Chapter

Developing Entrepreneurship in Digital Economy: The Ecosystem Strategy for Startups Growth

Antonio Thomas, Renato Passaro and Ivana Quinto

Abstract

The transition of the economies toward the digital era is determining the arising of a type of entrepreneurship based on factors and features quite different from established game rules. These changes disclose a series of opportunities for those firms which will be able to adapt at the new parameters and functionalities related to digital technologies diffusion. This contribution underlines some dynamics that should be considered from policy makers who aspire, on the one hand, to promote the emergence of a significant number of startups operating in the digital field and, on the other hand, to nurture the growth process of startups into scale ups. Due to social and economic troubles of many western areas, this latter aspect is even more important. According to a flourishing research stream on entrepreneurship, an interpretative approach for achieving the dual objective is to implement a specific strategy to create an appropriate regional ecosystem. The ecosystem represents a clear challenge within the traditional entrepreneurial policies frame, whose results have so far often been unsatisfactory. Despite its initially selective approach, from an ecosystem, many potential benefits can descend. However, creating an ecosystem for digital startup is a complex and burdensome task, which requires a safe and competent guidance, as well as the active involvement of many local actors.

Keywords: entrepreneurship, digital technology, ecosystem, high-growth firm, startup

1. Introduction

Since 1980s, in many western countries, the focus of industrial choices has changed substantially as consequence of the transition from SMEs policies to entrepreneurship policies. More recently, to react to the deep economic and financial crisis of 2008 and to sustain the diffusion of ICT, industrial policy measures have been fundamentally finalized at providing instruments increasing starting-up and the emergence of the self-employment in general, by spreading entrepreneurial culture and stimulating the direct participation of citizens in entrepreneurial process.

New ventures have been believed as a pathway for increase employment, especially for youth suffering from a disproportionate lack of job opportunities [1–3], while the startups, considered as innovation-based new ventures, have been spurred by the ambition of accelerating the adoption and diffusion of border line technologies, in doing so counteracting the competition of Eastern countries benefiting of lower production costs [4, 5].

These purposes have been sustained by measures improving the business environments, trying to make them economically conducive for firm emergence. Among these new measures, there are R&D grants and tax benefits, business accelerators and incubators, incentives and facilities for university-based spin-offs, financing of risk initiatives, and so on.

Nevertheless, this strategy has often led to unsatisfactory results, notably as regard to the contribution to territorial economic growth, innovations spreading, and dissemination of skills and competencies. Even in local contexts where high ventures birth rates were registered, there have been no relevant increases of key economic indicators, such as gross income, firms' survival, or profit level (e.g., [6–8]). A managerial and business research stream [9–11] argues that the weak impact of the mentioned measures on local economy development could be linked to three main aspects.

Firstly, a nebula idea of the entrepreneurship concept exists. A wide range of economic activities is used to be included in this term, even if the scientific literature has been clarifying its real meaning since many decades [12, 13], as detailed later.

Secondly, usually new firms are considered in a similar manner and often equated at startups. But not all new firms necessarily are startup, as well as startups are dissimilar in terms of value generation or job creation [14, 15]. A basilar matter is that too few startups are able to become high growth firms, which are able to assure a tangible contribution to the territorial context in terms of employment, income, investment, knowledge, and competencies [16, 17]. Indeed, startups are unsteady activities, with high probability of failure or destined to remain small business, when not simple micro-firms or self-employment activities. In the last circumstances, the contribution to regional growth is rather limited, if it exists [18, 19].

Thirdly, an excessive emphasis on technological innovation exists. Technological innovation in itself is not a panacea as it is risky and normally takes a long time to deploy its effects and to be fully appreciated. These peculiarities contrast with the typical weaknesses of new ventures, when they are not able to evolve in more established societal or legal forms [20–22]. The overwhelming focus on technologies innovation might acquire an ambiguous meaning when related to startups [23]. Firms operating into the so-called traditional sectors (automotive, domestic appliances, furnishings, etc.) of Western countries often exhibit higher growth rates than firms placed at the technological border. The capacity to propose, over the time, more and more effective business models could, therefore, overcome the prominence of technological factor [24]. Hence, all high growth firms are neither necessarily high-tech startups nor a new business in general.

With this in mind, the incoming of digital technologies in the realm of entrepreneurship represents a new challenge for entrepreneurs and policy makers [25]. When applied to manufacturing, digital technologies (such as social media, mobile computing, data analytics, 3d printing, cloud, and cyber solutions) lead to a remodeling of productive patterns originating new market opportunities, higher revenue streams, faster time-to-market, enhanced service provision, and increased productivity [25, 26]. Moreover, digital technologies also deeply modify the boundaries of products and processes, in doing so transforming the nature of uncertainty inherent entrepreneurial processes and outcomes, as well as the ways of dealing with such uncertainty [27]. All these changings are shifting the traditional way of creating and doing business, determining the emergence of a new specific type of entrepreneurship, the *digital entrepreneurship* (Nambisan, 2017).

Broadly defined as creating new ventures and transforming existing businesses by developing novel digital technologies and/or novel usage of such technologies [27], digital entrepreneurship needs to be properly fueled and enabled in many directions. Among these, European Commission [25] suggests the creation of

specific digital knowledge base and ICT markets, the creation of digital business environments, an easier access to finance facilitations, the diffusion of digital skills, the creation of e-leadership, and the creation of entrepreneurial culture. These complex aims assume a heuristic and wide-ranging approach that, presumably, requests a reconsideration of the logic that leads to the emergence and development of startups operating in the digital setting.

