

What is digital transformation? Core tensions facing established companies on the global stage

Nathan Furr¹ | Pinar Ozcan² | Kathleen M. Eisenhardt³

¹Strategy Area, INSEAD, Fontainebleau, France

²Department of Strategy, Innovation and Marketing, Saïd Business School, University of Oxford, Oxford, UK

³Department of Management Science and Engineering, Stanford University, Stanford, California, USA

Correspondence

Nathan Furr, Strategy Area, INSEAD, Fontainebleau, France.

Email: nathan.furr@insead.edu

Abstract

Research summary: Digital transformation is a dominant theme in the global economy, but what it means for established companies remains perplexing for both academics and practitioners. As digital erases familiar geographic, industrial, and organizational boundaries, it has led to simplistic characterizations such as “digital changes everything.” Yet while digital changes some things, others remain the same. Here, we identify three core tensions at the heart of digital transformation—products vs platforms, firms vs ecosystems, and people vs tools—and describe their underlying economics, driving forces, and countervailing forces. These tensions frame a concrete discussion of strategic alternatives for global companies. Overall, we emphasize that digital transformation is not an objective state, but rather a strategic choice by executives from an array of alternatives.

Managerial summary: Digital transformation is a dominant theme in the global economy, but what it means remains perplexing for executives and academics. Pundits claim that “digital changes everything” and that leaders must “disrupt or be disrupted,” but is this really true for established companies serving robust customer needs on the global stage?

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2022 The Authors. *Global Strategy Journal* published by John Wiley & Sons Ltd on behalf of Strategic Management Society.

Understanding what digital transformation means can be challenging as it breaks down familiar geographic, industrial, and organizational boundaries, creating new opportunities and threats. In this paper, we explore three key tensions at the heart of digital transformation—products vs platforms, firms vs ecosystems, and people vs tools—and enumerate their enabling and constraining forces. Building on these concrete constructs provides effective foundations for formulating digital transformation strategy.

KEYWORDS

business models, digital tools, digital transformation, ecosystems, global strategy, platforms

The only constant is change Heraclitus

The more things change, the more things stay the same Jean-Baptiste Alphonse Karr

1 | INTRODUCTION

Digital transformation has become a significant theme in global strategy as born-digital firms like Google, [Booking.com](https://www.booking.com), Alibaba, and Amazon as well as billion-dollar unicorns like Uber, Pinduoduo, Airbnb, and TikTok have come to dominate the collective imagination. These reinventions of traditional industries, many of which challenge global boundaries, have led to a common belief that digital transformation “changes everything.” The dire warning to incumbents is “disrupt or be disrupted.” This has led some to believe that digital transformation will create a completely new world order—a one-for-one disruption of old by new—as more data, connectivity, and digital intelligence eradicate global boundaries and upend the old industrial order.

But a closer examination of established firms undergoing digital transformation suggests a more complex story. For example, Danish shipper Maersk uses blockchain to do what it did before blockchain, namely to ship more efficiently around the globe. Dutch beverage-company Heineken is using digital transformation to better interact with customers, create products, and compete, but ultimately still makes beer and ships it in trucks (Furr, Garlandt, & Shipilov, 2021). Even in digital frontrunner industries—such as media and travel—where digital players have created significant disruption, many familiar firms coexist and even thrive: The New York Times and Huffington Post coexist while Airbnb has by no means eliminated Marriott. Although many established incumbents have changed in significant ways, their persistence and even prosperity raise questions about whether digital “changes everything.”

In this paper, our goals are to (a) unpack the puzzle of digital transformation for established firms operating on a global stage and (b) offer a related research agenda. These firms are not “born-digital” start-ups (Monaghan, Tippmann, & Coviello, 2020). Rather, they are incumbents

with legacy operations spanning geographic borders, often at substantial scale. Such firms may be vulnerable to the well-known inertial forces that inhibit adaptation to change. Yet, most are not dinosaurs destined to fail—that is, they can change. Significantly, they typically deliver goods and services for which the underlying customer needs remain relatively stable. Should these firms “change everything” and so imitate the strategies of digital-first icons like Google and Amazon? Or are there other and perhaps better strategies, particularly ones that take advantage of incumbents’ strategic position and existing resources? What inherent tensions arise from the shifting collaborative and competitive landscapes? In other words, what does digital transformation mean for the strategies of most firms?

Charting strategy for digital transformation in such firms is complicated. Part of the challenge is *defining digital transformation for a focal firm*. We broadly define digital transformation as the adoption of novel strategies and business models that are enabled by a myriad of new information technologies.¹ Others have described digital transformation using abstract constructs like shifts in representation, connectivity, and aggregation (Adner, Puranam, & Zhu, 2019). One reason for resorting to abstraction is that “digital transformation” has different meanings in different industries, and even in different firms within the same industry. Arguably, it may even have different meanings in the same firm. For a global firm that spans geographies, digital transformation depends on many factors like its unique goals (eg, digital marketing vs creating new markets), access to critical technologies (eg, 5G mobile connectivity in Europe vs 2G in Africa), and distinct technology architectures in different markets (eg, United States vs Chinese technology stacks).

Another part of the challenge is coping with the *web of technologies* underlying digital transformation. At its core, digital transformation is driven by several technology-based forces: exponential growth in computing power, increasingly ubiquitous connectivity, and big data. For example, computing power has grown exponentially relative to cost (Farmer & Lafond, 2016). The iPhone X is as fast as the first Cray supercomputer and the Apple Watch has 2 million times more memory than the first Apple computer. In addition, connectivity is becoming increasingly ubiquitous. In 2000, about 28% of the population in developed countries had “dumb” phones (Tuckel & O’Neill, 2006). Today, virtually everyone has a mobile phone, most of them “smart” with significant data access (ITU, 2021). Finally, big data has arrived—that is, more and more varied data, available more often, and from more sources. Taken together, these technologies enable start-ups like Airbnb and established firms like The New York Times to become digital almost overnight with relatively low investment by using distributed cloud services like Microsoft Azure and Amazon Web Services. Similarly, they enable the Apple watch to perform new tasks such as take a pulse and monitor sleep that were not even contemplated uses for the first Apple computer. Most importantly, these technologies spawn even newer technologies like blockchain and deep learning, each on its own unique developmental S-curve.

A final part of the challenge of charting strategy for digital transformation is its *complex strategic implications*. Digital transformation can change the possibilities for how value is created and captured. Resource portfolios and defensible positions may give way to network effects, scale economies of software and information, and positive feedback loops driven by ever smarter algorithms. Or as is often more likely, global firms now face both traditional strategic considerations and the new ones of digital transformation. Strategies may become both cooperative and competitive. Further, as Shaheer, Li, and Priem (2020) note, the lines between local and global strategy can blur. As the barriers to connect, transact, and interact among products, companies, industries, and geographies fall, unexpected opportunities can arise and new

ecosystems may emerge. Thus, executives and researchers confront a bewildering buffet of strategic alternatives.

In summary, we argue that digital transformation is not an objective state, but rather a strategic choice from an array of alternatives. Thus, digital transformation will likely look different and be different for different executives, even for those whose firms compete in the same industry or country. That is, executives face charting a concrete strategy for what specifically digital transformation means for their particular firm. Likewise, researchers face the struggle of framing the appropriate research scope, level of analysis, and research questions.

In the next sections, we propose three core tensions that sharpen the strategic alternatives for global firms: products vs platforms, firms vs ecosystems, and people vs tools (see Table 1). We unpack these tensions and provide concrete directions for future research. Thus, we shift away from the first wave of conversation about digital transformation. This wave adopted a technology-centric, “Silicon-Valley” tone with its focus on the disruption of glacial incumbents by brash start-ups à la “Borders versus Amazon” and the upending of the industrial order with startling new technologies. In its place, we offer a more measured, global perspective by looking at what digital transformation looks like around the world, particularly in established companies. Overall, if global strategy is about strategy across boundaries, then digital transformation offers the opportunity to rewrite those boundaries by placing digital transformation at the heart of global strategy.

2 | DIGITAL TRANSFORMATION

2.1 | Tension 1: Products vs platforms

One core tension within digital transformation is products (ie, goods and services) vs platforms. By platforms, we mean intermediaries that facilitate transactions and govern interactions between distinct user groups (Rietveld & Schilling, 2021). Before the emergence of the Internet, most firms competed based on products—for example, tastier beer, cheaper airplane flights, and so on. These products were tied closely to valuable resources like manufacturing assets and defensible positions like cost leadership that could provide competitive advantage. Although platforms like the Grand Bazaar of Istanbul have existed for centuries and platforms have long played a key role in industries like payments and video games (Ackerberg & Gowrisankaran, 2006; Katila, Piezunka, et al., 2022), products have dominated.

However, the emergence of the Internet as a general-purpose technology, followed by advances in telecommunications that brought ubiquitous connectivity (eg, smartphones) and in data generated in exponentially increasing quantities across industries, is shifting the balance toward platforms (Furr & Shipilov, 2019; Ozcan & Yakis-Douglas, 2020). For example, although it was possible to create a ride-sharing business 30 years ago (eg, assemble a list of drivers, post a phone number, and coordinate rides), digital platforms hosted on smartphones that use GPS to track participants, match riders, and drivers, optimize journeys, and facilitate instant billing and feedback have unleashed a massive, latent industry. In fact, more than half of the world's largest firms generate most of their revenue from platforms (Zhu & Furr, 2016). The Covid-19 pandemic is further accelerating this trend.

