Perspectives on Management Learning in the Digital Economy

Report for SSHRC knowledge Synthesis Grant: Skills and Work in the Digital Economy

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Executive Summary

Background

The actual, and potential, impacts of the digital economy on the nature of work have attracted growing academic interest since the mid 1990's. This is understandable as the digital economy presents us with the opportunity to completely transform the nature of work, both for the benefit and detriment to society. This potential impact is one reason why the digital economy is considered as a grand societal challenge – global issues that are sufficient complex that they cannot be tackled by any one single entity. Consider the effects of the different elements of the digital economy such as the digitization of global value chains and the newfound ability to break down jobs into tasks has had on job precarity, income insecurity and the invention of the so-called 'gig economy'. Yet, for all its potential drawbacks on nature of work, the translation of a national to global economy driven by the digital economy has already brought about new conceptualizations about the importance of creating brand value through cooperation and collaboration. This is significant, as grand societal challenges can only be tackled through the concerted efforts of like-minded partners. This is significant as the connectivity afforded by the digital economy appears to facilitate the emergence new types of organizations, such as multi-stakeholder partnerships, needed to take on grand societal challenges.

However, if the digital economy is a grand societal challenge that has a great influence on the nature of work, it stands to reason that it can also be brought to serve the greater good through multi-stakeholder partnerships. Yet, this invites us to consider a) what skills are needed to manage multi-stakeholder partnerships that can bring about positive societal transformation

and b) how higher learning institutions can design programs that will allow for the management learner to acquire related knowledge and skills.

Objectives

As such, considering relationships between management learning and the digital economy influenced the objective of this research project. Addressing this objective required formulating three ambitious, yet manageable research questions. Our first research question was how could a digital economy that contributes to the greater good through job stability, income security, and building an inclusive Post-Work World, come about? Second, what skills, knowledge, and habits of thought are needed to manage this more equitable version of the digital economy? And finally, how will managers learn these critical skills?

Methodology and Results

We also followed Eisenhardt et al.'s (2016) suggestion that conducting research about grand challenges is best accomplished through inductive methods that generate theory from data. This led us to implement an integrative review methodology for this study, which is a distinctive form of research that allows for a synthesis of past literature and the creation of new knowledge (Torraco, 2005, 2016; Webster & Watson, 2002).

Key Findings

The key finding from the literature we examine demonstrate that :

- Management research on the effects of the digital economy has largely focused on five themes, notably Managing precarious work; Managing inequality; Managing disruption; Managing social and psychological impacts; and Managing change;
- Much of the management research examine their respective object of research independently of other concepts. In other words, much of the research has been siloed;

- This implies that concepts related to the digital economy, such as job quality, crowdwork, zero-hour contracts non-standard work, contingent work on-call work, job-sharing platform-mediated work, portfolio careers, app work, capital platform work, atypical or informal employment arrangement, project-based work, small-scale employment arrangements and microwork have not only received much less attention, but that research on such concepts is generally so targeted that macro-level effects of the digital economy are potentially being underestimated;
- Opportunities afforded by the digital economy such as job–career congruence models for digital labourers, long-term strategies for producing technology-complementing skills, extending social protections, individual rights, well as 'human-in command approach' to technology design and application, as well as ideas about how the digital economy could bring about a guaranteed minimum revenue are also understudied;
- The potential for the digital economy to increase brand value through collaboration and cooperation efforts is also a promising avenue for further research;
- Ultimately, what might be needed is to shift the dominant thought from building a digital economy that favours the few, to working collaboratively to construct a digital ecosystem that shares the benefits generated through working better with all.
- More research is needed to examine how business schools could adapt their curriculum to help managers to acquire the collaboration and cooperation habits of thought and associated skills needed to replace the digital economy with a digital ecology.

Evidence Brief

Key Findings

- Management research on the effects of the digital economy has largely focused on five themes, notably managing precarious work; Managing inequality; Managing disruption; Managing social and psychological impacts; and Managing change;
- Much of the published research has, however, examined key themes in silos – most targeted objects of research associated to the digital economy ignored how they influence the nature of work;
- New forms of work brought about by the digital economy such as zero-hour contracts non-standard work, contingent work, on-call work, job-sharing platform-mediated work, portfolio careers, app work, capital platform work, atypical or informal employment arrangement, project-based work, small-scale employment arrangements and microwork have also received limited attention;
- Potential beneficial effects of the digital economy such as producing technology-complementing skills, extending social protections, reducing revenue disparity, and the potential for the digital economy to increase brand value through collaboration and cooperation efforts are also understudied; and
- more research is needed to examine how business schools need to adapt their curriculum to bring about a digital ecosystem that helps the many rather than blindly maintaining a digital economy that benefits the few.

Policy Implications

- Research on the skills and knowledge needed to manage multi-stakeholder partnerships needs to be encouraged by funding agencies;
- Higher business education needs to design learning environments, such as project-based or service learning, that will help student acquired cooperation and collaboration skills and knowledge need to manage multi-stakeholder partnerships;
- This would imply translating funding models for higher education that encourage or reward developing the short-term employability skills demanded by today's employers, to focusing on the acquisition of the long-term cooperation and collaboration skills needed to take on grand societal challenges.
- This could imply developing policy and funding mechanisms that encourage project based and service learning as these are recognized methods for acquiring collaboration and cooperation skills and knowledge.

Research Team

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Perspectives on Management Learning in the Digital Economy

Abstract

The digital economy, which was once considered as a panacea, is becoming increasingly viewed as a grand societal challenge – a problem that not only presents significant barriers to many people but is also so complex that it cannot be tackled by any one single organization. Mangers influence how the components of the global digital infrastructure, such as data analytics, artificial intelligence, and robotics impact society. However, mitigating the broad-gauged impacts of the digital economy, like its impact on the nature of work, would benefit from new ideas about manger's roles in the digital economy. Framed in a management learning perspective, this study collates what we know, and what we need to know, about management and the digital economy. Overall, this paper suggests that managers need to learn new habits of thought to build a more balanced, equitable, and sustainable version of digital economy. Perspectives on how to design management learning environments to help managers think of, then implement, a digital ecosystem rather than a digital economy will contribute to ongoing debates about management learning that will advance positive transformations of the nature of work.

Introduction

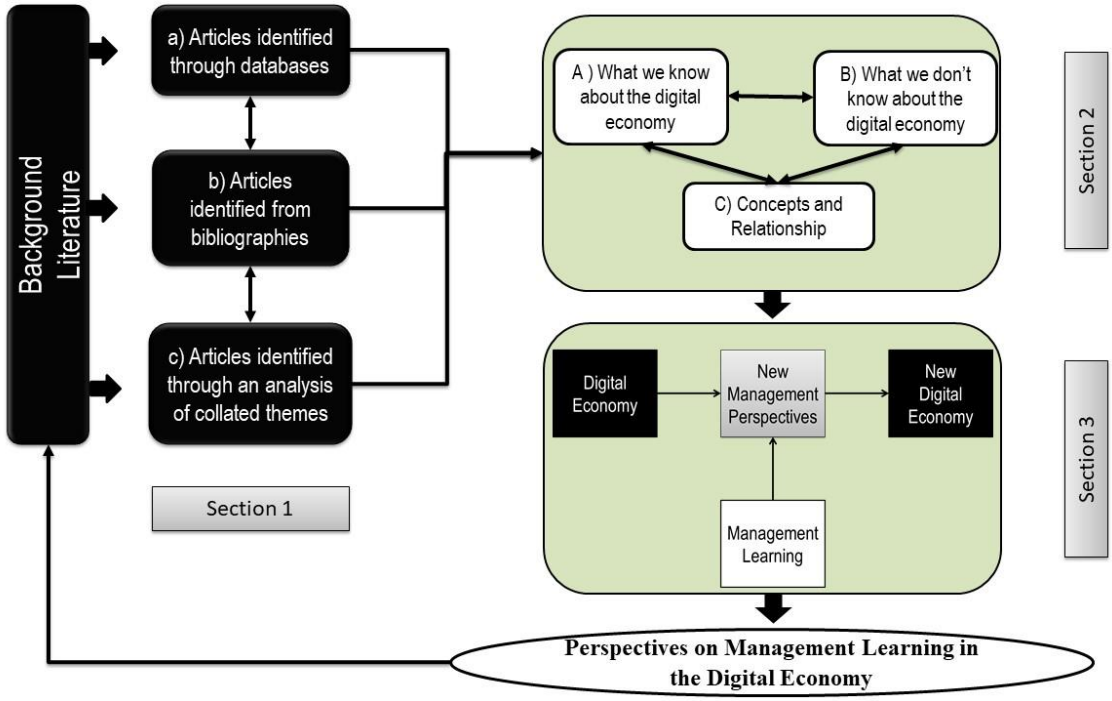
The digital economy, which was once viewed as a source of great opportunities for improving productivity, accessing education, and expanding entrepreneurship (Tapscott, 2015), is increasingly being considered as problematic (Atkinson, 2015; Castells, 2010; White, 2019). In fact, new technologies such as artificial intelligence, robotics, and blockchain are massively disrupting both the nature of work and industries (Antal et al., 2018). Considering the breadth and scope of both positive and negative impacts these technologies can have on job security and income disparity, insights about management in, as well as management of, the digital economy are clearly needed. As such, considering relationships (Weick, 1996) between management learning and the digital economy raises important questions. First, how could a digital economy that is concerned about job stability, income security, and building an inclusive Post-Work World, come about? Second, what skills, knowledge, and habits of thought are needed to manage this more equitable version of the digital economy? And finally, how will managers learn these critical skills?

Answering such questions will require considering how actors could theoretically shift the current state of the digital economy into a new state. Figure 1 synthesizes our approach to examining how managers could transform the current digital economy to a more equitable state of affairs. In Figure 1, Section 1 represents how data was collected, while section 2 presents how data was collated and analysed. Section 3 captures how the transformation from the current digital economy to a more equitable state may come about. By applying this framework, this paper will

suggest a) new ways of thinking about the digital economy are needed, b) that these new ways of thinking include believing that a digital economy which benefits the many is more important than a digital economy that benefits the few, and c) that there is therefore a critical need to (re)design management learning environments to foster new habits of thought, notably about the importance of collaboration and cooperation over competition.

Figure 1

Review Framework



This framework was developed with an appreciation that many scholars and practitioners categorise the digital economy as a grand challenge (Berrone, et al., 2016; Ferraro, Etzion, & Gehman, 2015) or as a wicked problem (Dentoni, Bitzer, & Schouten, 2018; Ferlie, et al., 2011;

Head & Alford, 2015; Rittel & Webber, 1973), comparable with the climate emergency (Cundill, Smart, & Wilson, 2018) or the COVID-19 pandemic (Bailey & Breslin, 2021). Thus, this paper is a response to the growing call for management scholars to address grand challenges (Buckley, Doh, & Benischke, 2017; George, et al., 2016). By painstakingly considering if this grand challenge is too complex to be managed, if it is beyond the scope of most managers, or if novel organisational models are needed (Tapscott, 2014), new insights will be provided. Yet, given the broad nature of this challenge, a manageable research agenda is needed.

As a case in point, previous scholarly work in this field suggests that dealing with grand challenges requires collaboration efforts (Ferraro et al., 2015; George et al., 2016), and the digital economy is no different. As will be discussed late in this paper, transforming the current state of any grand challenge arguably requires the intervention of what we will label as grand alliances – groupings of like-minded stakeholders that range from for-profit, not-for-profit, government, labor, and citizens, who accept to work together to tackle a component of a grand challenge. Yet, extant literature demonstrates that there are currently many gaps in our understanding about the management of such grand alliances. Ambiguous inclusion and exclusion criteria (Rucht, 2004), lack of insights about the control of the alliance's agenda and power dynamics (Austin & Seitanidi, 2012a), issues of inclusiveness (Moog, Spicer, & Böhm, 2015), as well as unanswered questions about the nature of the democratic experimentation in alliances (Ferraro et al., 2015) are but some of the known challenges regarding the management of these unorthodox organisations. Addressing such issues are important as there these fascinating global organisations for change have so far

received little academic attention (Tapscott, 2014), and considering the management learning required to contribute to successful grand alliances will provide an appropriate focus for this study.