This chapter aims primarily to discuss how the current focus on startups could be addressed, so that the digital era becomes a source of opportunities more than risks. Specifically, the paper is consistent with an up-warding audience of scholars [28–31] according to the best answer for collecting the business opportunities and channeling the benefits for local areas appears the creation of ecosystems able to support scale ups; that is, startups with high potentiality to grow-up [32].

The debate on the importance of these companies for local development and growth is really dated. The novelty is that, instead of an undifferentiated starting-up, a selective approach centered on startups with the better potentialities is now explored by creating specific business environments aligned to the purpose of systematizing, promoting, and sustaining their growth [3, 33, 34].

The chapter is organized as follows. After this introduction, Section 2 specifies the concept of entrepreneurship oriented for the purpose of the regional economic development. Afterward, the notions of startup and scale ups are clarified in Section 3. Section 4 deepens the dynamic meaning of an entrepreneurial ecosystem functional to scale ups development. Section 5 identifies the link existing among the challenges linked to digital technologies and the advantages provided by ecosystems. Some conclusive remarks are showed in the last section.

2. Entrepreneurship and entrepreneurialism

An aspect systematically ignored by policies concerns the concept of entrepreneurship, often considered as an undifferentiated phenomenon whose only evaluable output is the birth of new ventures. This is because, on one side, a shared definition of entrepreneurship is missing, as well as a precise knowledge of its boundaries and factors from which it originates. On the other side, it descends from the fact that, by logic, this concept can only derive from that of entrepreneur [13]. In turn, the figure of entrepreneur is ambiguous, confused with other economic roles such as the owner or the capitalist, not always easy to identify inside the firm, and whose assignments and tasks are not easily framed. Not by chance, the *Huffalump* metaphor, the imaginary animal impossible to capture [35], was introduced.

However, more recently, entrepreneurship literature has shed much light on these aspects. But these advances do not seem fully absorbed in determining policy measures. So that, even if a propulsive thrust of economy is expected from the entrance in the digital economy ([27], Nambisan, 2017), there is a real possibility that not all contexts will be able to benefit from the emerging opportunities.

In this view, this chapter emphasizes the thesis for which standardized policy actions addressed to support an undifferentiated starting-up risk to obtain limited, when not counterproductive effects. Investigations on firms' turnover have showed that an increasing birth rate is often accompanied by an almost similar increase of death rate. This faster turnover has not a positive impact on the social and economic context if the surviving ventures remain micro or individual firms [1, 2, 36]. In other words, just favoring a high *entrepreneurial activity*—the percentage of adults involved in the process of the creation or management of an enterprise—does not necessarily ensure the emergence of a sufficient share of companies that are able to succeed in the medium or long term with a positive impact on local context.

This assumption is coherent with the supposed *U-shaped relationship* between the entrepreneurial activity of a country and its per-capita Gross National Product (GNP). Leading scholars belonging to the *Global Entrepreneurship Monitoring* [4, 37] explain that the entrepreneurship activity is higher for countries with either a low or a high GNP per capita.

In countries with low GNP per capita, entrepreneurship activity is higher owing to the lack of professional alternatives and other revenue sources—'necessity' driven entrepreneurship rather than 'opportunity' [38]. When GNP per capita grows, countries with middle-income, activity gradually decrease up to a certain minimum point. That is because the emergence of scale-intensive firms operating in mid-technology sectors offers stable employment perspectives, which reduce the motivation toward starting up. After this point, activity newly increases. In areas with a higher GNP per capita, the presence of advanced technology and scale economies allows larger and established companies to meet the growing demand of expanding markets, exerting a positive attraction to would-be entrepreneurs. In these circumstances, high startups rates are predictable. They could begin an economic virtuous circle.

This theory, therefore, supports the existence of an *equilibrium rate* of entrepreneurial activity, which varies consistently in line with the degree of national development. This rate is considered "an 'optimal' industry structure, operationalized either in terms of the number of business owners or in terms of the small-firm share in value-of shipments" ([1], p. 3). Deviations from the equilibrium rate caused by cultural forces, institutional changes, and economic trends risk to cause negative consequences for national growth, since "economies can have both too few and too many businesses and both situations can imply a growth penalty" ([36], p. 285). A too low equilibrium rate may imply few stimuli toward innovation and change. A too high rate could determinate the failure to exploit scale and scope economies, a reduction in R&D expenditure, or an excess of price-based competition, forcing firms to reduce output/input quality or resorting to shadow economy. Consequently, regions deviating from the level of entrepreneurial activity compatible with their GNP, risk to obtain lower rates of overall economic growth.

The optimal equilibrium rate is dependent on both the *weight* of sectors, —dynamism in services business is statistically much greater than in manufacturing industry—and the *type* of entrepreneurship created. Hence, generic starting up policies could not be a panacea for local economic and social troubles, neither present nor future. This statement is supported by many evidences.

One of the most quoted scholar of entrepreneurship states that new firms do not always have an innovation propensity higher than incumbent firms, "even for a developed country such as the United States, only a very small fraction of new startups is really innovative" ([39], p. 8). Without innovative capacity, in a contestable market, these firms have limited chance to growth.

Likewise, usually the large majority of incumbents firms are destined to remain a small firm or even a self-employment venture. This possibility is more likely when the entrepreneurs' teams that manage such firms do not possess an adequate level of entrepreneurship, but only *business entrepreneurialism*, that is, a generic spirit or state of acting in an entrepreneurial manner in the broader sense [38]. A pioneer in the field of entrepreneurship research and education [40] explains that there is a "continuum" along which each entrepreneur or aspiring entrepreneur has a different increasing subjective level of entrepreneurial capabilities. In addition, the more the business is small, the more the relationship among entrepreneur's potentialities and firm's performance tends to be stronger.