The distance-diminishing effects of digital technologies (Autio & Zander, 2016; Manyika et al., 2016; Zaheer & Manrakhan, 2001) can blur the national boundaries for at least some platforms (Stallkamp & Schotter, 2021), bringing countries closer and placing firms on a more

TABLE 1 Digital transformation tensions

Theme	Products vs platform	Firms vs ecosystems	People vs tools
Tensions	<ul style="list-style-type: none"> • Competition based on product production vs platforms that match transactions • Economy of scale vs economy of demand 	<ul style="list-style-type: none"> • Create and capture value independently vs in cooperation within an ecosystem • Competitive vs cooperative strategy 	<ul style="list-style-type: none"> • Efficiency of tools vs flexibility of people • People and tools as complements vs substitutes
Driving forces	<ul style="list-style-type: none"> • Network effects • Rich information about users • Marketplace control 	<ul style="list-style-type: none"> • Need for access to more capabilities • Superior integration of complements and components for users • New ways to perform core activities 	<ul style="list-style-type: none"> • Improved efficiency • Enhanced learning • Economies of scale • Labor shortages
Counter forces	<ul style="list-style-type: none"> • Local effects • Lack of a solid product foundation • Insufficient demand heterogeneity • Unexpected vulnerability to competition 	<ul style="list-style-type: none"> • Co-specialization across borders • Complex products • Unfamiliar roles and strategies • Inter-firm conflict and potential rigidity 	<ul style="list-style-type: none"> • Local implementation • Varied and constraining regulatory regimes • Complex relationship between people and tools • Tools rarely a perfect substitute for people • Societal distortions
Strategic implications for established global firms	<ul style="list-style-type: none"> • Greater use of platforms, particularly product-based ones • Strategic choice of create vs join a platform • Staged timing to create a platform 	<ul style="list-style-type: none"> • Greater participation in ecosystems • System vs component vs bottleneck strategy • Staged timing to become an orchestrator 	<ul style="list-style-type: none"> • Greater adoption of digital tools • Centralization of global digital-tool talent and infrastructure • Exploiting geographic differences in leading and lagging technologies
Representative research questions	<ul style="list-style-type: none"> • How to transform products into platforms? • How do patterns coordinating workflows (eg, B2B) differ from transaction platforms? • Boundary conditions for global platforms and strategies to overcome? 	<ul style="list-style-type: none"> • Global vs local boundaries for ecosystems? • How do firms manage tension between creating and capturing value? • Facilitators and inhibitors of ecosystem emergence? 	<ul style="list-style-type: none"> • Scale, scope, and boundary for digital tools? • Global vs local organization of digital tools? • Incentives and change process facilitating digital tool adoption?

global competitive landscape. Whereas firms have traditionally been geographically or logistically bound by the resources required to produce their products, platforms relax the tie between geography and resources, even as other ties like between geography and language remain. To illustrate, the platform TikTok, created by Chinese company ByteDance, was able to expand to 175 markets, in 75 languages, with over 2 billion downloads in just 4 years (Sherman, 2020).

The tension between products and platforms arises from differences in their underlying economics. Products create value for buyers by leveraging primarily internal resources arrayed along a vertical value chain, which may have different elements in different countries. They capture value by selling to buyers for a price. Strategy, thus, involves finding product-market fit in the local context, creating VRIN resources, and establishing a defensible industry position. Financial success is frequently measured by product profitability. When there are strong scale economies, valuable resources like brand and technical skills, or steep learning curve advantages, products thrive.

In contrast, platforms create value for both the platform owner and its users by matching distinct groups (often buyers and sellers) in value-creating transactions (Eisenmann, Parker, & Van Alstyne, 2006; Gawer & Cusumano, 2008). These transactions create value by leveraging both the owner's and the users' resources. The platform owner then captures some of that value by charging a transaction fee. Here, strategy is about timing and speed—that is, starting early and moving quickly to kick start the platform (Zhu & Furr, 2016), which often creates a winner-takes-all dynamic. Since platforms thrive when they attract more users and generate more (and more high-value transactions), financial success is often measured by transaction volume.

Several **driving forces** of digital transformation increase the attractiveness of platforms relative to products, beyond the over-simplified allure of being the next Google. First, digital transformation enhances the potential for *network effects*. That is, digital transformation enables more and different types of data (thus more users and so better matches) and more ubiquitous connectivity (thus faster matches from more locations). These factors help to drive the potential for stronger network effects (Gawer & Cusumano, 2008; Katz & Shapiro, 1994). Cross-side (ie, indirect) network effects refer to when each group of users (often buyers and sellers) are attracted to a platform when there are more of the other. As the number of the other grows, the platform becomes more attractive. Same side (ie, direct) network effects occur when users of the same type benefit from more similar users. Typically, the most successful platform has more and stronger network effects. Once a platform becomes dominant in an industry, it can be difficult to dislodge (given its network effects) without attacking with a new core interaction (Parker, Van Alstyne, & Choudary, 2016) or leveraging a unique resource-base, such as the Disney+ challenge to Netflix.

Second, platforms often capture *rich information about users* (on both sides of the platform) that is itself valuable beyond the immediate transaction. More information creates more intelligence (ie, matches that become smarter with each learning cycle). Well-known examples of such positive feedback loops include Google's increasing dominance in search because of its many learning cycles and accumulating data. Yet, less well-known examples abound as well. The Chinese software company Qihoo gave away its anti-virus software for free, triggering the generation of more learning cycles from more users and ultimately creating dominance over traditional providers (Zhu & Furr, 2016). More information about users can also provide valuable insights into serving customers in novel ways or with new products. For example, European farm machinery platform Krampf, Chinese agricultural market platform Pinduoduo, and Italian motorcycle manufacturer Ducati all use sales and customer feedback data from their

online platforms to design new customer interactions and products. The value of platform-generated data can be particularly relevant for B2B platforms, such as a Norwegian-based global shipping platform Veracity. The reason is that these platforms often focus on the coordination of activities and workflows rather than transactions per se. Here, the data generated on the platform can allow better coordination of supply chains, factory workflows, and production activities.

Third, platforms also provide *marketplace control*, allowing the platform-owning firms to shape which complementors can offer products and to develop their own products to fill product categories. For example, Amazon employees' recent testimonies show how the online retail platform uses data about independent sellers to develop competing products. Zhu and Liu (2018) provide empirical evidence for this pattern, demonstrating that Amazon was more likely to enter third-party seller categories that achieved high revenue, except when those product categories required greater effort to grow. Likewise, for a time, German-based clothing platform Zalando used data on popular styles to create its own private-label clothing. When major brands complained, Zalando discontinued many of its private labels, but also extracted concessions (eg, favorable drop-shipping agreements) from those brands.

While the driving forces are often powerful, there are also **counter forces** to the reach of digital transformation and the dominance of platforms (Autio, Mudambi, & Yoo, 2021). First and foremost, despite the theoretical promise of platform-based firms being capable of surmounting any boundary, *local effects* can still limit platform success. National borders often coincide with discrete changes in language, culture, and regulatory frameworks that limit cross-platform interactions (Beugelsdijk & Mudambi, 2013; Ghemawat, 2003, 2017), thereby limiting network externalities for any given platform (Beugelsdijk & Mudambi, 2013; Chen et al., 2018; Head & Mayer, 2013; Stallkamp & Schotter, 2021). Sometimes these are familiar cultural and linguistic boundaries, which may be one reason why Europe has fewer native platforms compared to the more populous and homogenous nations like the United States and China. Sometimes these boundaries are at the intersection of technology and geography. When Uzunca, Rigtering, and Ozcan (2018) compared the growth of two digital platforms across nations, they found that digital platforms face distinct challenges in developing nations (eg, lack of public infrastructure and legal frameworks to facilitate secure transactions) versus in developed nations (eg, incumbent and regulatory resistance). As a result, they must adopt different strategies (eg, additive versus transformative strategies, respectively) to grow in these different institutional environments (see also Sturgeon, 2021). Finally, regulatory complexity and risk can limit platform growth such as occurred with Facebook's Libra Initiative (Büge & Ozcan, 2021). They can also affect firms' global strategies, such as when TikTok had to develop a separate platform for China—Douyin—to accommodate the greater involvement of the Chinese government.

Local effects are a particularly limiting factor for platforms that rely on location-based goods or services (eg, transportation, food delivery, dog walking, and dating; Furr, Shipilov, & Gaarlandt, 2021). Some platforms are less location-dependent because their interactions are either purely digital (eg, peer-to-peer lending and much of social media) or involve physical goods shipped by sellers without platform intervention (eg, eBay and Etsy). However, even these platforms can be affected by physical distance. For example, the likelihood of transactions between users on Twitter, eBay, and various crowdfunding platforms declines as the distance between them increases (Agrawal, Catalini, & Goldfarb, 2015; Burtch, Ghose, & Wattal, 2015; Hortaçsu, Martínez-Jerez, & Douglas, 2009; Takhteyev, Gruzd, & Wellman, 2012).

Local effects may also hinder digital platforms when there are benefits from a physical (retail) sales presence. Using platforms to eliminate retail stores and sell directly to consumers

at higher margins is attractive. However, disintermediating retailers may eliminate the benefits of physical sales (eg, buying experience). When the platform is provided by a controversial third-party like Meta/Facebook, it can also link the focal firm to the questionable reputation of the platform owner. Thus, by weighing short-term profit against the long-term effects on the company, many digital-born players like Warby Parker and Bonobos nonetheless have decided to integrate into physical retail (Furr & Shipilov, 2019).

Second, the firm may *lack a solid foundation* for a platform. While some firms create platforms from scratch like Airbnb, many firms that successfully form platforms start with superior products to attract users to create platforms (Hagiu & Altman, 2017; Zhu & Furr, 2016). Indeed, icons like Google, Amazon, and Apple began by offering attractive products like superior search (Google), better retail experience (Amazon), and path-breaking functionality (Apple iPhone) and then used this user base to overcome the challenge of attracting users to the platform, mitigating the familiar “chicken and egg” or “penguin” problem of platforms.

