relationship between digitalization, innovator roles and the role played in networks. Also, more empirical results are needed. This was a systematic literature review based on existing articles that provided a new theoretical framework, but future researches could base their theoretical background on this study and expand the findings by carrying qualitative or quantitative studies on this topic, thus confirming-, questioning or broadening what found in this study.

7. Conclusion

The goal of this study was to build a framework on digital innovator roles, by identifying and understanding the innovator roles, functions, and interactions inside and outside their networks, which make the implementation of digital novelties achievable. Relying on a systematic literature approach, this work combined literature related to digitalization, innovator roles and networks of collaboration, analysing a total of 52 journal published articles. The results indicated how digital innovations could be achieved by organizations: the whole organizational culture should change, sharing the vision of digitalization as an integrated part of a firm's strategy, having managers understanding innovation potentialities and implementing clear directives that allow innovator roles to foster innovations. These roles however will have to deal with the challenges of operating in networks of stakeholders that could decelerate the process, and will thus use their soft skills e.g. communication and collaboration to overcome them, working together both internally and externally through alliances, relationships and involving also other stakeholders in the project. This work thus provides managers new insights that could be used to determine their strategies, and a framework that could be widened or empirically tested in future research.

8. References

* THE MARKED ARTICLES WERE INCLUDED IN THE SYSTEMATIC LITERATURE REVIEW

*Autio, E. & Lumme, A. (1998). Does the innovator role affect the perceived potential for growth? analysis of four types of new, technology-based firms. *Technology Analysis & Strategic Management*, 10:1, 41-55.

*Awais Ahmad Tipu, S. (2014). "Employees' involvement in developing service product innovations in Islamic banks: An extension of a concurrent staged model". *International Journal of Commerce and Management*, Vol. 24 No. 1, pp. 85-10.

*Baccelli, O., & Morino, P. (2020). The role of port authorities in the promotion of logistics integration between ports and the railway system: The Italian experience. *Research in Transportation Business & Management*, in press, 100451.

*Baraldi, E., & Nadin, G. (2006). The challenges in digitalising business relationships. The construction of an IT infrastructure for a textile-related business network. *Technovation*, 26(10), 1111–1126.

*Battistella, C. & Nonino, F. (2013). Exploring the impact of motivations on the attraction of innovation roles in open innovation web-based platforms. *Production Planning & Control*, 24:2-3, 226-245

*Beliaeva, T., Ferasso, M., Kraus, S., & Damke, E. J. (2019). Dynamics of digital entrepreneurship and the innovation ecosystem. *International Journal of Entrepreneurial Behavior & Research*, 26(2), 266–284

*Beretta, M., Björk, J., & Magnusson, M. (2017). Moderating Ideation in Web-Enabled Ideation Systems. *Journal of Product Innovation Management*, 35(3), 389-409.

*Bouncken, R., & Barwinski, R. (2020). Shared digital identity and rich knowledge ties in global 3D printing—A drizzle in the clouds? *Global Strategy Journal*, 1–28.

Camarinha-Matos, L.M., Afsarmanesh, H. (2006). Collaborative Networks. Value creation in a knowledge society. In *International Federation for Information Processing (IFIP)*,

Volume 207, Knowledge Enterprise: Intelligent Strategies In Product Design, Manufacturing, and Management, eds. K. Wang, Kovacs G., Wozny M., Fang M., (Boston: Springer), pp. 26-40.

Cambridge Dictionary (2020). INNOVATION | meaning in the Cambridge English Dictionary. Retrieved 20 January 2020, from https://dictionary.cambridge.org/dictionary/english/innovation

*Caniglia, G., John, B., Bellina, L., Lang, D. J., Wiek, A., Cohmer, S., & Laubichler, M. D. (2018). The glocal curriculum: A model for transnational collaboration in higher education for sustainable development. *Journal of Cleaner Production*, 171, 368–376.

Chakrabarti, A.K. (1974). The role of champion in product innovation. *Calif. Manage.* Rev. 17, 58–62.

Chakrabarti, A.K., and Hauschildt, J. (1989). The division of labour in innovation management. *R&D Management*, 19(2), 161–171.

*Cichosz, M., Wallenburg, C. M., & Knemeyer, A. M. (2020). Digital transformation at logistics service providers: barriers, success factors and leading practices. *The International Journal of Logistics Management*, (ahead-of-print), in press.

*Coakes, E., & Smith, P. (2007). Developing communities of innovation by identifying innovation champions. *The Learning Organization*, 14(1), 74–85.

De Jong, J.P.J., & Den Hartog, D.N. (2008). Innovative Work Behaviour: Measurement and Validation. *Scales Research Reports H200820*, EIM Business and Policy Research

*Elliott, R., & Boshoff, C. (2009). The marketing of tourism services using the internet: A resource-based view. *South African Journal of Business Management*, 40(3), 35–50.

*Ettlie, J. E., & Rosenthal, S. R. (2012). Service innovation in manufacturing. *Journal of Service Management*, 23(3), 440–454.

*Fernández, P., Luisa Del Río, M., Varela, J., & Bande, B. (2010). Relationships among functional units and new product performance: The moderating effect of technological turbulence. *Technovation*, 30(5–6), 310–321.

Fichter, K. (2009). Innovation communities: the role of networks of promotors in Open Innovation. *R&D Management*, 39(4), 357–371.

Fujii S., (2017). Product Champion for Successful Innovation-A Review of the Previous Literature and Challenge for the Future. *Br J Res* 4(4):22.

Garifova, L. (2015). Infonomics and the Value of Information in the Digital Economy. *Procedia Economics and Finance*, 23, 738–743.

*Garzoni, A., De Turi, I., Secundo, G., & Del Vecchio, P. (2020). Fostering digital transformation of SMEs: a four levels approach. *Management Decision*, in press.

*Gemünden, H. G., Salomo, S., & Hölzle, K. (2007). Role Models for Radical Innovations in Times of Open Innovation. *Creativity and Innovation Management*, 16(4), 408–421.

*Goduscheit, R. C. (2014). Innovation promoters — A multiple case study. *Industrial Marketing Management*, 43(3), 525–534.

*Goduscheit, R.C., & Faullant, R. (2018). Paths Toward Radical Service Innovation in Manufacturing Companies-A Service-Dominant Logic Perspective. *Journal of Product Innovation Management*, 35(5), 701–719.

*Goode, G. (2017). The changing nature of strategic collaboration. *Strategic Direction*, 33(10), 1–3.

*Gupta, S., Cadeaux, J., & Dubelaar, C. (2006). Uncovering multiple champion roles in implementing new-technology ventures. *Journal of Business Research*, 59(5), 549–563.

*Hardwig, T., Klötzer, S., & Boos, M. (2019). Software-supported collaboration in small- and medium-sized enterprises. *Measuring Business Excellence*, 24(1), 1–23

Hauschildt, J., & Kirchmann, E. (2001). Teamwork for innovation - the “troika” of promotors. *R&D Management*, 31(1), 41–49.

*Hedman, J., & Henningsson, S. (2015). The new normal: Market cooperation in the mobile payments ecosystem. *Electronic Commerce Research and Applications*, 14(5), 305–318.

