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* = corresponding author

If you have any questions, would like a copy of the final version of the article, or would like copies of other articles we've published, please contact any of us directly, as follows:

- Frederik von Briel:
  - Email: f.vonbriel@uq.edu.au
  - Website: https://frederikvonbriel.com/
- Jan Recker
  - Email: jan.recker@wiso.uni-koeln.de
  - Website: http://www.janrecker.com/
- Lisen Selander
  - Email: lisen.selander@ait.gu.se
  - Website: https://www.gu.se/english/about_the_university/staff/?languageId=100001&userId=xselal
- Philipp Hukal
  - Email: ph.digi@cbs.dk
  - Website: https://www.cbs.dk/en/research/departments-and-centres/department-of-digitalization/staff/phdigi
- Sirkka Jarvenpaa
  - Email: Sirkka.Jarvenpaa@mccombs.utexas.edu
  - Website: https://www.mccombs.utexas.edu/Directory/Profiles/Jarvenpaa-Sirkka
- Youngjin Yoo

    - Email: yxy23@case.edu
    - Website: https://weatherhead.case.edu/faculty/youngjin-yoo
- Julian Lehmann
    - Email: j.c.lehmann@vu.nl
    - Website: https://research.vu.nl/en/persons/julian-lehmann
- Yolande Chan
    - Email: ychan@queensu.ca
    - Website: https://smith.queensu.ca/faculty_and_research/faculty_list/chan-yolande.php
- Hannes Rothe
    - Email: Hannes.Rothe@fu-berlin.de
    - Website: https://www.wiwiss.fu-berlin.de/fachbereich/bwl/pwo/rothe/team/rothe.html
- Paul Alpar
    - Email: alpar@staff.uni-marburg.de
    - Website: https://www.uni-marburg.de/de/fb02/professuren/bwl/wirtschaftsinformatik/team/prof-dr-paul-alpar
- Daniel Fuerstenau
    - Email: Daniel.Fuerstenau@fu-berlin.de
    - Website: https://www.wiwiss.fu-berlin.de/fachbereich/bwl/pwo/fuerstenau/Team/Fuerstenau.html
- Bastian Wurm
    - Email: bastian.wurm@wu.ac.at
    - Website: https://www.wu.ac.at/en/infobiz/team/wurm-bastian

Researching Digital Entrepreneurship: Current Issues and Suggestions for Future Directions

Abstract

This report documents the outcomes of a professional development workshop (PDW) held at the 40th International Conference on Information Systems in Munich, Germany. The workshop's goal was to identify how information systems (IS) researchers can contribute to enriching the understanding of digital entrepreneurship—that is, the intersection of digital technologies and entrepreneurship. The PDW assembled numerous IS researchers working on different aspects of digital entrepreneurship. Jointly, we delineated digital entrepreneurship from related phenomena and conceptualized different roles of digital technologies for entrepreneurial endeavors. We also identified relevant strategies, opportunities, and challenges in conducting digital entrepreneurship research. This report summarizes the shared views that emerged from the interactions at the PDW and during the collaborative writing of this report. The report provides IS researchers interested in digital entrepreneurship with food for thought and a foundation for future research.

Keywords: digital entrepreneurship, digital ventures, entrepreneurial endeavors, entrepreneurship processes, research agenda

Introduction

Digital entrepreneurship research focuses on how digital technologies—man-made technological objects that include non-material, algorithmically organized, computed components (Faulkner & Runde, 2019)—shape, and are shaped by, entrepreneurial processes (e.g., prototyping, scaling, or funding), outcomes (e.g., new market offerings, business models, or ventures), and contexts (e.g., ecosystems, networks, or communities; Nambisan, 2017; Yoo et al., 2010). Many changes occur at the intersection of digital technology and entrepreneurship. For example, digital technologies have achieved the following:

- sparked entrepreneurial endeavors that have crossed previously bounded industry sectors (e.g., Autio et al., 2018);

- unlocked formerly inaccessible entrepreneurial networks, ecosystems, and communities (e.g., Bruton et al., 2015; Ingram Bogusz et al., 2019);
- digitized heretofore analog assets and economic goods, leading to new entrepreneurial market offerings (e.g., Porter & Heppelmann, 2014); and
- accelerated the inception, scaling, and evolution of new ventures (e.g., Huang et al., 2017; Reuber & Fischer, 2011; Younkin & Kashkooli, 2016).

In information systems (IS), digital entrepreneurship emerged as an important research area around 2010 (Davidson & Vaast, 2010; Del Giudice & Straub, 2011). Several subsequent papers have advocated its value to the IS discipline and beyond (e.g., to the literature on innovation management and new product development; Nambisan, 2013; Yoo, 2013). Currently, research with a dedicated focus on the phenomenon of digital entrepreneurship is accelerating within and beyond the IS discipline (Berger et al., in press). This is noticeable, for example, in the increasing number of papers and special issues on digital entrepreneurship being published (Berger et al., in press; Fang et al., 2018; Nambisan et al., 2019; Shen et al., 2018).

Given this momentum, we felt that the 40th International Conference on Information Systems presented an opportune time to hold a professional development workshop (PDW) on digital entrepreneurship. The goal of the PDW was to identify how IS researchers can contribute to enriching the understanding of digital entrepreneurship. The PDW started with a panel discussion moderated by one of the organizers, Jan Recker. The panelists were Philipp Hukal, Sirkka Jarvenpaa, Lisen Selander, and Youngjin Yoo. All are active researchers in the digital entrepreneurship space, who each brought a different perspective and focus to the discussion.

The panel discussion was followed by roundtable discussions involving all workshop participants. In each roundtable, at least one of the panelists or one of the two co-organizers, Frederik von Briel and Jan Recker, served as moderator. An assistant took notes during the workshop. The panel and roundtable discussions focused on five guiding questions:

1. What is peculiar or unique about digital entrepreneurship, if anything?
2. What are the roles of digital technologies in digital entrepreneurship?
3. What are the key research questions and opportunities in digital entrepreneurship research?
4. What data and methods are particularly suitable for investigating digital entrepreneurship?
5. What are the challenges in advancing digital entrepreneurship research?

