Born global on blockchain

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Abstract

Purpose – The purpose of this paper is to alert international business (IB) and international entrepreneurship (IE) researchers of a new phenomenon and novel research opportunities arising as a result of digital innovations brought about by the new, decentralized internet popularly known as “blockchain”. The paper contains a general overview of the blockchain technology and maps connections with the IB/IE literature, focusing on explaining accelerated internationalization of firms that are born global on blockchain.

Design/methodology/approach – The paper is a viewpoint based on the author’s ongoing research on blockchain and fintech and reflections on the born global literature. The paper has benefited from the author’s insights through her involvement in the global blockchain community as an investor and advisor.

Findings – The author argues for establishing a theoretical link between the born global literature and the literature on the economics of information goods and platform economics to explain the pace of international growth in the context of blockchain start-ups.

Research limitations/implications – The author urges IB/IE researchers to pay attention to research opportunities in the blockchain area, especially those related to explaining rapid internationalization of digital start-ups and a new organizational form for organizing cross-border activities known as decentralized autonomous organization.

Originality/value – Three factors are shown to contribute to a rapid internationalization of blockchain start-ups: network effects, solving the chicken-and-egg problem and building an ecosystem around the evolving technology.

Keywords Internationalization, Blockchain, Born global firm, Information goods

Paper type Viewpoint

[...]The Blockchain can change [...] well everything. Goldman Sachs, Emerging Theme Radar, 2 December 2015.

Introduction

Recently, Doh (2017, p. 14) made a strong case for a return to a phenomenon-based research, which could help to “re-establish the field of international business as a leading contributor to scholarly research but also of a practical impact on both public policy and corporate strategy”. This sentiment is echoed by other respectable international business (IB) scholars: for example, Delios (2017, p. 391) argued provocatively that the vibrancy of the world of IB and its media coverage has not been matched by IB research and journal publications. The purpose of this paper is to alert IB and international entrepreneurship (IE) researchers to a new phenomenon – an emerging distinct group of technology start-ups and novel research opportunities arising as a result of unprecedented digital innovations unleashed by the new, decentralized internet (Web 3.0), popularly referred to as “distributed ledger technology” (DLT) or simply blockchain[1]. The paper is a viewpoint based on the author’s ongoing research into blockchain and fintech and reflections on the born global literature, and has benefited from the author’s insights through her involvement in the global blockchain community as an investor and advisor.
According to the World Economic Forum (2015), by 2025 10 per cent of the world’s GDP (currently about $100tn) may be on blockchain. As of late 2017, there is a rapidly growing population of start-ups innovating across various segments of this highly dynamic industry, with a total market capitalization of approximately $180bn[2]. One of the start-ups, Ethereum Foundation based in Zug, Switzerland, is the third fastest growing digital unicorn (1.5 years) compared to the top 20 US unicorns, behind Magic Leap and Snap, and way ahead of AirBnB, Uber and Dropbox (Felix, 2017). Currently, every major country has a digital currency exchange and almost every large financial institution in the world, including central banks (Mills et al., 2016), is engaged in blockchain research (Gupta, 2017), as this is the first sector which faces existential threat from the new technology. In addition, many governments around the world have adopted or are in the process of adopting blockchain technologies to improve the efficiency in the public sector – Georgia’s land titles initiative and Dubai’s 2020 blockchain strategy ranging from Kimberley certificates to secure diamond trade to digital identities are prominent examples (IBM/EIU, 2016; Government of Dubai, 2016).

The academic and practitioner literature on blockchain has been growing rapidly. The first papers were highly technical in nature and aimed at developers (Nakamoto, 2008; Buterin, 2014); innovation occurred at the edges of society[3], and the technology was understood and adopted only by a handful of computer geeks, techno-libertarians and a small pool of savvy investors and speculators. Starting from the mid-2010s, however, blockchain and cryptocurrencies slowly entered the mainstream, and there has been a surge of business-related articles, books, white papers and reports from financial institutions and consultants, focused on explaining the technology and its economic benefits and implications for various industry sectors, governments and society at large (Antonopoulos, 2015; Atziori, 2015; Mougayar, 2016; Davidson et al., 2016; Tapscott and Tapscott, 2016; Iansiti and Lakhani, 2017). Public awareness of the technology has also been increasing steadily: for example, in late May 2017, “bitcoin” and “ethereum” (two leading blockchain protocols) were among the most popular search terms on Google Trends (Altcointoday, 2017), while in July 2017, Forbes featured a prominent blockchain investor, Olaf Carlson-Wee, on its front cover.