For established firms, building a platform on an existing product is a particularly useful entry point. Yet, not every product forms a solid foundation for a platform. Research on turning products into platforms (eg Hagiu & Altman, 2017; Zhu & Furr, 2016) finds that the focal product must first have either a large customer base that can drive rapid growth or third-party sellers that want to reach its customers. Thus, when the user base of a product is small or local, it is unlikely to generate the rapid adoption typically necessary to overcome platform inertia and generate network effects on a global scale (Zhu & Furr, 2016). Finally, when the product is unstable or inferior, it is also unlikely to generate the user adoption necessary to kickstart the network effects underpinning a successful platform (Ott & Eisenhardt, 2020). For example, Taiwan's HTC is a global pioneer in virtual reality headsets. Yet when the firm attempted to copy Apple's success with the App Store platform built on the iPhone product, it struggled because virtual reality products were still too unstable. This deterred user adoption and kept complementors from creating enough meaningful applications (Cusumano, Gawer, & Yoffie, 2019).

Third, there may be *insufficient demand heterogeneity* to generate network effects and make the platform valuable. Demand heterogeneity (ie, a long-tailed distribution that contrasts with task heterogeneity that can limit platform growth) expands the number of potential applications, and so strengthens both value creation and network effects. In contrast, when demand is homogenous (ie, short tail distribution), it may make more sense to create the added goods or services in-house. For example, in their study of US-based Intuit's adoption of a platform business model, Hagiu and Altman (2017) suggest that demand heterogeneity provides a basis for turning a product into a platform. Specifically, when Intuit executives wanted to expand to a product platform, a critical question was which product would form the foundation of the platform: Quicken (personal finance), Quickbooks (small and medium businesses), or TurboTax (Hagiu & Altman, 2017)? Intuit went with Quickbooks because of heterogeneous users (from plumbers to landscapers), greater scale (5 million users), and greater value creation for third-party apps (different verticals, technical sophistication, and geographic locations). Another example is how Zillow offers an easy-to-use, valuable, and free service that enables heterogeneous prospective home buyers to see a greater diversity of seller homes. Yet Zillow also connects these buyers with diverse services like real estate agents and contractors that Zillow can also monetize. In contrast, platforms focusing only on one or a few products like real estate financing are too much homogeneous (ie, short tail distribution) to create powerful network effects (Parker et al., 2016).

Finally, platforms can be more *vulnerable to competition* than is implied by the popular view of platforms (Knee, 2021). For example, platforms can become locked into specific interactions, leaving themselves vulnerable to the entry of new platforms that offer more valuable core interactions. Ebay lost users to the more focused Etsy that offered specialized services, especially for suppliers on the platform. Instagram successfully competed against a largely laptop-based Facebook by offering mobile photos. Snapchat, in turn, competed against Instagram by offering less permanent interactions (ie, messages that disappear). Although Facebook acquired some of these successful platforms (eg, Instagram) or imitated them (eg, Instagram copied many Snapchat features), new core interactions are still available as illustrated by the rise of the TikTok and Campfire platforms. The potential for diverse core interactions increases across geographic boundaries. For example, despite the fact that Netflix has entered larger geographies by offering local content, telecom firm Digicel, which operates across 33 smaller Caribbean and Pacific islands, has leveraged local content from these geographies to create a competing entertainment platform. Finally, when platforms compete for the same interactions and fail to coordinate, they can diminish the value and even impede platform adoption for all (Ozcan & Santos, 2015). For example, the competition among industrial giants like GE, ABB, and Siemens to create platforms for smart factories has diminished their ability to create and capture value from their platforms.

A key **strategic implication** of digital transformation is to encourage creating or joining a platform as an attractive strategy for global firms. The former demands identifying a valuable core interaction or suitable product to form the basis of the platform (Ott & Eisenhardt, 2020). It then involves designing a simple transaction (with supporting technology), generating network effects (eg, often requiring a “J-curve” of significant upfront investment), and considering both rivals (that may influence the scale of network effects) and geography (that shapes whether the core interaction is repeatable across locations). The latter means coordinating with a platform partner such as by revealing internal data and considering cooperative dynamics (Brunswick, Almirall, & Majchrzak, 2019). For example, established firms (eg, banks struggling to leverage their treasure trove of data due to legacy IT infrastructure or cultural misfit) may find that partnering with a platform to jumpstart their digital journey is an effective strategy. As Ozcan and Zachariadis (2021) find, working with BigTech platforms can be a “win-win” strategy for traditional banks that would otherwise face the daunting task of overhauling their IT infrastructure to create a platform.

Creating vs joining a platform also requires attention to short- vs long-run tradeoffs. For small and medium enterprises, partnering with platforms like the Mastercard Farmers Network in Africa or Pinduoduo in China, often leads to benefits over both the short *and* long run due to access to previously unreachable tools or markets. For large and global firms, however, the benefits of joining rather than creating a platform may be less straightforward. For example, the Toys R Us participation in the Amazon merchant platform in North America facilitated short-term operational gains. Yet, it led to long-term failure for Toys R Us because Amazon gained control over sales data and operations (Knee, 2021). Thus, an attractive strategy for global firms often is to first join a platform to test new markets and platform dynamics quickly, and then launch their own platform. This strategy can also provide the opportunity to extend the focal firm’s platform to the countries where it operates without dependence on a platform partner.

For **research**, the product vs platform tension within digital transformation suggests compelling questions. For example, research has only begun to explore how firms parlay products into platforms (Hagiu & Altman, 2017; Zhu & Furr, 2016). Future research could explore the effectiveness of specific strategies to turn products into platforms in the global context, the

tradeoffs and synergies among different product-platform business models, and the organizational transformation processes that are relevant for adopting a platform. More broadly, research could explore the limits of platforms within global strategy (Autio et al., 2021; Knee, 2021). For example, when are platforms better for global vs local business (Koo & Eesley, 2021)? Likewise, how do distinctions between within-country and across-country network effects influence major decisions like which foreign markets to enter and whether to pursue a multi-domestic vs global strategy (Stallkamp, Pinkham, Schotter, & Buchel, 2018; Stallkamp & Schotter, 2021)? Finally, there are intriguing platforms that coordinate workflow (eg, healthcare, factories, supply chains, and B2B payments). Research could explore the tension of demand vs task heterogeneity, particularly in these B2B settings where greater task heterogeneity may limit network effects. These are only a few of the critical questions about platforms for international business (IB) scholars to address.

2.2 | Tension 2: Firms vs ecosystems

A second tension is firms vs ecosystems. By ecosystem, we mean the set of components and complements that collectively deliver a value proposition to users (Kapoor, 2018). Ecosystems can influence whether and how a firm can capture new market opportunities (Ozcan & Eisenhardt, 2009). Ecosystems can also affect the choice of technology when entering a new industry (Kapoor & Furr, 2015), appropriate allocation of resources to innovative efforts (Ethiraj, 2007), and the relevant strategies and roles that a firm can adopt (Adner & Kapoor, 2010; Furr & Szerb, 2021; Hannah & Eisenhardt, 2018). In the past, firms often operated within a value chain, and prospered with a largely atomistic approach to producing products and services. Now, digital transformation, by lowering costs, increasing connectivity, and facilitating greater modularity along the value chain, shifts the balance from firms' operating as solo actors toward ecosystems (Sturgeon, 2021; Yoo, Henfridsson, & Lyytinen, 2010). For example, digital interfaces can be embedded in physical devices like French firm Babolat's connected tennis racket and BMW's connected car platform. Blockchain can connect previously unconnected industries, such as in Maersk's global shipping platform (Furr & Shipilov, 2018). Application programming interfaces (APIs) can securely connect databases and functions, for example, allowing fintech firms to connect to larger financial institutions to share data and innovate together (Zachariadis & Ozcan, 2017; Ozcan & Zachariadis, 2021).

The tension between firms and ecosystems largely arises from differences in their underlying economics. Firms create and capture value by relying on a value chain that they mostly control. They may work with suppliers, but not in complicated constellations of firms. Rather, they engage in (often bilateral) alliances when they need to collaborate on specific issues like an R&D project or co-marketing (Davis & Eisenhardt, 2011; Eisenhardt & Schoonhoven, 1996). In contrast, ecosystems create collective value from the contributions of multiple actors. Thus, ecosystems differ from alliances and supply chains because they include a larger set of interdependencies, many of them informal yet necessary to create value for users (Adner, 2017; Jacobides, Cennamo, & Gawer, 2018). Ecosystems may (or may not) overlap with platforms (Gawer, 2014). Regardless, value creation and capture depend on actors outside the focal firm's boundaries. Collaboration in ecosystems, particularly in the digital world, is more fluid than traditional formal alliances and often based on complements (Casadesus-Masanell & Yoffie, 2007; Ozcan & Yakis-Douglas, 2020). Overall, ecosystems have distinct roles for firms (Furr & Szerb, 2021; Ozcan & Hannah, 2020), have different possible strategies such as bottleneck and system

strategies (Hannah & Eisenhardt, 2018), and create local interdependencies (Burford, Shipilov, & Furr, 2021) that shape value creation and capture.

Several **driving forces** are increasing the relevance of ecosystems relative to the solo firm in the era of digital transformation. First, with more connectivity possible for previously unconnected products and services, firms require an *increasingly large set of capabilities* (Furr, Dyer, & O’Keeffe, 2016; Ozcan & Eisenhardt, 2009). Developing and maintaining a full set of capabilities spanning old industry divides within a single firm is likely to be costly and risky (Furr & Shipilov, 2018). By contrast, working with an ecosystem of collaborators allows firms to spread the cost of delivering goods and services across multiple partners (and countries) while also opening avenues to previously inaccessible capabilities. For example, smartwatches no longer just tell time but rather also provide important health information. Furr and Shipilov (2018) describe how Korea’s Samsung collaborated with “uncommon partners” such as Nestle, IMEC, and over a dozen start-ups and university projects to develop a smart watch/health monitoring device that they hoped would leapfrog the Apple Watch (Sullivan, 2017).