After the event, we invited all participants to join in documenting the shared views that had emerged from our joint discussions at the PDW. Several participants accepted our invitation. Thus, the report should be read as a summary of the convergent ideas about how IS researchers can contribute to enhancing the understanding of digital entrepreneurship, which PDW participants, including the panel members and organizers, developed during the PDW and the collaborative writing process that followed.

The remainder of this report is structured as follows. We first report on the outcomes of our joint attempt to delineate digital entrepreneurship from related phenomena. Next, we present our attempt to clarify different roles that digital technologies perform in digital entrepreneurship and explain how a focus on each of these roles raises important research questions. Subsequently,

we discuss unique research questions that PDW participants saw emerging from situating digital entrepreneurship in the larger realm of the study of technology and organizing. Then we discuss PDW participants' ideas about novel methods and data that can help to advance our knowledge of digital entrepreneurship. Lastly, we discuss key challenges to advancing digital entrepreneurship research that PDW participants saw.

Delineating Digital Entrepreneurship as a Phenomenon

We started with our first guiding question about whether there is anything peculiar or unique about digital entrepreneurship. After all, advances in information and communication technologies have always spurred opportunities to create new economic activities and start new businesses (Roberts, 1991). To answer our question, we compared digital entrepreneurship to other phenomena, such as "regular" entrepreneurship (e.g., Davidsson, 2016; Shane & Venkataraman, 2000; Shepherd, Souitaris, & Gruber, in press) and digital innovation (e.g., Fichman et al., 2014; Kohli & Melville, 2019; Yoo et al., 2010). Table 1 summarizes the outcomes of this comparison. In what follows, we discuss two important aspects for grasping digital entrepreneurship as a phenomenon.

Table 1. Differences between entrepreneurship, digital innovation, and digital entrepreneurship

Aspect	**Entrepreneurship**	**Digital Innovation**	**Digital Entrepreneurship**
Focal Phenomenon	The creation of new economic activities (Shane & Venkataraman, 2000)	The creation of new and improved products, processes, or services through digital technologies (Yoo et al., 2010)	The creation of new economic activities embodied in or enabled by digital technologies
Dominant assumptions	Entrepreneurial agents exploit opportunities by assembling resources in new ventures (Shane, 2003).	Digital technologies give rise to new or improved products, processes, services, or business models (Fichman et al., 2014; Kohli & Melville, 2019).	Digital technologies blur boundaries of entrepreneurship processes and outcomes. Digital technologies disperse entrepreneurial agency across a broader range of actors (Nambisan, 2017).
Primary levels of analysis	**Individuals and ventures**: • Entrepreneurial agents (Shepherd et al., 2019)	**Artefacts and organizations:** • Digitized products, processes, services,	**Artefacts, ventures, and outcomes:** • Digital technology objects, such as artefacts, platforms,

	• New ventures, typically referring to emerging, independent, and professionally funded firms (Garg & Eisenhardt, 2017) • Entrepreneurial ecosystems	and business models (Fichman et al., 2014) • Incumbent organizations • Both new and established markets	or infrastructure (Nambisan, 2017) • Entrepreneurial endeavors, which include new ventures and entrepreneurial pursuits in incumbent organizations • Digital environments, such as ecosystems (Autio et al., 2018) • Societal outcomes (Fang et al., 2018)
Selected foci in the literature	• Entrepreneurial opportunities • Founder characteristics • Modes of organizing • New venture characteristics and performance • Entrepreneurial strategies • Ecosystem characteristics	• Development and adoption • Technology architectures • Technology appropriation and recombination • Organizational structures and change • Business value • Competitive dynamics • Digital platforms	• Development and commercialization • Technology characteristics • Technology appropriation and recombination • Modes of organizing • Distribution and scaling of entrepreneurial endeavors • Digital platforms • Business and social outcomes

Since digital entrepreneurship focuses broadly on the creation of new economic activities embodied in or enabled by digital technologies, it covers a wide range of economic, societal, and organizational phenomena. Digital entrepreneurship concerns the creation of new economic activity wherein either the creation or the new activity is embodied in or enabled by digital technologies. Importantly, new economic activity can be created through any *entrepreneurial endeavor*—that is, any entrepreneurial pursuit of opportunity (Shepherd et al., 2019), including the creation of entrepreneurial firms, intrapreneurial projects, and social movements.

Participants agreed that digital technologies not only affect specific entrepreneurial endeavors but also produce multi-level consequences, such as social, economic, or environmental outcomes (e.g., Davidson & Vaast, 2010; Fang et al., 2018; George et al., 2020; Selander & Jarvenpaa, 2016). This is because digital technologies blur traditional process boundaries and outcomes. For example, the practice of designing, deploying, and managing digital technology in entrepreneurial ventures makes traditional concepts of product, firm, and industry boundaries increasingly insufficient demarcations for describing entrepreneurial endeavors. Digital ventures that act as complementors and leverage open bio data infrastructures exemplify these dynamics (Rothe et al., 2019). Other examples are entrepreneurial endeavors building on open hardware

platforms (Pujol & Wareham, 2018) and entrepreneurial social movements that form on social media to change the status quo (Young et al., 2019).

Hence, digital entrepreneurship as a phenomenon should not be confined to a particular form of venture or a specific process. Rather, it is important to be inclusive when considering whether a particular phenomenon is an instance of digital entrepreneurship or not. For instance, while highly funded ventures that set out to reshape entire industries qualify as digital entrepreneurship, so do individual entrepreneurs who develop apps.