This level of attention by business and media has not been matched by interest from IB/IE scholars, at least not to my knowledge. The blockchain ecosystem represents a significant research opportunity, as it enables to study a population of highly innovative firms literally at birth. Most of these start-ups are at a very early R&D stage (alpha and beta), with many not even having a minimum viable product. These start-ups are genuinely “born global” (Rennie, 1993), as there are no technical restrictions on blockchain deployment because it is open sourced, decentralized and globally distributed by its very nature[4], and a start-up’s developer teams, funders, users and exchanges listing their tokens can be located anywhere around the globe. Many ventures capitalize on administrative arbitrage opportunities and are incorporated in Switzerland, Singapore or Gibraltar countries with favorable institutional frameworks. Moreover, blockchains, through smart contracts technology, make possible the so-called “decentralized autonomous organizations” (DAOs) – entities (profit and non-profit) that exist purely on the internet with no real-world footprint, and whose rules of association exist only as programmable contracts on the blockchain (Buterin, 2017). The very meaning of “national borders”, “modes of entry” (e.g. exporting, FDI) and even “firm” (a DAO can be run without human managerial involvement) changes in the blockchain context.

The first part of the paper is intentionally descriptive and contains a general overview of blockchains and the global blockchain ecosystem. The second part of the paper connects
with the IB/IE body of literature, focusing, in particular, on how one can explain accelerated internationalization of firms which I call “born global on blockchain”.

**Blockchain’s fundamentals**

The technology, which is replacing the “internet of information” (i.e. the current internet) with the “internet of value” (Tapscott and Tapscott, 2016), emerged as a result of two path-breaking innovations at the intersection of computer science, cryptography and economics (particularly game theory). In 2008, a developer (or a group of developers) known as Satoshi Nakamoto published a technical white paper which laid the foundation of an open source, public, distributed and peer-to-peer exchange of bitcoin, a digital currency which allowed pseudonymous, verifiable and immutable online payments without the need of a financial intermediary (Nakamoto, 2008). Bitcoin has a scarcity value similar to gold and unlike fiat money, as only 21 million bitcoins will ever be mined[5]. The second breakthrough came in 2014, when Vitalik Buterin and his core team of developers, in recognition of the limitations of the bitcoin blockchain (bitcoin was designed to be used only as a payment system), developed a second-generation blockchain called Ethereum (Buterin, 2014). Ethereum is a shared global computer infrastructure focused on running the programming code of any decentralized application (known as dApp). Ethereum enables “smart contracts” – computer codes that can facilitate the exchange of anything of value (money, content, property, shares, etc.) and represent the ownership of digital property. Smart contracts automatically execute when specific conditions are met and run exactly as programmed without any possibility of censorship, downtime, fraud or third-party interference (Ethereum.org, 2017). It is precisely the use of smart contracts that enables trustless peer-to-peer transactions of value without the high costs of intermediaries like banks, Uber, AirBnB, Upwork or stock exchanges. As both bitcoin and smart contracts are built on top of novel internet protocols, the latter inspired many other financial and non-financial applications, including private blockchains (e.g. developed by banks), resulting in a vibrant and constantly growing ecosystem.

The predictable areas blockchain technology is set to transform include financial services, insurance, cybersecurity, elections, energy, logistics, identity, legal, governance and health care (Evans, 2017). As of mid-2017, the size of the Blockchain ecosystem is somewhat difficult to determine with accuracy (it is a dynamic space, with many new entries and exists). Venturescanner lists over 900 Bitcoin-based start-ups (venturescanner.com) alone, and AngeList cites 760 companies (based on multiple blockchains). The population of start-ups can be divided into four segments: protocols and infrastructure, middleware and DevTech, capital and liquidity and applications (Ruppert, nd) (see Table I with the segments and representative companies). In addition to start-ups, developers and investors, including traditional investors, many corporates have established alliances with blockchain start-ups: for example, the largest consortium, Ethereum Enterprise Alliance, counts some 150 members, including Microsoft, J.P. Morgan, Credit Suisse, Intel, Accenture, Cisco and Wipro.