The paper is organised as follows. The structured approach we adopted first provide important background information (Figure 1, section 1) about the digital economy including associated concepts, definitions, potential challenges, components, and impacts. Then, how this literature was collated and synthesized will be presented in the methodology section of this paper. This will include which databases we used, which key words were selected, and how the data was collated. This will be followed by a narrow findings section that will synthesize what we know, and do not yet know, about the relationships between the digital economy, its impacts on the nature of work and management learning (Figure 1, section 2). From that point, we will broaden our perspective again to discuss how managers could build a new version of the digital economy that would have positive effects on the nature of work (Figure 1, section 3). As we will demonstrate, this will require managers to acquire new ways of thinking, but also to unlearn, or drop (Weick, 2007) many of the habits of thoughts they have acquired in management learning environments. Consequently, we recognize that this paper might even challenge the current purpose of higher management education institutions. In other words, if the dominant focus on cold analytical skills favored by classical MBA programs (Leavitt, 1989) hasn't evolved since Leavitt's study, and if business schools haven't heeded the advice of Ghoshal's (2005) seminal paper to stop doing what they are doing, management learning might need to be redesigned. Limits to our study, avenues for future research, scholarly and practical implications of this paper, as well as a conclusion will complete this study.

Background

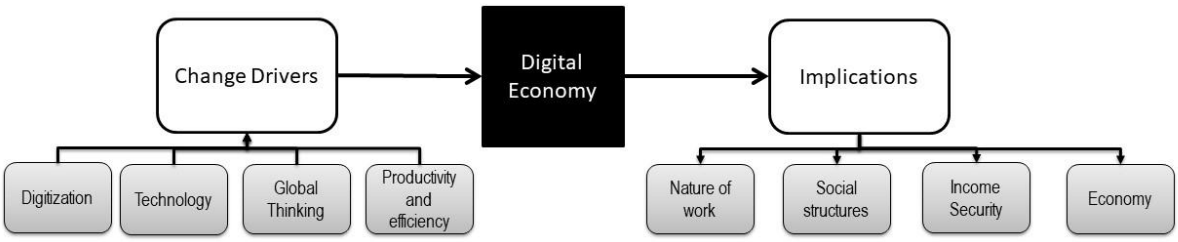
The term digital economy, and its many implications for businesses, organizations, and countries was first coined as the use of information computer technology (Tapscott, 1996). This definition was expanded to include three main components; E-business infrastructure (hardware, software, telecoms, networks, etc.), E-business (how business is conducted), and E-commerce (transfer for goods, for example e-books or Netflix) (Mesenbourg, 2001). The expanded components help emphasize the influence and impacts that hardware and software can have on economic agents such as businesses, governments, educational institutions and others (Malecki & Moriset, 2007; Tsyganov & Apalkova, 2016). Through multiple innovations, the digital economy transforms the capabilities of consumers, the structure of industries, and the role of the state (Guryanova et al., 2020). As digital technology has become cheaper, faster, and more accessible, businesses have found new ways to expand its functions within both their economic and social activities (Afonasova et al., 2018; Malecki & Moriset, 2007). The change this has brought to the economic landscape is impressive. For instance, in a few short years, the spread of the digital economy has made fundamental concepts such as geographic location irrelevant in many ways – by allowing people to trade online, the very nature of products, value creation and the competitive environment of firms have all changed (Afonasova et al., 2018; Guryanova et al., 2020; Malecki & Moriset, 2007; Rose et al., 2011; Tapscott, 1996). To the point where digitization and globalization have developed in parallel helping one another expand (Soto-Acosta, 2020). In other

words, it is not a stretch to consider that the digital economy has even modified how we conceive space and time.

As the digital world has evolved, so has its associated definitions and taxonomy. Yet, as the digital economy is still evolving (Afonasova et al., 2018), its definitions will continue to change. Some authors even propose that the digital economy should be viewed as a journey rather than a destination (Quinton & Simkin, 2017). This is important as collating concepts in this field might be like trying to hit a moving target, which will make research unwieldy. Yet, clearly more important than scholarly debates about the definition of the digital economy is understanding the impact it is having on society (Sudoh, 2005). As a case in point, the United Nations highlighted impacts of the digital economy on productivity, value added, employment, income, trade, investment, and market concentration (Kituyi, 2019) and the European Commission called the digital economy the single most important driver of innovation, competitiveness, and growth (Nachira, et al., 2007). Similarly, Policy Horizons Canada recently identified the next generation of global challenges that should drive Canada's academic research efforts. This report identified 16 emerging grand challenges that demand more scholarly attention. The first on their list is working in the digital economy (Antal et al., 2018). As synthesized in Figure 2, the digitization of global value chains, the unbundling of tradition jobs into tasks, the elimination of intermediaries and technologies reducing the scarcity of human labor options as the main change drivers of the digital economy (Antal et al., 2018). Clearly, the digital economy has enormous potential for changing the relationship between individuals, enterprises, societies and thus, make a considerable difference to socioeconomic systems (Sudoh, 2005; Tsyganov & Apalkova, 2016). Yet, it remains

unclear if the gains produced by the digital economy will be distributed equitably (Kituyi, 2019). What is more, the change drivers are not only impacting workers in wealthy G7 countries such as Canada, but the high cost attached to implementing the digital economy clearly provides an indisputable advantage to rich countries (Tsyganov & Apalkova, 2016). This poses the risk of exacerbating inequalities throughout the world since companies that adapt to the digital world are 26% more profitable than their industry peers (Anderson & Wladawsky-Berger, 2016) as accessing technological resources becomes central to competitiveness (Ceipek, et al., 2019). This state of affairs only reinforces our position that new ways of thinking about the digital economy may be needed to prevent the creation of a new caste of digital outcasts.

Figure 2 *The Digital Economy as viewed by the SSHRC*



Furthermore, the change drivers identified in Fig 2 are blurring the lines between the old economy and the new digital economy (Rappitsch, 2017). As such, much of the *realpolitiks* of digital economy simply no longer fit in many old economic models – since the digital economy does not necessarily rely on physical products, it doesn't always follow classic economic theories such as the rules of supply and demand. As countries and companies adjust their policies to reflect these realities, so must management learning evolve. Plausibly, one reason individual managers, organizations, firms, and even countries struggle to mitigate the negative impacts of the digital economy on the nature of work is that management learners continue to acquire outdated theories – business schools may not have fully considered the implications of the digital economy and its effect on business frameworks and strategies or on the nature of work (Bharadwaj, et al., 2013). For example, Porter's Five Forces Model and the VRIO Framework which is widely taught in business schools rely on assumptions of analogue technology and non-digital products (Koch & Windsperger, 2017). Yet, changes in the expectation and capabilities of consumers (Guryanova et al., 2020) and by new technology-based firms (Spencer & Kirchhoff, 2006) have brought about new relationship co-creation (Piazza & Abrahamson, 2020) and increased two-way communication between firms and their clients (Achen, 2017) that shake classic supply and demand models. Thus, the impacts such profound changes have on job stability and on revenue disparity supports labelling the influence of the digital economy on the nature of work as one of the most important grand challenges of our time (Anderson & Wladawsky-Berger, 2016).

It is therefore vital that management learning be designed to acquire the necessary skills, knowledge, and habits of thought needed to tackle this, as well as other, grand challenges. Thus,

how managers learn the art, craft, and science (Mintzberg, 2004) of grand challenge management is critical. Unpacking questions related to management learning in the digital age are all the more important when one considers the ongoing criticism levelled at business schools in general, and MBA programs in particular. Much of the longstanding critiques surrounding MBAs focuses on the inability of the MBA program to ensure a successful business career (Bennis & O'Toole, 2005; Grey, 2004; Livingston, 1971; Navarro, 2008; Pfeffer & Fong, 2002), while others raise alarms about the indoctrination of questionable practices that evolve from problematic values (Vaara & Faÿ, 2011). To the point where MBAs are accused as being the cause of many problems in society (Ghoshal, 2017) when in fact, MBA students should learn to be mindful of their responsibilities as future business leaders (Carroll & Shabana, 2010).

Relatedly, several authors have suggested approaches to improving management learning. For instance, design thinking is argued to have important implications for management (Dunne & Martin, 2006; Simon, 2019), while still others propose that we need to reconsider how values and practices are acquired in higher management education (Vaara & Faÿ, 2011). This specific approach will be revisited in the discussion section and inductively inspired the core argument of this paper to the effect that: although grand alliances are the most promising avenue for dealing with grand societal challenges, nevertheless, little is known about the management learning environments best suited to develop the knowledge, skills, and habits of thought needed to successfully manage grand alliances. This is because most MBA curricula still focus on outdated management theory and are not designed to develop the habits needed to bring about a balanced

global digital economy, rather than simply perpetuating the current siloed vision of the digital economy.

Having presented the contextual background of this paper, let us now present the methodological decisions implemented to review the current understanding of management learning needed to develop a balanced digital ecosystem.

Methodology

This paper has so far contextualised the influence of the digital economy on the nature of work. We have also argued that there is a need to better understand the skills, knowledge, and habits of thought managers will need to mitigate the impacts of the digital economy. To answer the research questions selected for this study:

a) how could a digital economy that is concerned about job stability, income security, and building an inclusive Post-Work World, come about?
b) what skills, knowledge, and habits of thought are needed to manage this more equitable version of the digital economy? and
c) how will managers learn these critical skills?

we based our methodology on the *Framework for Addressing Grand Challenges* (George et al., 2016). This provided a structured approach to examining the nature of the digital economy, the multilevel actions needed to influence the outcomes and impacts of the digital economy, as well as the knowledge and skills needed for managers to participate in building a more equitable

digital economy. We also followed Eisenhardt et al.'s (2016) suggestion that conducting research about grand challenges is best accomplished through inductive methods that generate theory from data. This led us to implement an integrative review methodology for this study, which is a distinctive form of research that allows for a synthesis of past literature and the creation of new knowledge (Torraco, 2005, 2016; Webster & Watson, 2002).

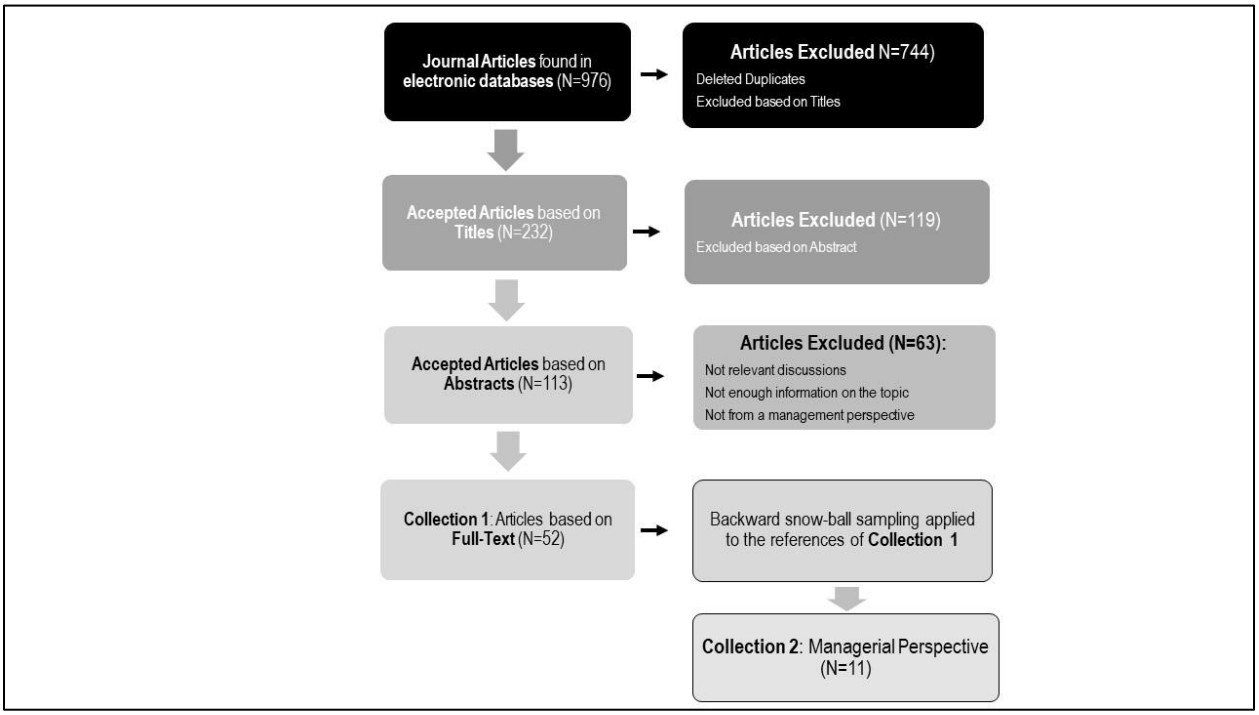
Article Selection

Our data collection efforts began by consulting the head research librarian for business at the lead author's institution. The aim was to establish inclusion and exclusion criteria, database selection, and keywords for our integrative literature review (Torraco, 2016). According to the expert librarian, a representative collection of publications discussing relationships between management learning and the nature of work in the digital economy requires a combination of both disciplinary and interdisciplinary scientific articles. After careful analysis, Scopus, Emerald Management eJournals, SAGE Journals Online, and EBSCOhost Business Source Complete databases were therefore selected. Furthermore, articles published from 1996-2021, in peer-reviewed articles, in the English language would limit our object of research.