Since digital technologies disperse agency, the boundaries of digital entrepreneurship as a phenomenon are defined through the role that the digital technologies play in entrepreneurial endeavors. Participants felt that a good starting point for probing whether something is digital entrepreneurship or not would be to ask, “Would this particular entrepreneurial endeavor exist without digital technology? If so, how would it be different?” These questions allow for focusing on how the capability to act—that is, agency—might be different because of the involvement of or reliance on digital technology.

Digital technologies are broad and pervasive, which makes establishing the conceptual boundaries of digital entrepreneurship an arduous task. Nevertheless, establishing conceptual boundaries is critical for digital entrepreneurship researchers. Doing so increases the accuracy of theoretical predictions when instances of a phenomenon are suitably discriminated from related but different phenomena. Table 1 above illustrates that digital entrepreneurship has some overlaps (e.g., in phenomena, foci, and levels of assumptions) with digital innovation and entrepreneurship, which highlights why conceptual discrimination is particularly important for digital entrepreneurship, much like it is in research on digital innovation (e.g., Baiyere et al., 2017) or transformation (e.g., Wessel et al., in press).

Understanding the form of reliance on digital technologies in entrepreneurial endeavors assists in confronting this challenge. For example, the products of some well-known direct-to-consumer ventures, such as Warby Parker and Bonobos (e.g., Bell et al., 2014), are not digitally enabled (they sell physical products, such as eyeglasses and clothes), but their entire operations are digitally embodied—that is, they are dependent on digital infrastructures. Thus, their reliance on digital technology differs from that of entrepreneurial endeavors such as Oculus Rift and Lockitron (e.g., Gleasure & Feller, 2016), which produce market offerings that embody some form of digital technology (they sell virtual reality headsets and smart door locks, respectively). As none of these ventures could exist in its current form without digital technologies, both types of endeavors qualify as examples of digital entrepreneurship.

The Role of Digital Technologies in Digital Entrepreneurship

Our second guiding question concerned the role of digital technologies in digital entrepreneurship. As illustrated through the Venn diagram in Figure 1, digital technologies can feature prominently in digital entrepreneurship in at least three primary ways: as **digital enablers** of entrepreneurial endeavors (i.e., in activities such as prospecting, developing,

scaling, or exploiting), as **digital outcomes** of entrepreneurial endeavors (i.e., as the intended or realized value proposition of entrepreneurial endeavors), or as **digital contexts** in which entrepreneurial endeavors take place (i.e., as a key property of the external surroundings, such as sectoral and regulatory environments).

These three ways are not mutually exclusive but represent different lenses. For example, one could potentially look at a single entrepreneurial endeavor from any of the three perspectives. As the Venn diagram shows (intersections 4–7), combinations of these three ways are also possible. We will elaborate on each of the dimensions and their intersections in the following and briefly discuss potential research topics that flow from them. Table 2 summarizes the roles of digital technologies, exemplar studies, and potential research questions.

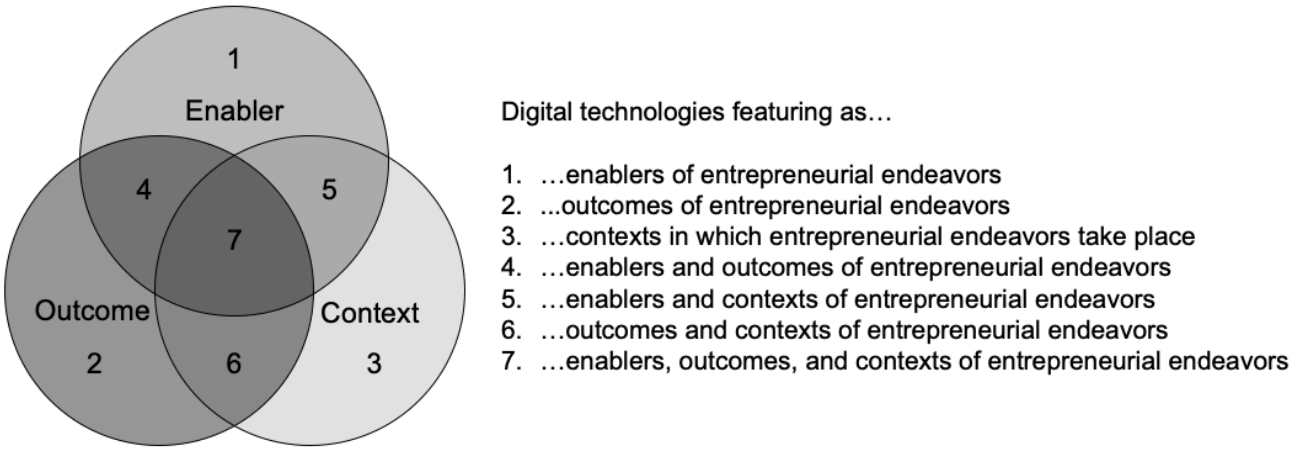

Figure 1. A framework for the role of digital technologies in entrepreneurship

Table 2. Different roles of digital technologies in digital entrepreneurship

Definition of the Role of Digital Technologies	**Illustrative Studies**	**Selected Future Research Questions**
As enablers of entrepreneurial endeavors (section 1 in Figure 1)	Ceccagnoli et al. (2012); von Briel, Davidsson, & Recker (2018a)	• Which affordances can be provided through existing or emerging digital technologies? • Which capabilities are required of entrepreneurial agents to activate these affordances? • Can digital technologies change traditional benefits derived from spatial ecosystems?
As outcomes of entrepreneurial endeavors (section 2 in Figure 1)	West & Kuk (2016); Andersen & Ingram Bogusz (2019); Jarvenpaa & Standaert (2018)	• How does the generativity of value propositions impact the evolution of entrepreneurial endeavors? • How do digital value propositions influence pivots during emergence? • Why are some digital technology outcomes more challenging to create and commercialize than others?