*Heim, I., Kalyuzhnova, Y., Li, W., & Liu, K. (2019). Value co-creation between foreign firms and indigenous small- and medium-sized enterprises (SMEs) in Kazakhstan's oil and gas industry: The role of information technology spillovers. *Thunderbird International Business Review*, 61(6), 911–927

*Hemmert, M., Bstieler, L., & Okamuro, H. (2014). Bridging the cultural divide: Trust formation in university–industry research collaborations in the US, Japan, and South Korea. *Technovation*, 34(10), 605–616.

*Henfridsson, O., Mathiassen, L., & Svahn, F. (2014). Managing Technological Change in the Digital Age: The Role of Architectural Frames. *Journal of Information Technology*, *29*(1), 27–43.

*Hensen, A. H. R., & Dong, J. Q. (2020). Hierarchical business value of information technology: Toward a digital innovation value chain. *Information & Management*, 57(4), 103209.

Holmström, J. (2018). Recombination in digital innovation: Challenges, opportunities, and the importance of a theoretical framework. *Information and Organization*, 28(2), 107–110.

*Hornuf, L., Klus, M. F., Lohwasser, T. S., & Schwienbacher, A. (2020). How do banks interact with fintech startups? *Small Business Economics*, in press

Howell, J. M., & Boies, K. (2004). Champions of technological innovation: The influence of contextual knowledge, role orientation, idea generation, and idea promotion on champion emergence. *The Leadership Quarterly*, 15(1), 123–143.

Howell, J. M., Shea, C. M., & Higgins, C. A. (2005). Champions of product innovations: defining, developing, and validating a measure of champion behavior. *Journal of Business Venturing*, 20(5), 641–661.

*Jaag, C., & Finger, M. (2017). What future for the post office network? *Competition and Regulation in Network Industries*, 18(3–4), 153–174.

Jenssen, J. I., & Jørgensen, G. (2004). How Do Corporate Champions Promote Innovations? *International Journal of Innovation Management*, 08(01), 63–6.

Jesson, J., & Lacey, F. (2006). How to do (or not to do) a critical literature review. *Pharmacy Education*, 6(2), 139–148

Kamaşak, R., & Bulutlar, F. (2010). The influence of knowledge sharing on innovation. *European Business Review*, 22(3), 306–317.

*Kessler, E. H. (2000). Tightening the belt: methods for reducing development costs associated with new product innovation. *Journal of Engineering and Technology Management*, 17(1), 59–92

*Khalili, A. (2017). Creative and innovative leadership: measurement development and validation. *Management Research Review*, 40(10), 1117–1138.

*Klerkx, L., & Aarts, N. (2013). The interaction of multiple champions in orchestrating innovation networks: Conflicts and complementarities. *Technovation*, 33(6–7), 193–210.

*Lee, L. L., & Guthrie, J. (2011). Corporate social capital in business innovation networks. *International Journal of Learning and Intellectual Capital*, 8(3), 272.

Lyytinen, K., Yoo, Y., & Jr., R. J. B. (2015). Digital product innovation within four classes of innovation networks. *Information Systems Journal*, 26(1), 47–75.

Maidique, M.A., (1980). Entrepreneurs, champions and technological innovation. *Sloan Manage*. Rev., 59–76. (Winter).

*Maier, M. A., & Brem, A. (2017). What innovation managers really do: a multiple-case investigation into the informal role profiles of innovation managers. *Review of Managerial Science*, 12(4), 1055–1080.

*Makkonen, H., & Komulainen, H. (2018). Explicating the market dimension in the study of digital innovation: a management framework for digital innovation. *Technology Analysis & Strategic Management*, 30(9), 1015–1028.

Mansfeld, M. N., Hölzle, K., & Gemünden, H. G. (2010). Personal Characteristics of Innovators — An Empirical Study Of Roles In Innovation Management. *International Journal of Innovation Management*, 14(06), 1129–1147.

*Matschoss, K., & Heiskanen, E. (2018). Innovation intermediary challenging the energy incumbent: enactment of local socio-technical transition pathways by destabilisation of regime rules. *Technology Analysis & Strategic Management*, 30(12), 1455–1469.

*Melander, L., & Pazirandeh, A. (2019). Collaboration beyond the supply network for green innovation: insight from 11 cases. *Supply Chain Management: An International Journal*, 24(4), 509–523.

Miron, E., Erez, M. and Naveh, E. (2004). Do personal characteristics and cultural values that promote innovation, quality, and efficiency compete or complement each other? *Journal of Organizational Behavior*, Vol. 25, pp. 175-99.

*Muhos, M., Saarela, M., Foit, D., & Rasochova, L. (2018). Management priorities of digital health service start-ups in California. *International Entrepreneurship and Management Journal*, 15(1), 43–62.

*Musa, M. A., Ismail, S. E., & Othman, S. (2008). Corporate governance and innovative leaders. *Social Responsibility Journal*, 4(1/2), 34–40.

Nylén, D., & Holmström, J. (2015). Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation. *Business Horizons*, 58(1), 57–67.

*Papadonikolaki, E., van Oel, C., & Kagioglou, M. (2019). Organising and Managing boundaries: A structurational view of collaboration with Building Information Modelling (BIM). *International Journal of Project Management*, 37(3), 378–394.

*Pershina, R., Soppe, B., & Thune, T. M. (2019). Bridging analog and digital expertise: Cross-domain collaboration and boundary-spanning tools in the creation of digital innovation. *Research Policy*, 48(9), 103819.

Reibenspiess, V., Drechsler, K., Eckhardt, A., & Wagner, H.-T. (2018). Enabling Innovation Champions in Organizations - Results of a Systematic Literature Analysis. *Proceedings of the 51st Hawaii International Conference on System Sciences*.

*Remneland Wikhamn, B., & Knights, D. (2016). Associations for Disruptiveness: The Pirate Bay vs. Spotify. *Journal of Technology Management & Innovation*, 11(3), 40–49.

*Rocha, C. F., Mamédio, D. F., & Quandt, C. O. (2019). Startups and the innovation ecosystem in Industry 4.0. *Technology Analysis & Strategic Management*, 31(12), 1474–1487.

*Schmidt, M.-C., Veile, J. W., Müller, J. M., & Voigt, K.-I. (2019). Kick-Start for Connectivity: How to Implement Digital Platforms Successfully in Industry 4.0. *Technology Innovation Management Review*, 9(10), 5–15.

Schon, D.A., (1963). Champions for radical new inventions. *Harvard Bus*. Rev. 41, 77–86.

*Schroth, F., & Häußermann, J. J. (2018). Collaboration Strategies in Innovation Ecosystems: An Empirical Study of the German Microelectronics and Photonics Industries. *Technology Innovation Management Review*, 8(11), 4–12.

Schweisfurth, T. G., & Herstatt, C. (2014). How internal users contribute to corporate product innovation: the case of embedded users. *R&D Management*, *46*(S1), 107–126

*Sergeeva, N., & Zanello, C. (2018). Championing and promoting innovation in UK megaprojects. *International Journal of Project Management*, 36(8), 1068–1081.

Smith, D. J. (2007). The politics of innovation: Why innovations need a godfather. *Technovation*, *27*(3), 95–104. https://doi.org/10.1016/j.technovation.2006.05.001

*Tao, L., Garnsey, E., Probert, D., & Ridgman, T. (2010). Innovation as response to emissions legislation: revisiting the automotive catalytic converter at Johnson Matthey. *R&D Management*, 40(2), 154–168.