For our preliminary search, we designed a matrix where rows represented variations of the digital economy, such as "Digital Economy", "New Economy", "Digitalisation", and "Digitalization". Impacts on working in the digital economy, such as new types of jobs, and income insecurity (Antal el al., 2018), we added key words related to work, e.g., "work", "jobs", "employment", and "income" to our research matrix's columns. Once the matrix was established, a combination of elements in the rows and columns were selected and searched.

Building on Torraco's (2016) recommendations, a staged review was subsequently conducted, excluding publications deemed irrelevant after reviewing the title, abstract, and full texts. As demonstrated in Figure 3, this preliminary search resulted in 52 articles, forming collection 1(Appendix A).

Figure 3 *PRISMA Representation of Our Article Selection Process*



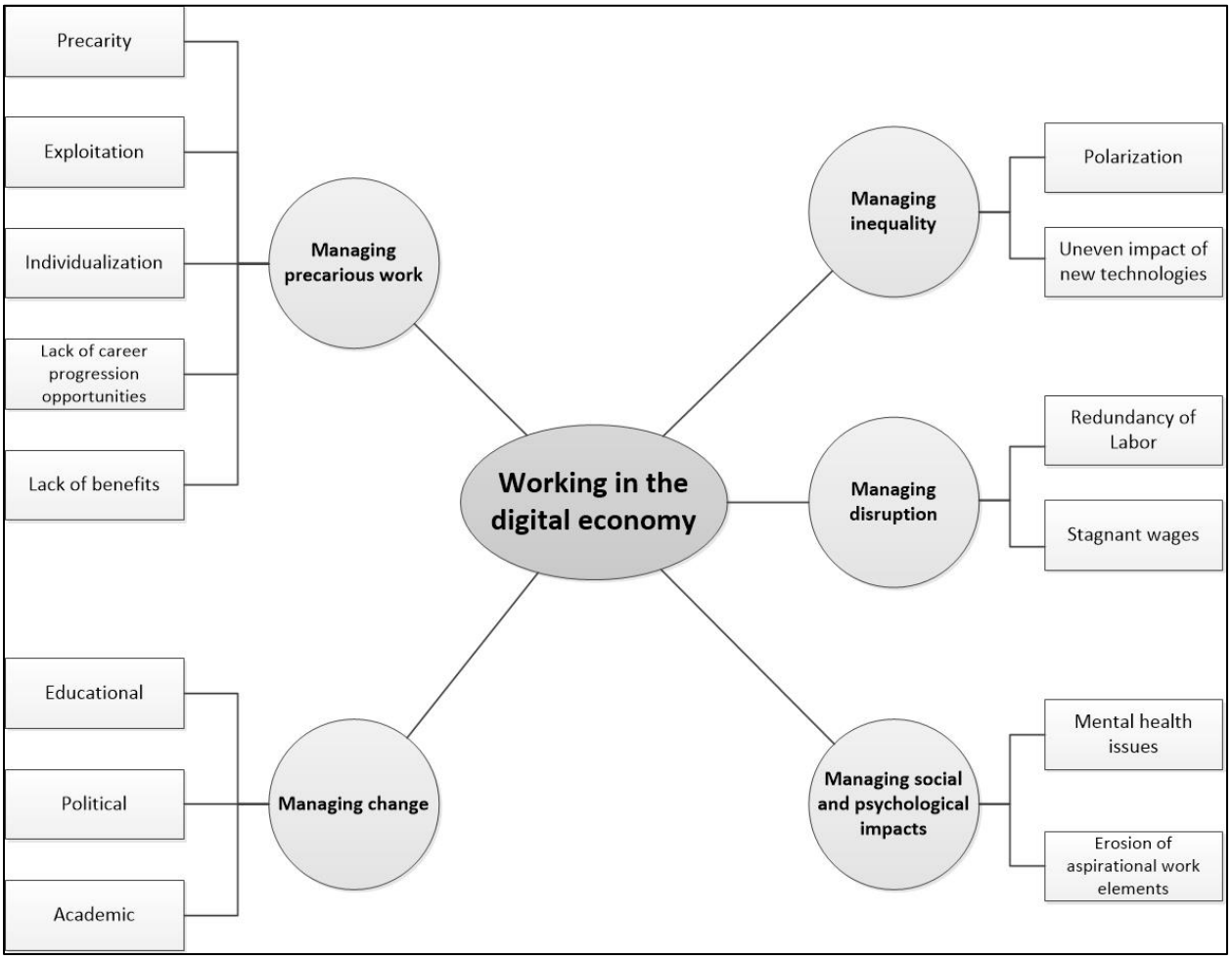
Even though the databases were selected purposefully to provide perspectives regarding management and the nature of work in the digital economy, the initial review of collection 1 revealed an underrepresentation of management focused articles (n = 4). Rather, economics (n = 18), and policy perspectives (n = 16) were most prevalent in collection 1. Given our intended focus on relationships between management learning, the digital economy, and the nature of

work, a backward snowballing method (Bezerra, et al., 2014) was therefore applied to collection 1. To this end, the references of the articles identified in collection 1 were subsequently reviewed using the ADOBE PDF advanced search function with “manage*” as a keyword. A staged review of the titles, abstracts, then full text was also applied to all papers in the second dataset. The sample that emerged was subsequently collated using theoretical sampling (Eisenhardt et al., 2016) that produced a new collection of literature that presents managerial perspectives on the relationships between the digital economy and the nature of work, forming collection 2 (Appendix B).

Analysis

To collate what we know about relationship between management learning and working in the digital economy, we conducted a thematic analysis on articles in both collections 1 and 2. We started by coding the material and dissecting text into fragments, then moved forward with abstracting the coded segments and arranging them into three hierarchical levels of basic themes, organizing themes, and global themes (Attride-Stirling, 2001). Themes were refined iteratively and NVIVO 12, a qualitative analysis software, was applied for facilitating the coding and segmentation process as well as creating the thematic network map (See figure 4). The output of the thematic analysis is synthesized in the findings section while the collated raw data is presented in Appendix C.

Figure 4 *Thematic Analysis Map*



Findings

By identifying, collating, then critically reviewing the existing literature focused on management learning need to build an equitable digital economy, new perspectives about managing the nature of work in the digital economy emerged. Our findings are organized conceptually (Torraco, 2016) and are presented in 5 subsections. The two-staged analysis of the

literature provides insights about the impact the digital economy is having on the nature of work as well as on managers roles in addressing these issues.

What We Know

Thus, setting the stage for our discussion section which will offer insights on how management learning can contribute to translating the current state of digital economy to a more equitable one, five main themes related to managing the nature of work in the digital economy were collated from our dataset:

a) Managing precarious work;
b) Managing inequality;
c) Managing disruption;
d) Managing social and psychological impacts; and
e) Managing change.

More broadly put, these interrelated themes represent the current body of knowledge on the nature of work in the digital economy and the associated management implications for higher learning. Let us examine, in greater detail, the findings we obtained.

Managing Precarious Work

Digitization of the economy has encouraged managers to alter the nature of work significantly. These include less stable and transient types of employment such as platform work, gig work (Gandini, 2019), portfolio work, and digital labor, among others (Dunn, 2020; Grimshaw, 2020; Myhill, Richards, & Sang, 2020; Rodriguez-Lluesma, García-Ruiz, & Pinto-Garay, 2021). Although these formats of employment may lead to more autonomy and flexibility for workers, these occupations are deemed to be intrinsically less meaningful than jobs with

more long-term incentives (Wong, Fieseler, & Kost, 2020). Precarious work might bring greater profit to firms, but managers who implement such policies should remain cognizant that theses shifts have been associated with poor quality jobs with low and stagnating levels of pay (Drahokoupil & Jepsen, 2017; Dunn, 2020; Lent, 2018; Lewchuk, 2017; Myhill et al., 2020; Rodriguez-Lluesma et al., 2021). Additionally, these jobs offer workers less bargaining power (Amuso, Poletti, & Montibello, 2020; Chen, Liu, Guo, & Xie, 2020; Drahokoupil & Jepsen, 2017; Grimshaw, 2020; Lewchuk, 2017; Shibata, 2020) which leads to a lack of both income and employment security as businesses focus on short-term gains (Cappelli & Keller, 2013; Dunn, 2020; Muntaner, 2018; Myhill et al., 2020; Perrons, 2003; Wong et al., 2020). Granted, the lack of organizational structures pertaining to new forms of employment are leading to diminishing opportunities for advancement (Myhill et al., 2020; Rodriguez-Lluesma et al., 2021; Wong et al., 2020) might be agreeable to managers who focus only on the bottom line. But this arguably comes at the expense of workers' well-being.

Unsurprisingly, these new precarious conditions brought about by profit-centric managers have even been noted to cause general health issues (Lewchuk, 2017; Myhill et al., 2020) such as anxiety (Lewchuk, 2017). Potential causes include the longer work hours, higher work intensity, and work-home spillover (Dunn, 2020; Lord, 2020; Muntaner, 2018; Perrons, 2003). While they have been known to cause health issues, technological advancements in the world of work have also led to the emergence of concepts like "digital nomadism" – a novel type of work in which individuals have a greater sense of flexibility and autonomy, working outside the walls of any organization (Aroles, Granter, & de Vaujany, 2020).

Managing Inequality

As the nature of work in the digital economy changes, concerns regarding equality emerge. As stated by Autor, "our chief economic problem will be one of distribution, not of scarcity" (Autor, 2015, p. 28). This implies that occupations displaced or eliminated by the digital economy will need to be replaced or compensated to avoid massive social unrest. One major notion influencing inequality in the digital workforce is job polarization, where simultaneous growth of both low- and high-skilled jobs has come at the expense of the middle-skilled workforce (Acemoglu, 2002; Autor, 2015; Brougham & Haar, 2018; Caruso, 2018; Kurer & Palier, 2019). Furthermore, wage polarization is occurring where managers implement policies through which only the high-skilled proportion of the workforce are reaping the benefits of technological change, further exacerbating the income inequality (Acemoglu, 2002; Autor, Katz, & Kearney, 2008; Bresnahan, 1999; Brougham & Haar, 2018; Caruso, 2018; Chen et al., 2020; Kurer & Gallego, 2019). As a comparable argument, the improved efficiency of high-skilled workers thanks to the advancements in information technology has not happened in an equivalent manner for manual workers, such as construction laborers. This widening efficiency gap has led to a heightened income inequality (Zardkoohi & Bierman, 2016).

Gender inequalities are also being exacerbated as women are facing higher risks of job displacement and lower compensation, even in technology-related roles (Grimshaw, 2020; Perrons, 2003; Rubery & Grimshaw, 2001). Within organizations, power dynamics are also shifting to occupations located at critical junctions of information flow and thus, have higher earnings compared to other occupations (Kristal, 2020). Yet, between organizations, greater

profits are being realized by a smaller number of already-enriched firms as industries are becoming increasingly monopolized (Santor, 2020; White, 2019). Geographically speaking, an uneven and contingent impact of new technologies by country is being observed (Amuso et al., 2020), with middle-income countries are more likely to suffer net job losses (Grimshaw, 2020). One related finding is that much of the academic research in the field of employment relies heavily on macro- and labor economics rather than industrial relations, development, feminist economics, or sociology of work despite their importance in future policies concerning the nature of work in the digital economy. This is reflected in the current lack of policy papers addressing such issues (Grimshaw, 2020).

Managing Disruption

The proliferation of technology has disrupted the labor market and shifted the demand for labor – at least, our current understanding of "labor". Consequently, the speed at which the tasks are being computerized is frequently rendering labor redundant (Acemoglu & Restrepo, 2018; Autor, 2015; Caruso, 2018; Frey & Osborne, 2017; Gekara & Thanh Nguyen, 2018; Kurer & Palier, 2019; Lent, 2018; Pulkka, 2017; Santor, 2020; Upchurch, 2018). True, the digital transformation of tasks has undeniably contributed to the liberation of workers from many burdensome repetitive tasks (Gekara & Thanh Nguyen, 2018). But at the same time, shifting from routine to non-routine cognitive work to meet the new demands of the labor market requires new skills (Technical, personal, and cognitive) that not everyone can acquire. This creates a skill-bias (Acemoglu & Restrepo, 2018; Autor, 2015; Bresnahan, 1999; Caruso, 2018;

Frey & Osborne, 2017; Gekara & Thanh Nguyen, 2018; Grimshaw, 2020; Kurer & Palier, 2019; Spitz-Oener, 2006). This skill-bias contributes to the manifestation of a "jobless growth" within both developed and developing countries (Gekara & Thanh Nguyen, 2018; Verme, et al., 2016). Some also argue that detrimental disruptions associated with skills-bias will not only take place in the middle-skilled or low-skilled occupations, but also in the cognitive, creative and more abstract jobs in the long run (Frey & Osborne, 2017).