While the media tends to depict blockchain as a “disruptive” or “enabling” technology, it is neither – blockchain is a transformative technology akin to steam and electricity, which will create new economic and social foundations (Iansiti and Lakhani, 2017). From a technical perspective, as described by Buterin (2014), a blockchain is a decentralized network that has a common shared memory (“state”), which is updated by processing inputs (“transactions”) coming in from the outside, according to a set of prescribed rules (“the protocol”). Importantly, this is done without any central coordination or single point of potential failure. Blockchains use cryptographic incentives to achieve information security goals: cryptography can validate transactions that happened in the past, while economic incentives ensure that the desired properties of the system (e.g. creating a chain of blocks, or
a history of transactions) hold into the future. Validators (nodes in the distributed network called “miners” in some blockchains such as bitcoin) solve complex computational puzzles to ensure the integrity of the blockchain (i.e. verify and timestamp the transactions). These validators get rewarded algorithmically with coins (e.g. bitcoins) and/or transaction fees (Evans, 2014).

From a business perspective, a blockchain can be thought of as a distributed database (ledger) used to produce consensus about the facts that are necessary for commerce to function; such ledgers are the basic transactional recording technology at the heart of all modern economies. Blockchain represents a new approach to producing consensus which does not require a centralized trust mechanism, overturning the old technology of ledgers that needed to be centralized to be trusted (Davidson et al., 2016) and in the process disintermediating traditional institutions of trust such as banks, governments and large firms, which are the pillars of modern capitalism. More broadly, blockchain is a new decentralized web, the way the web was originally envisioned by its inventors, but, arguably, became subject to control and misuse by governments (who often limit citizens’ access to the internet) and large corporations such as Amazon and Facebook (who misuse private data) (Hardy, 2016).

The way economic value is built and captured on a blockchain differs substantially from the current internet. The previous generation of public shared protocols (TCP/IP, HTTP, SMTP, etc.) created disproportionate amounts of value, but most of it was captured on top of the applications layer, largely in the form of users’ data by private companies like Facebook

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Table I. Blockchain start-ups, 2017

Source: Based on Ruppert (nd)
and Google. The current Web 2.0 stack, in terms of how value is distributed, is composed of “thin” protocols (about 15 per cent of value) and “fat” applications (the rest) (Monegro, 2014, 2016). Accordingly, the associated corporate model of any company that relies on databases with data boils down to capturing, privatizing and monopolizing the data; creating scarcity by preventing access; and repackaging and selling the data (Waters, 2017). This value distribution is reversed in blockchains: value concentrates at the shared protocol layer, with only a fraction of that value being captured at the applications layer, resulting in a stack with “fat” protocols and “thin” applications. This reduces barriers to entry for new players and creates a more competitive ecosystem of products and services on top. Such partition of value in most public blockchain protocols is caused by the shared data layer, the code that is by default open source and the introduction of a cryptographic token with fundamental and speculative value (Monegro, 2016, Waters, 2017).

Tokens and ICOs
Tokens[6] – also referred to as coins, digital currencies or cryptocurrencies – are digital money that can be exchanged online, using cryptographic hashing and digital signatures to verify transactions and avoid double spending of the same token. Cryptocurrencies are a special asset class[7]: as Wang and Vergne (2017) suggest, a cryptocurrency should be best seen as “synthetic commodity money” which resembles both fiat money in having no non-monetary value and commodity money in being scarce. Unlike fiat money, cryptocurrencies are technological platforms entailing a true innovation potential (Wang and Vergne, 2017)[8]. Cryptocurrencies also have features of traditional equity, in that they denote an investor’s ownership in a start-up issuing the token. Equity, however, incentivizes the holders to concentrate the equity, as it represents a perpetual right to profits. Tokens, on the other hand, have an intrinsic use in that they incentivize wide adoption of a particular technology, leading the value being distributed more broadly. For entrepreneurs, tokens are more attractive than traditional equity financing because they are non-dilutive (Srinivasan, 2017).