Generally, policies do not care or are not able to select aspiring entrepreneurs with the better potentialities. Hence, it is surprising to discover neither high failure

rates nor large share of micro-firms from policies directed to favor undifferentiated startups. While firms which are unable to grow and develop rarely can disseminate knowledge or innovations, high failure rates are associated with a possible dispersion of public funds and sunk costs.

These contingencies introduce the specific problem regarding the *quality* of the arising entrepreneurship: "business ownership and entrepreneurship are not synonymous … entrepreneurs are a small fraction of the business owners" ([36], p. 275). It is worth to underline that a seminal article on the nature and quality of entrepreneurship goes back to Carland et al. [12].

Authors distinguish entrepreneurs with the highest level of entrepreneurship and capabilities, identified as *true entrepreneurs in the Schumpeterian sense*, from other typologies of entrepreneurs with a lower level of entrepreneurship. Among the latter, there is the *small business owner* ("an individual who establishes for the principal purpose of furthering personal goals … the owner perceives the business as an extension of his/her personality, intricately bound with family needs and desire") ([12], p. 358) and the *self-employer*, a personal response to the lack of professional alternatives, implying a low entrepreneurial level [38]. Businesses undertaken by small business owners and self-employers who "are not dominant in their field, and don't engage in any new marketing or innovative practices" ([12], p. 358) usually exhibit a low propensity for expansion, change, and knowledge adoption, while we have a high probability of failure. Often these entrepreneurs "have incomes below the poverty line" (Stam, 2015, p. 123).

On the contrary, a true entrepreneur is an individual who creates an *entrepreneurial venture* in Schumpeterian sense. That is a venture "characterized by innovative strategic practices … employ strategic management practices in the business" ([12], p. 358). An entrepreneurial venture does not necessarily mean a large firm, but a business able to develop and to reach profitability and success, thereby having a relevant and stable impact on local growth. The ability to found and manage an entrepreneurial venture mirrors entrepreneurs' subjective predispositions, personal traits, experiences, knowledge and competences, innate or acquired, that shape their capabilities in a business's management, as well as in lifestyle [41].

The logic of this brief exposition concerns the opportunity, in some circumstances, to abandon policies that aim to support generic entrepreneurial activity by proposing top-down measures, such as granting subsidies or facilitations. The simple improving of the environmental framework risks to favor an undifferentiated creation of new businesses and/or startups, as well as the survival of incumbents no more competitive.

As researchers agree to sustain that the entrepreneurial process is the result of a complex interaction between individuals, cultural, social, and environmental factors, the alternative that is intended to endorse is to concentrate efforts on entrepreneurs/aspiring entrepreneurs who show the best business plans, the preeminent entrepreneurial features, and the ability to withstand market difficulties [3, 28, 34, 42]. These entrepreneurs have the higher probability of founding and managing *entrepreneurial ventures*.

3. The transition from startups to scale up

3.1 The concept of startup

A focus of entrepreneurship policies has been, as explained, increasing the number of startups and spreading the entrepreneurial culture by providing tangible (grants, real services, and facilitations) and intangible tools (training, incubators,

consultancies). The corner stone of this policy sinks its roots in the belief that the startups are a powerful tool for spreading innovations and knowledge locally [21].

It is therefore essential to clarify what the startups are. Alike other social and economic phenomena based on individual or collective behaviors, different interpretations of startup exist. Each one offers a viewing angle for reading, analyzing, and evaluating the startup process.

This chapter follows and deepens one of the best known definitions of startup: "a temporary organization searching for a repeatable and scalable business model [32]." Although extremely concise, this definition is very widespread and effective.

A startup is an "organization" that is a systematic complex of human, material, and financial resources, tangible and intangible assets, coordinated by someone with a rough business idea for reaching a unitary scope. Often, it is a venture which is trying to become something to evolve in a steady enterprise. There is no certainty about a happy end of this process. This organization is designed to create a new product or service works under conditions of extreme uncertainty; hence, it is "searching." Statistically, it is more likely that the founders decide to abandon the project or to sell the idea they were working on. Then, a startup can and must evolve into an enterprise, or fail, or dissolve. This is why it is "temporary." Behind the possibility of becoming a company, however, there must be the perspective of transforming a business idea into a business model. Of course, this contingency does not imply that a startup will become a big company. It can remain a small firm with few employees or even an individual firm.

Consistent with the pillar of Schumpeterian theories, the focus of a startup is expected to be on innovation. Innovation understood as a positive change compared to a pre-existing situation, therefore not only technological but also managerial, organizational, productive, or technical, who allows and sustains a company in the proposition of a profitable business model. The latter has to be "repeatable." It means that the way in which company creates, delivers, and captures value has to be sustainable with recurring profit. Startup also has to be "scalable." It implies that the company must be able to serve profitably an increasing number of customers. Some business models can be repeatable but not scalable or scalable but not repeatable; but only when they are in the meantime both repeatable and scalable, they can catch the interest of venture capitalists [32]. The role of venture capitalists is essential for the startup dynamic because, often, traditional banks have neither the instruments to finance the starting-up processes nor competencies to judge business model potentialities.

As reminded by Blank [32], a scalable startup created from the very beginning by founders who believe that their proposal could change the world is different from a startup created by people just aspiring to become self-employed or to satisfy family need through a small business which is not designed to scale. In short, scalability is the basilar feature which distinguishes a startup with potentialities from other types of enterprises generically defined newborn ventures. This potentiality to profitably expand their boundaries is a crucial aspect which allows to clarify some doubt about the overall startups policies efficacy for the territorial development.