As contexts in which entrepreneurial endeavors take place (section 3 in Figure 1)	Rothe et al. (2019)	• How do digital technologies break down traditionally assumed environmental boundaries? • How do digital technologies foster the decomposition of traditional sectoral value chains? • How do digital technologies impact the emergence, structure, and evolution of larger entrepreneurial ecosystems?
As enablers and outcomes of entrepreneurial endeavors (section 4 in Figure 1)	Um et al. (2015)	• Which path dependencies do digital technologies, which are outcomes from one venture, create for other ventures? • How does the evolution of digital technologies, as outcomes of entrepreneurial processes, influence the evolution of enabling digital technologies?
As enablers and contexts of entrepreneurial endeavors (section 5 in Figure 1)	Kuhn & Galloway (2015)	• Which affordances do digital technologies provide to entrepreneurial endeavors that operate in a specific spatial environment? • How do ecosystems that foster digital entrepreneurship emerge? • How can digital technologies create opportunity spaces for entrepreneurial action?
As outcomes and contexts of entrepreneurial endeavors (section 6 in Figure 1)	Huang et al. (2017)	• How is the success of entrepreneurial endeavors linked to their environment and to other entrepreneurial endeavors operating in the same environment? • How can digital technologies, as outcomes of entrepreneurial processes, create new opportunity spaces for entrepreneurial action in other environments?
As enablers, outcomes, and contexts of entrepreneurial endeavors (section 7 in Figure 1)	Wessel, Thies, & Benlian (2017)	• How can markets be designed to incentivize the reliance of emergent digital technologies on the creation of new digital value propositions such that incumbent market structures change?

1. Digital technologies as enablers of entrepreneurial endeavors. One perspective is to examine digital technology as an enabler that positively influences entrepreneurs' actions toward creating, distributing, and/or commercializing new value propositions. Digital technologies can act as disequilibrating forces that create room for multiple entrepreneurial endeavors and enable their processes (Davidsson et al., in press). For example, von Briel, Davidsson, and Recker (2018a) identify advances in digital technologies for prototyping, developing, and commercializing digital hardware that make them enablers of a new wave of digital hardware ventures. They explain that the emergence of low-cost platforms for electronics development, such as Arduino or Raspberry Pie, and rapid prototyping technologies, such as 3D printers or mini-mills, make physical prototyping both faster and cheaper for entrepreneurs. Furthermore, crowdfunding platforms, such as Kickstarter or IndieGoGo, allow entrepreneurs to overcome constraints during development by substituting traditional sources of funding and

market research with online crowds. In addition, leveraging the existing functionalities of interconnectable devices, such as smartphones or wearables, allow entrepreneurs to reduce the costs of their market offerings.

Digital technologies can also act as enablers of one or several specific actions, practices, or routines underlying the processes of individual entrepreneurial endeavors. For example, Ceccagnoli et al. (2012) show that software application platforms provide a foundation for small entrepreneurial firms to commercialize their software offerings. Focusing on SAP's software application platform, they identify that small entrepreneurial firms that joined the platform increased their sales and were ultimately more likely to issue an initial public offering, as the platform provided them with legitimacy and reduced uncertainty for investors regarding their potential to generate future profits.

PDW participants agreed that focusing on digital technologies as enablers raises research questions on both the macro and micro levels, such as which affordances can be provided through existing or emerging digital technologies and which capabilities entrepreneurial agents require to activate these affordances both within and across entrepreneurial endeavors. Researchers could also ask whether and how digital technologies can substitute for or enhance traditional benefits derived from spatial ecosystems, such as Silicon Valley or Zhongguancun (Du et al., 2018); what role digital collectives, such as makerspaces, play in providing access to and educating entrepreneurs about how to use digital technologies (Browder et al., 2019); whether and why different enabling technologies might influence success differently; and whether and how the enabling potential of digital technologies differs across process stages, industry sectors, or geographical regions (Davidsson et al., in press).

2. Digital technologies as outcomes of entrepreneurial endeavors. Another perspective concerns the unique materiality of digital technologies that entrepreneurial endeavors create as the core of their value propositions (Lyytinen et al., 2016; von Briel, Recker, & Davidsson, 2018b). The infusion of digital technologies into traditional products and services has opened up vast opportunities for entrepreneurs to create novel value propositions. For example, West and Kuk (2016) trace how MakerBot became a market leader in the 3D printing industry by creating a novel value proposition consisting of two distinct but complementary digital market offerings—a 3D printer and a 3D design file online repository. They explain that Thingiverse, an online repository that allows users to freely share 3D design files, helped MakerBot increase 3D printer sales because it provided a generative and free complement.

The decoupling of material form from logical function and the potential to decouple and recombine digital technologies (Yoo et al., 2010) has also given rise to new ventures realizing innovative new business models and purely non-material market offerings around digital technologies, such as artificial intelligence, augmented reality, distributed ledger technology, cloud computing, and online platforms (e.g., Ingram Bogusz et al., 2019; Muñoz & Cohen, 2018; Snihur et al., 2018). For example, focusing on Bitcoin-based entrepreneurial endeavors, Andersen and Ingram Bogusz (2019) find that entrepreneurs fork existing blockchain software code to create new market offerings, such as Bitcoin XT and Ethereum. The novelty of these market offerings and their divergence from existing software code can span from simple adaptations (i.e., development forking) to radical divergences and spin-offs into separate technologies (i.e., hard forking).

PDW participants agreed that focusing on digital technologies as outcomes raises various research questions, for example, about the generativity of value propositions and the resultant impact on the evolution of emerging entrepreneurial endeavors (Jarvenpaa & Standaert, 2018), whether and how institutional fields might shape the processes and outcomes of entrepreneurial endeavors (Tumbas et al., 2017), or how the digital artifacts constituting emerging entrepreneurial endeavors' value propositions might influence pivots during emergence (McDonald & Gao, 2019). It would also be interesting to see whether some digital technology outcomes, such as artificial intelligence ventures, show different growth and scaling dynamics than other kinds of digital ventures (Iansiti & Lakhani, 2020) or whether and why some digital technology outcomes might be more challenging to create and commercialize than others.