The token plays an important role in the blockchain ecosystem, facilitating open protocol innovation, funding R&D, creating value for shareholders and enabling demand-side economies of scale and user adoption of the new technology and dApps. As an example, Numerai (an Ethereum-based hedge fund) has distributed its tokens to about 19,000 AI scientists globally to incentivize them, through an auction system, to develop better prediction algorithms for trading. In a decentralized web, the token model replaces the current “free” advertising model[9], solves the proverbial chicken-and-egg problem characteristic of digital network businesses (Caillaud and Jullien, 2003) and, therefore, makes the innovation and monetization of protocols, where most of the economic value is created, possible (Ehrams, 2016; Monegro, 2016).

The blockchain ecosystem has pioneered a new approach to funding innovation through initial coin offerings (ICOs) (also known as “token sales”), and some industry observers believe that in future, ICOs will become the standard in funding other, non-blockchain start-ups. This new fundraising phenomenon is well described in Kastelein (2017) and Lundy et al. (2018). As suggested by Naval Ravikant (2014), a reputable venture capitalist, “Bitcoin is more than money and more than a protocol. It’s a model and platform for true crowdfunding – open, distributed, and liquid all the way.”

An ICO is an event in a technology project that uses digital (cryptographic) tokens where part of its token pool is exchanged for other currency to a community of developers and early adopters. ICOs are used to fund the development of technical blockchain infrastructure and applications with high upfront capital requirements. They democratize the funding process and give the opportunity to ordinary (non-qualified) investors to participate in
supporting early stage companies. In the pre-ICO era, only professional investors (i.e. angel investors and venture capitalists) had privileged access to early stage start-ups like Uber, Google, Amazon and Facebook. In the first half of 2017, ICOs raised some $1.27bn (Coindesk, 2017) with just one company, Bancor, raising over $150m in three h, and another one, BAT (Basic Attention Token), reaching its target of $35m in less than 30 s. Investors, including traditional venture capitalists, are attracted to ICOs because of an opportunity for extraordinary high, even though very risky, financial returns[10] and liquidity – unlike with private equity-backed start-ups, where investors have to wait several years to exit, ICO investors can easily exit their investments by selling their tokens for other cryptocurrency or fiat money on exchanges.

Connections to the international business/international entrepreneurship literature

The second part of the paper suggests how research on blockchain-based start-ups can advance theory of born global firms. Many authors (Rialp et al., 2005) suggest that theory of born globals/BGs/international new ventures (INVs) is incomplete, and significant lacunae in our knowledge of these firms remain. For example, Cavusgil and Knight (2015) argue that relatively few studies are grounded in robust theoretical perspectives; hence, researchers should be aiming to expand the theoretical base of BG firms beyond the Uppsala model of gradual internationalization (Johanson and Wiedersheim-Paul, 1975; Johanson and Vahlne, 1977) or the network theory perspective (Coviello, 2006; Madsen and Servais, 1997; Oviatt and McDougall, 2005) to incorporate, for example, the resource- and knowledge-based perspective (Knight and Cavusgil, 2004; Rialp et al., 2005; Weerawardena et al., 2007; Cavusgil and Knight, 2015). These bodies of literature are comprehensively reviewed in recent studies by Hennart (2014); Zander et al. (2015); Cavusgil and Knight (2015) and Dow (2017) and so will not be rehearsed here.

Instead, following Mahnke and Venzin’s (2003) work on the internationalization process of digital good providers and Siddiqui and Li (2017) on the effects of cultural, administrative, geographic and economic (CAGE) distance (Ghemawat, 2007) on digital start-ups, I argue for establishing a theoretical link between the BG/INV literature on the one hand and the literature on the economics of information goods and platform economics on the other, to explain, in particular, the pace of international growth in the context of blockchain-based new ventures. This is consistent with Knight and Liesch (2016) argument that our understanding of the nexus between technology and early internationalization remains superficial[11]. So far, the emergence of BG/INV has been modelled in terms of:

- unique firm-specific resources and capabilities;
- use of non-equity modes of entry into foreign markets;
- dramatic decrease in communications and transportation costs; and
- the business model (Hennart, 2014).