Some researchers [9, 14, 23] are quite skeptical about the advantages of the starting-up in general, describing a blanket policy focus on startups as "bad public policy." It occurs when startups born, thank to public facilitations and supports, and limit themselves at crowding-out existing companies that have not benefited from support or when they replicate existing business model taking advantage of greater operational and management slenderness by virtue of learning by others mistakes ("copycat") or if they absorb all the resources allocated for policy measures. Moreover, high startups death rate could determinate relevant sunk costs for society

and aspiring entrepreneurs. In these circumstances, "evidence suggests the contribution of entrepreneurial startups to the economy is limited and in some cases can be potentially damaging" ([15], p. 136).

Moreover, some types of startups normally offer a lower contribution to local economy development. Among them, there are [32] *buyable startups*, namely startups born to be bought; *large company startups*, for answering to changes in customer preferences, new technologies, legislation issues, competitors pressure; or *social startups*, whose mission is to make the world a better place for a welfare purpose. Hence, to consider startups in a similar and undifferentiated way is a limit of industrial policy.

3.2 The concept of scale up

If entrepreneurship literature is rather skeptical about the effectiveness of startups, it agrees to sustain that the so-called high growth firms (henceforth HGFs) have significant spill-over effects: "small businesses that become middle-sized and ultimately large businesses, over a comparatively short period of time, are central to economic prosperity" ([14], p. 208). That is because HGFs are the preferential channel in the net jobs creation [6] and are beneficial to the development of other enterprises placed in the same context [43], as well as in industrial clusters [44], as they provide meaningful stimulus within economies by increasing competition, promoting innovation, and improving the efficient allocation of resources [23]. Not by chance, HGFs tend to exhibit high levels of productivity, innovation, export-orientation, internationalization, and investments in human capital [29, 43, 45]. Consequently, "the ability of a country to nurture the growth of such businesses is probably the most important element in enterprise development" ([14], p. 208).

HGFs are neither exclusively young businesses [18] nor predominantly in high tech sectors [6], and just few are venture capital backed [8]. Moreover, only episodically exhibit a linear growth, while they can expand organically or with external acquisition [23]. In line with these assumptions, a thriving stream of research stresses the necessity to favor the emerging of *scale ups* [22, 28, 29].

A univocal definition of scale up company still does not exist since the metrics, that is, the characteristics that distinguish it from the startup, vary according to the size of the reference context, the type of sector in which they operate, and the business model (usually b2c or b2b) [46]. Consistent with Blank [32], a scale ups can be framed as fast growing startups that have already overcome some phases on which the activity of the startup is focused. In particular, the scale up is a company that has developed its product or service, has defined its business model (scalable and repeatable), and can therefore focus on its growth on the market to take it forward in a controlled and sustainable manner. Hence, terminologically and consistent with the previous startup definition, only startups can become scale ups, while incumbent ventures can become HGFs; often just for a limited period of time [16].

A scale up stands out for some parameters attesting its success like market traction, 1–10 million € turnover annually, at least 1 million users (in the b2c), 20% growth in revenues or headcount for 3 years running after at least 10 people and $ 1 million in revenues, and 20% of the turnover from the foreign market [47]. Their highest ambition is to become a "centaurus"—valued more than 100 million dollars—or an "unicorns"—valued over 1 billion dollars.

3.3 Favoring scale ups diffusion

As other entrepreneurial ventures, the possibility that scale ups come to light is strictly linked to their intrinsic capacity to discover, to exploit, and to successfully

manage economic opportunities. The incoming of digital era certainly is a source of uncountable opportunities. A new wave of economic openings linked to the Industry 4.0, where digital platforms will be coupled and connected with sophisticated infrastructures of sensors, cyber-physical systems, and robots, is expected [48]. Furthermore, digital innovations are bringing substantial new challenges on how to handle with technology, management, government policies, stakeholders' engagement, and so on [49]. Hence, the digital economy represents for ventures both a challenge and a requirement for conformity. It is a challenge, if they wish to set out a developmental pathway; it is a duty, if ventures are forced to adapt their organizational and productive pattern in order to remain competitive.

To look for strategies that are able to increase the presence of scale ups engaged into digital economy should be a primary aim for researchers and policy makers of many western countries. In this perspective, literature (Brown and Mason, 2012) [19, 34] specifies that this possibility is linked to the capacity to create a specific business environment consistent with scale ups needs. Only when effectively planned, this framework provides consistent outcomes. In Italy, for instance, the low number of scale ups created is not believed to depend on the lack of quality startups but mainly on their need to move abroad to find sufficient risk capital investments for tackling scaling, as well as for the shortage of connections with external actors [47].

Hence, new policy measures are requested, as the environments in which scale ups prosper are distinct from those which have high rates of startups [17, 21] (Brown and Mason, 2013). Scale ups also need to access to specialized resources that differ significantly from those supporting new firms [28, 32]
(Brown and Mason, 2012).

To this purpose, the necessity to create a distinctive type of supportive economic and social framework emerges. It should be planned to captivate entrepreneurs with wide economic potential [16, 19, 42]; to establish steady and productive relationships among all the local stakeholders; to provide relational forms of support (such as network building, institutional alignment of priorities, strategic guidance, leadership development, and mentoring) ([20], p. 2016), instead of money-based facilities (from grants to tax incentives or subsidies) that have showed limited impact [10]; to attract different businesses funding resource (such as debt finance, crowd-funding, and peer to peer) targeted to the specific requirements of the businesses [43]; to nurture the developing of the innovation system joining local customers end users, suppliers, universities, and so on [50]; to guarantee the recognition of unprotected and open sources innovations, respect on technological innovations and the protection of intellectual property rights [46]; and to limit its action at regional or local level [33].