Managing Change

Previous studies establish that the response of managers to the substantial alterations to the nature of work and technology-enabled disruptions in the labor market has not necessarily been adequate from different perspectives. From a learning perspective, policy-makers and administrators of educational systems have resisted rather than embraced needed changes (Acemoglu & Restrepo, 2018). With the unprecedented disadvantage of low or moderately skilled workers as the result of computerization of the economy (Autor, 2015), it is debatable whether educational system administrators have prepared the workforce adequately, or inclusively, to compete with, or work alongside, the emerging technologies (Acemoglu & Restrepo, 2018; Autor, 2015; Bresnahan, 1999; Djankov & Saliola, 2018; Gekara & Thanh Nguyen, 2018; Pulkka, 2017; Witte M, 2000).

From an academic research point of view, the theoretical classification of new breeds of workers as well as their existent behavior under novel work arrangements remain understudied (Cappelli & Keller, 2013; Djankov & Saliola, 2018). An explanation can be that "textbook

accounts of important workplace management topics, such as work attitudes and behavior, organizational culture, and outcomes like turnover and job performance, are based on the full-time employment model and the unique relationship that employers have with employees" (Cappelli & Keller, 2013, p.1). Lastly, policy-makers have also failed to adequately guard against issues such as the exclusion of workers with non-traditional work arrangements from social protection schemes, exploitative work offshoring, and the absence of collective bargaining powers of workers (Djankov & Saliola, 2018; Drahokoupil & Jepsen, 2017; Gandini, 2019; Schoukens, 2020; Witte M, 2000).

Managing Social and Psychological Impacts

Technology-driven changes have transformed employment from "a career" to "a job", and consequently to "a task" (Dunn, 2020). While division of labor is far from a new concept, the unprecedented rate of transformation of jobs to task-based and insecure work can negatively affect the mental health of even the most resilient and robust workers (Brougham & Haar, 2018). Some of the reported impacts of employment uncertainty are nervousness, stress (Brougham & Haar, 2018), job strain, emotional exhaustion, work-life conflict (Rafiq & Chin, 2019), anxiety about employment, concerns about personal and family life, postponed family formation decisions, seclusion (Aroles et al., 2020; Lewchuk, 2017) and fears of job loss and alienation (Caruso, 2018). At the same time, and perhaps more importantly, the combined technology-triggered unemployment or underemployment can lead to devastating dysfunctions in communities such as homelessness and increased rates of crime (Lent, 2018).

The traditional image of stable organizational careers is also fading away as a result of disruptive technologies (Brougham & Haar, 2018) and the rise in temporary and non-linear careers (Rodriguez-Lluesma et al., 2021). Concurrently, the new types of work lack aspirational elements of careers such as sense of community (Aroles et al., 2020), work-life balance (Lord, 2020), job fulfillment (Wong et al., 2020), workplace relationships (Lewchuk, 2017), depth of work content (Grimshaw, 2020), collective patterns of working life (Muntaner, 2018), and job satisfaction (Grimshaw, 2020). With the increased acceptance of technology among public and workplaces and the possibility of teleworking, these implications could also extend to the workforce with more stable and traditional employment. Employees who work away from office are predisposed to the fears of being taken off from office communication and experiencing feelings of frustration at being out of the loop. Additionally, issues such as work-family conflict, co-worker resentment, guilt and overwork by employees to earn the trust of virtual managers are also becoming more prevalent (Golden, 2009; Halford, 2005).

What We Don't Know

The overall analysis of our data reveals a comparative lack of attention to some conceptual aspects of the relationships between managers and nature of work in the digital economy, for instance job quality and gig work (Myhill et al., 2020). What is more, scholarly work in this field by and large focuses on specific concepts, elements, or silos. Take, for example, the conceptualization of new forms of work such as crowdwork (Amuso et al., 2020; Aroles et al., 2020; Lord, 2020), zero-hour contracts (Cappelli & Keller, 2013; Lord, 2020) non-standard work,

contingent work (Cappelli & Keller, 2013), on-call work, casual work, employee or job-sharing (Drahokoupil & Jepsen, 2017), platform-mediated work (Dunn, 2020), portfolio careers, app work, capital platform work (Lord, 2020), atypical, or informal employment arrangement (Muntaner, 2018), project-based work (Rodriguez-Lluesma et al., 2021), small-scale employment arrangements and microwork (Wong et al., 2020). These are components of the novel alternative types of precarious work arrangements. Yet, most studies examine each component independently, with only occasionally overlapping with other forms of work arrangements. In short, there is little generalisation that is currently done to ensure that the findings about one component can apply to other types of alternative work forms as well (Cappelli & Keller, 2013). This creates an overall foggy perception of global impacts of the digital economy – it is currently difficult to see a clear picture of the management implications related to the influence management decisions are having on the nature of work, which in turn contributes to the challenge of designing management learning environments needed to mitigate the deleterious impacts of the digital economy.

Yet, some solutions for mitigating the negative implication of working in the digital economy are advanced in the literature, such as a basic income, lifelong learning (Pulkka, 2017), job–career congruence model for digital laborers (Wong et al., 2020), long-term strategies for producing technology-complementing skills (Autor, 2015), extending social protections, individual rights, and other policies to contingent workers (Coyle, 2017; Djankov & Saliola, 2018), as well as ‘human-in command approach’ to technology design and application (Grimshaw, 2020, p. 489). Such concepts offer safety net options to mitigate the inequalities in form of minimum income, tax schemes, and government-provided work assignments (Lent, 2018). Yet, little is

known about these concepts in general as well as how management learning should or can adjust in consequence. To the point where, regardless of the growth in the quantity of scientific articles in this field, some claim that the literature in this field is still asking more questions than it is answering (Drahokoupil & Jepsen, 2017). Thus, theoretical underpinnings for learning to mitigate the negative implications of the digital economy and managing a positive transformation of the nature of work is assessed as being weak.

Yet, adapting management learning appears as a promising stepping stone in ensuring that a higher proportion of the population reaps the benefits of the digital economy (Amuso et al., 2020). A handful of studies discussed how learning can help mitigate the challenges they were studying, e.g., lifelong learning (Pulkka, 2017), long-term strategies for producing technology-complementing skills (Autor, 2015), career-adaptability training (Wong et al., 2020), teaching cognitive skills targeted at all types of jobs (Djankov & Saliola, 2018), and training for middle-skill jobs of the future (Autor, 2015). Nevertheless, as these studies focuses on learning employability skills, there is a lack of insights on how to learn the management skills, knowledge, and habits needed to successfully navigate the grand challenges of the digital economy.

Discussion

The review of extant literature reveals several gaps in our understand of how managers can mitigate the impacts of the digital economy on the nature of work, and how management learning can contribute to this effort. Yet, positioning the digital economy as a grand challenge allows us

to leverage the argument that, what we label as grand alliances, appear as the most promising way to manage grand challenges. Yet, as grand alliances are unorthodox and atypical organisations, new ways of managing, and new ways of learning management, are therefore needed. This suggests that management schools will need to redesign their curriculum, processes, and purpose in society. Contributing ideas about how to (re)design management learning environments can arguably be achieved by first considering the particularities of managing grand alliances.

Perspectives on a Digital Ecosystem

As outlined in this paper, digital innovations have radically changed how organizations, business, and countries collaborate and compete (Akaev, Sarygulov, & Sokolov, 2018; Guryanova et al., 2020; Snow, 2015) and these changes have significant impacts on the nature of work (Antal et al., 2018). Sadly, the reviewed literature demonstrates that management decisions taken in the context of the current view of the digital economy is affecting large areas of the workforce for the worse. And if managers blindly expand the digital economy without regards for social impacts, the effects could be dramatic – managers blindly fumbling around in the fog of the digital economy conceivably risk causing as much damage as humans have had on the natural world. Put differently, if managers do not bring balance to the digital economy, irreparable Anthropocene-like damages could extend beyond the digital landscape to the real, analogue world.

This line of thought suggests that conceptualizing the digital economy as an ecosystem represents a new and pertinent way of viewing the larger context in which the digital economy operates. More specifically, a digital ecosystem has been defined as the balancing effect that

greater integration of social and cultural context has on the economic life of a region and its overall economic capability (Nachira et al., 2007). Moving from a digital economy which is synonymous with competition to a digital ecosystem would, however, require new habits of thought that encourage business networking, cooperation, the sharing of knowledge, and enabling creativity and growth (Nachira et al., 2007). Moreover, the use of "ecosystem" rather than "economy" highlights the interdependence between organizations and their environment – as in a natural ecosystem, life thrives when there is balance. This is the same in the digital ecosystem as stakeholders prosper only if there is balance that allows all members of the system to thrive. Resultingly, managers need to learn to make decisions which will help the ecosystem as a whole thrive (Koch & Windsperger, 2017). A key element of a digital ecosystem concept is what the term 'system' represents: a network of network that is activated by innumerable actors. And through the study of how these networks come about and interact, we can become better informed about the overall system.

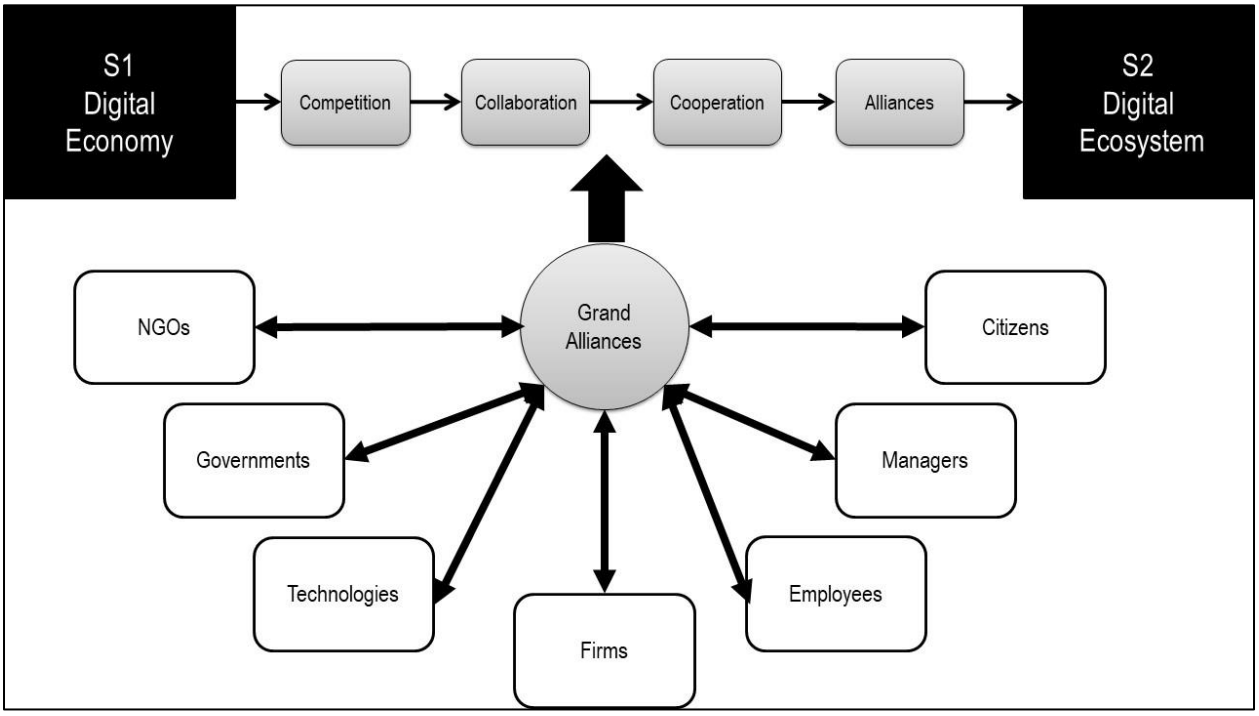
Such network thinking has already had some traction in the business world and has led to new alliances known as collaborative value creation networks and digital business ecosystems (DBEs) (Senyo, Liu, & Effah, 2019). DBE was first conceptualized to describe a new collaborative environment which transcends normal industry boundaries and fosters open and flexible collaboration and competition between firms to co-create value (Nachira et al., 2007). DBE's are a combination of Moore's (1993) business ecosystem which shows the general interdependence of organizations and digital ecosystems which is understood to be networks that share a common purpose to provide and sustain value around a digital platform and are characterized by high

uncertainty, complexity, and turbulence. (Koch & Windsperger, 2017; Senyo et al., 2019). More precisely, DBE's are defined as "a socio-technical environment of individuals, organizations and digital technologies with collaborative and competitive relationships to co-create value through shared digital platforms" (Senyo et al., 2019, p. 53). So far, such alliances have been implemented in a variety of fields including information systems, general management, tourism, and computer sciences (Senyo et al., 2019).