My focus is on the last factor, the one advanced by Hennart (2014, p. 129). Hennart’s argument is that “[...] the speed with which firms can develop their international sales, and hence the probability that they will be INVs/BGs, depends on the business model they are implementing, that is, on the way they have linked the type of product or service they sell with a particular subgroup of customers using a specific communication and delivery method”. While many researchers attributed the fast internationalization of INVs/BGs to their selling knowledge-intensive products, the key difference between INVs/BGs and other firms, in Hennart’s analysis, is to be found in their business model: INVs/BGs sell niche
products and services to internationally dispersed customers using low-cost information and delivery methods. Dow (2017) finds partial support for Hennart’s (2014) proposition. My argument is somewhat similar to that of Hennart: the very nature of information goods facilitates rapid global growth, and this is true of many digital start-ups, not just blockchain-based ones, as Siddiqui and Li (2017) have shown. Unlike Hennart (2014), however, I would not call these start-ups “accidental internationalists”, as their founders consciously and deliberately seek global (or at least regional) scale early on. A case in point is Golem, described as the AirBnB of computing, which aims to rent idle power on existing devices, from smartphones to computers to any user (individual or corporate) who requires large amounts of computational power such as for movie rendering or medical research. These blockchain entrepreneurs understand the economics of information goods and the power of global network effects ensuring the product’s adoption by large numbers of globally dispersed users simultaneously. Parenthetically, the profile of these entrepreneurs – usually very young and large teams of talented people with significant funds raised through ICOs, sometimes preceded by traditional risk capital investments – is rather different from the typical “resource-constrained” BG start-up (Zander et al., 2015).[12].So what is different about information goods that may impact the pace of internationalization? Information good is a type of good whose market value is derived from the information it contains and can exist in either digitized or analogue format (Varian, 1998). Digitization has enabled the detachment of information goods from the medium of transfer, impacting the production, exchange and consumption of information (Vafopoulos, 2012). Commonly used examples of information goods are digital goods such as computer software (OS, applications, games, etc.) and online services ranging from internet search engines and portals to online content (e.g. Dow Jones and Reuters) (Jones and Mendelson, 2011). Supporting infrastructure (e.g. datacenters, mobile devices and cloud computing) makes the information more accessible and, therefore, more valuable. Information goods have a number of distinguishing characteristics from most tangible goods, but the ones that receive special attention in the economics and strategy literature are unique cost structure (high fixed, but near zero marginal costs of reproduction and distribution and infinite economies of scale), properties of “public goods” (more than one person can use them at the same time) and network effects (Katz and Shapiro, 1985; Arthur, 1996; Varian, 1998; Hand, 2003; Quah, 2003; Rochet and Tirole, 2003; Evans and Schmalensee, 2005; Eisenmann et al., 2006; Hagiu, 2014). Given that blockchain start-ups and associated tokens are best viewed as technological platforms connecting various groups of users (Wang and Vergne, 2017), as discussed earlier in the paper, platform economics literature (Gawer and Cusumano, 2008; Evans and Schmalensee, 2016; Choudary, 2015; Hagiu, 2014) sheds further light on why blockchain start-ups internationalize literally at birth. It is these network effects potentially leading to a winner-take-all (or most) position, coupled with the ability to solve the chicken-and-egg problem and grow an ecosystem around the technology that underpin rapid internationalization of digital start-ups, including blockchain start-ups. Integrating these concepts into the theory of BG/INV represents, in my view, a significant research opportunity for IB/IE scholars. The following discussion is an attempt at such integration.

Determinants of rapid internationalization

Network effects

Network effects are demand-side economies of scale (which increase buyers’ willingness-to-pay, demand and value for users and, therefore, revenues for the firm) which in large start-ups, such as leading blockchain protocols, can be coupled with traditional supply-side economies of scale (decreasing unit costs with increasing scale) (Hagiu, 2014; van Alstyne
et al., 2016). Same-side (direct) network effects arise when the utility that a user derives from consumption of the good increases with the number of other users consuming the good (Katz and Shapiro, 1985). Cross-side (indirect) network effects are present when the value to customers on one side of the platform typically increases with the number of participating users on the other side (Hagiu, 2014). Studies of platforms stress the importance of accumulating a “critical mass” of consumers and producers on a platform (Gawer, 2014); once the inflection point is reached, growth follows an exponential, rather than linear, trajectory, as network effects unfold (Hagiu and Rothman, 2016). Network effects may lead to not only a digital start-up’s rapid growth and internationalization but also a winner-take-all (or most) position (Noe and Parker, 2005; Eisenmann et al., 2006; Sun and Tse, 2007) on a global scale.