The specific environments and the specialized resources scale ups and HGFs need are usually defined *ecosystems* (Napier and Hansen, 2011) [24].

4. An ecosystem for the emerging of scale ups

4.1 The basilar features

In the last decade, the *entrepreneurship ecosystem approach* has emerged as response for the propagation of scale ups and HGFs in general (e.g. [11, 28]). An ecosystem encloses the "set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organizations (e.g. firms, venture capitalists, business angels, banks), institutions (universities, public sector agencies, financial bodies) and entrepreneurial processes (e.g. the business birth rate, numbers of high

growth firms, levels of 'blockbuster entrepreneurship', number of serial entrepreneurs, degree of sell-out mentality within firms and levels of entrepreneurial ambition) which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment" ([8], p. 5).

There are more models of entrepreneurial ecosystems, but each one is unique, that emerge under an inimitable set of conditions and circumstance and only where it finds fertile soil [31]. However, ecosystems usually share some common crucial features.

Firstly, an ecosystem cannot come to light in a vacuum [24] but generally arises where there are place-based assets, such as a previous strategic location of other industrial activities, even if of traditional type, or cluster [8]. This is not a surprising assumption, as researches indicate that firms that are located in "clusters" exhibit higher growth than those in other locations [44], and that in clusters usually have high number of graduates in technical disciplines who support the adoption of innovations [50]. However, the entrepreneurial ecosystem approach offers a distinctive perspective on the clustering of economic activities respect to the original concept of Porter [51].

Notably, the core of a thriving ecosystem is the presence of one or more large successful established businesses, preferably knowledge based. Their primary role is to deliberately cultivate the ecosystem itself [31]. Large companies provide outcomes of their R&D, are magnets of skilled workers, provide a market for local subcontractors, and shape specialized personnel who can decide to leave the firm to assume other roles (entrepreneur, mentor, angel investor, etc.) in the same context. These companies also invest in the local territory financing universities, research centers, and social initiatives and attract specialized suppliers that fertilize the context spreading knowledge [8, 11].

About the *cross-fertilization* process, it is crucial to underline the so-called entrepreneurial *recycling* process. It is fostered by entrepreneurs whose successful business idea/startup (*blockbusters*) was taken over from another firms or who, having already reached entrepreneurial significant goals, decide to remain in the cluster reinvesting their profit, time, wealth, experience, and expertise in supporting new entrepreneurial activities as serial entrepreneurs, venture investors, advisors, or manager of other firms [52]. The spillover effect of these entrepreneurs is particularly significant in the developmental process of the ecosystem, and these businesses in turn are the source of further waves of spinoff activity (Mason, 2009) [29]. Hence, potential entrepreneurs are themselves important players in creating the ecosystem and keeping it healthy [53].

Another key role is played by *deal-makers*, "individuals with valuable social capital, who have deep fiduciary ties within regional economies and act in the role of mediating relationships, making connections and facilitating new firm formation" ([54], p. 24). They can be entrepreneurs, investors, or service providers who are well-connected, qualified, and experienced who informally or with a fidelity role offer support to young firms and startups, helping them to develop their potential [29]. *Deal-makers* also support information sharing process. This is consistent with a relevant feature of the ecosystem, that is, an information-rich environment in which knowledge is both accessible and shared according to the principle of open innovation and cooperation for tacit dissemination. For successful entrepreneurship, the presence of dealmakers is more important than the measures supporting local entrepreneurship or investors networks, and it is a valid predictor of the health state of the regional entrepreneurial economy [54].

For the effectiveness of an entrepreneurship ecosystem, a prominent role is also due to the presence of universities and other research centers. The most significant lapel is not as much the research output transfers as the predictable presence of innovative spinoffs and startups that spread knowledge in the ecosystem itself.

Evidence shows that ecosystems have typically emerged in places that already have an established and highly regarded knowledge base which employs significant numbers of scientists and engineers. Universities and research and corporate R&D laboratories are a primary source of skilled personnel who can found innovative startups [55]. Anyway, sometimes the substantive disconnection between universities and their surrounding local entrepreneurial and innovation ecosystem belittles entrepreneurial spillovers from universities [50].

Another propulsive role is played by services providers that perform no-core activities which are outsourced. Three types of services facilitating the process of business startup and growth by enabling new firms to focus on their area of expertise can be highlighted: (1) specialist business services (law, marketing, accountability, management, consultants familiar with the unique needs of technology startups, technology marketing and assessment consultants, and PR firms), (2) technical services offering precision machining, prototyping, testing, and so on, (3) finance providers, such as venture capital firms or investment banks.

From financial perspective, the most important aspect concerns the availability of a critical mass of seeds and connections with local and foreign investors and venture capital funds [10], while the importance attributed to venture capitalists tends to be minor, as most firms are initially funded through a combination of self-financing, loans from family and friends, and bootstrapping. Despite a cluster is likely to stagnate or decline without these actors [44], in ecosystems venture capital seems lags, rather than stimulate, the emergence of entrepreneurial activity (Mason, Brown, 2014). This type of financing is more suitable for high growth technology-based firms [10].

4.2 The entrepreneurial enablers

An ecosystem has to be planned and managed. Often traditional decision makers of political origin have not suitable and enough technical and economic competencies to follow the implementation of the ecosystem: "however challenging the encouragement of entrepreneurship may seem, it is truly too important to be left to policy specialists" ([10], p. 264). In this regard, Isenberg [28] argues it would be better to establish new organizations with a 'sell-by date' composed of experts with specific entrepreneurial competencies—*entrepreneurial enablers*.