Clearly, from a management learning perspective, shifting from managing a firm in a competition driven digital economy, to managing the same firm in a cooperation driven alliance, implies a significant shift in said managers habits of thought. For instance, alliances for change such as DBE's disrupt traditional business environments in which organizations are seen as the sole creator of value. To the point where previous literature posits that co-created value is presumed to be superior to the value created by a single organization (Adner, 2006) and that value creation in a digital environment are always based on the contribution of multiple stakeholders (Koch & Windsperger, 2017). All this implies that in a digital environment, value is co-created (Adner, 2006). Co-creation implies that ecosystems will only transform one state to another collectively (Koch & Windsperger, 2017; Moore, 1993; Senyo et al., 2019). This is important as, DBE's are considered to be generally more dynamic than traditional businesses since they have to maintain complex relationships and learn autonomously as new requirements, opportunities, and threats emerge (Senyo et al., 2019). Hence, value creation is no longer linear sequences of events in a firm's value chain. Instead, in the new digital environment, value is driven by the contributions of multiple stakeholders, including customers, who integrate and apply resources for themselves

and for others (Koch & Windsperger, 2017). In short, as synthesised in Figure 5, the digital ecosystem will see the business landscape evolve from competition, to cooperation, to collaboration (Snow, 2015), and finally to alliances. Yet even though many firms have made the switch from competition to alliances needed to collectively take on grand challenges that threaten their very existence, management learning practices, in many cases have failed to make this shift.

Figure 5 *Conceptualizing Relationships in a Digital Ecosystem.*



Clearly, having managers who think of ecosystem and alliance management rather than competition would produce important changes in the way firms build their relationships with their networks. There is therefore a need to consider how alliances such as DBE's bring about change

as well as what are the skills, knowledge, and habits of thought needed to effectively manage them. But this is not a simple matter, as the magnitude of the tasks of first thinking of, then actually building, a digital ecosystem "transcend the capacities of individual organizations and sectors to deal with them adequately" (Austin & Seitanidi, 2012b, p. 727). And while several authors contend that 'going it alone' is no longer an option for corporations to survive in the digital ecosystem, and that working with others is the only way to bring about significant and lasting change (Head & Alford, 2015), it is fascinating to note that the ability of multiple organizations to break down silos and work together is actually facilitated by digital technology. While Van Fenema and Keers (2018) argue that new forms of mostly digital networks and alliances have emerged as the result of increasing cooperation between organisations, it appears important, from a management learning perspective to consider who is actually involved in these networks. Figure 5 also (re)presents the variety of stakeholders needed to take build the alliances needed to bring about a digital ecosystem and serves as a reminder that collaborations go beyond strategic partnerships established between corporations (Koschmann & Kuhn, 2012; Stadtler, 2018; Stadtler & Van Wassenhove, 2016). In fact, the different forms of alliance involved in build a digital ecosystem include a broad range of stakeholders such as corporations, non-profits, NGOs, governments (Dahan, Doh, Oetzel, & Yaziji, 2010; Selsky & Parker, 2005).

Previous literature reviewed for this paper also suggests that there will logically be different types of grand alliances. Some will be local networks, whereas others will be truly global and involve numerous allies. As the connections between the allies will arguably be influenced by the nature of the alliances, different management skills will be needed to ensure the stability,

flexibility, and legitimacy of the network (Rasche, 2012). For instance, this last author posits that local networks will require tight couplings, whereas transnational alliances will require loose couplings, in the sense that the connection between stakeholders is weak but remains quite responsive. This is important since "in loosely coupled systems where the identity, uniqueness, and separateness of elements is preserved, the system potentially can retain a greater number of mutations and novel solutions than would be the case with a tightly coupled system" (Weick, 1976, p. 6). The ability of the alliance to maintain the identity of the members appears as quite significant and the different agents will arguably be less inclined to commit to the cause if they will have to change their very nature. Again, this suggests that bringing about significant change to the digital economy will require managers who have developed the ability to adapt the novel problems, while concurrently remaining committed to their respective *raison d'être,* be it to generate a profit, serve a constituency, or fulfill a social mission. The point here is that combining the different types of stakeholders that are needed to build the multilevel action suggested by the Framework for Addressing Grand Challenges (George et al., 2016), with how they connect with others to form sustainable alliances for change, demonstrates that specific management skills and knowledge will be required – and not necessarily those currently being taught in many business and management schools today.

Management Learning and Ecosystem Thinking

The observation that managers will not only require new skills, knowledge, and ways of thinking to navigate the different kinds of alliances suggest that management learning

environments may need to be redesigned. Thankfully, previous literature also provides ideas about promising theoretical and practical options that could be considered for redesigning management learning.

For instance, Dipadova-Stocks (2005) suggests that higher education currently produces managers who are unconcerned about the consequences of their decisions. To counter this trend, she submits that service learning is the most promising learning approach for improving management practices. This form of experiential learning focuses on community service. It is proposed as an alternative to higher learning environment that have become places where “the academy does not seem to be particularly relevant to the nation's most pressing civic, social, economic, and moral problems"(Boyer, 1996, p. 14). Service learning is arguably a pertinent approach for learning ecosystem and alliance thinking because it “has the capacity to break down social class barriers, integrate universities and their local communities, and diminish disciplinary barriers” (Dipadova-Stocks, 2005, p. 346).

Another advantage of service learning is that it engages and activates students in their own learning story. For example, student-led project-based learning, in which students get to identify what projects they will work on would also encourage the management learner to better appreciate the power and effectiveness of networks. In such a model, students would be able to decide what external partners they would work with and what projects they would tackle. This is all the more important as the millennial generation, the most digitally connected generation yet, are purported to be highly concerned about social responsibility and are particularly interested in making a difference (Brower, 2011). Moreover, student-led project-based learning would provide

promising occasions to learn both altruistic (Hibbert, Beech, & Siedlock, 2017) and servant (Chen, Snell, & Wu, 2018) leadership. This is important as both these concepts can significantly contribute to ecosystem and alliance management. Also, engaging students in deciding which projects to work on would also help mitigate the critiques that higher management education is unable to develop ethical reasoning in their students (Steiner & Watson, 2006). This is significant as reasoning and thought are fundamental for building experience (Dewey, 1944). In other words, how could management learners develop the skills and appreciation for alliances if they are never exposed to them in their higher education? Of course, this contrasts with an educational system in which instructors believe that they need to dictate the nature of the learning environment (Dewey, 1938). Yet, just as changes in student values are ongoing, perhaps the role of the university is not to dictate what those values should be, but rather to design environments that encourages the exploration of what they could be. In other words, perhaps we need to encourage alliance thinking as a purpose, so that tomorrow's managers will have the power to tackle grand challenges that, if left unchecked, can be ruinous to us all. Indeed, if the "the purpose of the university is to provide a comfortable environment for the faculty" (Detrick, 2002, p. 2001), we suggest that scholars best begin thinking about helping students learn how to tackle grand challenges. Because if campuses become "islands of affluence, self-importance, and horticultural beauty in seas of squalor, violence and despair" (Boyer, 1996, p. 19), maintaining comfortable intellectual oasis' for a handful of elite scholars is useless if the world around them is burning.

Our findings also demonstrate that as much as managers need to learn new habits of thought, it is arguably just as important that they unlearn, or drop (Weick, 1996) other currently

dominant thoughts. Specifically, the worrisome trend of thinking of silos that was apparent in the academic literature that overwhelmingly examined the digital economy from the point of view of a single technology, or components, rather than at the system as a whole, gives us cause for reflection. The efforts to build a digital ecosystem will arguably require managers to drop much of what they acquired in contemporary business schools. Theory that exclusively aims to drive competition rather than cooperation, might need to be put aside, or at least contested with alternative views. Put differently, management learning environments develop dominant values and practices that students internalize. In this way, learning become "schemes for perceiving, thinking, feeling and acting within a given field and its structures" (Vaara & Faÿ, 2011, p.30). In a sense, developing a new *Habitus*, or connections between individuals and their judgements about what is ethical and aesthetic, is a critical function of higher learning institutions (Bourdieu, 1979). We need therefore need to consider if higher education remains simply the location for learning of the codes and ideas that maintain the status quo of the digital economy, or will it be structured in a way to provide the ecosystem thinking to a broader range of students. Granted, such a shift might have significant impacts on higher education institutions. Management schools might even need to privilege admitting students who show potential for learning the complex social codes needed to successfully manage grand alliances over candidates who are simply able to get good scores on an SAT or GMAT admission exams. Put differently, in a Habitus perspective, it is in the best interest of scholars and management learning institutions to make alliance thinking fashionable. This is because what is thought to be fashionable is accompanied by ways of thinking, as well as ways of speaking and acting that can be leveraged in a convincing manner, later on, by those who

have acquired said skills. In short, shifting the current digital economy to a digital ecosystem will require managers who have acquired alliance thinking, speaking, and acting.

Granted, realigning dominant thought about management learning would shake several pillars of higher management institutions. Beyond shifting admission criteria to favour potential diplomacy and collaboration skills, case competitions might need to become case ‘cooperations’ that encourage collaboration between teams to tackle a common problem, silos in research and teaching would need to be removed, and experiential opportunities would need to replace some classroom learning. Seeking to build new form of Habitus in their students could even lead Universities to adopt tactics of commercial enterprises who successfully leverage the digital economy by engaging with students and faculty to co-create their brands and improve their services (Foroudi et al., 2020). The resulting increased nurturing of teamwork, servant leadership, valuing of connection with the local community, as well as developing the habit of thinking about the impacts of managerial decisions would all become what is taught and rewarded. And in this manner, new social codes and habits of thought would be built. In short, alliance thinking needed to tackle grand challenges would come to dominate cold analytical skills needed to maximise short term quarterly bottom lines, which is precisely what is needed if we are to reverse the trend we are on with the current version of the digital economy.

Limits and Pathways for Future Research

As the digital economy can be viewed as a grand challenge, the risk of scope creep clearly needs to be managed while conducting research in this field. Yet, this point of view perhaps provides one explanation about the siloed nature of the research on this object of research. And our study is no different. The key words selected, and the databases we used, all influenced the datasets we built and analyzed. For instance, we focused on the nature of work within the digital economy, but the aforementioned Policy Horizon report identified ten elements influenced by the digital economy, which we mostly had to ignore. Clearly, more research is needed about the other components as well. Another limit of this paper was that it was framed by a management learning perspective. Changing the angle from which we analyze the collated data would undoubtedly change the ideas that inductively emerged. For instance, several authors have mentioned that managers will need specific skills to strategically manage collaborative enterprises (Busi & Bititci, 2006; Quinton & Simkin, 2017). Yet the limits of this paper somewhat prevented us from exploring the impacts of strategic management and accounting aspects of alliance management. For instance, how should managers evaluate a grand alliance's performance? Considering if this will require auditing concepts such as trust, how the alliance learns, as well as how individual actors contribute to the given alliance (Bititci, Garengo, Dörfler, & Nudurupati, 2012), were beyond the scope of this work.

While we concede that even though much of this review centered on negative impacts of the digital economy, alliance thinking appears as a promising and exciting avenue for future

research. Expanding our understanding of Bourdieu's ideas on higher education also appears as worthwhile endeavors. Another research stream could be built on the reviewed literature that frequently referred to the networks involved in building the digital ecosystem by applying an actor network theory lens to this field (Akrich, Callon, Latour, & Monaghan, 2002; Callon, 1986; Latour, 2005; Law, 1986). Finally, while much of this review takes a critical view of the values that dominate the current version of the digital economy, future research could also adopt a critical management epistemology. This would help incite debates about the relationships between politics, knowledge, and values associated with the digital economy.

Such avenues could lead to not only better understanding of the influence of the digital ecosystem on other elements than the nature of work, but could also explore how the changes agents, such as technologies could also be leveraged to bring about positive change for the many rather than short-term profit for the few. Accordingly, how this would ultimately trickle down to management learning is important and future research could explore, in much greater detail, the relationships between different types of learning environments, academic policy, and the structure of faculties have on management learning. This line of research could help better understand how to conceive learning environments that will not only produce new ways of thinking about the digital economy, but on other grand challenges as well. Ultimately, this might challenge the current role of universities in society. But when we consider the clear and present dangers posed by grand challenges such as the digital economy, this might be exactly what society needs.

Conclusion

This paper highlights the lack of consensus regarding the conceptualization of the digital economy. Ongoing debates about what is, and what is not, part of, influenced by, or an actor in, the digital economy makes conducting research in this field challenging. As demonstrated in the findings section of this review, much of the previous research in this field could be characterised as being siloed. Determining how this siloed approach came about is beyond the scope of this paper. But this observation is important as it arguably prevents scholars, managers, and university administrators alike from seeing the overall impacts of the digital economy on the nature of work. We are not implying that teasing apart the minute relationships within the digital economy is not important or valuable. We are only advancing that perspective is important here. And if we do not want to see the digital economy having dramatic negative impacts on the livelihoods of many, then new approaches and perspectives may be needed. We therefore suggest that management learning institutions need to design learning environments that would develop new values, practices, and habits of thought that would foster alliance thinking that leads to a digital ecosystem instead of the current 'winner takes all' version of the digital economy.