Tapscott, D. (1995). *The digital economy: promise and peril in the age of networked intelligence*. New York: McGraw-Hill.

Thomas, D.R. (2006). A General Inductive Approach for Analyzing Qualitative Evaluation Data. *American Journal of Evaluation*, 27(2), 237–246.

Tranfield, D., Denyer, D. & Smart P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14, 207–222.

*Tronvoll, B., Sklyar, A., Sörhammar, D., & Kowalkowski, C. (2020). Transformational shifts through digital servitization. *Industrial Marketing Management*, in press.

*Verstegen, L., Houkes, W., & Reymen, I. (2019). Configuring collective digital-technology usage in dynamic and complex design practices. *Research Policy*, 48(8), 103696.

*Wallin, A., Harjumaa, M., Pussinen, P., & Isomursu, M. (2015). Challenges of New Service Development: Case Video-Supported Home Care Service. *Service Science*, *7*(2), 100–118.

*Westerlund, M. (2020). Digitalization, Internationalization and Scaling of Online SMEs. *Technology Innovation Management Review*, 10(4), 48–57.

Witte, E. (1973). Organisation für Innovationsentscheidungen. Das Promoteren-Modell, Vahlen, Göttingen, Germany.

Witte, E. (1977). Power and Innovation: A Two-Center Theory. *International Studies of Management and Organization*, 7, 47–70.

Wolfe, R. A. (1995). Human resource management innovations: Determinants of their adoption and implementation. *Human Resource Management*, 34(2), 313–327.

*Yang, J.-T. (2007). Knowledge sharing: Investigating appropriate leadership roles and collaborative culture. *Tourism Management*, 28(2), 530–543.

Yoo, Y., Lyytinen, K. J., Boland, R. J., & Berente, N. (2010). The Next Wave of Digital Innovation: Opportunities and Challenges: A Report on the Research Workshop Digital Challenges in Innovation Research. *SSRN Electronic Journal.*

*Zhou, W., Velamuri, V. K., & Dauth, T. (2017). Changing Innovation Roles of Foreign Subsidiaries From The Manufacturing Industry In China. *International Journal of Innovation Management*, 21(01), 1750008.

Zimmermann, H.D. (2000). Understanding the Digital Economy: Challenges for New Business Models. *SSRN Electronic Journal.*