The tasks of these temporary organizations are to assure a holistic approach that considers especially bottom-up measures, as the major needs for the firms belonging to the entrepreneurial ecosystem do not concern the offering of grant and subsidies. The latter could have self-defeating effects respect on a Darwinist natural and spontaneous selection of the best firms and business models [5, 28]. As explained, ecosystem is chiefly founded on the active input coming from the entrepreneurial community. Hence, the involved firms require *relational* rather than *transactional* assistance during the different stages they run across, with the provision of intensive support and mentoring, as well as facilitations for startups through business incubators. The latter provides business advice, networking with mentors, business angels, banks, and service providers. The purpose is to build "bridges" between different actors through the creation of communities of best practices or entrepreneurial networks [8, 21]. Therefore, it is important primarily to establish steady and effective *connections* among all the involved actors and networking linkages.

These tools answer to the essential presence of startups which aspire to expand and develop. Sometimes, in the early stages of establishing an ecosystem, to stress on supporting the starting up processes helping these ventures with organizational and human capital development, internationalization support and access to growth capital could be necessary. But a mature ecosystem needs to focus its efforts on companies

with the greatest potential. Entrepreneurial enablers should possess the ability to understand the right moment to shift the focus of their intervention. In addition, as the creation of an ecosystem occurs by phases which evolve over time, the organization's experts have to be able to determinate metric to evaluate strength, weakness, and bottlenecks of the ecosystem through a continue monitoring, identifying whether and how to intervene, and verifying over time the effectiveness of such interventions. Consistent with the described selective approach, they should also have the political strength to concentrate resources (public and/or private) primarily on a small number of high-potential early stage firms to accelerate their development [6, 46]. As success breeds, resources have to be granted in a selective way and not equally distributed [28].

Among the enablers duties, another vital aspect concerns the creation and diffusion of a specific *culture*. There is the necessity to plan initiatives acting on the cultural pattern of the territory, stimulating universities and school to focus on entrepreneurial education and promoting events which celebrate local entrepreneurship and innovation. The purpose is to valorize the entrepreneurial choice among citizens favoring a mentality changing and stimulating imitation. In this perspective, it would be significant to already have in the ecosystem HGFs or other successful examples to imitate. In parallel, as basic informal rule, an ecosystem should be characterized by the acceptance of failure as a normal outcome of entrepreneurial activity. The consequence is that there is no diffidence to employ workers coming from other companies, even if they have failed [11]. Being based on largely trustworthy relationships, the ecosystem has also to be pervaded by the typical optimistic and positive business climate which feeds of self-confidence among entrepreneurs [41].

Last but not least, a prosperous ecosystem also depends on innovations diffusion and industry conditions. For instance, even if riskier, technological advances of disruptive nature, which create "discontinuities," are believed to produce the largest opportunities [27, 50]. Consequently, often the emergence of an entrepreneurial ecosystem depends on the development of markets for newer technologies [8, 55]. Digital technologies are a remarkable example of this type, with a lot of opportunity that could be disclosed for new would-be entrepreneurs and the local context [48]. From this last perspective, entrepreneurial enablers have a great responsibility in connecting the ecosystem to the technological and innovation dynamics. To collect all these changes and challenges, the business environment has to show a high social capital [54], while firms show a high level of intellectual capital, in form of the three interrelated human, relational, and organizational components [56].

The overture described is in line with the increasingly widespread theses according to which economic behavior can be better understood within its historical, temporal, institutional, spatial, and social contexts. Contexts provide individuals with opportunities and set boundaries for their actions and influence entrepreneurial choices, helping to understand who, when, how, and why someone becomes involved. But also entrepreneurship impacts on context, modifying its features [3]. Consistent with some influential experts [57], the next shift in policies will lead from "regional entrepreneurship policy" to "policy for an entrepreneurial regional economy," that is the ecosystem approach.

5. Perspectives for digital startups birth and scale ups diffusion

5.1 The digital technologies

Observing the transformations taking place in the industrial system, it is clearer how, on the one hand, technology becomes much more pervasive by entering more

and more directly and intensely in production processes, products, and services. From the other hand, the technology-based competition is intensified, with new comer countries that force Western countries to continuously renew the bases of their technological and competitive advantage. This dynamic makes R&S activity and the related ability to propose innovations increasingly necessary [49].

With specific regard to digital technologies, "the biggest transformation in business the world has seen in over a century" ([48], p. 5), they are radically changing the way people live, work, communicate, and play. Their pervasive diffusion is also causing significant repercussions on the dynamics of companies in European countries: 2.6 new digital job for each job destroyed is expected, manufacturing can achieve growth from 15 to 20% by 2030 if digitalized, revenue coming from digital technologies will growth of 2% for year, big data technology and services are expected to grow worldwide to USD 16.9 billion in 2015 at a compound annual growth rate of 40%, while companies using that data become 5–6% more productive [48]. Also, the way of carrying out many of the traditional production processes is modifying considerably, as well as consolidated theoretical approaches regarding the methods of supplying resources, the product management, and service offered are questioned. Indeed, the possibility of constantly introducing new functionalities for a product or service, even in remotely, would seem to alter the validity of theories on the product life cycle, on the genesis of the innovation, or on the product development process [25, 26].

Consequently, by proceeding with digital technologies adoption and implementation, an almost infinite number of economic opportunities for existing or new ventures is emerging, waiting to be grasped. Even more by considering that the boundaries of digital technologies in the three interrelated components of digital *artifacts*, *platforms*, and *infrastructures* are still unexplored, and every innovation such as cloud computing, data analytics, online communities, social media, 3D printing, and digital makerspaces contains indefinite applications.