3. Digital technologies as contexts in which entrepreneurial endeavors take place. A third perspective examines digital technologies that shape and disequilibrate the contexts of entrepreneurship (e.g., Autio et al., 2018; von Briel, Davidsson, & Recker, 2018a). As entrepreneurship never occurs in a vacuum, entrepreneurship researchers generally consider as context the business (e.g., automotive, healthcare, or financial sector), social (e.g., support or friend network), political (e.g., social movements, such as labor activism), spatial (e.g., ecosystem, industrial districts and clusters), or institutional (e.g., cultural, economic, or social systems) environments in which entrepreneurial endeavors take place (Welter, 2011). Hence, in contrast to an enabler lens that exclusively focuses on the direct and positive effects of digital technologies on entrepreneurial action, a context lens adopts a broader view and also takes indirect and negative effects into account.

Digital technologies can reshape existing contexts or create new ones. They do so, for example, by opening up traditional industry sectors to new economic activity from the outside. For example, Rothe et al. (2019) show that advances in genome sequencing technology led to vast open genome data, which gave rise to bio data ventures that used this data in new ways to solve customer issues. Specifically, bio data ventures either contextualize, de-contextualize, or re-contextualize open genome data to capture value.

PDW participants agreed that focusing on digital technologies as context raises research questions, such as whether and how digital technologies break down traditionally assumed environmental boundaries (e.g., sectoral or spatial boundaries), whether and how they foster the decomposition of traditional sectoral value chains, how regulations influence and shape sectors and entrepreneurial endeavors in them, how governance in digitized sectors can be upended or modified, and how digital technologies impact the emergence, structure, and evolution of larger entrepreneurial ecosystems.

4. Digital technologies as enablers and outcomes of entrepreneurial endeavors. Digital technologies are fundamentally self-referential (Yoo et al., 2010). Consequently, entrepreneurial endeavors must use existing digital technologies to create new digital technologies as their value propositions. For example, to develop software applications, digital ventures must use computers including operating systems, development environments, etc. This means that a digital technology created as an outcome by one entrepreneurial endeavor can be an enabler of other entrepreneurial endeavors. Think of electronics development platforms developed as digital market offerings by entrepreneurial ventures, such as Arduino, Raspberry Pi, or Electric Imp. They increasingly enable the emergence of other entrepreneurial ventures, for example, by

accelerating the prototyping activities of digital hardware ventures (von Briel, Davidsson, & Recker, 2018a).

Another example is the growing availability of application programming interfaces (APIs) through which entrepreneurial ventures can govern the use of (parts of) their value propositions by third parties (Um et al., 2015). Snapchat, for instance, enables other ventures to use its Stories feature as part of its own value propositions. Technology design decisions made by one venture, such as Snapchat, about the governance of its API, thus, directly affect the trajectories of other digital ventures (von Briel, Recker, & Davidsson, 2018b).

PDW participants agreed that the intersection of digital technologies as enablers and outcomes raises fundamental questions about interdependencies. For example, the Snapchat example above illustrates external agencies and path dependencies that originate for some new ventures from using the outcome of another venture's process (i.e., Snapchat) as their enabler (Goh & Pentland, 2019). Since digital technologies can evolve over time, their evolution as outcomes of entrepreneurial processes will influence the evolution of enabling digital technologies, which will then likely influence the future evolution of the outcomes of digital technologies.

5. Digital technologies as enablers and contexts of entrepreneurial endeavors. Digital technologies can enable the establishment and transformation of entrepreneurial contexts. However, emergent entrepreneurial endeavors that operate in digital contexts and that are enabled by digital technologies do not necessarily have digital technologies as their market offerings. For example, focusing on artisan entrepreneurs selling their products on the online marketplace Etsy, Kuhn and Galloway (2015) show that the digital platform not only enables these entrepreneurs to sell their products but also provides them with an environment to receive peer support from other entrepreneurs. Hence, while digital technology enables their entrepreneurial endeavors and provides them with a context in which to operate, the offerings themselves are still artisan products of a non-digital nature.

PDW participants pointed out that research at the intersection of digital technologies as enablers and contexts is often closely aligned with research on entrepreneurial ecosystems and raises questions, such as which affordances digital technologies provide to entrepreneurial endeavors operating in a specific spatial environment and how ecosystems emerge that foster digital entrepreneurship (Autio et al., 2018). Yet, besides altering existing boundaries, such as spatial, temporal, or sectoral limits, digital technologies can also create new contexts. For example, digital technologies can create an opportunity space for entrepreneurial endeavors in their own right. Current social movements often peruse social media platforms to scale and fuel their initiative, as this enables them to reach a global audience. Here, digital opportunity spaces, such as those associated with the #LasTesis hashtag, effectively offer a scene for political messages and entrepreneurial action.

6. Digital technologies as outcomes and contexts of entrepreneurial endeavors. Digital technologies are, by nature, interoperable (Ceccagnoli et al., 2012) and characterized by a potential for infinite expansibility (Faulkner & Runde, 2019). Therefore, they give entrepreneurial endeavors the potential to operate across contexts and scale rapidly (Huang et al., 2017). Moreover, the sensibility of digital technologies allows them to create vast contextualized data, which can create a context for novel entrepreneurial endeavors. Ubiquitous sensors and open

data repositories are examples of such digital technologies that create contexts for the establishment of new ventures. Digital platforms offer a good example of such digital technologies (e.g., Parker et al., 2017; Tiwana, 2015). For example, focusing on WeCash, a Chinese platform venture in the fintech industry, Huang et al. (2017) show that WeCash was able to rapidly scale its user base by using contextual data from 6,000 sources, including users' social media presence and online behavior data from mobile operators and internet service providers, together with frequent platform adaptations and instant releases.

PDW participants agreed that the intersection of digital technologies as outcomes and context raises research questions, for example, about how the success of entrepreneurial endeavors is linked to their environment and to other entrepreneurial endeavors operating in the same environment or across environments (Srinivasan & Venkatraman, 2018).