9. Appendix

9.1. Appendix I – Literature Classification Digitalization (R1)

Article Id	***Focus of The Study***	***Type of Digitalization Observed***	***Sample***	***Data Collection and Analysis***	***Main Findings***
Baccelli, O. & Morino, P. *(2020)* *The role of port authorities in the promotion of logistics integration between ports and the railway system: The Italian experience* *Research in Transportation Business & Management*	The intermodality Italian research between Systemic Port Authorities (SPA) in the Centre-Northern and Southern Italy	Logistic integration of ports and railways	Porth authorities of Centre-Northern Italy and Southern Italy	Reports of Italian policies at the national, regional, and local level. Multi Actor and Multi Criteria Analysis (MAMCA).	SPAs acting as cluster manager anticipate stakeholders' requests. SPAs can help in overcoming barriers. Political support and economic incentives may increase efficiency. Coordination plays a pivotal role. Difference emerge between areas due to economic conditions and limitations, leading to different approaches and outcomes.
Baraldi, E., & Nadin, G. *(2006)* *The challenges in digitalising business relationships. The construction of an IT infrastructure for a textile-related business network* *Technovation*	Methods and challenges of introducing IT tools in inter-firm interactive business networks	Information Technology (IT) in the textile industry	A home-textile network in Italy The Stella project	Case study Qualitative Semi-structured interviews, direct observations, active participation	Innovation projects face different challenges, IT solutions simplify the processes and influence the type of network established. Inter-firm knowledge and communication should be first translated in clear measures. Full automation is not achievable. Rigidity should be substituted with a continuous interaction between actors and clear role definition.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Beliaeva, T., Ferasso, M., Kraus, S., & Damke, E.J. *(2019)* *Dynamics of digital entrepreneurship and the innovation ecosystem* *International Journal of Entrepreneurial Behavior & Research*	The role of innovation ecosystem's actors in developing digital entrepreneurship	Digital entrepreneurship	SME Brazilian IT company, GTI IT Solutions.	Qualitative and Quantitative Face-to-face in-depth semi-structured interviews, secondary data provided by the company Pattern matching, data exposure and SNA	To achieve high digitalization, a focus should be made on strategic partnerships in three principal areas. The first relates to the access to funding and investment profits The second relates to the access to complementary intangible and tangible resources. The third relates to the access to knowledge and expertise needed. Shifting from lower to higher level of digitalization, multiple relationships of actors are established
Bouncken, R., & Barwinski, R. *(2020)* *Shared digital identity and rich knowledge ties in global 3D printing—A drizzle in the clouds?* *Global Strategy Journal*	The knowledge links in global digital business Focus on social contexts fostering tacit knowledge transfer	Modern audio-visual digital technologies Shared digital economy	35 interviews in 10 cases of 3D printing firms collaborating across value chain positions and in the world	Qualitative multiple case-study Interviews, secondary data from websites, press releases, platforms, and newspapers Flexible pattern matching analysis	Digitalization reduces boundaries and enriches contextualized knowledge exchanges. Explicit knowledge is positively influenced by the tie strength of a relationship. Tacit knowledge can be differentiated in technological potential knowledge and operational process knowledge. The concept of Shared Digital Economy as social exchange unites people and allow exchanges without strong ties.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Caniglia, G., John, B., Bellina, L., Lang, D.J., Wiek, A., Cohmer, S., & Laubichler, M.D. *(2018)* *The glocal curriculum: A model for transnational collaboration in higher education for sustainable development* *Journal of Cleaner Production*	Which teaching-learning environments and background are required by transnational collaborations to sensitize about (un)sustainability Glocal model presentation	Digital technologies for collaborations and communication	The Global Classroom Project: Liberal Arts Education in the 21st Century 2 Universities, Arizona State University (ASU) and Leuphana University of Lüneburg (Leuphana)	Case study on the Global Classroom (GC) Project	With the project, students face different knowledge topics, collaboration, empowerment, and cultural diversity reflection. Digitalization brings closer and facilitates transnational collaborations, expanding cultural background and overcoming boundaries. Training and learning change too. The vision should be aligned with glocal curriculum aspects and balancing the inequalities across universities.
Cichosz, M., Wallenburg, C.M., & Knemeyer, A.M. *(2020)* *Digital transformation at logistics service providers: barriers, success factors and leading practices.* *The International Journal of Logistics Management*	Factors that inhibit or successfully foster digital transformation (DT)	Digitization transformation and technology in logistics service providers (LSPs)	17 interviews in transport and logistics companies (T&L), and couriers, express and parcel companies (CEP)	Qualitative Semi-structured interview. Secondary data from websites, reports, visits Individual case analysis, evaluation feedback inclusion	Five barriers at technology implementation in LSPs i.e. logistics system complexity, lack of resources, technology adoption, resistance to change, and data protection. Eight successful factors for DT i.e. vision, customer-centred culture, engagement, strategy alignment, process simplification, skills and training, openness to change, knowledge network. DT is a gradual process that should be embedded in the organizational culture, with clear goals and act accordingly.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Garzoni, A., De Turi, I., Secundo, G., & Del Vecchio, P. *(2020)* *Fostering digital transformation of SMEs: a four levels approach* *Management Decision*	Factors stimulating business change in SMEs in regional contexts underdeveloped from an innovation performance point of view	Digital transformation (DT) in SMEs Industry 4.0	Smart District 4.0 project in Southern Italy Firms from Agri–Food, Clothing and Footwear, Mechanics and Mechatronics sector 7 interviews with key role in the project	Extreme case study Qualitative Interviews, secondary data e.g. archival records, official channels, documentary information Data analysis, interpretation	DT is the results of three elements: digital artifact-, infrastructure-, and platform. DT is promoted through a 4-level digital approach i.e. awareness, enquirement, collaboration, and transformation. Firms willing to innovate have to implement technology coherently. Network communities, human- and social capital, and companies' participation are also fundamental.
Goduscheit, R.C., & Faullant, R. *(2018)* *Paths Toward Radical Service Innovation in Manufacturing Companies-A Service-Dominant Logic Perspective* *Journal of Product Innovation Management*	The abilities and paths taken by firms willing to introduce radical service innovations on the market	Digitalization and Radical service innovations	60 interviews in 24 manufacturing B2B SMEs	Qualitative Semi-structured in-depth Interviews, secondary data from presentations, meetings, internal material for servitization strategy Coding analysis	Digitalization increases the chances of an extended network and innovation, but only if linked with other conditions. Relationship with customers need interaction and their involvement. Collaboration is fundamental to access further and heterogenous resources. Combining the resources with knowledge leads to radical innovation.
Goode, G. *(2017)* *The changing nature of strategic collaboration* *Strategic Direction*	Demonstrate of how equity participation as a new type of strategic collaboration to face digital transformation	Digitalization change in UK media industry	169 instances from reports in the UK broadcasting industry	Reports from press, magazine broadcast industry database, annual reports Content analysis	Through equity participation, both partners gain from each other e.g. expertise, resources, reduce barriers, strategic position, funding, growth. These alliances balance the need for a rapid response to changing market and customer preferences.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Hardwig, T., Klötzer, S., & Boos, M. *(2019)* *Software-supported collaboration in small- and medium-sized enterprises* *Measuring Business Excellence*	Benefits and challenges of collaborative application in Germany SME	Digitalization of project communication through software	CollaboTeam project Survey of 101 SMEs in Germany	Quantitative Open-closed questionnaires based on 5-point scales Statistical analysis	The use of tools has mainly positive outcomes but also negative. Low level of web-communication, project management tools and file sharing are the three main gaps between demand and use of collaborative applications. To succeed, clear solutions, specific orientation, changing the culture, and design the work accordingly.
Hedman, J., & Henningsson, S. *(2015)* *The new normal: Market cooperation in the mobile payments ecosystem* *Electronic Commerce Research and Applications*	Digital mobile payment innovation and implications for the collaboration between stakeholders	Digital innovation in the payment field The mobile payment market cooperation (MPMC)	3 cases in the Danish payment context 8 interviews with representatives	Qualitative Documents, semi-structured interviews, workshops, public-available sources, news, webpages Case study analysis	Alliances diverge on the basis of the level considered, i.e. micro, meso and macro lebel Regulatory bodies should be aware of the potentiality of the technology, and act accordingly. Firms can adopt "attacking" strategies (battering-ram) to prevent newcomers' entry or build-and-defend to protect the market position.
Heim, I., Kalyuzhnova, Y., Li, W., & Liu, K. *(2019)* *Value co-creation between foreign firms and indigenous small- and medium-sized enterprises (SMEs) in Kazakhstan's oil and gas industry: The role of information technology spillovers* *Thunderbird International Business Review*	How Small-Medium Enterprises (SMEs) technological development can be fostered by the collaboration of foreign and indigenous oil and gas (O&G) companies	ICT use in oil and gas (O&G) companies	23 interviews in 3 type of companies: Local private company (SME) State-owned national O&G company (NOC) Subsidiary of an international O&G company (IOC)	Qualitative Semi-structured interviews with industry experts Secondary data collection e.g. cases, web data sources, vignette case study Vignette Data analysis	Differences emerge in SME, NOC and IOC with regard to the level of ICT used, control, skills Formation of O&G-ICT clusters could support ICT development, a value creation network could improve the sector, balancing the inequalities given by current low knowledge spillovers. Government could foster this approach through incentives.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Henfridsson, O., Mathiassen, L., & Svahn, F. *(2014)* *Managing Technological Change in the Digital Age: The Role of Architectural Frames* *Journal of Information Technology*	Two architectural frames approaches supporting digital products innovation	Digital technology change	31 interviews, 47 meetings and 29 specifications at CarCorp, a small international automaker in EU and US	Qualitative Longitudinal study Semi-structured Interviews, observations, and archival data Transcripts Coding analysis	Digital technology properties influence the digitized products redesign speed Two complementary architectural frames to respond to technological change. Hierarchy-of-parts relates to physical parts of a product and to economics of scale; Network-of-patterns relates to digital elements design flexibility and scalability Collaboration is facilitated by the inclusion of network of patterns in product development process.
Hensen, A.H.R., & Dong, J.Q. *(2020)* *Hierarchical business value of information technology: Toward a digital innovation value chain.* *Information & Management*	Implications of different uses of Information Technology (IT) on organizational innovation performance Distinction between IT uses and internal and external benefits	Use of Information Technology (IT) for innovation	Data from 1028 German firms collected	Quantitative Surveys retrieved from the German section of European Commission's Community Innovation Survey (CIS) Regression-, Mediation-, Post-hoc analysis	IT generates benefits at the process level (first order) which in turn mediate benefits at the organizational level (second order). Internal and external absorptive capability (AC) can be distinguished in IT use for knowledge search and relational search. Value creation depends on IT employment in the business process.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Hornuf, L., Klus, M.F., Lohwasser, T.S., & Schwienbacher, A. *(2020)* *How do banks interact with fintech startups?* *Small Business Economics*	Relationship between banks and financial-technology start-ups (fintechs) by identifying bank characteristics and partnership preference.	Digital innovations banking solutions	400 banks from 500 bank-fintech alliances in four countries: Canada, France, Germany, and the UK	Quantitative Web search, news articles Data analysis through regression models, data analysis	The purpose of a collaboration determines the partnership chosen. Partnerships announcement negatively influences a bank's value in the short-term (inability to innovate by itself). Implementation of a strategy and the presence of a CDO have positive effects on partnerships. Policy maker restrictions gradually lead to a more alliance-based ecosystem. Alliances should be strongly supported, as unstable partnership lead to conflicts and collaboration conclusion.
Jaag, C., & Finger, M. *(2017)* *What future for the post office network?* *Competition and Regulation in Network Industries*	Tendencies and potential strategies of incumbents in the postal operator sector.	Digitalization in the postal operator sector (PO)	6 national postal operators in Australia, Italy, New Zealand, Switzerland, UK, and US	Qualitative Case studies analysis	Three main strategic orientations can be implemented: physical infrastructure provider, hybrid intermediary, or exclusive provider of digital services. The political and market conditions can influence network strategies. The broad strategic orientation should therefore guide the network strategy with a clear and defined approach.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Makkonen, H., & Komulainen, H. *(2018)* *Explicating the market dimension in the study of digital innovation: a management framework for digital innovation* *Technology Analysis & Strategic Management*	Market dimensions as the result of user knowledge, actions, and behaviours of actors in an innovation network influencing digital innovation and innovation process	Digital innovation M-ad (mobile advertising)	79 interviews with M-advertisers, retailers, and representatives	Qualitative Interviews, exchanged email, personal observations Data analysis of transcripts	Actors build an innovation network by participating in an innovation project for multiple reasons. The network of actors is a core aspect for innovation and hub actors should strengthen the relationships within it. The technology-market interplay is based on innovation levels, i.e. concept, network, and interrelated industry. The innovation concept is the solution, need, and fit at the same time: failure comes from a lack of understanding of the market and inadequacy.
Melander, L., & Pazirandeh, A. *(2019)* *Collaboration beyond the supply network for green innovation: insight from 11 cases.* *Supply Chain Management: An International Journal*	Exploration of nature, characteristics and outcomes of collaborative relationships established by firms aiming to green innovation achievement	Green service innovation	30 interviews in 11 firms from different industries	Qualitative In-dept interviews, secondary data e.g. reports and firm documents, market analyses Single-case, cross-case analysis	Firms green innovation networks are based on long-term oriented relationships. Digitalization allows performance and efficiency improvements, but the industry in overall has to promote its benefits. Collaborations allow the exchange of knowledge, relationship building, development of products, but also implies the need for coordination and trust among actors. Barriers can emerge with regard to new partner inclusion, reluctancy to data sharing, unawareness of potential benefits.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Muhos, M., Saarela, M., Foit, D., & Rasochova, L. *(2018)* *Management priorities of digital health service start-ups in California* *International Entrepreneurship and Management Journal*	Management priorities experienced in digital health service businesses in the start-up phase	Digital health service start-ups	10 interviews in 5 digital healthcare case start-ups in Southern California	Multiple case study Qualitative Interviews Recording and transcription Coding, single case and cross-case analysis	9 management priority areas Radical innovation is the main focus of start-ups which have to deal with complexity, risk of failure and inefficiency Start-ups lacking assets, legitimacy and funds rely on network management to achieve goals and enhance performance. Context and culture implications should be taken into account to analyse growth.
Papadonikolaki, E., van Oel, C., & Kagioglou, M. *(2019)* *Organising and Managing boundaries: A structurational view of collaboration with Building Information Modelling (BIM)* *International Journal of Project Management*	The influence of the management and configuration of boundaries on BIM based collaborations	Digital transformation in the construction industry Building Information Modelling (BIM)	2 BIM-based collaborations in project networks in the Netherlands	Qualitative Semi-structured interviews, group sessions, company documents Transcript Coding analysis	Different perception about BIM-based projects lead to different outcomes. In order to succeed, BIM cannot be seen just as a tool, but as a main integrated aspect of the strategy. Collaboration and boundary spanning roles are a key aspect of the that. Hard skills (structural) but also new soft competences are required in this type of collaboration.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Pershina, R., Soppe, B., & Thune, T.M. *(2019)* *Bridging analog and digital expertise: Cross-domain collaboration and boundary-spanning tools in the creation of digital innovation* *Research Policy*	How digital innovation is fostered by cross-domain collaborations between specialists from digital and analog contexts Emphasis on boundary-spanning tools	Digital innovation	27 interviews of respondents from the serious game market	Qualitative Nest case study Interviews, direct observation, firm documentations Thematic, coding analysis	Cross-domain partnerships are fundamental for innovation, but conflicts due to lack of reciprocal understanding emerge. Process is always changing, requiring a constant communication between digital and analog experts. Boundary-spanning tools act as understanding bridges, knowledge integrating tools and integral part of the evolving process.
Remneland Wikhamn, B., & Knights, D. *(2016)* *Associations for Disruptiveness: The Pirate Bay vs. Spotify* *Journal of Technology Management & Innovation*	Technology power as the result of the network linkages established with cultural and social norms.	Disruptive innovation Digital music providers	2 digital music service cases The Pirate Bay (TPB) Spotify	Comparative case Study Data retrieved from official sources e.g. news articles, interviews, websites, court reports books, blogs Actor Network Theory (ANT) lens	TPB challenges big corporations by not paying for copyrights, but they are more likely to have to face lawsuits and being obscured. Spotify on the contrary is a legal provider, copyright owners receiving incomes from licensing agreements, are less likely to engage in lawsuits. To evaluate a firm power disruptiveness, technological, social, economic, and intellectual property features should be taken into account.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Rocha, C.F., Mamédio, D.F., & Quandt, C.O. *(2019)* *Startups and the innovation ecosystem in Industry 4.0.* *Technology Analysis & Strategic Management*	The impact of collaborations between start-ups and manufacturing firms on digital innovation	Digital innovation in Industry 4.0	4 start-ups in Brazil	Qualitative Semi-structured interviews, website available documents Content analysis, coding	Digital solutions come from the need of automation, to reduce cost and increase quality. To gain access to external knowledge, collaboration networks are created. Organizational practices and relationships are informally built. Informality is seen also in lack of KPIs, planning and monitoring which weakens collaborations. Challenges are related to understanding, adaptation, collaboration difficulties, differences in cultural and organizational structure, government support.
Schmidt, M.-C., Veile, J.W., Müller, J.M., & Voigt, K.-I. *(2019)* *Kick-Start for Connectivity: How to Implement Digital Platforms Successfully in Industry 4.0.* *Technology Innovation Management Review*	The implementation of Digital Platform in industry 4.0	Industry 4.0 technological developments	32 German managers from firms with different size and industry	Qualitative Semi-structured interviews Coding analysis of transcripts	External actors trigger for a new platform approach, while internal initiators implement it through collaborations. Collaboration and supportive partnerships, HRM, expertise, and communication influence the implementation process of platforms. The change should be in the corporate culture as a whole. New alliances, conflicting expectancies, trust issues, and legal aspects threaten collaborations.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Schroth, F., & Häußermann, J.J. *(2018)* *Collaboration Strategies in Innovation Ecosystems: An Empirical Study of the German Microelectronics and Photonics Industries* *Technology Innovation Management Review*	Challenges and advantages of collaborative innovation ecosystems Identification of reasons, methods, and partners of collaborative companies	Digitalization as knowledge exchange and innovation tool Dynamic innovation ecosystems where industrial R&D&I develops	42 Germany respondents; 36 senior managers and 6 other representatives	Qualitative Interviews Coding analysis	Companies select potential partners by looking at expertise, reliability, affiliations, and previous collaborations. In collaborations, firm gain from access to employees, knowledge, and new perspectives. However, alliances mean higher costs, long processes, conflicts and negotiations. Firms oriented to incremental or radical innovations follow different approaches.
Tronvoll, B., Sklyar, A., Sörhammar, D., & Kowalkowski, C. *(2020)* *Transformational shifts through digital servitization* *Industrial Marketing Management*	Digital change required in order to evolve from a product-centric to a service-centric business	Digital servitization	33 respondents from maritime solutions firm in the Netherlands	Qualitative Semi-structured in-dept interviews, direct observations Transcripts, note Coding analysis	Digital servitization requires a transformation in the entire service ecosystem and in the mindset of both employees and firm as a whole. Specialized employees have to be recruited, to bring and develop new capabilities. Partnership-oriented collaborations are fundamental. Reciprocal exchanges, clarity and knowledge of the network actors lead to success.