Second, the *superior integration of complementary components* can provide advantages over solo firms. For example, Apple’s orchestration of an ecosystem of complementary components (ie, physical MP3 player device, music management software, and music acquisition) became possible with the digitization of music which allowed the unbundling of albums into individual songs. Apple’s ecosystem enabled it to dominate and capture disproportionate value in the already established market for MP3 players (Eisenhardt & Bingham, 2017). Further, while ecosystem orchestration can be valuable in any industry, it is particularly useful in digital settings because digital products can often be more easily bundled to create advantages than traditional products. For example, one hurdle in Uber’s global expansion into China was that its competitor Didi put WePay and other digital products into its ecosystem. This ecosystem created greater value than Uber’s solo-firm offering. Similarly, ecosystems can help firms introduce integrated digital tools for faster, cheaper, and/or more accessible transactions and interactions. For instance, Mastercard, Transport for London (TfL), and Cubic Transportation Systems (a maker of equipment like subway turnstiles) created an ecosystem to provide contactless payments. This ecosystem enabled over 1 billion contactless trips per year, and saved TfL over 100 M pounds in annual collection expenses (Furr & Shipilov, 2019).

Finally, ecosystems can enable *new ways to perform core activities*, such as through open innovation, communities, and crowdsourcing. For example, Bremner and Eisenhardt (2022) describe how the community organizing form allowed the US civilian drone company 3DR to discover the dominant quadrotor architecture before competitors. Likewise, Lifshitz-Assaf (2018) describes how crowdsourcing led to a breakthrough at NASA that fundamentally challenged the process, boundaries, and even identity of how scientific work is produced inside the US space agency. Similar activities, such as how Netflix opened its recommendation engine to improvement by individuals outside the firm (Lifshitz-Assaf, Tushman, & Lakhani, 2018) and Maersk used blockchain to coordinate shipping supply chains (Furr & Shipilov, 2018) suggest that ecosystems can alter which activities are best performed within the firm.

Yet there are also **counter forces** to participate in ecosystems by global firms. First, although ecosystems can be critical to value creation and capture, they often require *co-specialization* (Jacobides et al., 2018) which may be difficult to achieve across global boundaries with their different regulatory, technical, and related regimes. For example, global banks looking to build an ecosystem with the most innovative fintechs were hampered by the diverse regulatory regimes of these fintechs (Ozcan & Zachariadis, 2021). Similarly, Furr, Garlandt, and Shipilov (2021) observe that differences between the technical and regulatory regimes in China

and the United States increasingly demand global technology firms to develop separate technology stacks and product teams in the two countries. Finally, data, once viewed as a borderless asset, is increasingly becoming subject to regulatory constraints. This, in turn, requires country-specific ecosystems that are co-specialized to transfer and protect data. An important data-related challenge within global ecosystems is the sharing of data within different coding languages (Ozcan & Zachariadis, 2021).

Second, ecosystems may be less effective for *complex products*—that is, those products that cannot be readily modularized or standardized around interfaces. In their study of civilian drones, Bremner and Eisenhardt (2022) observe, for instance, that communities excel at solving ambiguous problems such as finding alternative drone architectures and simple (ie, modular) problems like designing components for DIY drone kits. In contrast, firms like China's DJI are better at designing complex products like the temperamental drone gimbal. This component required intense coordination by engineers with diverse skills such as mechanical engineering, computer science, and optics—a challenge that proved difficult for 3DR as a global open-source community that operated across countries and languages. Thus, when product development requires extensive coordination and integration, firms as mostly solo independent entities (Bremner & Eisenhardt, 2022) are likely to be most effective (Furr & Shipilov, 2018; Jacobides et al., 2018). This is particularly true under high uncertainty (Furr & Eisenhardt, 2021).

Third, ecosystems involve *unfamiliar roles and strategies* that may puzzle many executives from established firms. This confusion, in turn, can decrease the perceived value created by the ecosystem for focal firms and thus their willingness to participate (Ozcan & Hannah, 2020). For example, bottlenecks often emerge and limit the performance of the ecosystem system as a whole, and influence which firms are able to capture the most value from the collective value created by the ecosystem (Baldwin, 2015; Jacobides & Tae, 2015; Kapoor, 2018). Moreover, simply understanding that bottlenecks exist is insufficient to capture the value created by the ecosystem because the bottleneck type and its evolution influence the appropriate strategies to create and capture value (Furr, Kapoor, & Eisenhardt, 2021). To illustrate, Hannah and Eisenhardt (2018) describe how different ecosystem strategies require different resources—a “system” strategy requires a broad resource set compared to a “component” strategy, while a “bottleneck strategy” of moving to new bottlenecks as they emerge requires the ability to adapt resources quickly. Likewise, some firms play an architect role in orchestrating the parts of the ecosystem which then affects their ability to capture value (Furr & Szerb, 2021; Ozcan & Eisenhardt, 2009). As Furr and Szerb (2021) describe, firms that are the upstream or downstream architects of the ecosystem for other firms typically gain significant performance advantages.

Fourth, *interfirm conflict* about how to organize the roles within the ecosystem or divide the created value can inhibit the benefits of ecosystems (Ozcan & Hannah, 2020; Ozcan & Santos, 2015). Sometimes this conflict can even stymie the formation of the ecosystem. For example, Ozcan and Santos (2015) examine the opportunity for a new mobile payments market at the intersection of two traditionally separate global industries: finance and mobile communications. Despite the attractiveness of the collective (and interdependent) opportunity, the relevant firms (ie, banks and telcos) were unable to cooperate. They had dominant positions in their respective industries and thought mostly in terms of competition (eg, ownership of the customer), not cooperation. Thus, they were ultimately unable to agree on an ecosystem architecture for their respective roles. In other words, cooperation between these potential complementors proved elusive because they lacked shared incentives and views with respect to the ecosystem's architecture of roles and division of created value. The result

was that the banks and telcos created a vacuum that BigTech firms like Apple and Google filled. Yet, in contrast, sometimes these conflicts can be resolved. For example, local banks and telcos in the Nordic countries were able to cooperate in developing and deploying payment apps such as Vipps (Norway) and MobilePay (Denmark) that are now widely used for small transactions.

Interfirm conflict can also arise in existing ecosystems. This conflict can foster rigidities that prevent participating firms or even the entire ecosystem from adapting to external changes that disrupt the ecosystem's roles or power structure. For example, in studying the response of advertising ecosystems to the rise of social media platforms, Ozcan and Hannah (2020) find that in the face of technological change, ecosystem orchestrating firms understood that they needed to restructure the ecosystem. Yet, high-power ecosystem partners blocked the addition of the new social media providers to the ecosystem, which caused delayed and inferior adoption of new media technologies. Such interfirm conflict can also limit ecosystem adaptation to regulatory changes or regulatory differences between countries.

Digital transformation often involves joining or even orchestrating an ecosystem that adds new collaborative sources of value creation. Thus, a major **strategic implication** of digital transformation is to enhance the relevance of ecosystems as an attractive strategy for global firms by speeding the pace and lowering the costs of coordination. Effective ecosystem strategy depends on bringing together relevant members, creating interfaces such as among product components and coaligning the incentives of ecosystem members such that everyone gains from the collective effort (Brunswick et al., 2019). It also depends on a common understanding of each member's role and strategy. A key strategic choice is whether to pursue a component, system, or bottleneck strategy (Hannah & Eisenhardt, 2018). As noted above, each of these strategies has unique resource demands, risks, and opportunities. Another key strategic choice is whether to be an *orchestrator* of the ecosystem, a costly and complex task (Furr & Shipilov, 2018). Orchestrators define the relevant ecosystem architecture and convince others to join (Adner, 2021; Ozcan & Eisenhardt, 2009). They also clarify boundaries and their own role (Ozcan & Hannah, 2020) as well as ensure adequate value creation and distribution of that value to incentivize long-term participation (Jacobides et al., 2018). Orchestrating an ecosystem that has both global and local elements further adds to the complexity of this role. Cross-country differences, for example, in value chains, competitive landscape, or regulations may require a local ecosystem rather than a global one. As in the case of platforms, it may be an effective strategy to join an existing ecosystem early on, but then later orchestrate an ecosystem in countries where the focal firm has a strong operating presence.

Regarding ecosystem **research**, compelling questions remain unanswered. For example, although the existence of ecosystem orchestrators (Furr & Shipilov, 2018) and keystone firms (Jacobides & Tae, 2015; Williamson & De Meyer, 2012) is known, many of their features remain unclear. What are their tactics? What tensions do they spark? Their specific influence on ecosystem emergence and evolution is also under-studied. What are the organizational, legal, and procedural mechanisms that facilitate vs impede cooperation from participants (Brunswick et al., 2019)? What is the right balance to induce participation, but also gain value? These questions provide a rich territory for research (Furr & Shipilov, 2020), and become more complicated (and interesting) when cross-country differences are added to the puzzle. For example, what are best practices for managing ecosystems with both global and local elements? Another significant avenue for future research is to explore how ecosystems might form across national boundaries in order to address critical global issues like climate change and pandemics. Do such ecosystems follow the same evolutionary patterns as ecosystems centered on economic

issues? These and more possibilities suggest the rich range of research opportunities for studying global ecosystems that emerge from digital transformation.