The magnitude of this change is so significant and visible that a specialized literature has arisen—the *digital entrepreneurship*. It analyzes the effects of digitalization on the traditional methods of conducting a business to success. For instance, about the digital artifacts (the digital components, applications or media content that are part of a new product/service and offers a specific functionality or value to the end-user), the decoupling of information from its related physical form or device has led to the gradual infusion of such digital artifacts into a wide range of products and services and discloses a plethora of business occasions for different industrial sectors [58]. Digital artifacts are continually embedded in wider and constantly shifting ecosystems, such that they become increasingly editable, interactive, reprogrammable, and distributable [59]. Similarly, digital technology that offers communication, collaboration, and/or computing capabilities to support innovation digital infrastructures requires new personnel with different roles (customers, investors, partners, etc.) in all stages of entrepreneurial process, from opportunity exploration to venture launch [59].

Furthermore, "digital infrastructures (digital technology tools and systems that offer communication, collaboration, and/or computing capabilities to support innovation and entrepreneurship) infuse a level of fluidity or variability into entrepreneurial processes, allowing them to unfold in a nonlinear fashion across time and space" (Nambisan, 2017, p. 6), making less stable boundaries in both entrepreneurial outcomes and processes. This, in turn, leads to changes in behaviors and actions among digital entrepreneurs. Indeed, digital firm's success tends to step away from the exploiting of a certain opportunity, or the execution of a detailed value proposition, as it needs to follow a continuously evolving value proposition, namely actions that leverage the potential of a continuous re-scoping of business model [27].

The continuous changes associated with the implementation of digital technologies also support a transformation in the figure of the entrepreneur and his orientation to primarily seek economic performance. On one side, in fact, the most important aspect of the firm, especially if in the initial stages of life, becomes the validity of the business idea that it intends to develop and the consistency with the skills already possessed. The goal is to ensure the future competitiveness of venture or its attractiveness toward larger companies that might decide to buy it. On the other side, the focus of the decision-making process could depend on the pool of employees, probably coetaneous of the entrepreneur but with more digital skills, who are able to identify and collect market opportunities and transforming in business [26].

In the meantime, less importance of funding sources is expected in favor of the role of connections. In fact, unreleased opportunities to resort to financing with methods such as crowdfunding or crowdsourcing or obtaining support from customers and suppliers are arising. In this way, the traditional funding gaps for new businesses, particularly in technology sectors, normally looking for small amounts of finance, can also be easily filled [43].

On closer inspection, these changes are intrinsic conditions and functionalities belonging to the entrepreneurship ecosystem approach. In ecosystems, the goal of profit is fundamentally subordinated to the desire for self-realization or experimentation with innovative ideas of aspiring entrepreneurs (the pleasure of discovery), while the presence of networks of stakeholders along the productive process and the supply chain is believed crucial. Likewise, a continuous rotation of employees who pushed by personal objectives of income, job satisfaction, or self-efficacy tends to offer their competencies to other neighboring companies or to create their own startup, is judged spontaneous.

These behaviors improve not only the processes of dissemination of knowledge and innovative ideas within the ecosystem but also their propagation speed. This high fluidity of people and resources within the ecosystem is considered a strategic lever for its success [28]. But fluidity is also a key feature of digital technologies which often have low access barriers and are cheap to adopt and exploit.

In addition, re-programmability and re-combinability of digital artifacts and platforms, on their own and in conjunction with other factors, enable the introduction of new functionalities in different market contexts, thereby refashioning existing pathways or opening new chances to create value, i.e., rendering existing market offerings less bounded from already existing opportunities. Digital firms could not feasibly operate without the Internet-enabled digital platforms (shared, common set of services and architecture that serves to host complementary offerings, including digital artifacts), which meet producers and consumers and facilitate the exchange of goods, services, or social currency, also enabling value creation for all through the digital landscape [25]. The difficulty to establish boundaries for digital platforms is therefore confirmed. In addition, the interaction of digital artifact properties with other contextual features resulting from the challenges linked to digital technologies (e.g., new legislative regulations, new pricing mechanisms, etc) also can radically change the definition of value in a market, proposing new further functionalities or business opportunities [59].

5.2 The role of ecosystem

On these premises, ecosystems could assure a fundamental contribution facilitating the developmental pathway for digital startups. Indeed, an ecosystem guarantees the passage of the traditional business environment to one no longer linked to individual or company factors but to a network of specialized partners with a wide availability of knowledge and open innovations.

Due to the presence of research centers disseminating knowledge, universities forming graduates in technical disciplines, and consultants, it is highly probable that these specific environments are linked to regional or urban areas. Not by chance, some authors (e.g., [33, 60]) put cities as the key organizing unit for innovation, entrepreneurship, and economic growth and argue about how digital startups and scale ups may take in place in cities and, sometime, require them as preferential ecosystem that help lever their development [58, 60].

Even the ecosystem tendency to the concentration of activities is coherent with the nature of digital companies. Their location choices do not depend on factors such as proximity to the market or availability of tangible inputs or from the availability of large physical space difficult to find in an urban area. As digital companies include online retailers but exclude retailers which have a physical presence on the 'high street' and are linked to the generation and diffusion of knowledge, as well as to the presence of specific support services or specialized human capital and venture capital, they should give priority to the agglomerations of competencies typical of urban context with the presence of universities and research centers [8, 61].