Article Id	***Focus of The Study***	***Type of Digitalization Observed***	***Sample***	***Data Collection and Analysis***	***Main Findings***
Verstegen, L., Houkes, W., & Reymen, I. *(2019)* *Configuring collective digital-technology usage in dynamic and complex design practices* *Research Policy*	Actor's actions taken to use, organize and digital tools to achieve goals	Digital technologies in business Building Information Modelling (BIM)	Two architectural firms in the Netherlands.	Qualitative Semi-structured interviews, archival data, observations Transcripts Coding analysis	The use of technological tools is an ongoing, dynamic, multifaceted process, requiring understanding the digitalization and possible outcomes. Actors use and react to digital tools differently: they can organize the work jointly or give guidelines for future configurations. Interaction between individual and collective level are needed to achieve digital innovation. Boundaries should be specific for the context.
Wallin, A., Harjumaa, M., Pussinen, P., & Isomursu, M. *(2015)* *Challenges of New Service Development: Case Video-Supported Home Care Service* *Service Science*	Challenges of digitalization of home care services	ICT in elderly care	Case of a R&D project of a new video-supported home care service jointly funded internationally	Qualitative Semi-structured interviews, archival data, workshops, observations Transcripts Collaborative analysis	Developing a succesful new service requires a flexible, dynamic and adaptive network, complete vision and an understanding of the individual value creation. Challenges may arise during the development and thus key roles improving productivity, users' motivation and rules and regulations context, should be identified, analysed, and understood. Motivated employees and people committed to the project and long-term oriented should be involved.