Overall, this review of the role of management learning within the digital economy provides the following findings:

- The digital economy influences many aspects of our lives, notably on the nature of work;
- Railing against the onset of the digital economy is useless as this evolution is largely inevitable;
- What managers can do, however, is decide what the impacts of the digital economy will be;

- It is not too late to build a balanced digital ecosystem that will bring about a positive Post-Work world that will benefit the many, rather than a brutal winner-take-all digital economy that only rewards the few;
- Translating the current imagined version of the digital economy to a balanced digital ecosystem requires grand alliances of like-minded stakeholders;
- Managing these grand alliances will require new ways of thinking; and
- Management learning institutions have a key role to play in building new habits of thought that nurture and value collaboration, solidarity, and cooperation needed to successfully manage grand alliances.

By leveraging the contributions made by other scholars, this review demonstrates that the digital economy offers a fascinating field for future research. This paper contributes to this ongoing adventure by highlighting what we know, and still do not yet know, about management learning in a digital ecosystem. Examining this object of research suggests that grand alliances are the best avenue to tackle grand societal challenges. Thus, more research is needed not only about the relationships between these atypical organizations and the digital ecosystem, but also between the actors involved in grand alliances as well. Put differently, more insight is still needed about the skills, knowledge, and thought that managers will need to help grand alliances succeed, as well as how they could they learn these essential attributes.

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Appendix

Appendix A: Literature Review Map: Collection 1

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Bresnahan, 1999)	Economics	Income inequality, computerization in the workplace	Examines the labor market shift impact on white-collar jobs due to computerization. Author finds information and communications technologies has forced a shift from labor in "modest cognitive" tasks to labor skills in jobs with either higher cognitive skills or "people skills".	Could extend this analysis into industrial technologies and blue-collar jobs. Could also examine the magnitude and persistence of the effect of the organizational complementarity brought on by technological advancement.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Witte M, 2000)	Sociology	The effect of automation on various occupational groups. Uses the internal differentiation hypothesis to address the skilling debate	This study focuses on the relationships between the skilling debate, studies on underemployment, and job satisfaction. Internal differentiation hypothesis: Jobs that are influenced by automation increase in complexity but the level of autonomy of the workers decreases. The authors find evidence of their hypothesis for blue-collar workers with an empirical study conducted in the Netherlands. Overall, although, their results do not show a process of internal differentiation. The authors find that automated jobs are generally more	Upskilling differs by occupational groups. Further study could examine why automation has a different effect on the three occupational groups (blue-collar, white-collar, professional).

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			complex and autonomous.	
(Rubery & Grimshaw, 2001)	Management	The impact of information and communication technologies (ICTs) and how they affect the quantity, quality and distribution of jobs	The authors review different views on the effects of emerging ICTs on employment. They review the implications of organizational reshaping, the new types of employment organization and new forms of protection, the impact of ICTs on the time and dimension of work, labor force divisions, and the impact of ICTs on skills and job prospects. The authors suppose that ICTs will	Future research could be done regarding ICTs by businesses to prepare for an employment shift.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			have both negative and positive aspects for employment.	
(Acemoglu, 2002)	Economics	Wage inequality, skill-bias	The research explores the causal relationship between technological change and income inequality. Technological change favors high-skill workers thus, creating a skill-bias.	What determines wage differences among similar workers and how technical change and institutional change interact
(Autor, Levy, & Murnane, 2003)	Economics	Computerization, Job skill demand	Looks at how the computer capital allows for the substitution of workers when conducting routine manual and routine cognitive tasks and can help workers when conducting non-routine	Implications for future labor supply/demand changes based on technology change and price. Between different groups in the workforce (gender, education, age).

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			cognitive and communications tasks, given that these tasks are imperfect substitutes.	
(Perrons, 2003)	Social Policy	An evaluation of how new technologies affect paid work and the resulting effect on gender inequality	The author uses 55 interviews with media owners, managers, and employees to assess the impacts of new technologies on paid work. Perrons focuses on workers with care responsibilities and discusses working patterns like hours worked and homeworking. The author concludes by stating that ICT has increased the temporal and spatial possibilities of work, but gender inequality and gender bias still exist.	Further research could evaluate the earnings difference that exists between different genders in different sectors of work - income disparities in the digital platform gig sector, especially.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Spitz-Oener, 2006)	Economics	The relation between skill requirements for jobs and computerization.	Spitz-Oener uses a survey-based data set from West Germany to identify an association between occupational skill requirements and the computerization of occupations and the task within the occupation. The author uses regression techniques to conclude that the increase in computerization accounts for about 36% of educational upgrading in employment. This coincides with the hypothesis of Autor et al. (2003) of skill-biased technological change.	Further research could be on this subject by using a different data set from another country/economy.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Goos & Manning, 2007)	Economics	Technological change, rise in job polarization in Britain	The authors argue that the "routinization" hypothesis (Autor, Levy, & Murnane 2003) explains job polarization rather than the hypothesis of skill-biased technical change (SBTC). The authors create a regression model to estimate the increase in explained polarization. They find that polarization can explain one third of the rise in the lower half of the distribution and can explain half of the rise in the upper half of the distribution.	Further research could examine more closely different occupational groups and different labor markets (Canada or U.S.).

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Autor et al., 2008)	Economics	Wage inequality, real minimum wage, information technology	Challenges and rejects the idea that the rise in inequality in the 1980's in the U.S. was "episodic" and driven by non-market factors - aka the Revisionist interpretation. The authors find a polarization of wage (increase in high and low wage) growth and attribute growing income inequality to skill-biased technological change. Information technology roles are replacing roles that require routine tasks.	Future inequality in the U.S. could increase due to international trade and outsourcing. Development in Asia, improvements in communication technology, and globalization could play a future role in economic inequality.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Autor & Dorn, 2013)	Economics	Wage inequality, employment polarization, wage polarization ("larger increases in both employment and wages at both ends of the occupational skill distribution")	Analysis of the polarization of job demand due to technological change: reallocation of noncollege labor into service occupations, wage and employment polarization, and geographic mobility. It was found that the real wages and hours worked by noncollege service workers has been increasing (lower tail). Service jobs are harder to automate. Specifically, the authors argue that polarization comes from consumer preferences and the falling cost of automating routine. In other words: "unbalanced technological progress".	How technological progress and the automation of routine task jobs can influence the need for labor specialization?

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Cappelli & Keller, 2013)	Management	The classification of alternative employment practices	The authors create a classification system that differentiates full-time regular (classical) employment and its alternatives based on the sources and extent of control over the work, the contractual nature of the job, and the parties involved.	Major future implications to the work arrangements made by organizations and managers. Assessing the productivity and different behaviors based on employment arrangements.
(Autor, 2015)	Economics	Technology, automation, job supply, employment and unemployment	Autor argues that automation has not eliminated jobs or decreased the ratio of jobs to population and is not a perfect substitute for labor. Technological augmentation changes the demand for types of labor (horizontal shift). Technological change "polarizes" the labor market.	Job polarization is unlikely to continue. More research is needed to further examine the relationship of automation and labor supply. There is a need to examine how the increase in wealth from automation will be properly distributed (scarcity of wealth).

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			Artificial intelligence and robotics will heavily influence occupational change. "Automation raises the value of the tasks that workers uniquely supply".	
(Verme et al., 2016)	Economics	An examination of labor mobility in Morocco	The authors use quarterly panel data to analyze the effects of recent macroeconomic and labor reforms in Morocco on labor mobility. Labor mobility is measured by probability matrixes and it found that labor mobility in Morocco is higher than what has been expected. Women and men are not equally as mobile, with women suffering lower mobility and	Labor mobility could be measured in other developing countries that are experiencing policy changes.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			lower labor market status.	
(Brougham & Haar, 2018)	Management	Employee perception, Technology, STARA awareness, Artificial intelligence	Authors created a new measure called STARA Awareness to assess to what extent employees feel their job will be disrupted by technologies such as AI, robotics, and algorithms. The authors found a negative correlation between an increase STARA awareness and organizational commitment and career satisfaction, and a positive correlation with turnover intentions, cynicism, and depression.	This study could be used to help managers and policy-makers prepare for employment changes given the perceptions of their employees.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			Authors find that employees do not perceive STARA to be a threat to employment.	
(Coyle, 2017)	Public Policy	Technological change and policy. Reshaping policies so as to direct them more towards workers and consumers	Workers that use digital platforms in jobs that have risen from recent technological change are vulnerable and are sometimes not covered by protective policy (sick pay, parental leave, benefits, etc.).	New research into theoretical, alternative policy to protect the workers and consumers emerging in the digital industry.
(Drahokoupil & Jepsen, 2017)	Policy	Information and communication technology (ICT), digitalization of the economy	A short review of articles on the digitalization of the economy and its implications. The authors review a paper by Valenduc and Vendramin where they discuss how	Further research can be done on the platform economy, and the organization of workers in the digital economy. Policy recommendations are needed to help governments incorporate these changes into the economy.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			'Big Data' is the largest contributor to the new wave of digitalization. The authors then address digital labor platforms by referring to Pazaitis et al. and the effect on existing labor platforms. They touch on regulation and policy related to digital labor platforms.	
(Frey & Osborne, 2017w)	Economics	Job loss to computerization, gaussian process classifier, probability of computerization	The authors create a method of estimating the probability of the computerization of 702 occupations called the Gaussian process classifier. They classify the jobs based on the probability of computerization and estimate the effect on the labor market.	Further research could attempt to estimate the number of jobs that are likely to be lost to computerization.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Haake, 2017)	Political Policy	The impact of digitalization on trade unions and society	Haake argues that trade unions should incorporate digital self-employed workers and crowd workers. He argues that this is crucial for the 'on-demand sharing economy'. The author argues that the workers in this economy are suffering due to shocks to the labor market and improper legislation.	This article question the existence of future trade unions that represent digital self-employed workers. Future research could look into development of a framework for policy surrounding this issue.
(Jepsen & Drahokoupil, 2017)	Policy	Digitalization and its effects on the labor economy, business models, and the distribution of productivity gains	The authors review literature that focuses on the hypothesis that digitalization will decrease the demand for labor, increase wage polarization and decrease the wage share. They review articles that examine the effect of digitalization on labor demand,	Future research could assess potential policy options to help regulate the digitalization of work in order to mitigate the negative impacts caused by digitalization.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			consumption, gender aspects, and trade unions.	
(Lewchuk, 2017)	Economics	Employment Precarity Index, employment security, gig economy, well-being	Lewchuk designs a new method to measure employment security called the Employment Precarity Index. With this index, Lewchuk determines who is working a permanent or precarious job. The author uses this measure to determine the social cost of the least secure 'gig' economy. Lewchuk finds that increased job insecurity is associated with poorer health outcomes, increased anxiety, and greater social isolation.	Future research could use this new measure of job security to analyze emerging employment fields and the associated regulation.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Liebman, 2017)	Policy/Management	Digital platforms and their effects on the economy and gig economy	Liebman explores the different policy debates surrounding the digitalization of gig economy, crowd work, and regulatory policy. Liebman addresses the size and growth of the gig economy; how labor markets are affected by digital platform companies; as well as the legal and regulatory debate surrounding new technologies. The author acknowledges that there are "winners and losers" in the labor market after technological advancement. Liebman encourages fair distribution of wealth of the gains from digitalization.	Future research into the policy surrounding digitalization would be beneficial in ensuring that gains from the industry are used to improve overall prosperity and living standards.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Pulkka, 2017)	Economic Policy	A basic income as a solution to technological unemployment	Pulkka discusses the implications of a budget neutral basic income used to prop up workers affected by labor market changes brought on by technological change. Pulkka also considers other solutions such as proactive finance policies, guaranteed job programs and employee funds. The authors analysis determines that a basic income would increase disposable income, purchasing power, and bargaining power of workers affected by technological change.	Future research could compare means-tested social security with basic income in a different setting than technological advancement. Policy recommendations are needed for fiscal budgets and bureaucratic functionality.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Acemoglu & Restrepo, 2018)	Economics	Technological advancement and the implications on labor (reduced share of labor, the creation of new tasks and the lowering of wages	Technological advancement leads to the automation of routine tasks; resulting in lower wages, unemployment, and even rendering some labor useless. However, new tasks which are less routine may counteract this shift and produce more employment and higher wages. This shift results in more inequality on the basis of skill-bias in the new digital economy.	Education systems role in adapting to the new skills needed to handle the new more complex tasks that technology creates.
(Caruso, 2018)	Political Theory	ITC technologies, digital innovation. The social implications of the new perceived technological revolution	Recent technological innovation has been expressed as "Industry 4.0" and digital capitalism. Caruso argues that the digital revolution has not yet transformed the work environment.	The digital revolution has increased the socialization of the production process, cooperative exchange, collective participation in decision-making, and the autonomy of labor/digital Taylorism. Future work could examine these relationships