7. Digital technologies as enablers, outcomes, and contexts of entrepreneurial endeavors. Lastly, digital technologies can simultaneously be enablers, outcomes, and contexts of digital entrepreneurship. Think of crowdfunding platforms, such as Kickstarter and Indiegogo (e.g., Wessel, Thies, & Benlian, 2017). They are the market offerings—that is, *outcomes*—of some entrepreneurial endeavors, the *enablers* of other entrepreneurial endeavors (be they digital or non-digital), and they also establish and shape broader *contexts* for entrepreneurial endeavors across multiple industry sectors. For example, digital technologies, such as electric vehicles and adaptive pricing models, which are developed and used by entrepreneurial ventures, blur the boundaries between mobility and energy markets and also enable the entrance of entrepreneurial ventures offering new value propositions, such as balancing grid stability and customer mobility (Valogianni et al., 2020).

PDW participants agreed that focusing on the intersection of all three framework dimensions requires researchers to broaden their focus and adopt holistic perspectives and approaches, such as multi-level theorizing (Zhang & Gable, 2017), systems thinking (Alter, 2013), or multi-agent market simulations (Ketter et al., 2016), to answer questions, such as how digital technologies enable the entrance of new ventures into existing markets and how markets could be designed to incentivize particular digital ventures (e.g., those focusing on sustainable business models).

Six Strategies for Situating Digital Entrepreneurship Research in the Broader Scholarship of Technology and Organizing

Our third guiding question concerned ways of identifying key research questions and opportunities in digital entrepreneurship research. Our discussion yielded six strategies for identifying important and relevant research problems to address. All six strategies are underpinned by two dominant assumptions of digital entrepreneurship (Table 1)—that digital technologies (a) blur boundaries of entrepreneurship processes and outcomes and (b) disperse entrepreneurial agency across a broader range of actors.

1. **Evaluate which research questions other disciplines outside of IS have already addressed or answered.**

For example, in the field of strategy, different modes of growth, such as whether a firm will grow organically, pursue acquisitions, or engage in alliances with those with complementary resources are of strategic importance and have been extensively studied (e.g., Gilbert et al., 2006; Lockett et al., 2011). One might ask how those entrepreneurial firms that have unique digital assets choose their mode of growth (i.e., digital technologies as enablers) and how the digitality of those market offerings with the potential to blur process boundaries and disperse agency realize modes of growth that run contrary to the assumptions that strategists have already developed (i.e., digital technologies as outcomes).

As a second example, in the field of entrepreneurship, the entrepreneurial agent has long been a core focus of investigation (e.g., Grégoire & Shepherd, 2012; McMullen & Shepherd, 2006). Contemporary work environments increasingly pose new questions about agents, such as whether entrepreneurs behave and interact differently in digital technology contexts and what the implications of these altered behaviors would be. Digital platforms might redefine who can (or cannot) be an entrepreneur, which forms of social and/or human capital are required, and how prospective agents pursue entrepreneurial endeavors (Nambisan & Baron, in press).

2. **Choose levels of analysis that have so far been ignored.**

As different disciplines have different foci, varying the unit of analysis allows digital entrepreneurship researchers to establish connections between IS and other disciplines through the joint application of analyses and theories at different levels of abstraction. The dimensions displayed in Figure 1 reside on three particular levels of analysis: the ecosystem (i.e., digital technologies as contexts), the entrepreneurial endeavor (i.e., digital technologies as enablers), and the value proposition (i.e., digital technologies as outcomes). However, because digital technologies blur boundaries of entrepreneurship processes and outcomes and disperse entrepreneurial agency across a broader range of actors, this implicates other units of analysis, such as the entrepreneurial agent or societal and environmental impacts as the level of value analysis. To illustrate, consider the role of digital crowds as entrepreneurial agents. Majchrzak and Malhotra (2019) illustrate how digital crowds may provide “on demand entrepreneurial mindsets” that temporarily form to address nascent and ephemeral needs of the market. Such “flash crowds” might require us not only to rethink what entrepreneurial agents are but also what crowd-based entrepreneurial organizing—its temporality, associated resources, and mobilizing power—might look like.

3. **Focus on novel interactions among levels of analysis but also between actors, technologies, enablers, outcomes, and contexts.**

For example, PDW participants discussed interactions between digital ventures and incumbent organizations. In much of the literature, each organizational form is studied separately. However, as large traditional corporations grapple with digital transformation, some are forming their own corporate venture organizations specifically to find opportunities to engage with emerging digital entrepreneurship endeavors (Anthony, 2012). Other incumbents join emerging entrepreneurial ecosystems. Consider the cases of Mercedes and Porsche. Both are established car manufacturers that have joined the emergent Formula E racing series

(Jarvenpaa & Standaert, 2018). In essence, these established organizations with high brand value in their physical car productions sought to become part of a racing ecosystem, where the technical specifications require teams to have basically the same physical car and where most of the differentiation is through software.

This example, again, illustrates the potential of digital technologies to blur the boundaries of entrepreneurship processes and outcomes and disperse entrepreneurial agency across actors. A focus on interactions, such as those between digital ventures and traditional corporations, that evolve around digital technology offers a wide range of important questions that one could explore at multiple levels of analysis. For example, an increasing number of intermediaries connect corporates and digital entrepreneurial ventures. Many accelerators and incubators work closely with traditional corporations and play the role of brokers. While the exact nature of such brokering and the factors that influence the outcomes of such brokering are not known, there are indications that accelerators might help ventures reach key goals (Hallen et al., 2020). Incubators and accelerators can be digital or non-digital themselves, which can raise questions about the nature of intermediaries and their impact on digital entrepreneurship. Overall, PDW participants agreed that digital entrepreneurship research might be particularly conducive to enhancing our understanding of different levels of entrepreneurship phenomena and their potential interactions, such as at the team, project, cohort, and crowd levels.