Article Id	*Focus of The Study*	*Type of Digitalization Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Westerlund, M. *(2020)* *Digitalization, Internationalization and Scaling of Online SMEs* *Technology Innovation Management Review*	Differences between internationally and domestically oriented Small-Medium Enterprises (SMEs) and how this impact scaling	Digitalization changing business models	535 Canadian firms (partly) digital operating at the international and local level	Quantitative Publicly available data from Canadian dataset of 2401 companies Criteria filtering Quantitative descriptive analysis	Compared to domestically oriented firms, international SMEs are more likely to: use digital tools ally and collaborate with other firms, develop internal technology experts, face data security breaches and maintenance operations. SMEs willing to internationalize should thus develop digitalization-, networking-, scaling capabilities, build relationships linkage, exploit their knowledge, and rely on online tools.

9.2. Appendix II – Literature Classification Innovator Roles (R2)

Article Id	*Focus of The Study*	*Innovator Role(s) Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Autio E. & Lumme A. *(1998)* *Does the innovator role affect the perceived potential for growth? Analysis of four types of new, technology-based firms* *Technology Analysis and Strategic Management*	Interrelationships between the technology applied by a firm and the evolution of the firm. Focus on New Technology-Based Firms (NTBF)	NTBF seen as four main innovator roles: Application innovator Market innovator Technology innovator Paradigm innovator	392 new technology-based firms in Finland	Quantitative Follow-up structured questionnaires with closed questions Empirical analysis	Existing players are not likely to welcome new firms who threaten to make their technology obsolete. The greater the degree of novelty of technology applied, the greater is the friction slowing its growth. The more sophisticated the technology applied by the firm, the more relevant the systemic conflicts become.
Awais Ahmad Tipu, S. *(2014)* *Employees' involvement in developing service product innovations in Islamic banks. An extension of a concurrent staged model* *International Journal of Commerce and Management*	How employees are involved in the product innovation process in Islamic banks (conventional banks competitors but rigorous Sharia principles and prohibitions)	Product champion	2 Islamic banks, 3 interviews per bank	Qualitative Semi-structured face-to-face interviews to managers and officers involved in innovation processes Thematic analysis of transcript	The product champion improves the innovation process and establish external relationships. Involvement of front-line employees, management support and multifunctional team structures promote the development process. Collaboration and the exchange of knowledge make possible to learn about competitors.

Article Id	***Focus of The Study***	***Innovator Role(s) Observed***	***Sample***	***Data Collection and Analysis***	***Main Findings***
Battistella C. & Nonino F. *(2013)* *Exploring the impact of motivations on the attraction of innovation roles in open innovation web-based platforms* *Production Planning and Control*	Motivations characterizing the different innovator roles in web-based platforms (OIPs) field. Understanding of the link between motivations for knowledge sharing and innovation roles	Champion Expert promotor Power promotor Relationship promotor Process promotor	26 OIPS selected on the basis of participation, concept originated, and possibilities given to innovators	Qualitative (Delphi) study to determine the presence of innovator roles in OIPS Factor analysis and MDS to classify OIPS.	Notwithstanding monetary rewards, the motivation and attraction of innovator roles in OIPs is divided in four main groups. The first three (champion/expert-; relationship- and process roles) are motivated by individual intrinsic and professional extrinsic motivation. The expert, power, and process roles group show also both social intrinsic- and extrinsic motivation.
Beretta M., Björk J., & Magnusson M. *(2018)* *Moderating Ideation in Web-Enabled Ideation Systems* *Journal of Product Innovation Management*	How the presence of moderator roles and the practices implemented lead to better management in web-enabled ideation systems and the overcoming of common shortcomings.	Moderator role	20 “Idea Boxes” projects at the Ericsson company Moderators are informal role	Qualitative Different multiple data sources such as interviews, documents, site visits, and observations. Codification of transcripts, organization of data in tables	Moderators establish three main practices while fostering innovation (strategy formulation, means combination, ideation process formalization) Moderators are fundamental in earlier phases and more involved in internal and incremental process. Moderators are informal roles that earn legitimization through credibility, community participation, relationships development, and authority.

Article Id	*Focus of The Study*	*Innovator Role(s) Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Coakes, E., & Smith, P. *(2007)* *Developing communities of innovation by identifying innovation champions* *The Learning Organization*	Proposal of communities of innovation (CoInv) as best mean to achieve and support sustainable innovation, and a fundamental element in the corporate entrepreneurship process.	Innovation champion	Existing literature	Research paper Proposal on the basis of existing literature	Champions informally emerge in the firm but require management support. CoInvs are characterized by knowledge creation and sharing, champions identification and support, involvement in the process, opportunity promotion. CoInv intellectually stimulate the members of the community.
Elliott, R., & Boshoff, C. *(2009)* *The marketing of tourism services using the internet: A resource-based view* *South African Journal of Business Management*	Relationship between factors and "perceived success of Internet marketing" in small tourism businesses. How resources explain Internet marketing success and Sustainable Competitive Advantage (SCA)	Product champion	Sample of 316 small tourism business from registered database	Quantitative: Questionnaire with four to ten item scale based on previous developed scales. SEM, factor analysis.	Owner-manager acts as product champion when there is an understanding of issues and advantages of technology implementation. Alliances allow owner-mangers a faster and cheaper formation. The more the owner-manager makes use of alliances, the more the perceived success will be. Small business barriers are overcome.