In the context of blockchain, as well as preceding generation of digital start-ups (e.g. Yahoo!, eBay, Facebook, Amazon, Medium, Apple, Google and Uber), three types of network effects (and corresponding “laws”/mathematical formulas for valuing networks depending on the number of users) are typically discussed: broadcast/one-to-many (Sarnoff’s law exemplified by Yahoo!), transaction/peer-to-peer (Metcalfe’s law exemplified by Facebook) and group-forming/many-to-many (Reed’s law exemplified by Slack and WhatsApp groups) (Reed, 2001; Hariharan et al., n.d). WhatsApp, for example, launched globally from the outset but unlike Facebook, pursued a group-forming approach (Hariharan, 2016). The peer-to-peer and group-forming effects—and particularly the latter, as they ensure even faster growth and engagement than in peer-to-peer networks—are highly relevant for blockchain ventures’ growth and internationalization, whereby various user groups (e.g. developers, investors, exchanges, miners/validators, consumers and merchants) are usually not constrained by geography, with the possible exception of some fintech applications requiring nation-specific KYC and AML solutions[13]. Ethereum, for example, is believed to have grown in size and value to achieve a market capitalization of $30bn in mid-2017 because of the group forming effect, as its utility is amplified by the utility of the multiple middleware and dApps currently being built on top of the protocol, where the success of one dApp is driving the success and adoption of another dApp.

**Solving the chicken-and-egg problem**

To foment network effects, start-ups need to bring a large number of participants on board and solve the “chicken-and-egg” problem: to attract buyers, a platform should have a large base of registered sellers, but these will be willing to register only if they expect many buyers to be affiliated with the platform (Caillaud and Jullien, 2003). To overcome this problem, speed-up adoption, lock-in consumers early and scale quickly, Web 2.0 start-ups have often used a non-neutral pricing structure, whereby one user group becomes the money side and the other the subsidy side (Rochet and Tirole, 2006; Eisenmann et al., 2006). In other words, the platform can affect the volume of transactions, as well as the value of the network, by charging more to one side of the market (one user group) and reducing the price (or even setting it to zero) paid by the other side (Rochet and Tirole, 2006). This approach is well captured by the URL acronym – Ubiquity First, Revenue Later (The Economist, 2010) – as internet entrepreneurs put an emphasis on growth and attracting a user base first and focus on revenues and profits later.

Blockchain start-ups are solving the chicken-and-egg problem and reaching a global scale quickly in a novel way, through ICOs and token distribution rather than price subsidies and advertising as drivers of adoption, user and developer engagement and monetization. Kin, a social platform with some 300 million users and a potential competitor to Facebook, is launching a Kik token to incentivize developers to build digital services on
top of the platform. The start-up will also charge users (initially the teen market) an entrance fee with Kin to then spend within the Kik ecosystem (Campbell, 2017). Another example is Omise, initially an Asia-Pacific “born regional” transitioning to a venture with a global footprint. This fintech payment start-up first attracted a large number of merchants in the region and now, through its decentralized exchange and payments platform OmiseGo, is aiming to issue OMG tokens, which will be used to promote adoption by users through, for example, an automatic airdrop to every address on the Ethereum blockchain (OmiseGo, 2017).