2.3 | Tension 3: People vs tools

A third core tension within digital transformation is people vs tools. Indeed, digital tools are at the very center of our collective conceptualization of digital transformation. By digital tools, we mean software-based applications and algorithms that perform specific tasks. These tools, particularly algorithms, are increasingly able to mimic and even exceed sophisticated human capabilities like pattern recognition and learning. Digital tools include data analytics, machine learning, blockchain, and related technologies that constitute a force often described as “disruptive substitution of humans by algorithms.” But digital tools can also be applications that facilitate activities. Examples include applications like GitHub, Jira, Slack, Trello, SharePoint, Declaree, and Udemy. As an illustration, French unicorn Alan, the first new insurance company in 35 years in France, uses GitHub Discussions to enable asynchronous, transparent decision with the goal of eliminating time and location constraints imposed by meetings.

Yet, despite the promise of digital tools, a path forward, especially for established incumbents, remains foggy. As an illustration, a recent Forbes Insights CXO survey reveals that three out of four top executives declared AI a core component of their digital transformation plans. However, only 11% said their companies have begun implementing an enterprise-wide strategy, and only 2% had serious “data governance” processes in place (Forbes, 2021). Yet, effective application of digital tools is very dependent on data quality. Thus, the delta between the rhetoric of digital tools and the reality remains significant.

The tension between people and digital tools partially arises from differences in their underlying economics. People are mostly non-scale free variable costs. So when a firm grows, its costs grow with it in a roughly linear relationship. This ongoing relationship affects the pace of growth and the underlying capital requirements to fuel that growth. In addition, since people can leave firms, it is critical to continually attract and retain them. In contrast, digital tools are largely scale-free. That is, their costs are primarily the fixed costs of software. So while the development of digital tools is often expensive, their marginal costs are very low. This cost relationship means that firms become increasingly profitable as their revenues grow. Further, digital tools offer 24x7 availability without complaints. They do not leave, ask for wage increases, require motivation, and—for global firms—speak different languages. Thus, the frictions of the employment relationship are avoided.

There are several **driving forces** behind the attractiveness of digital tools relative to people that collectively improve processes, enhance products, and lower costs. First, digital tools *improve efficiency* including error and cost reductions. Digital tools excel at activities such as rule execution, repeated operations, and optimization. For instance, AI is helping governments to respond more efficiently to the thousands of citizen messages that they receive daily. They do so by analyzing text and automating responses, and by employing sentiment analysis on the changing priorities and reactions of the public. Tools like predictive machine learning, a subcategory of AI, and automated A/B testing are also improving the decision processes of managers. Likewise, blockchain-based applications like digital IDs and currency can provide more efficient and reliable transactions, contracts, and activities. Digital tools can improve the efficiency of processes such that products are made more cheaply with better quality. For instance, the German industrial firm Bosch first used cameras to detect potentially defective parts on a

production line, and then humans to re-inspect the same images. The result was that 5%-10% of parts were still defective in the field. By introducing an AI model between the camera and humans, Bosch created a learning loop that reduced the percentage of parts needing re-inspection to 0.5% and the overall defect rate in the field to effectively 0% (Kapoor, 2019).

Digital tools not only improve the efficiency of processes, but they also can improve both processes and products through *enhanced learning*. Automated internal processes and digital platforms to connect to consumers allow increased “datafication”² which, through AI, enable firms to learn from their own processes and customers. For example, US-based Nike offered free access to its Nike Run Club and Nike Training Club platforms during the Covid-19 pandemic. The result was a major increase in available data (10×) about where Nike’s most loyal customers lived, what types of workouts they preferred, and which products they used on a daily basis. These data helped the company to make informed strategic decisions about where to build its physical branches, as well as how to stock its shelves and customize product advertisements (Greenwood, 2021).

Using large data sets (ie, big data) that would overwhelm human cognitive processing, AI tools excel at identifying patterns and optimizing on identified parameters. These tools can be used in digital marketing such as to identify micro-segments, provide more targeted messaging, and identify new customers. For example, Harley Davidson dealerships used machine learning to identify characteristics of the riders who bought their motorcycles, match those characteristics with data about non-customers, and then run hundreds of A/B tests to identify the most effective ways to message these likely customers. The result was a reported three-fold increase in sales at one dealership (Power, 2017). Such tools become particularly powerful when algorithms can become “smarter” with increasing volume, enabling learning advantages that are hard to imitate.

Digital tools also enhance learning by helping firms to identify new opportunities for better products. For example, airlines often discover advantageous flight routes by identifying customer behaviors hidden in their data. To meet consumer demand for faster transactions, PayPal merged historically separate internal units that addressed regulatory compliance and payments requirements to create a new unit organized around a novel digital process for instantaneous transactions (Goldberg, 2020). Using digital tools to redesign its products, Mastercard developed a blockchain-based platform, Provenance, to satisfy customer demand for transparency about the sources of goods (eg, seafood products) that are often fraudulently labeled or sourced (Moore, 2020). Similarly, UnionBank of the Philippines built a blockchain platform to connect rural, underserved banks with the country’s financial system. This provided services for the 70% of Filipinos who remain unbanked or underbanked (Bloomberg, 2019). As these examples suggest, digital tools can help firms develop better products to fit the needs of existing and potential customers.

Digital tools can also enhance learning across traditional organizational and geographic boundaries. For example, a major global beverage manufacturer is aggregating historically separate geographic markets based on one of three archetypes (ie, direct to wholesaler, direct to retailer, and indirect to wholesaler/retailer) and then transacting with these markets using digital interfaces that allow data collection and learning across geographies (Furr, Garlandt, & Shipilov, 2021). Using data in one geographic market, manufacturers can better predict changes in other markets and prepare products in anticipation of shifting consumer demands (Gaarlandt, 2021).

A final driving force toward digital tools is *economies of scale*. As described earlier, digital tools are often primarily comprised of fixed costs. As the number of transactions increases, the

cost per unit decreases. Thus, the very attractive scale economies of digital tools are a critical driving force for their adoption. For example, Tidhar, Hallen, and Eisenhardt (2022) find that firms that aggressively adopt AI reach profitability faster and require less capital to grow than firms that continue to make substantial investments in people but not digital tools. This driving force is likely to be particularly strong in winner-takes-all markets such as those with strong network effects like marketplaces and those with low variable costs like software. Economies of scale are also likely to be important when there are labor shortages that drive up the costs of employing people.

While the driving forces to adopt digital tools are compelling, several **counter forces** exist. These influence how established firms address the tension between tools and people. First, digital tools often require *local implementation*. Furr et al. (2021) suggest three forces pushing for localization: business model, physical/technical infrastructure, and customer journeys. Specifically, they suggest that repeat-transaction business models, like retail, tend to require greater localization than low-touch business models like subscription. This is particularly true for business models where relationships matter (eg, business-to-business transactions), or where emotions (eg, trust) play a significant role. Furthermore, when firms depend more on physical infrastructure (eg, manufacturing and distributing high “weight to price” products that cannot be shipped easily or cheaply) or technology infrastructures (eg, 5G vs 2G networks), then localization is often critical. Finally, if customer journeys are different across geographies, then there is often a need to localize digital tools. For example, in their study of Uber’s entry into different geographic markets, Uzunca et al. (2018) found that Uber needed to adjust its algorithms in developing countries such as Egypt to add features to address local issues like journey-tracking by family members to ensure women’s safety.

Second, differences in *regulatory regimes* often constrain the globalization of digital tools. For example, the General Data Protection Regulation in Europe creates significant constraints on how firms acquire, store and use data. These constraints, in turn, have required changes in the use of digital tools and data that have led to localization of digital tools and negative performance implications for firms (Burford et al., 2021). Likewise, digital tools are often data-dependent in ways that conflict with customers’ privacy concerns and so may slow cross-sector growth (Agrawal, Gans, & Goldfarb, 2018). Such constraints can even lead to the failure of digital tools. Recent work by Büge and Ozcan (2021) explains how Facebook’s cryptocurrency initiative (Libra) largely failed to scale globally due to regulatory resistance in various countries. Moreover, as regulators become increasingly sensitive to the size and monopolistic tendencies of large technology giants, regulatory regimes will likely become a stronger counterforce to the globalization of digital tools. An illustration is the recent US pushback against Chinese companies like Huawei and TikTok.

A third counterforce is the *complex relationship* between humans and their use of digital tools (Sull & Eisenhardt, 2015). Sometimes this is familiar resistance to change (Burgelman, 1994; Huff, Huff, & Thomas, 1992; Rajagopalan & Spreitzer, 1996; Sull, Tedlow, & Rosenbloom, 1997). Sometimes it is a matter of investment in the human capability to use tools. For example, Brynjolfsson et al. (2021) find that predictive analytics tools are more effective in manufacturing plants where firms invested in a better skilled workforce and a high-efficiency production process. But at other times, the relationship between people and tools is more nuanced. For example, Glaeser, Hillis, Kim, Kominers, and Luca (2021) describe how restaurant inspectors continued to prefer their own intuition over the more accurate advice of algorithms, regardless of whether that advice was simple or complicated. Similarly, Tong et al. (2021) describe resistance among younger employees to being “supervised” by algorithms, but

not among more experienced employees. Finally, sometimes this counter force has more to do with infrastructure than people. Ozcan and Zachariadis (2021) observe that many established UK banks were simply not able to adopt AI-based tools since their legacy IT infrastructures depended on an assortment of coding languages from different decades.