Article Id	*Focus of The Study*	*Innovator Role(s) Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Ettlie, J. E., & Rosenthal, S.R. *(2012)* *Service innovation in manufacturing* *Journal of Service Management*	Which culture (engineering and entrepreneurial) e and how different strategies are enacted to develop new service innovations Focus on manufacturing firms.	Champions Innovation sponsor	9 new service offerings by firms (B2B and B2C)	Qualitative Analytical induction, interview based on protocol Analytical induction analysis	Engineering culture: new to firm innovations, strategy planning and technical competence, key operations managers as champion. Entrepreneurial culture: new to the world/industry innovations, market integration, blurring of functional boundaries, champion from general management (GM). Presence of an innovation sponsor, which gathers resources and legitimizes the innovation effort.
Fernández, P., Luisa Del Río, M., Varela, J., & Bande, B. *(2010)* *Relationships among functional units and new product performance: The moderating effect of technological turbulence.* *Technovation*	Link between physical proximity of functional units, presence of product champions, cross-functional harmony (HFU) and new product performance. Focus on the moderator role of the technological turbulent environments: high (HTTE) and low (LTTE).	Product champion	151 answers from managers of innovative firms registered in the Centre for the Technological Development of Industry (CDTI) Spanish database	Quantitative Item/Likert scale-based questionnaires to R&D and other area managers. ANOVA analysis	In HTTE, collaboration and communication are significantly effective on performance and impact, while in LTTE they negatively affect success. Managers' perception of product champion presence is positively linked to performance in both environments. The physical proximity of the people involved is particularly relevant in HTTE. In LTTE, results are negative regarding performance. The presence of cross-functional teams does not imply that product champions are needless.

Article Id	***Focus of The Study***	***Innovator Role(s) Observed***	***Sample***	***Data Collection and Analysis***	***Main Findings***
Gemünden, H.G., Salomo, S., & Hölzle, K. *(2007)* *Role Models for Radical Innovations in Times of Open Innovation* *Creativity and Innovation Management*	Moderating impact of degree of innovativeness on promotors' influence on innovation success.	Project managers Expert promotor Power promotor Process or champion promotor Technological related relationship promotor Market related relationship promotor	146 highly innovative new product development projects of 105 German companies	Quantitative Expert identification of potential technological areas of innovation, questionnaires survey Multivariate test analysis, multi-trait-multimethod methodology (MTMM).	Innovator roles positively influence innovations improvement, but the influences can differ. Every role is more suited for a particular area of interest. Type of innovativeness and requirements meeting should be taken into account too. Strategic alliances are built to gather what is lacking.
Goduscheit, R.C. *(2014)* *Innovation promoters— A multiple case study* *Industrial Marketing Management*	The role played by innovation promoters in loosely-coupled inter-organisational innovation projects	Innovation promoters Power promoter Expert promoter Process promoter Relationship promoter	49 response of 7 Danish innovation projects with 3 to 14 participating organization each.	Qualitative Semi-structured interviews recorded and transcribed, direct observation. Coding of collected data and interpretive analysis.	It is possible to distinguish sub-types of the four "typical" innovation promotors. The division of functions and the collaboration between promotors are challenging, as participant are frustrated by the changes. The stages of the innovation projects depend on the skills off the promoters assigned. In order to succeed clarity is required, both in labour specific divisions and transparent communication within participants.

Article Id	*Focus of The Study*	*Innovator Role(s) Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Gupta, S., Cadeaux, J., & Dubelaar, C. *(2006)* *Uncovering multiple champion roles in implementing new-technology ventures* *Journal of Business Research*	The role played by a NC in building a network start-up firm and the strategic relationship of NC with other champions of the firm	Network Champion (NC) New venture creation champion (NVCC) New venture product champion (NVPC) New venture implementation champion (NVIC)	8 interviews collected in 3 suppliers and 3 buyers firm of 1 Australian firm	Qualitative Inductive case study research Face-to-face interviews recorded and transcribed Coding analysis	NC has a direct link with NVCC and investors, and an indirect one with NVPC and NVIC. NC encourages and attracts supplies, buyers, third party and the focal firm facilitating the building of the network. The NVIC is more involved in the process than the NC. The knowledge enhancing the strategy building comes from the different roles, rather than only from a lone NC.
Hemmert, M., Bstieler, L., & Okamuro, H. *(2014)* *Bridging the cultural divide: Trust formation in university – industry research collaborations in the US, Japan, and South Korea.* *Technovation*	Comparison of university–industry research collaborations (UICs) with the aim of R&D new products and technologies. Focus on trust, innovation champion mediation and institutional settings	Innovation champion	618 UIC collaborations with firms of the biotechnology, microelectronics, and software industry collected in US, Japan and South Korea	Quantitative Structured questionnaires mostly based on 7-point Likert scales or semantic differentials. Empirical analysis, factor-, hierarchical multiple regression analysis	Tie strength, partner reputation, and contractual safeguards are associated to trust in UIC. The role of the innovation champion is that of mediating the trust mechanisms during the collaboration creation. Some factors are unbalanced across countries due to country culture and values. Differences emerge due to the strong or lack of history of collaboration between university and industry (advanced and emergent respectively).

Article Id	***Focus of The Study***	***Innovator Role(s) Observed***	***Sample***	***Data Collection and Analysis***	***Main Findings***
Kessler, E. H. *(2000).* *Tightening the belt: methods for reducing development costs associated with new product innovation* *Journal of Engineering and Technology Management*	Factors that influence new product development cost and which are the most- and least effective practices.	Product champion	127 surveys from respondents belonging to 75 projects carried in 10 large companies in a variety of industries.	Quantitative Questionnaire scales-based Likert-type scales or literal translation of respondents' answers Backward-elimination; regression analysis	Top Management (TM) support fosters resources acquirement but excessive bureaucratisation and a frequent involvement lead to costs rise. Projects development costs can be reduced with an efficient assignation of multiple people. Higher closeness can negatively influence costs, as interruption are more frequent. Digital tolls help create virtual communication channels to exchange data.
Khalili, A. *(2017)* *Creative and innovative leadership: measurement development and validation* *Management Research Review*	Study on the leadership behaviour in Australian context. Development and validation of a comprehensive model on creative and innovative leadership behaviour.	Innovation champion	514 respondents in managerial and non-managerial positions in different industries of Australia	Quantitative Questionnaires based on 1to5 Likert scale. Quantitative-, factor analysis, path model.	Leaders/champions enhance creativity and innovative behaviour through "Inspiring Creativity and Innovation", "Encouraging Shared Vision" and "Providing Individual Support". This has a positive and significant link with both creativity and innovative behaviour at the individual level.

Article Id	*Focus of The Study*	*Innovator Role(s) Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Klerkx, L., & Aarts, N. *(2013)* *The interaction of multiple champions in orchestrating innovation networks: Conflicts and complementarities* *Technovation*	The interaction and complementarities between champions working in teams aimed to the creation of an innovation network	Technology or expert champion Power champion or innovation godfather Process champion Network or Relationship champion Specialized and Non-Specialized innovation broker	3 cases (Rondeel, Sjalon, Greenport Shanghai) in the agri-food sector with multi-organizational innovation networks all supported by the TransForum Innovation program	Qualitative Semi-structured interviews, observations, secondary data Transcript, coding of data	Champions operate in teams, they belong in the primary innovation community, overseeing the innovation network and the sub-functions of the secondary one. Informality facilitates communication; lack of clarity can have negative implications. Complexity emerges with network evolution or the improper interaction between champions. Complementarity between champions allows communication, shared vision, support, innovation brokers mediation and facilitator role.
Lee, L.L., & Guthrie, J. *(2011)* *Corporate social capital in business innovation networks* *International Journal of Learning and Intellectual Capital*	How relationship networks can influence innovation for Corporate Social Capital (CSC)	Innovation networks figures: Central connector Broker role (bridges)	155 publicly listed firms from global information technology (IT) services sector	Business news reports; firms' accounting reports Content- and financial analysis on data Social Network Analysis (SNA)	Financial soundness is an attractor for partnerships and corporate reputation. Innovation can be seen as a 3-E process (exploration, engagement, exploitation) Brokers or bridges need to be in a critical position to link clusters, and skilled to champion an idea. Centrally connected firms can better exploit network ideas; centrality and absorptive capacity are required.