Ecosystem development
The traditional unit of analysis in much BG/INV research has been the individual firm, firm’s founders and alliances and networks. Accelerated internationalization of blockchain – and other digital start-ups for that matter – cannot be fully understood without attention to ecosystems, which is a related but a distinct concept from a “business network” (Iansiti and Levien, 2004). The key difference here with the traditional literature is that blockchain BGs do not tap into existing ecosystems of typically larger multinational enterprises (MNEs) to facilitate growth and overcome resource constraints. They initiate their own and often draw in larger MNEs (e.g. Microsoft, IBM, global banks) to be part of their ecosystem, as exemplified by the Ethereum Enterprise Alliance and Hyperledger, so the familiar dynamic is reversed. Ecosystems, as a third form of organizing business activity, in between markets and hierarchies, can be thought of as “intentional communities of economic actors whose individual business activities share in some large measure the fate of the whole community” (Moore, 2006, p. 33). Both practitioners and academics (Evans, 2016; Adner and Kapoor, 2010; Dougherty and Dunne, 2011) agree that modern day technology can only progress in ecosystems relying on flexible specialization and large-scale collaboration across organizational boundaries (Piore and Sabel, 1984; Benkler, 2002). It has been suggested that one of the most important ideas today is that ecosystems can be “opened up” to the entire world of potential collaborators (Moore, 2006, p. 34). Arguably, an ecosystem approach has a systematic advantage over either markets and hierarchies in drawing on a wider set of external capabilities and distributed heterogeneous knowledge (Chesbrough, 2006), organizing the ongoing interactions and connections of emerging arenas of innovation building on multiple sciences and technologies (Dougherty and Dunne, 2011), matching the best available human capital to the best available information inputs to create information goods (Benkler, 2002) and allowing for economies of scope in production and design, which ultimately lead to economies of scope in innovation (Gawer, 2014). Digital ecosystems’ research strongly suggests that knowledge creation and community building are inextricably linked (Nachira et al., 2007).

Given that blockchain R&D is open source, where anyone around the globe with an access to the internet and a computer can contribute a piece of code or other specialized knowledge (e.g. in AI), founders deliberately nurture nascent ecosystems to coordinate complex innovation projects characterized at this early stage of Web 3.0 by fundamental technological and market uncertainty (Knight, 1921). For example, one of the major impediments to having a dApp with billions of users akin to Facebook is blockchain scaling (i.e. improving the speed of transactions) which involves solving difficult computer science, cryptographic and game theoretic problems, most of which has never been done before (Ehrsam, 2017)[14]; hence, this task is best accomplished through an ecosystem. Global growth of an ecosystem is being managed through traditional means, such as organizing developer and investor conferences, communicating milestones through social media
channels (e.g. Slack, Twitter and Medium), organizing meet-ups in major cities around the world and blogging, as well as novel means, such as token airdrop and native protocol funds (i.e. funds similar to corporate venture capital). One venture working on a blockchain protocol (rival to Bitcoin and Ethereum), and hence having the role of ecosystem leader, has recently launched such native venture fund to not only primarily stimulate developer activity on their platform but also support the protocol roadmap, and testing and bug fixing, coupled with an expectation of financial returns. Ecosystem building amplifies network effects, as discussed in the previous section, and, consequently, accelerates ventures’ global growth.

Conclusions and implications
This paper has focused on a new phenomenon in IB – a growing population of technology-based born global start-ups with distinctive characteristics who are building the infrastructure and applications for the new Web 3.0. Our understanding of the rapid internationalization of these young ventures will benefit from establishing theoretical linkages between the BG/IE literature, the literature on the economics of information goods and platform economics. Specifically, a closer look at how these ventures unleash network effects, solve the chicken-and-egg problem and develop ecosystems may go some way at shedding further light on the emergence of BGs in the Web 3.0 context.

I invite IB/IE researchers to be part of this exciting technological development by further contributing to solving many pressing theoretical and empirical questions in the IB area brought about by the unfolding blockchain revolution. As a start, future research may delve deeper into the question that Siddiqui and Li (2017) pose in their award-winning paper on the CAGE distance – do digital start-ups operate in a truly borderless world that exemplifies the so-called “death of distance”? The researchers’ answer to this question in the study which explores the internationalization speed of Apple’s apps is “no” – despite the apps’ availability via global platforms, their international adoption is still subject to distance. Blockchain is decentralized and theoretically borderless – it literally “lives” on the internet; and BG blockchain start-ups seem to have little regard for national boundaries – a start-up may be registered in Switzerland; have initial funding from the USA; have listings on European, Chinese, Japanese and USA exchanges; have a core team based in Europe; have first customers in Asia; and have investors, advisers and developers from all over the world. Such global footprint is likely to be a partial reflection of the digital goods economics requiring a reconceptualization of BGs and their strategies in the digital economy. Existing theoretical frameworks in IB/IE explaining BGs’ behavior are firmly grounded in economic research on tangible goods in the world of decreasing returns to scale. These frameworks have contributed tremendously to advances in the IB/IE fields, and it is time to broaden the theoretical foundation and the conversation in general to reflect the realities of the digital world.