Fourth, digital tools are *rarely perfect substitutes* for people. As early AI researcher Hans Moravec argued, machines tend to excel at activities that people do not, such as spotting patterns in large data sets and following instructions exactly. By contrast, humans excel at tacit behaviors such as sensor motor activities and intuitive leaps. Thus, while some tasks are clearly at risk of substitution by digital tools (especially simple and repeated tasks), many other tasks are unlikely to be fully completed using digital tools (Acemoglu, Autor, Hazell, & Restrepo, 2020). For example, Cao, Jiang, Wang, and Yang (2021) built an AI analyst to analyze financial information for investment decisions. The authors find that people and tools have complementary capabilities: Humans outperform AI when contextual information matters while AI outperforms people when the information is voluminous, transparent, and high-dimensional. Yet this initial AI advantage declined over time as humans were able to absorb more information. The authors predict that ultimately digital tools like AI for high-skill professionals will be complements to people rather than substitutes (Cao et al., 2021). Similarly, Agrawal et al. (2018) argue that a combination of digital tools and people has the highest success rate in ambiguous, novel, or holistic settings like cancer detection. These authors underscore a “human in the loop” relationship that will likely characterize the future in which the primary uses of digital tools are people *and* tools, not people *or* tools.

Finally, digital tools can amplify or even generate *societal distortions* in ways that are a strong counterforce to their use. For example, while some tout gig-work platforms like Uber as a global free-lancing platform that empowers workers, others emphasize their short and long-term problems that are *disempowering* a generation of workers who have downgraded their careers without the benefits of full-time employment (Möhlmann & Henfridsson, 2019). Digital tools can also amplify biases. As an illustration, Amazon discovered that artificial intelligence tools used in HR tended to reinforce prior gender biases in hiring. This occurred even when gender-identifying factors such as differences in language usage between men vs women or gaps in working careers due to maternity were explicitly suppressed (Kodiyan, 2019).

A key **strategic implication** of digital transformation is to increase the relevance of digital tools as an attractive global strategy. These tools are particularly germane when firms have substantial data, repeated processes, or compete in winner-takes-all markets. Yet digital tools have other strategic implications as well. An important one is the value of geographic consolidation as a global strategy to gain *economies of skill*. By economies of skill, we refer to crossing geographic boundaries in order to gain the benefits of agglomerating digital talent in one or perhaps a few geographies in order to accelerate learning and specialization. Anecdotal evidence suggests that when individuals are concentrated in a single geographic location, people working on digital technologies are able to learn more quickly from each other and specialize more effectively than when they were spread across multiple geographies (Furr, Shipilov, & Gaarlandt, 2021). For example, global travel platform [Booking.com](https://www.booking.com) purposely concentrates their technical talent in the Netherlands to benefit from economies of skill.

Similarly, there are technical economies of scale that also affect local vs global strategy tradeoffs for using digital tools. For example, a single technical backbone with customization at the nodes is a well-established network design principle known as “end-to-end” design that allows efficiency and flexibility. As the ubiquitous connectivity of the cloud improves, firms can increasingly operate a simple technical backbone from a central operating unit, hosted on the

cloud, and with customization at the nodes (eg, country) level. Major digital-born players like Amazon, Uber, and others employ such global technology backbones with customization at the nodes. But non-digital natives, by contrast, often start with local legacy systems which require hard choices and tradeoffs about where and how to compete.

Another strategic implication is the value of learning lessons about digital tools across geographies. While such cross-geography learning is often important (Shaheer et al., 2020), it can take on a unique character for digital tools. For example, it can be valuable to pay attention to both leading and lagging markets for the implementation of digital tools. In fact, some of the most interesting innovations come from countries like Kenya, where digital technologies leapfrog intermediary technologies. Thus, lagging markets are often different from leading markets with regard to digital transformation, and so should be neither ignored nor assumed easy to digitize.

The tension between tools and people also offers a wide range of **research** opportunities. For example, the driving forces for digital tools have often been anecdotally observed, but not systematically studied. Research could unpack the scale, scope, and boundary conditions for each of these driving forces generally, but also particularly for established firms operating across geographic boundaries. For example, what are the pros and cons of companies like [Booking.com](https://www.booking.com) locating technical talent in a single location? What are the boundary conditions of centralization vs localization? If learning and innovation often benefit from heterogeneity, when do the benefits to diversity (and what kinds of diversity) outweigh the benefits of centralization? Considering the organizational resistance to digital tools, can firms adopt already familiar organization change processes to accompany the integration of new digital tools, as suggested by Furr et al. (2019), or are new processes needed?

Likewise, research could unpack the counter forces in the tension between people and tools. What forces encourage people to adopt digital tools? What role do negative emotions like fear of irrelevance and even replacement play in this adoption (Kim & Norton, 2019)? Can technologies like sentiment analysis help? Finally, a useful research direction is to probe how organizations can create strategies not only for but also *with* digital tools. For example, firms are starting to compose shareholder reports to be read by AI rather than humans (Cao, Jiang, Yang, & Zhang, 2020). What are the implications of such usage for firm strategy and performance?

3 | CONCLUSION

Digital transformation fundamentally challenges the boundaries of activities, industries, and geographies. Thus, it presents a significant paradigmatic shift for global strategy. Yet digital transformation does not entirely remove boundaries—that is, the future is not one of massive, scale-free monopolists that disrupt whole swaths of global industries. Instead, digital transformation sometimes rewrites boundaries such as with the scaling of digital platforms. Yet at other times, digital transformation retains familiar boundaries such as the cultural, linguistic, and regulatory limits to digital platforms. To understand digital transformation, it is essential to move beyond the over-simplified rhetoric of disruption toward the underlying economics and forces and counter forces that frame both critical strategic tradeoffs and future research questions.

Viewed properly, digital transformation is a broad and complex phenomenon that does not fit easily into any given theory. Thus, one challenge is simply defining what digital transformation means in order to create traction for both strategic choice and research. In addition, major

technological advances—exponential growth in computing power, greater ubiquity of connectivity, and big data—are creating a web of technologies that underlie digital transformation, such as AI and blockchain, further complicating the understanding of digital transformation. A third challenge is that digital transformation has its own economics and strategic implications that can differ from those of traditional strategies that rely on resource portfolios and defensible positions. Our central argument is that digital transformation is not an objective state, but rather a strategic choice by executives among an array of alternatives with potentially multi-faceted outcomes. Thus, digital transformation may mean something different across geographies, industries, competitors, or even within the same firm.

To understand digital transformation more deeply requires disaggregating it into tractable constructs and well-defined tradeoffs, while also retaining an appreciation for its systemic complexity. As a first step, we identify three core tensions at the heart of digital transformation—*products vs platforms*, *firms vs ecosystems*, and *people vs tools*. These tensions frame a concrete discussion of strategic alternatives for global companies in the era of digital transformation. For each tension, we articulate the driving forces toward digital transformation (ie, toward platforms, ecosystems, and tools) and their counter forces (ie, toward products, solo firms and people; Table 1). These tensions delineate both a clear foundation for executives to form global strategy and a rich terrain for researchers to tackle related research questions.

In contrast to the common view of “the world disrupted by start-ups,” we emphasize the continued relevance of established companies that serve diverse customer needs, the possibility of multi-finality in strategic choices, and the complementarity between traditional strategies and the strategies of digital transformation. Marriot can coexist with Airbnb just as Carrefour can coexist beside Amazon. These core tensions warn against simplistic claims such as “data is the new oil” and “platforms are eating the world”. For example, although some promote platforms as scale-free organizing forms that violate all known strategy rules, a closer examination of actual platform firms suggests a remarkably linear relationship between employees and revenue, albeit with a different intercept or slope than non-platform firms. These tensions also warn against considering only the upsides of digital transformation while neglecting its downsides. For example, after global fashion brand LVMH bought German footwear company Birkenstock, the development of direct-to-consumer e-commerce promised higher margins. Yet e-commerce also risked losing LVMH’s vaunted global network of independent retailers.

These three core tensions also offer an agenda for research. As the technologies of digital transformation like AI, block chain, and virtual/augmented reality mature, they present new strategy choices for classic research questions like the optimal boundaries of the firm, the strategic value of core capabilities, and the creation and capture of value. Paired with these strategy choices are questions surrounding organizing form and innovation processes. For example, while digital transformation often requires changing organizational processes (Furr et al., 2019), what are the implications for organizing form? How do digital tools support the growing popularity of non-hierarchical organizing forms like small, agile teams at the Dutch bank ING? Likewise, how might digital tools tap into the “collective intelligence” of firms in ways previously impossible (Eisenhardt et al., 2020), such as French-insurer Alan’s use of digital tools to enable transparent, asynchronous operations? Research on digital transformation might also consider novel innovation processes to solve different types of product problems (Bremner & Eisenhardt, 2022) and so stay at an evolving frontier (Furr, 2019).

In some ways, charting a global strategy for digital transformation is familiar. Although it involves developing strategies (and business models) that are enabled by dazzling new technologies, strategy formation comes back to understanding the core tensions, their driving forces and

counter forces, and the focal firm's unique position vis-à-vis other players in its markets. Moreover, as much as digital transformation introduces new possibilities, many of the fundamentals of strategy remain: What are the sources of competitive advantage? How can the firm repurpose those sources to create new advantages? And how can the firm be sufficiently agile to capture waves of incoming opportunities (Eisenhardt & Bingham, 2017; Eisenhardt, Bingham, & Furr, 2011).

Yet in other ways, charting a global strategy for digital transformation is new. For example, Furr and Eisenhardt (2021) describe the increasing relevance of the *strategy creation* view—that is, a strategic perspective that is appropriate for conditions of high uncertainty such as occurring in nascent and transforming markets. These are the very markets that digital transformation often ignites. In contrast with the traditional resource-based and industry-structure perspectives, strategy creation emphasizes learning, strategic thinking, and shaping markets, rather than leveraging resources and erecting barriers to entry. Ozcan and Yakis-Douglas (2020) also emphasize a similar shift away from traditional competitive strategy perspectives, but toward *collaborative strategies*. They ask leaders of global firms to question whether their strategies are additive to their local environment, cooperative with their ecosystem partners, and open to various stakeholders. Although collaborative strategies are not new, digital transformation likely fosters particularly rich blends of collaborative and competitive strategies.