Article Id	*Focus of The Study*	*Innovator Role(s) Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Maier, M.A., & Brem, A. *(2017)* *What innovation managers really do: a multiple-case investigation into the informal role profiles of innovation managers* *Review of Managerial Science*	Informal innovator role profiles and their combination Influence of the company size on these roles	Power Promotor (PoP) Expert Promotor (ExP) Process Promotor (PrP) Relationship Promotor (ReP) Champion (Cha)	19 respondents from firms	Qualitative Face-to-face, telephone or video-chat interviews; secondary data e.g. CV and in-depth descriptions. Transcription and coding of the material collected.	Dominant roles are PrP and ReP, but company size influences these roles. Small: only champion for multiple tasks, combination of all informal innovator roles characteristics, support from departments. Medium: only champion, combination of ReP+PrP+Cha characteristics; support from departments. Large: innovation management team; combination of ReP+PrP characteristics; support from colleagues.
Matschoss, K., & Heiskanen, E. *(2018)* *Innovation intermediary challenging the energy incumbent: enactment of local socio-technical transition pathways by destabilisation of regime rules* *Technology Analysis & Strategic Management*	How regimes rules are questioned by intermediating organizations	Innovation champion Intermediary	A local transition pathway in a new smart city district of Kalasatama, Helsinki 23 interviews from the incumbent and the intermediary	Qualitative Account of previous attempts to make disruptive business models; direct observations; semi-structured interviews. Coding analysis	The regime continues to be stable through interlinked actors and rules. A new regime emerges from a progressive change with the establishment of new requirements. Intermediaries destabilise the regime though rules negotiation. New collaborations and social interactions fasten idea generation and process, challenging the existing regimes

Article Id	*Focus of The Study*	*Innovator Role(s) Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Musa, M.A., Ismail, S.E., & Othman, S. *(2008)* *Corporate governance and innovative leaders* *Social Responsibility Journal*	Illustration of the need to integrate innovation and corporate governance	Innovation champion	Companies around the world with a successful integration history Example from GE and P&G	Viewpoint paper	Innovation championing should be a customer-centric based process built on interaction. New five traits depict the ideal innovative manager: imagination and courage; external focus; decisiveness; domain expertise; and inclusiveness. Innovation is the result of teamwork; creativity is the starting point, but this should be also embedded in corporate governance principles and CEO leadership.
Sergeeva, N., & Zanello, C. *(2018)* *Championing and promoting innovation in UK megaprojects* *International Journal of Project Management*	Championing-, stimulation-, promotion-, and communication of innovation champions within megaprojects	Innovation champion	30 interviews led in 5 megaprojects cases in London	Qualitative Semi-structured interviews with innovation managers and champions; additional documentation e.g. strategies, reports. Transcription of interviews and coding analysis.	Megaprojects innovation comes from the project purpose, customer and user satisfaction, objective established by Governments and willingness for performance improvement. Champions are active in encouraging megaprojects through communication channels. Collaboration and alliances, and governance capability were found important. Knowledge externalisation helps developing projects within and outside the industry.

Article Id	*Focus of The Study*	*Innovator Role(s) Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Tao, L., Garnsey, E., Probert, D., & Ridgman, T. *(2010)* *Innovation as response to emissions legislation: revisiting the automotive catalytic converter at Johnson Matthey* *R&D Management*	Innovators' initiatives leading to innovation implementation. Focus on relationship between regulations and innovative response, and how outcomes are influenced by managers.	Product champion Technology champion Project champion	Johnson Matthey (JM) company	Case study on the development of the automotive catalytic converter (ACC) at the Johnson Matthey company	Regulations reduced ambiguity in the sector and fostered innovation initiatives and collaborations. Innovation was obtained through the collaboration within departments and industries. The role of the technology champion was to provide expertise, being informed on regulations' changes, and link the internal/external network. Success relied also in the support of top management, authorizations, flexible use of resources and persistence of the project champions.
Yang, J.-T. *(2007)* *Knowledge sharing: Investigating appropriate leadership roles and collaborative culture* *Tourism Management*	The relationship between an organization culture focused on collaboration, and knowledge sharing (KS). Study on how leadership roles affect KS	8 types of leadership roles Monitor Coordinator Director Producer Innovator Broker Facilitator Mentor	499 surveys from respondents in 9 international tourist hotels	Quantitative Item scale-based survey questionnaires Empirical analysis, regression analysis	Work Group-, Immediate Superior-, and Business Unit collaboration are positive and significant contributors of KS. KS comes from informal conversations with co-workers and thus a collaborative climate should be encouraged. The KS positive correlation are with Mentor- and Facilitator roles, and in a weaker contribution with innovator role. The Monitor role instead is a negative contributor as it reduces KS through control, rules, and regulations.

Article Id	*Focus of The Study*	*Innovator Role(s) Observed*	*Sample*	*Data Collection and Analysis*	*Main Findings*
Zhou, W., Velamuri, V. K., & Dauth, T. *(2017)* *Changing Innovation Roles of Foreign Subsidiaries from The Manufacturing Industry in China* *International Journal of Innovation Management*	What is the innovator role played by China subsidiaries, its current evolution, and the distinctive traits that characterize it. Multi-National Companies (MNCs)	Project manager Innovation manager	14 experts from 8 manufactory MNC who are involved in innovation projects from Germany, France and USA	Qualitative Semi-structured face-to-face and phone in-dept interviews with subsidiary manager Secondary data from press releases and internet research Thematic content analysis, coding.	Global innovation is mostly carried by larger MNCs. Three main factors: Innovation capabilities, i.e. tacit assets (understanding and interaction in LAS; network complexity and flexibility in LOADS). Organisational structures, i.e. procedures (lack and high understanding of R&D functions in LAS and LOADS respectively). Interaction with the headquarters i.e. agreements (low and high local decision-making power and trust building in LAS and LOADS respectively).

9.3. Appendix III – List of Visual Items Included in the Study

ITEM NAME	DESCRIPTION	POSITION
Figure 1	Literature selection process	Section 2.2, page 11
Figure 2	Documents per Year distribution	Section 2.3, page 12
Figure 3	Citations per Year distribution	Section 2.3, page 12
Figure 4	Documents per Country distribution	Section 2.3, page 12
Figure 5	Towards a model on Innovators Roles and Digital Innovation Achievement	Section 4, page 25
Table 1	Literature Classification Scheme	Section 2.4, page 13
Table 2	Main Findings Coding Table	Section 2.5, page 14
Appendix I	Literature Classification Digitalization and Networks	Section 9.1, page 39
Appendix II	Literature Classification Innovator Roles and Networks	Section 9.2, page 53
Appendix III	List of Visual Items Included in the Study	Section 9.3, page 65