4. Focus on outcome variables that have traditionally received minimal attention.

A different strategy could involve asking how openness (of infrastructure, data, knowledge, or ideas), often implied with digital technology, might not only disperse agency but also create new risks. For example, while digital crowds might enable individuals to temporarily gather around certain problems and opportunities, one associated risk relates to the unboundedness of the crowd. Organizations must, on the one hand, satisfy the autonomy of digital crowds and, on the other hand, redeem their entrepreneurial endeavors so that they create value (Selander & Jarvenpaa, in press). Moreover, opportunities for directionality and coordination of entrepreneurial action in online crowds might entail the risk of crowd fragmentation.

As another example, research could explore how digital technologies as contexts not only offer upsides in terms of value creation and value appropriation infrastructures for entrepreneurs, thereby mitigating their liabilities of newness, but also downsides, such as the costs of role conflict (Nambisan & Baron, in press). Research could also examine potentially harmful path dependencies (Sydow et al., 2009) and imprinting effects (Stinchcombe, 1965) in digital entrepreneurship. For instance, initially valuable digital technology may not only enable but also increasingly constrain a venture's growth prospects given certain technological inflexibilities and lock-ins. Another downside could be that the use of freelancing and micro-tasking platforms, which are enabling digital technologies for entrepreneurs (getting services, such as programming or marketing, quickly and cheaply), can also lead to exploitation and precarious work arrangements (Lewchuck, 2017). The lower cost of work for entrepreneurs (and other firms) also means lower taxes and contributions to health care and other social costs in local communities. Hence, research on digital entrepreneurship might also be able to make contributions to important phenomena, such as responsible innovation (George et al., 2020; Owen et al., 2013).

5. Revisit, problematize, and update assumptions about established core concepts.

Several concepts are shared across disciplines, such as value, temporality, or agents. For example, many digital entrepreneurship endeavors, such as AirBnB, Airtasker, and Uber, focus on disrupting existing markets through novel digital technology offerings (i.e., digital technologies as outcomes) to create value for users and themselves (e.g., Gerwe & Silva, 2020). However, examples such as the housing-affordability issue faced by residents of major cities, exacerbated by the re-appropriation of long-term living space into short-term AirBnB rentals, illustrate that these ventures do not necessarily and unequivocally create value for society at large.

Moreover, many digital entrepreneurship endeavors do not even manage to capture value for themselves but are built on the hope that rapid scaling will eventually allow them to capture value at some point in the future. In some cases, however, the market that they enter does not permit many disruptions, making it inherently difficult for digital entrepreneurship endeavors to capture value consistently even if they grow to a large scale (Kenney & Zysman, 2019). For example, in the case of Uber, the traditional taxi industry has never enjoyed large margins. Thus, ventures like Uber had to avoid regulatory overhead and suppress the incomes of drivers, who act as complementors to "create value" for users.

As another example, digital entrepreneurship might offer the opportunity to expand the scant attention given to the concept of temporality (Lévesque & Stephan, 2020; Mitchell & James, 2001; Saunders & Kim, 2007). Digital technologies have peculiar temporal implications for organizing and work (MacCormack et al., 2001). Moreover, time tends to be one of the scarcest resources in entrepreneurial endeavors. This begs certain questions about how digital technologies might change or shape temporal aspects of organizing, such as the sequence or concurrency of work, and how digital technologies might shape time, timing, or expectations thereof (Jarvenpaa & Valikangas, in press).

6. Address larger societal issues and global challenges.

Grand challenges, such as responses to pandemics, environmental crises, and poverty, could be addressed through research on digital entrepreneurship. For example, investigating digital entrepreneurship endeavors that have emerged as a response to the COVID-19 crisis could provide fertile ground to address a contemporary global issue where dispersed agency plays a role, while digital entrepreneurship itself might provide fertile ground to critically reflect on implicit assumptions about who is an entrepreneurial agent. Research on gender equality (Sundermeier et al., 2018) suggests that the purportedly "neutral" internet might not be free from offline inequalities that affect the emergence of entrepreneurial endeavors (Dy et al., 2017). Women remain under-represented in entrepreneurship. As Laguia et al. (2019) state, "think entrepreneur, think male". Thus, research could investigate whether digital technologies might bear the potential to rectify gender imbalances by equalizing venture creation processes and thereby change our understanding of entrepreneurs. In addition, questions of the digital divide and socially marginalized groups remain relatively unexplored and require empirical attention (McAdam et al., 2019).

Likewise, digital entrepreneurship offers opportunities to level out traditional privileges and disadvantages resulting from perceived lower barriers to entry, disembodiment of the

entrepreneurial actor, and the absence of visible markers of disadvantage online. Meanwhile, the productivity gap between emerging and developed nations might actually be exacerbated, rather than alleviated, through digital technologies due to uneven access to technology infrastructure (United Nations, 2019).

Using Novel Data and Methods to Investigate Digital Entrepreneurship

The fourth guiding question concerned suitable data and methods for investigating digital entrepreneurship. IS research has grown into a pluralistic, inclusive field. Consequently, digital entrepreneurship researchers have the full range of qualitative, quantitative, design, and mixed methods at their disposal. It is especially in the mixed methods space that PDW participants recognized opportunities for researchers to fully utilize digital capabilities to investigate nascent phenomena, such as digital entrepreneurship (e.g., Fielding, 2012; Whelan et al., 2016).