In this paper, our goals were to (a) unpack the puzzle of digital transformation for established firms operating on a global stage and (b) offer a related research agenda. We attempted to offer a more realistic, multi-faceted, and global perspective on digital transformation by looking at what digital transformation looks like around the world, particularly in established companies. If global strategy is about strategy across boundaries, then digital transformation offers the potential to rewrite those boundaries by placing digital transformation at the heart of global strategy. More broadly, digital transformation provides compelling opportunities for both global companies and academic researchers to explore what digital transformation really means for the strategies of most companies.

ENDNOTES

¹ By information technology, we mean the broad definition of using computers to gather, store, and manipulate information or data and not the narrower definition of information systems.

² Datafication is the transformation of previously invisible process/activity into quantified data, thus allowing for real-time tracking and predictive analysis (Mayer-Schonberger & Cukier, 2013).

REFERENCES

- Acemoglu D, Autor D, Hazell J, Restrepo P. (2020). *Ai and jobs: Evidence from online vacancies* (NBER Working Papers No. 28257). National Bureau of Economic Research, Inc. Retrieved from <https://EconPapers.repec.org/RePEc:nbr:nberwo:28257>.
- Akerberg, D. A., & Gowrisankaran, G. (2006). Quantifying equilibrium network externalities in the ach banking industry. *The Rand Journal of Economics*, 37(3), 738–761.
- Adner, R. (2017). Ecosystem as structure: An actionable construct for strategy. *Journal of Management*, 43(1), 39–58.
- Adner, R. (2021). *Winning the right game: How to disrupt, defend, and deliver in a changing world*. Cambridge, MA: MIT Press.
- Adner, R., & Kapoor, R. (2010). Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal*, 31(3), 306–333.

- Adner, R., Puranam, P., & Zhu, F. (2019). What is different about digital strategy? From quantitative to qualitative change. *Strategy Science*, 4(4), 253–261.
- Agrawal, A., Catalini, C., & Goldfarb, A. (2015). Crowdfunding: Geography, social networks, and the timing of investment decisions. *Journal of Economics & Management Strategy*, 24(2), 253–274.
- Agrawal, A., Gans, J., & Goldfarb, A. (2018). *Prediction machines: The simple economics of artificial intelligence*. Brighton, MA: Harvard Business Review Press.
- Autio, E., Mudambi, R., & Yoo, Y. (2021). Digitalization and globalization in a turbulent world: Centrifugal and centripetal forces. *Global Strategy Journal*, 11(1), 3–16.
- Autio, E., & Zander, I. (2016). Lean internationalization. *Academy of Management Proceedings*, 2016, 17420.
- Baldwin C. (2015). *Bottlenecks, modules and dynamic architectural capabilities* (Working Paper).
- Beugelsdijk, S., & Mudambi, R. (2013). MNEs as border-crossing multi-location enterprises: The role of discontinuities in geographic space. *Journal of International Business Studies*, 44(5), 413–426.
- Bloomberg. (2019). Retrieved from <https://www.bloomberg.com/press-releases/2019-10-29/unionbank-s-block-chain-based-i2i-network-powers-financial-inclus>
- Bremner, R. P., & Eisenhardt, K. M. (2022). Organizing form, experimentation, and performance: Innovation in the nascent civilian drone industry. *Organization Science*, 1–28.
- Brunswick, S., Almirall, E., & Majchrzak, A. (2019). Optimizing and satisficing: The interplay between platform architecture and producers' design strategies for platform performance. *MIS Quarterly*, 43(4), 1249–1277.
- Brynjolfsson, E., Rock, D., & Syverson, C. (2021). The productivity J-curve: How intangibles complement general purpose technologies. *American Economic Journal: Macroeconomics*, 13(1), 333–372.
- Buge, M., & Ozcan, P. (2021). Platform scaling: Fast and slow. *MIT Sloan Management Review*, 62(3), 40–46.
- Burford, N., Shipilov, A., & Furr, N. (2021). How ecosystem structure affects firm performance in response to a negative shock to interdependencies. *Strategic Management Journal*, 43(1), 30–57.
- Burgelman, R. A. (1994). Fading memories: A process theory of strategic business exit in dynamic environments. *Administrative Science Quarterly*, 39, 24–56.
- Burtch, G., Ghose, A., & Wattal, S. (2015). The hidden cost of accommodating crowdfunder privacy preferences: A randomized field experiment. *Management Science*, 61(5), 949–962.
- Cao S, Jiang W, Wang J, Yang B. (2021). *From man vs. machine to man + machine: The art and AI of stock analyses* (Working Paper).
- Cao, S., Jiang, W., Yang, B., & Zhang, A. L. (2020). *How to talk when a machine is listening: Corporate disclosure in the age of AI*. National Bureau of Economic Research.
- Casadesus-Masanell, R., & Yoffie, D. B. (2007). Wintel: Cooperation and conflict. *Management Science*, 53(4), 584–598.
- Chen, W., Hua, Z., Zhang, Z. G., & Bi, W. (2018). Analysis of freemium business model considering network externalities and consumer uncertainty. *Journal of Systems Science and Systems Engineering*, 27(1), 78–105.
- Cusumano, M. A., Gawer, A., & Yoffie, D. B. (2019). *The business of platforms: Strategy in the age of digital competition, innovation, and power*. New York, NY: Harper Business New York.
- Davis, J. P., & Eisenhardt, K. M. (2011). Rotating leadership and collaborative innovation: Recombination processes in symbiotic relationships. *Administrative Science Quarterly*, 56(2), 159–201.
- Eisenhardt, K., Bingham, C., & Furr, N. (2011). Which strategy and when? *Sloan Management Review*, 53, 71–78.
- Eisenhardt, K. M., & Bingham, C. B. (2017). Superior strategy in entrepreneurial settings: Thinking, doing, and the logic of opportunity. *Strategy Science*, 2(4), 246–257.
- Eisenhardt, K. M., & Schoonhoven, C. B. (1996). Resource-based view of strategic alliance formation: Strategic and social effects in entrepreneurial firms. *Organization Science*, 7(2), 136–150.
- Eisenmann, T., Parker, G., & Van Alstyne, M. W. (2006). Strategies for two-sided markets. *Harvard Business Review*, 84(10), 92.
- Ethiraj, S. K. (2007). Allocation of inventive effort in complex product systems. *Strategic Management Journal*, 28(6), 563–584.
- Farmer, J. D., & Lafond, F. (2016). How predictable is technological progress? *Research Policy*, 45(3), 647–665.
- Forbes. (2021). Retrieved from <https://www.forbes.com/sites/forbespr/2021/02/11/forbes-2021-cxo-growth-survey-reveals-c-suite-executives-are-optimistic-about-a-recovery-prioritizing-digital-transformation-customer-experience-talent-brand-purpose/>

- Furr, N. (2019). Product adaptation during new industry emergence: The role of start-up team pre-entry experience. *Organization Science*, 30(5), 1076–1096.
- Furr, N., Dyer, J., & O’Keefe, K. (2016). Managing multi-party innovation. *Harvard Business Review*, 94(11), 76–83.
- Furr, N., & Eisenhardt, K. (2021). Strategy and uncertainty: Resource-based view, strategy creation view, and the hybrid between them. *Journal of Management*, 47, 1915–1935.
- Furr N, Garlandt J, Shipilov A. (2021). Should your global firm centralize digital operations. *Harvard Business Review*. Retrieved from <https://hbr.org/2021/2010/should-your-global-firm-centralize-digital-operations>
- Furr N, Kapoor R, Eisenhardt KM. (2021). *Bottlenecks and technology industry emergence* (Working Paper).
- Furr, N., & Shipilov, A. (2018). Building the right ecosystem for innovation. *Sloan Management Review*, 59(4), 59–64.
- Furr, N., & Shipilov, A. (2019). Digital doesn’t have to be disruptive. *Harvard Business Review*, 97(4), 94–104.
- Furr, N., & Shipilov, A. (2020). A playbook for creating adaptive ecosystems. In S. Crainer (Ed.), *The power of ecosystems*. London, UK: Thinkers 50.
- Furr N, Shipilov A, Gaarlandt J. (2021). *Is digital global* (Working Paper).
- Furr N, Szerb A. (2021). *Architects and bottlenecks: Ecosystem roles in the solar photovoltaic industry* (Working Paper).
- Gaarlandt J. (2021). Personal interview with Jur Gaarlandt, Partner at Spark Optimus. March 10, 2020.
- Gawer, A. (2014). Bridging differing perspectives on technological platforms: Toward an integrative framework. *Research Policy*, 43(7), 1239–1249.
- Gawer, A., & Cusumano, M. A. (2008). How companies become platform leaders. *MIT Sloan Management Review*, 49(2), 28.
- Ghemawat, P. (2003). Semiglobalization and international business strategy. *Journal of International Business Studies*, 34(2), 138–152.
- Ghemawat, P. (2017). *The laws of globalization and business applications*. Cambridge, UK: Cambridge University Press.
- Glaeser EL, Hillis A, Kim H, Kominers SD, Luca M. (2021). *Decision authority and the returns to algorithms* (Working Paper).
- Goldberg A. (2020). Personal interview by Nathan Furr with Arnold Goldberg, Executive Vice President, Paypal. September 16, 2020.
- Greenwood, M. (2021, February 23). Nike’s digital ecosystem paved the way for D2C transformation. *Brain-Station*. Retrieved from <https://brainstation.io/magazine/nikes-digital-ecosystem-paved-the-way-for-d2c-transformation>
- Hagiu, A., & Altman, E. J. (2017). Finding the platform in your product. *Harvard Business Review*, 95(4), 94–100.
- Hannah, D. P., & Eisenhardt, K. M. (2018). How firms navigate cooperation and competition in nascent ecosystems. *Strategic Management Journal*, 39(12), 3163–3192.
- Head, K., & Mayer, T. (2013). What separates us? Sources of resistance to globalization. *Canadian Journal of Economics/Revue Canadienne d’économique*, 46(4), 1196–1231.
- Hortaçsu, A., Martínez-Jerez, F., & Douglas, J. (2009). The geography of trade in online transactions: Evidence from ebay and mercadolibre. *American Economic Journal: Microeconomics*, 1(1), 53–74.
- Huff, J. O., Huff, A. S., & Thomas, H. (1992). Strategic renewal and the interaction of cumulative stress and inertia. *Strategic Management Journal*, 13, 55–75.
- ITU. (2021). *Measuring digital developments: Facts and figures 2020*. Geneva, Switzerland: ITU Publications.
- Jacobides, M. G., Cennamo, C., & Gawer, A. (2018). Towards a theory of ecosystems. *Strategic Management Journal*, 39(8), 2255–2276.
- Jacobides, M. G., & Tae, C. J. (2015). Kingpins, bottlenecks, and value dynamics along a sector. *Organization Science*, 26(3), 889–907.
- Kapoor, R. (2018). Ecosystems: Broadening the locus of value creation. *Journal of Organization Design*, 7(1), 1–16.
- Kapoor R. (2019). Industrial AI at Bosch. In Bosch (Ed.), Bosch Center for Artificial Intelligence.
- Kapoor, R., & Furr, N. (2015). Complementarities and competition: Unpacking the drivers of entrants’ technology choices in the solar photovoltaic industry. *Strategic Management Journal*, 36(3), 416–436.