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			Decision autonomy has not improved, low skill jobs have not yet been replaced, and the "work-life balance" has become harder to maintain. Innovation has allowed for firms to reduce wages and increase their ability to monitor performance.	and their monetary benefits.
(Dengler & Matthes, 2018)	Economics	The effect and substitution potential of automation on various tasks performed during an occupation - rather than entire occupations	The authors examine the digital transformation of the labor market in Germany and argue that previous studies have overestimated the effect of automation on jobs and occupations. By calculating the existing substitution potentials of tasks within an occupation they find that only	More research is needed into how technology will affect the labor market so as to create policy to help protect institutions. Further research could investigate the causal effect of digital transformation on employment growth.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			15% of German employees are at risk of being replaced by automation, whereas they found a 47% substitution potential when examining occupations as a whole.	
(Djankov & Saliola, 2018)	Economics	Digital transformation of work, technological progress, labor market	The authors explored policy recommendations for governments based on how the labor markets and demand structure will change due to digitalization and technological progress. They recommend investing in human capital (knowledge, skills, and health) and social protection (guaranteed social minimum and social insurance).	Further research is needed into how governments can raise the necessary capital to invest in protective measures for the economy during automation and technological change. Coupled with an increase in revenue, governments must increase public spending efficiency.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Gandini, 2019)	Human Relations	Gig economy, Labor process theory, point of production, control, digital labor	The author uses labor process theory to characterize the gig economy through digital platforms. The article considers points of production, emotional labor, and control, and argues that labor power in the digital gig economy is being used as a commodity that allows for the management and monitoring of workers.	The author focuses on feedback, ranking, and rating systems used on digital platforms to examine the labor process. Further study into this field could look at other aspects unique to the digital gig economy.
(Gekara & Thanh Nguyen, 2018)	Social Sciences	New technologies and the transformation of work and skills	Technology has displaced and transformed several jobs. This complex transformation has also resulted in the emergence of new jobs in addition to the reconfiguration and elimination of others. These transformations have led to a higher demand for technical,	More research on the impact technological change has on workforce demographics specifically, the effect it has had on women. Other avenues for future research include the exploration of the impact technology has had on union membership and the extent to which the industrial power balance might have shifted as a result.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			specifically, computer skills. Thus, resulting in a smaller, more skilled workforce	
(Lent, 2018)	Sociology	Automation, robotics, and AI, and their impact on workers and employment.	Lent summarizes the work done by Hirschi (2018) by examining the challenges faced by workers due to technological change. The author considers career development aspects for displaced workers as well as educational transformations that could prepare workers.	Further research could be done into career development for workers affected by automation, robotics, and AI. Research could examine whether technology change will create more jobs or eliminate existing jobs.
(Muntaner, 2018)	Public Health	The social interests and class structure of digital platform workers	An opinion paper based on the new arrival of digital platform workers brought on by digital innovation. The	Future research could address social inequalities in the field of the digital gig economy. Policy recommendations would be useful in this area of study.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			author argues that digital platform 'gig' workers are subject to increased occupational health hazards.	
(Upchurch, 2018)	Social Science	Discussion surrounding robotics and AI and their impacts on work	Upchurch discusses robots and AI and their impacts on the world of work. The author refers to technological 'singularity' described as an end point where AI will be able to function without human intervention. The author discusses the technical limitations, social limitations, and economics of robotics and AI. He notes that AI and robotics will hamper productivity in the medium and long run but increase it in the short run.	The author notes that there is a lack of research offering predictions concerning a post-work world where human labor is completely replaced by AI and robotics.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Chin, Li, Jiao, Addo, & Jawahar, 2019)	Management	Digitalization and automation of the manufacturing industry and its implications on the career sustainability of workers	The authors create a new theoretical framework for career sustainability for manufacturing employees in China based on digitalized manufacturing. In this framework, employees can decide to continue, shift, or re-orient their career path during manufacturing innovation based on the 4 dimensions of career sustainability: resourceful, flexible. renewable, and integrative.	Further research could incorporate organizational learning and knowledge management into the career sustainability and the firms'/managers decisions. Further research is needed to examine to what extent technology will change labor demand.
(Gramano, 2020)	Legal Studies	Legal classification and discussion of the relationship between gig workers and digital platforms	The author assesses the relationship between a digital platform and its workers such as Uber. The article then discusses the legal	Future research could be done in defining the working relationship between digital platforms and its workers. Policy recommendations could be given to facilitate this process.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			classification surrounding this working relationship by summarizing two case studies and concludes that the platform plays a much larger role than just intermediation between customer and worker. Concluding that workers are unfairly burdened by the risk of failure to perform.	
(Kurer & Palier, 2019)	Political Science	Automation, digitalization, employment polarization	The authors argue that the polarization of wages and the decreasing lower middle class and the associated effects on politics have not been given enough attention. More attention into routine labor markets disaffected by technological change could be	Political disruptions could be avoided if more attention was paid to disaffected workers. As wage polarization increases, it seems as though political affiliation is also becoming increasingly polarized as well.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			electorally advantageous. The authors raise the question as to why left leaning parties seem to pay less attention to these disadvantaged groups.	
(Kurer & Gallego, 2019)	Political Science/Economics	Employment trajectory of workers affected by technological change	In order to analyze the political consequences of technological change and employment polarization the authors use panel data and construct a digitalization indicator to use in their fixed-effects regression to estimate the effects of digitalization at the industry level on income and subjective job satisfaction. They find that non-routine cognitive workers benefit the most from	Further research could theorize ways to protect or shift the skills of workers who might become disadvantaged by increasing digitalization.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			technological advancement as opposed to manual, routine workers who become disadvantaged.	
(Peugny, 2019)	Economics	Job polarization in Europe	Peugny gathers data from 12 European countries to analyze job polarization in the past 20 years. Peugny found evidence of job polarization across Europe. The proportion of managers and professionals has been increasing, as well as the proportion of less skilled employees. Evidence shows that industrial skilled employees and clerks (middle skill jobs) have seen a decrease	Further research could discover where the workers who have lost their middle-skill jobs have gone. How has unemployment been affected by this shift, and which jobs are benefiting from this shift?

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			in proportion compared to other employment segments.	
(Rafiq & Chin, 2019)	Economics	Association between job insecurity and life satisfaction with employment challenges brought on by emerging digital technologies	The authors collected data from China and used a moderated hierarchical multiple regression approach to analyze the association between job insecurity and life satisfaction. Focusing on technological changes and digitalization being the driving force behind job transformation, the authors find a negative correlation between job insecurity and life satisfaction and that the association	Further research is needed to analyze the monetary consequences job insecurity of employees imposes on organizations. Organizations could consider job security as a performance driver.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			changes based on age and career stage.	
(White, 2019)	Social Policy	An assessment of the negative effects of automation and possible solutions	White argues that the digital economy has widened inequality through the automation of jobs and increased the profits for a small number of individuals. The author evaluates different options to help mitigate the negative effects of the digital economy, with a particular focus on stakeholder grants and universal basic income (UBI). He recommends a UBI scheme to help with the negative aspects resulting from	Future research could evaluate other government transfer programs as a means to mitigate inequality while facing transitional labor periods brought on by technological change.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			the digital economy.	
(Amuso et al., 2020)	Policy	Income volatility in the gig economy	Gig economy work could decrease gender differences but has created polarization between (1) age groups, (2) Skilled and unskilled workers, and (3) between and within territories. Additionally, the gig economy weakens the bargaining power of workers exposing them to threats	Existing literature on the gig economy does not allow for an understanding conducive to effectively reforming policies. Thus, more data needs to be collected and more research on public-private partnerships and educations role in reaping the benefits of the digital economy are also needed to ensure this development is understood and handled accordingly.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Aroles et al., 2020)	Organization Studies	Digital Nomadism (remote and nomadic work) - its image, underlying structure and practices, and its relation to the work world	The paper explores the image and structure of digital nomadism, a mobile style of work and life, and its relation to the current world of work. The authors conclude that digital nomadism seems to be an extension of capitalist logics and is becoming more institutionalized and professionalized in the digital age.	More clarity on what constitutes digital nomadism, and the associated implications on society is required moving forward.
(Chen et al., 2020)	Social Policy	Labor protection and social protection in the digital labor market economy.	There exist regulatory loopholes in the digital employment sector in China that have interfered with social insurance branches and labor regulations compliance. The authors argue that	Research into social and institutional policy is needed in order to properly manage digital employment. Research is needed into organizational management and how it relates to the digital economy.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			digital employment has strayed from social institutions and social control.	
(Dunn, 2020)	Social Science	Gig workers, gig work platforms, and gig work characteristics	Dunn introduces gig work and summarizes the aspects of control, typology, job quality, and motivation associated with gig work. After conducting a survey study, Dunn finds overlap in typology of work and platform as well as the workers' perception of quality of work. He compares gig motivation with the perception of job quality and finds mixed results between respondents. He concludes by stating that a worker-centric approach is	The author states that a longitudinal study is needed to examine gig work in depth. Further research could also include more data and try to estimate the overall percentage of gig workers in the U.S. economy and elsewhere.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			needed to determine the quality of gig work itself.	
(Grimshaw, 2020)	Policy	A review of policy targeting new technologies and inequality	The author reviews and compares seven international policy reports and finds similarities in the unevenness of job changes and the declining labor income share. Three articles discuss the interaction between new technologies and growing inequalities. The consensus from these reports refer to the "economics account of job change caused by new technologies", and less on job	Future research implications could point towards collaboration between international organizations given that they have published similar viewpoints.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			displacement from robotics and AI.	
(Kristal, 2020)	Sociology	Correlation between computerization and income inequality	Kristal offers a new interpretation on the correlation between computerization and higher earnings and higher wage inequality. By examining the dynamics between technology and politics, the author surmises that the flow of information and capital is responsible for the increase is wage inequality. Companies with greater access to and control of information benefit most from computerization.	Future research implications could include an examination of information asymmetry in other industries, other than industries most affected by computerization, and how wage/income inequality is influenced.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Lord, 2020)	Social Science	A broad review of labor policy in different countries	Lord reviews relevant studies from around the globe that cover topics such as job (in)security, the changing qualities of work due to technological developments, and employee perception. The author incorporates discussion surrounding Covid-19, and the challenges that have risen from it.	Future research into the digitalization of work will have to acknowledge Covid-19 as part of the driving factor of change.
(Myhill, Richards, & Sang, 2020)	Social Policy	Gig work assessment	The authors draw on previous research to assess the nature of gig work - defined as "platform-based employment which uses digital technology..." - and judge its subjective and objective quality compared to other forms of	Further research could contribute to policy surrounding gig work for use by HRM practitioners and trade unions. Future research could involve a larger sample of gig workers, working in a larger variety of jobs, over time.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			work. The authors find that gig work has objectively fewer desirable characteristics, but the subjective experience differs across platforms and differs based on worker characteristics.	
(Azu, Jelivov, Aras, & Isik, 2020)	Economics	The impact of digitization on youth unemployment in West Africa	The authors measure digitization by internet penetration and mobile telephone subscriptions. They use a panel ARDL estimation technique to establish the unemployment and digitization are cointegrated and that increased digitization is associated with a decrease in youth unemployment in West Africa.	This research could be applied to other developing areas around the world. Public economics experts could use this information to develop policy that would help in lessening youth unemployment rates.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Rodriguez-Lluesma et al., 2021)	Human Relations	The effects of technology advancements in work as a human relation	The authors view technological advancement in work as a social relation with four aspects: exchange value, intrinsic extra-economic purpose, communication for reciprocal services, and correspondence with primary human needs according to use values, and the interaction between these four dimensions. They argue that this transformation of work has shifted toward a "relational realm".	Further research could examine collective agents and the consequences of digitalization on motivation and engagement. Future study could examine how the changes in social relations affect organizations performance.
(Santor, 2020)	Economics	Impact of machine learning (ML) on the economy	The authors cover the economic impact of artificial intelligence (AI) and ML on innovation, employment, and economic	The authors state that research into policies that relate to redistribution, privacy, and competition are needed to manage AI and ML processes. Discussion is needed surrounding big data,

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			growth. Additionally, associated issues related to privacy, and international trade are offered. They also cover regulation and the economics of inequality surrounding ML. The authors anticipate a gain in productivity due to AI but admit that it does come with certain downfalls.	who controls it, and how its controlled.
(Schoukens, 2020)	Policy	Comparative analysis of platform work vs standard work and the resulting difference in social protection schemes	After careful examination of platform work and policy recommendations surrounding social protection made by the EU, the authors find that platform work is different than standard work and thereby not properly covered by social protection plans in the EU.	This research could be used by policy-makers to re-evaluate certain social protection plans to better incorporate platform workers.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Shibata, 2020)	Political Science	A critique of gig work and the notion of autonomy in Japan	After introducing and developing the idea of gig work, Shibata delivers a critique of gig work in that it built around the idea of autonomy but is actually 'fictitious freedom'. The author uses Japan as the case study and highlights competition and surveillance as central processes to gig work.	Further research could analyze gig work in different national and socio-economic contexts. Platform companies could address the problems platform workers face in order to raise productivity.
(Wong et al., 2020)	Social Policy	A study on the perspectives and arrangements of workers using digital, intermediary platforms	The authors conduct a two-stage field study to compare the cognitive presentations of workers and career schema. They hypothesize that when a digital workers presentation of microwork as a career is incongruent, they are less	Further research could examine the development of career theories for digital labor. Future study into job-career (in)congruence and its relationship with productivity is needed.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			likely to have a meaningful work experience. The sense of meaningfulness diminishes when workers see their work as only a job and not a career.	