In particular, participants see research opportunities emerging from the various types and vast amounts of digital trace data that are created by many digital entrepreneurship endeavors, from which both researchers employing qualitative and quantitative methods can benefit. For example, Securities and Exchange Commission (SEC) filings often include information about the type of technology that digital entrepreneurship endeavors use in their market offerings (i.e., digital technologies as outcomes); online sources, such as StackShare or ProgrammableWeb, provide information about different digital assets that digital entrepreneurship endeavors use to build and offer their market offerings (i.e., digital technologies as enablers; e.g., Schulte-Althoff et al., 2020); some digital entrepreneurial endeavors even start on open source platforms, such as GitHub (i.e., digital technologies as contexts; e.g., Andersen & Bogusz, 2019); and others leverage blockchains to engage in initial coin offerings (i.e., digital technologies as enablers; e.g., Fisch et al., in press), thereby leaving yet another type of digital trace data about entrepreneurial endeavors at different analytical levels (e.g., about artifacts, entrepreneurs, and investors). The growing accessibility and availability of such data sources in combination with advances in computational tools for data collection and analysis provide many new opportunities for researchers interested in generating and testing digital entrepreneurship theory (Freelon, 2014; Pentland et al., in press). At the same time, such data can also enable more inductive and explorative data-driven analyses of new economic activity in the digital technology contexts of entrepreneurship ecosystems (e.g., Basole et al., 2015; Rubens et al., 2011; Schulte-Althoff, et al., 2020; Schulte-Althoff, Schewina, & Fürstenau, 2019).

However, PDW participants pointed out that it is important for digital entrepreneurship researchers to find ways to leverage the benefits of novel methods and data while adhering to traditional standards of rigor. Since digital technology-enabled entrepreneurial endeavors inevitably produce digital traces, digital entrepreneurship researchers are well positioned to explore novel investigative approaches that align with the strong theory-building traditions in the social sciences while relying on the promises that novel data sources and computational approaches hold (Pentland et al., in press).

Using adequate tools to collect and analyze such novel data enables digital entrepreneurship researchers to capture phenomena that were unobservable or simply non-existent in the past (Agarwal et al., 2008; Hedman et al., 2013). Digital entrepreneurship researchers could, therefore, exercise pragmatic freedom by combining novel methods to make sense of patterns and relationships as they are reflected in the empirical material. Of course, this does not equate to an ill-reflected "anything goes" approach to research design (Wicks & Freeman, 1998; Xu et al., in press). Instead, the tenet for combining diverse data sources and appropriating methods is the usefulness of the knowledge contribution to the community of inquiry in the space of digital entrepreneurship.

Key Challenges in Advancing Digital Entrepreneurship Research

The fifth guiding question concerned key challenges that researchers will face when studying digital entrepreneurship. PDW participants underlined that some researchers look at digital technology and see everything as new, while others look at digital entrepreneurship and see nothing new at all (Baiyere et al., 2017). Both perspectives have some validity. Our perspective, as summarized in Table 1, is that digital entrepreneurship is indeed a distinct phenomenon, but it has some areas of overlap, in foci, assumptions, and levels of analysis, with related phenomena.

Therefore, the challenge is to study digital technology in such a way that it reveals its unique capabilities during entrepreneurial endeavors without assuming that all capabilities stemming from the involvement of digital technology are necessarily unique. Researchers must balance the need to be contextual—that is, to understand what digital technology is actually changing during entrepreneurial endeavors—and the need to be abstract—that is, to derive generalizable conclusions. PDW participants identified a set of guiding questions that can help researchers address this challenge:

- Which analytical levels do researchers need to focus on to appropriately capture the phenomenon's uniqueness?
- What role do researchers assign to digital technology at or across these levels?
- How can researchers ensure that their choice of levels does not limit their horizon and makes them miss important insights?

To illustrate the relevance of asking these questions, consider that many researchers in disciplines outside of IS are only slowly acknowledging the need to incorporate digital technology into their theorizing (e.g., Murray et al., in press; Nambisan, 2017). At present, the focus of digital entrepreneurship research outside of IS often is limited to digital ventures based on multi-sided platforms (i.e., digital technologies as contexts). However, there are fully integrated digital ventures, such as Tesla, that leverage and benefit from other unique affordances provided by digital technology, such as their potential to create market offerings that can evolve continuously (i.e., digital technologies as outcomes).

PDW participants also recommended looking at non-traditional outcome and impact measures that go beyond financial performance. For example, evolutionary speed, social performance, or inclusiveness could be studied as outcomes of entrepreneurial endeavors. A focus on such measures would allow for developing novel insights and making important contributions even in samples of digital entrepreneurship endeavors that seem trivial at first sight. The potentially distinct roles of digital technologies (i.e., their roles as enabler, outcome, and/or context) might then reveal themselves as byproducts.

Finally, to establish a vibrant and growing digital entrepreneurship research community, PDW participants proposed that it is also important for digital entrepreneurship researchers to communicate their work in a way that makes it accessible especially to junior researchers, including doctoral students. By doing so, they can enable junior researchers to conduct follow-up studies as well as provide a foundation for a cumulative body of knowledge in digital entrepreneurship research. Research programs, for example, regarding the technology adoption model, trust, auctions, or online reviews and ratings, can serve as useful examples of how flourishing scholarly communities can be established and nurtured. One strategy could be to ensure that digital entrepreneurship researchers pursue research on both success and failure (Burton-Jones et al., 2017).

Conclusion

Digitalization has brought several phenomena to the forefront of societal interest that are, at their core, of interest to IS scholarship. Digital entrepreneurship is certainly one of them. Economic activities and private lives, business and societal opportunities, and even grand challenges can be linked to entrepreneurial endeavors of both emergent and incumbent organizations, where digital technologies play an important role as enablers, outcomes, and/or contexts.

With the prevalence of this phenomenon, it is only natural that researchers across the technology and organizational sciences have begun to focus increasingly on digital entrepreneurship. This presents both an opportunity and obligation for IS researchers to not only partake but also take a leading role in conducting research on this phenomenon. If IS research were to lead digital entrepreneurship research, it would increase the impact and recognition of IS research across many fields.

In this report, we have delineated digital entrepreneurship from related phenomena, provided wide-reaching references to literature in this area, and identified research opportunities and strategies for identifying interesting new phenomena to study. We hope we have laid fertile ground by planting the initial seeds for research ideas on the phenomenon that can now be developed further.

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