- Katila, R., Piezunka, H., Reineke, P., & Eisenhardt, K. M. (2022). Big fish versus big pond? Entrepreneurs, established firms, and antecedents of tie formation. *Academy of Management Journal*, 65(2), 427–452. <https://doi.org/10.5465/amj.2018.1197>
- Katz, M. L., & Shapiro, C. (1994). Systems competition and network effects. *Journal of Economic Perspectives*, 8(2), 93–115.
- Kim H, Norton M. (2019). *Aligning employee effort to strategic change: The role of gift exchange* (Working Paper).
- Knee, J. A. (2021). *The platform delusion: Who wins and who loses in the age of tech titans*. New York, NY: Penguin.
- Kodiyan, A. A. (2019). An overview of ethical issues in using AI systems in hiring with a case study of Amazon's AI based hiring tool. *Researchgate Preprint*, 1–19.
- Koo, W. W., & Eesley, C. E. (2021). Platform governance and the rural–urban divide: Sellers' responses to design change. *Strategic Management Journal*, 42(5), 941–967.
- Lifshitz-Assaf, H. (2018). Dismantling knowledge boundaries at NASA: The critical role of professional identity in open innovation. *Administrative Science Quarterly*, 63(4), 746–782.
- Lifshitz-Assaf H, Tushman M, Lakhani KR. (2018). A study of NASA scientists shows how to overcome barriers to open innovation. *Harvard Business Review*.
- Manyika, J., Lund, S., Bughin, J., Woetzel, J., Stamenov, K., & Dhingra, D. (2016). *Digital globalization: The new era of global flows* (pp. 1–156). New York, NY: McKinsey Global Institute.
- Mayer-Schönberger, V., & Cukier, K. (2013). *Big data: A revolution that will transform how we live, work, and think*. Boston, MA: Houghton Mifflin Harcourt.
- Möhlmann, M., & Henfridsson, O. (2019). What people hate about being managed by algorithms, according to a study of uber drivers. *Harvard Business Review*, 30, 1–16.
- Monaghan, S., Tippmann, E., & Coviello, N. (2020). Born digitals: Thoughts on their internationalization and a research agenda. *Journal of International Business Studies*, 51(1), 11–22.
- Moore K. (2020). Personal interview with Ken Moore, Chief Innovation Officer at Mastercard. May 4, 2017.
- Ott, T. E., & Eisenhardt, K. M. (2020). Decision weaving: Forming novel, complex strategy in entrepreneurial settings. *Strategic Management Journal*, 41, 2275–2314.
- Ozcan, P., & Eisenhardt, K. (2009). Origin of alliance portfolios: Entrepreneurs, network strategies, and firm performance. *Academy of Management Journal*, 52(2), 246–279.
- Ozcan, P., & Hannah, D. (2020). Forced ecosystems and digital stepchildren: Reconfiguring advertising suppliers to realize disruptive social media technology. *Strategy Science*, 5(3), 193–217.
- Ozcan, P., & Santos, F. M. (2015). The market that never was: Turf wars and failed alliances in mobile payments. *Strategic Management Journal*, 36(10), 1486–1512.
- Ozcan, P., & Yakis-Douglas, B. (2020). Digitalization and its strategic implications for the multinational enterprise. In *The oxford handbook of international business strategy*. Oxford, UK: Oxford University Press.
- Ozcan, P., & Zachariadis, M. (2021). *Open banking as a catalyst for industry transformation: Lessons learned from implementing PSD2 in Europe*. Swift Institute Report. Oxford, UK: Oxford University Press.
- Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). *Platform revolution: How networked markets are transforming the economy and how to make them work for you*. New York, NY: WW Norton & Company.
- Power, B. (2017). How Harley-Davidson used artificial intelligence to increase New York sales leads by 2,930%. *Harvard Business Review*, 30, 2017.
- Rajagopalan, N., & Spreitzer, G. M. (1996). Toward a theory of strategic change: A multi-lens perspective and integrative framework. *Academy of Management Review*, 22(1), 48–79.
- Rietveld, J., & Schilling, M. A. (2021). Platform competition: A systematic and interdisciplinary review of the literature. *Journal of Management*, 47, 1528–1563.
- Shaheer, N., Li, S., & Priem, R. (2020). Revisiting location in a digital age: How can lead markets accelerate the internationalization of mobile apps? *Journal of International Marketing*, 28(4), 21–40.
- Sherman, A. (2020). *Tiktok reveals detailed user numbers for the first time* (Vol. 2021). CNBC. <https://www.cnbc.com/2020/08/24/tiktok-reveals-us-global-user-growth-numbers-for-first-time.html>
- Stallkamp, M., Pinkham, B. C., Schotter, A. P., & Buchel, O. (2018). Core or periphery? The effects of country-of-origin agglomerations on the within-country expansion of MNEs. *Journal of International Business Studies*, 49(8), 942–966.

- Stallkamp, M., & Schotter, A. P. (2021). Platforms without borders? The international strategies of digital platform firms. *Global Strategy Journal, 11*(1), 58–80.
- Sturgeon, T. J. (2021). Upgrading strategies for the digital economy. *Global Strategy Journal, 11*(1), 34–57.
- Sull, D. N., & Eisenhardt, K. M. (2015). *Simple rules: How to thrive in a complex world*. Boston, MA: Houghton Mifflin Harcourt.
- Sull, D. N., Tedlow, R. S., & Rosenbloom, R. S. (1997). Managerial commitments and technological change in the US tire industry. *Industrial & Corporate Change, 6*(2), 461–501.
- Sullivan M. (2017). How samsung's simband tried to preempt the apple watch (and why it didn't work). *Fast Company*. Retrieved from <https://www.fastcompany.com/3068719>
- Takhteyev, Y., Gruzd, A., & Wellman, B. (2012). Geography of Twitter networks. *Social Networks, 34*(1), 73–81.
- Tidhar R, Hallen B, Eisenhardt KM (2022). *Measure twice, cut once: Achieving exceptional growth in nascent markets* (Working Paper).
- Tong, S., Jia, N., Luo, X., & Fang, Z. (2021). The Janus face of artificial intelligence feedback: Deployment versus disclosure effects on employee performance. *Strategic Management Journal, 42*(9), 1600–1631.
- Tuckel P, O'Neill H. (2006). *Ownership and usage patterns of cell phones: 2000–2005*. Paper presented at the second international conference on telephone survey methodology, January, Vol. 13.
- Uzunca, B., Rigtering, J. C., & Ozcan, P. (2018). Sharing and shaping: A cross-country comparison of how sharing economy firms shape their institutional environment to gain legitimacy. *Academy of Management Discoveries, 4*(3), 248–272.
- Williamson, P. J., & De Meyer, A. (2012). Ecosystem advantage: How to successfully harness the power of partners. *California Management Review, 55*(1), 24–46.
- Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). Research commentary—The new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research, 21*(4), 724–735.
- Zachariadis, M., & Ozcan, P. (2017). *Open APIs and the transformation of banking in the UK*. SWIFT Institute Industry Report.
- Zaheer, S., & Manrakhan, S. (2001). Concentration and dispersion in global industries: Remote electronic access and the location of economic activities. *Journal of International Business Studies, 32*(4), 667–686.
- Zhu, F., & Furr, N. (2016). Products to platforms: Making the leap. *Harvard Business Review, 94*(4), 72–78.
- Zhu, F., & Liu, Q. (2018). Competing with complementors: An empirical look at Amazon.com. *Strategic Management Journal, 39*(10), 2618–2642.

How to cite this article: Furr, N., Ozcan, P., & Eisenhardt, K. M. (2022). What is digital transformation? Core tensions facing established companies on the global stage. *Global Strategy Journal, 12*(4), 595–618. <https://doi.org/10.1002/gsj.1442>