One of the most intriguing organizational innovations that blockchain has made possible is a DAO. While the start-ups working on protocols and applications (e.g. cross-border remittances) are governed by a group of developers and other core team members, a DAO is truly autonomous, in that what the organization does or will do is determined purely by code (Maas, 2017). Thus, together with programmable money (cryptocurrencies) and programmable contracts (smart contracts), a DAO may become a building block of new economic governance (Davidson et al., 2016). While the DAO idea may sound technoutopian, kernels of these social technologies already exist in the form of peer-to-peer networks, crowdsourcing and crowdfunding, as well as the blockchain protocol itself (which has governance norms hard coded into its consensus mechanism). Experiments are now underway with developing protocols for coordinating collective human effort across borders.
without the need of managerial authority or a centralized agency[15]. Such organizations are self-governing with the coordination properties of a market, the governance properties of a commons and the constitutional properties of a nation-state (Davidson et al., 2016). Clearly, DAOs challenge the underlying assumptions for the very existence of the international firm, which relies on hierarchical governance to coordinate global trade and investment. It is argued that every corporate function, from financing, project management, talent and resource management, decision-making and voting can in principle be replicated on blockchains (Outlier Ventures Research, 2017). This has far-reaching consequences for shareholders, managers and employees of international firms, and it is conceivable that in the long run the management layer is fully automated through the application of blockchain, smart contracts and artificial intelligence (Outlier Ventures Research, 2017). To paraphrase McAfee and Brynjolfsson (2017, p. 307), one key question is – are MNEs becoming passé? Tracing the evolution and potential global impact of these unconventional organizational forms would be a high research priority.

Notes
1. Strictly speaking, blockchain is a specific type of DLT. In practice, however, the two terms are used interchangeably.
2. Both the number of start-ups and the market capitalization figure are highly volatile, reflecting uncertainty associated with blockchain innovations and change on a daily basis.
3. The first most infamous use case of Bitcoin was the Silk Road (2011-2013), an illegal marketplace created on the darknet, which facilitated trade in drugs and weapons using bitcoin as a payment mechanism. Despite the sinister origins of Bitcoin, the Silk Road demonstrated that the technology actually works.
4. While the technology does not indeed have any theoretical restrictions, in practice, this is more complicated: for example, the speed of the internet across China’s Great Firewall may pose security threats to blockchain transactions, and trading blockchain-related securities and coins (cryptocurrencies) on exchanges in Africa could be more difficult than in Europe, where exchanges are better developed.
5. Many other coins are also programmed to be scarce.
6. Strictly speaking, dApp coins and protocol tokens are two separate classes of digital assets, one is a currency and another a security.
7. This explains why regulators around the world are confused about how to tax digital currencies – while some consider it an asset, others tax it as currency. Academic research suggests it is neither.
8. It should be noted that not all cryptocurrencies are genuinely innovative, and most of them will fail.
9. The token model is “better than free” because it pays early adopters to use the technology (Srinivasan, 2017).
10. Early investors in Bitcoin and Ethereum enjoyed 1000× returns, and some start-ups surpassed this record on a time-weighted basis – see https://icostats.com/vs-eth
11. I am grateful to one of the reviewers for this comment.
12. Major blockchain ventures can afford to pay their lead employees salaries comparable to other established major digital companies, such as Facebook or Google. One constraint on growth is global shortage of computer science talent (e.g. programmers in Solidity or Python).
13. KYC (know your customer) and AML (anti-money laundering) are two standard bank requirements.

14. Because blockchain is open rather than proprietary, once these problems are solved, there will be applications bigger than Facebook (Ehram, 2017).

15. For examples of DAOs, see Aragon (https://aragon.one) and Backfeed (http://backfeed.cc/experience-in-depth).

References


Further reading


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