Appendix B: Literature Review Map: Collection 2

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Scarbrough, 1999)	Management	Analyzation of knowledge worker groups and the implications for management and knowledge management	The authors use a conflict-based analysis to discuss the institutional and organizational ramifications of the social production of knowledge and the economic appropriation of profit, while identifying the management process for knowledge workers.	While this study uses Microsoft as a case study, further research could identify other companies to assess, given the recent surge in knowledge capital and technology.
(Halford, 2005)	Management	Empirical study on the implications of a hybrid workspace	Halford examines the spatial hybridity of work and argues that it changes the nature of work and the associated organizational/managerial structures needed.	Further research could assess the implications of different workspaces on operational controls and resistances.
(Golden, 2009)	Management	A discussion surrounding telework	The authors present an examination of factors surrounding telework that include: the growth of telework, technology, the environment, and challenges facing telework. The issues presented include; knowledge sharing, individual differences, and organizational practices. The authors then present managerial recommendations.	Further research could examine how emerging technologies will fit into the telework industry. The authors admit that more research is needed to harness new technologies in telework.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Zardkoohi & Bierman, 2016)	Management	Examination of two contrasting views of income inequality	Discussion surrounding the work done by Cobb (2016) that states that internal management practices can better determine pay rates than the external market to avoid income inequality. The authors argue that Cobb's equitable renumeration theory conflicts with the distributional outcomes of established organizational pay practices.	The authors mention that one of the causes of recent, rising inequality is due to technological advancement in digital technology. Further research could compare this opinion article with ones that focus on the polarization of jobs; Autor et al. (2003), for example.
(Fedorenko, Berthon, & Rabinovich, 2017)	Management	An examination of crowdsourcing and the value it brings through identity creation	The authors explore the idea of identity (personal, extended, and social) and its implications for crowdsourcing from a consumer perspective. The authors suggest that the idea of identity creation can be used by managers to add value for participants in crowdsourcing.	The authors suggest that future research covers the subjective meanings behind crowdsourcing by conversation analysis and ethnomethodological studies.
(Schörpf, Flecker, Schönauer, & Eichmann, 2017)	Management	The management and control of crowd-working	The authors conduct a survey study of platform providers, crowd-workers, and clients to analyze their intertwined relationships. Platforms serve as a means of control of crowd-workers dependent on reputation with particular characteristics. Clients are prioritized and the client- crowd-worker relationship is asymmetric, which is exacerbated by platforms.	Future study into the triangular relationship between platforms, crowd-workers, and clients could be used by policy-makers to help improve the welfare of all parties involved.

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
(Jirjahn, 2018)	Management	An assessment of the role of managers' subjective attitude on profit sharing	With data from manufacturing firms in Germany, while controlling for objective firm characteristics, the author finds that a subjectively positive attitude from managers is associated with an increased likelihood and continuation of profit sharing.	Future research could examine the impact of profit sharing and the continued link between a managers' subjective attitude.
(Walker & Lloyd-Walker, 2019)	Management	Review of literature on the projected trends of workplace environment	Using relevant research, the authors explore project organization for the future of project workers with attention paid to technology advancements. The authors find that non-routine roles will increase in creativity, but routine workers will be replaced by advanced technologies.	Project managers/project organizers can use this information to better manage their career trajectories and their relationships with employees.
(Kellogg, Valentine, & Christin, 2020)	Management	Algorithms in the work world and organizational control	The operation and mechanisms through which managers implement algorithms and the subsequent worker reactions. The authors use Edwards (1979) "contested terrain" theory to establish the "6 Rs" theory of control for management. The authors relate algorithms to labor process theory, rational control, and new occupations.	The authors suggest that future research explores mitigation techniques of the negative outcomes related to the implementation of algorithms in the workplace.
(Koo, Curtis, & Ryan, 2020)	Management	A study of the perceptions of hotel employees on artificial intelligence (AI)	The authors used a quantitative study and mixed methods design to establish that perceived job insecurity significantly affected perceived job engagement which stayed consistent through managerial and non-managerial positions. Then, the authors performed a qualitative study to relate the implications of job engagement to the influence of AI of hotel employees. The authors assert	Research conducted in this study has implications for the managerial role in the hospitality industry. Future research could focus on data collected from AI-related technologies, instead of the

Author, Year	Discipline	Research Focus	Contribution/ Findings	Future Research Implications
			that the self-determination theory is best used to explain their findings.	perception of AI technologies.
(Santana & Cobo, 2020)	Management	A comprehensive mapping into the future of work (FoW)	The authors use a bibliometric methodology to gather documents that cover themes such as corporate social responsibility (CRS), human resource management (HRM), and current FoW themes like the impact of technological change on employment and management. They sort the articles by motor, basic, specialized, and emerging. The authors claim that relevant FoW literature covers aspects focused on technology change but are intertwined with organizational and political ideas.	This methodological bibliography could be used to further research into topics such as: new forms of work, flexible work arrangements, telework, and the changing nature of work. More research is needed into the intersection between HRM and the platform economy.

Appendix C: Thematic analysis of the literature (Overarching theme of working in the digital economy)

Global Themes	Organizing Themes	Basic Themes	Instances
Managing precarious work	Precarity	- Unstable employment, volatile, and instable income - Being at risk of periods of illness, technical difficulties or, deactivation - Unpredictability of work commitments and schedule - Shift to temporary and nonlinear careers - Short-term on-demand jobs - High levels of labor turnover	(Dunn, 2020; Grimshaw, 2020; Myhill et al., 2020; Rodriguez-Lluesma et al., 2021)
	Exploitation	- Low/stagnating wages - Low bargaining power due to the low barriers of entry (intensified competition) and diminished contractual power - The inevitable necessity of working more intensely for long hours to maintain high earnings - Commodification of work by platforms - A high ratio of inevitable unpaid work (or unpaid period between tasks)	(Amuso et al., 2020; Drahokoupil & Jepsen, 2017; Dunn, 2020; Myhill et al., 2020; Schoukens, 2020)
	Individualization	- Uberization of the employment - A sharp increase in the use of independent contractors - Work as serial individualized tasks rather than a common competency - Reduced capacity for unionization resulted from the intentional prevention of workers from socializing with each other	(Drahokoupil & Jepsen, 2017; Grimshaw, 2020; Lord, 2020)
	Lack of career progression opportunities	- Absence of opportunities for career progression due to the absence of traditional organizational structures - Limited training and development opportunities - Limited possibilities for a professional career and the absence of job-career congruence	(Myhill et al., 2020; Rodriguez-Lluesma et al., 2021; Wong et al., 2020)

Global Themes	Organizing Themes	Basic Themes	Instances
	Lack of benefits	- Absence of social security (social insurance) due to the absence of a regular work pattern - No rights to holiday or sick pay - Diminished access to social protection or pension plans	(Chen et al., 2020; Muntaner, 2018; Myhill et al., 2020; Pulkka, 2017; Schoukens, 2020)
Managing inequality	Polarization	- Polarization of skill demands: between age groups between skilled and unskilled labor (Fewer jobs in between for middle-skilled workers) between and within territories between high education & low education workers between genders - Polarization of income: a growing income gap between complex, high-skilled jobs and simple, low-skilled jobs	(Amuso et al., 2020; Autor, 2015; Autor et al., 2008; B. Chen et al., 2020; Perrons, 2003)
	Uneven impact of new technologies	- Significant benefits for a smaller number of already-enriched organizations and individuals as the structural logic of the digital economy - Upgrading trend for professional workers while deskilling the blue-collar workers - Higher power and wages gained for occupations located at critical junctions of information flow - Workers in non-routine cognitive jobs as the main beneficiaries - Digital divide among social divisions of class, gender, race, and ethnicity. - Technology as a substitution for moderately educated workers and as a complementing element for workers engaged in abstract tasks - Job gains in digital-intensive industries and falls in non-digital industries	(Autor et al., 2008; Grimshaw, 2020; Kristal, 2020; Kurer & Palier, 2019; Rubery & Grimshaw, 2001)
Managing disruption	Redundancy of labor	- Man-machine substitution	(Acemoglu & Restrepo, 2018;

Global Themes	Organizing Themes	Basic Themes	Instances
		- Reduced labor share and employment as a result of automation and other emerging technologies - A greater inclination to substitute service sector workers - Inadequacy of the digital economy in creating enough jobs for an expanding labor force	Autor, 2015; Brougham & Haar, 2018)
	Stagnant wages	- Sizable global decrease in the labor share of income - Lower bargaining power for many due to the fierce competition for the remaining jobs in the aftermath of the increased unemployment and reduced workplace opportunities	(Brougham & Haar, 2018; Grimshaw, 2020; Pulkka, 2017)
Managing change	Educational	- The lackluster performance of the educational system to prepare workers for the jobs of the future (education-job gap) - The need for enhanced cognitive skills and interpersonal skills among even low-skilled workers - The resistance to change within the educational system - The challenge of preparing people to seize the potential of technological progress and enabling them to work alongside them - Lack of sufficient digital skills among labor force	(Acemoglu & Restrepo, 2018; Autor, 2015; Bresnahan, 1999; Djankov & Saliola, 2018; Gekara & Thanh Nguyen, 2018; Pulkka, 2017; Witte M, 2000)
	Political	- Exclusion of workers with untraditional work arrangements, low wages, or autonomous working patterns from social protection schemes - Lack of governmental human-capital investments - Absence of the collective bargaining and trade union action among digital workers - Lack of proper attention to issues of technology-enabled work offshoring and	(Djankov & Saliola, 2018; Drahokoupil & Jepsen, 2017; Gandini, 2019; Schoukens, 2020; Witte M, 2000)

Global Themes	Organizing Themes	Basic Themes	Instances
		exploitation of labor by multinational companies in regulatory frameworks - Negligence to the workers who are unable to adapt to change and are forced to exit the labor market	
	Academic	- Lack of attention to the new formats of work in textbook accounts of important workplace management topics - The failure to distinguish properly among novel alternative types of work - Knowledge gap in identifying the existent behaviors of workers whose work arrangements differ from direct employment	(Cappelli & Keller, 2013; Djankov & Saliola, 2018)
Managing social & psychological impacts	Mental health issues	- Feelings of isolation and loneliness, job strain, emotional exhaustion - Heightened mental stress caused by the close monitoring of workers through platforms - Health damaging detriments, such as nervousness, and stress, brought about by long-term uncertainty in precarious jobs - Turnover intentions, cynicism, indifference, and depression as a result of technology awareness - Feelings of job dissatisfaction as a result of automation - Anxiety about employment relationship on top of concerns about personal and family life - Enduring fears of alienation and job loss - Negative behavioral outcomes caused by work–life conflict - Intensified mental pressure on workers because of slashed job opportunities	(Aroles et al., 2020; Brougham & Haar, 2018; Lent, 2018; Lord, 2020; Rafiq & Chin, 2019; Witte M, 2000)
	Erosion of aspirational work elements	- Perceived lack of community - Work–home spillover - The erosion of the boundaries and collective patterns of working life	(Dunn, 2020; Grimshaw, 2020; Lent, 2018; Lewchuk, 2017;

Global Themes	Organizing Themes	Basic Themes	Instances
		- Lack of job fulfillment due to the marginal nature of gig activities and the inherent nature of digital work - Community dysfunction such as high crime rates, homelessness as a result of unemployment - Reduced depth of work content, leading to deskilling and diminished job satisfaction - The hardship of forming workplace-based relationships for times of need	Muntaner, 2018; Rubery & Grimshaw, 2001; Wong et al., 2020)