Belonging to an ecosystem presents another advantage for digital companies. In the ecosystem, the innovative and creative processes are no longer centered on the individuals or on the ventures, but looks at the entire regional context meant as fertile environment from which economic opportunities can arise. Therefore, the innovative and entrepreneurial critical processes become linked to the entire external environment, considered as a place of aggregation of individuals, companies, individual talents, institutions and support services [28]. This feature is consistent with the needs of digital entrepreneurship, where the most important productive factors are the availability of specialized personnel, of venture capitalists, and knowledge generation sources. To be placed in an ecosystem also could help all the memberships companies to obtain legislative rules that ensure, for example, the ownership of the innovations introduced and the cyber security of client companies, in doing so encouraging the adoption of the same technologies [62].

Anyway, to grow, digital startups must incorporate quickly new management functions, from operations to marketing, evolving from an unstructured chaotic day-to-day to an evolving structure, mature, and dynamic organization. Consequently, they have to bring out the need of new competencies, especially of digital nature. They have to be able to possess, manage, dominate, and develop digital technologies and the inherent knowledge. These competencies enclose hard skills (from the ability to use computer programs and packages to the use of specific machines and tools for production such as social, mobile, analytics, cloud, artificial intelligence, robotics, Internet of Things, and cybersecurity) and soft skills (linked to relationships and behaviors of people enabling the effective use of new digital tools such as problem solving, knowledge networking, the new media literacy, etc.) [63]. Consistent with the ecosystem features reminded in the previous sections, even from this last perspective, the ecosystem approach seems the more suitable for digital startups and their growth.

6. Conclusive remarks

The diffusion of digital technologies with their still undefined boundaries announces a new era in entrepreneurship, where traditional ways and forms of pursuing entrepreneurial opportunities will be increasingly reshaped. A new horizon of business opportunities only waits for being discovered and then managed profitably [27, 48, 57].

Relevant changes also are involving the basilar criteria of management and organization of companies and the ways to compete globally. From these modifications,

new criteria to start a business and pathways for its development and growth descend: the emergence of *digital entrepreneurship* [25, 62].

For policy makers, the main challenge is to assure both that the domestic ventures are able to collect digital business opportunities successfully and to provide benefits for the whole territorial context, along a development route stable and persistent in terms of net employment, income, and cross fertilization. A flourishing entrepreneurship research stream believes that a chance to reach the above objectives lies in the ability to implement specific business environments called *ecosystems*. These are targeted on selective measure supporting the emerging of ventures with innovative business models but also their development and growth ([24]; Napier and Hansens, 2011). While, according to empirical evidence, policies only focused in favoring the firms birth rate may not be the best solution to the problems of employment and growth of many Western countries.

Anyway to support scale ups and high growth firms in general is a hard task that must be carried out by specialized personnel and with the appropriate skills. This is because there are not many cases of good practice to follow, but only a basic logic according to which all the domains (a favorable culture, enabling policies, availability of adequate financing, high-quality human capital, safety-friendly markets for products, institutional supports, etc.) that make up an ecosystem must be aligned and coordinated (*holistic approach*). Moreover, the ecosystem needs to involve, since the beginning, many stakeholders/actors (at least an interested large corporation, policy makers, local bankers, and venture capitalists, people acting on the local culture, local universities, etc.) [24, 54]. The more intense the cooperation among these key actors is, the more likely the ecosystem will be to succeed.

Nevertheless, both domains and actors are characterized by proximity and include hundreds of variables interacting in highly complex and idiosyncratic ways. They should be able to converge toward a set of shared objectives according to a series of priorities [31] (SEP, 2018).

Despite the complexity to create an ecosystem, its features and functionalities seem well-suited with digital enterprises features, as they focus on the development of the *intellectual capital*, which has to sustain the growth of firms operating with a new disruptive technology [8, 56]. Indeed, the roots of a well-operating ecosystem lie in a specialized and motivated *human capital*, open to innovation and with a widespread entrepreneurial culture. It is also founded on a dynamic system of connections among all the stakeholders of a context who are interested into its development, the *networking capital*. Again, the ecosystem rests its strength on the quality of the firms enclosed in terms of values, managerial philosophy, organizational patterns, and informative systems; in other word, the *organizational capital*.

To this aim, therefore, policy makers are called to sustain a great effort. Not by the chance, up to now a lot of attempts aiming at creating conducive environments failed. Moreover, there is an effective risk that the entrepreneurial ecosystem remains a tautological concept (Stam, 2015): entrepreneurial ecosystems produce successful entrepreneurship, but where there is a lot of successful entrepreneurship, there is apparently a good entrepreneurial ecosystem.

Beyond this theoretical-conceptual paper, aimed to connect the increasing sector of digital firms with a specific business environment, future surveys should focus their analyses at least on three directions. Firstly, a clear individuation of the needs and resources requested by digital firms and startups in the light of their own specificities; secondly, the detailed examination of the operative mechanisms of existing ecosystems precisely focused on digital technologies; and lastly, an investigations on the coherence among digital technologies with the local background of competencies and knowledge to individuate possible gaps to fill.

Author details

Antonio Thomas*, Renato Passaro and Ivana Quinto
Department of Engineering, University of Naples Parthenope, Italy

*Address all correspondence to: antonio.thomas@uniparthenope.it

IntechOpen

References

[1] van Stel A, Carree MA, Thurik R. The effect of entrepreneurial activity on national economic growth. Small Business Economics. 2005;**24**(3):311-321

[2] Audretsch DB, Keilbach MC, Lehmann EE. Entrepreneurship and Economic Growth. New York: Oxford University Press; 2008

[3] Autio E, Kenney M, Mustar P, Siegel D, Wright M. Entrepreneurial innovation: The importance of context. Research Policy. 2014;**43**(7):1097-1108

[4] Bosma N, Acs ZJ, Autio E, Coduras A, Levie J, Global Entrepreneurship Monitor. Global Report. Babson Park, MA, USA: Babson College; 2008. p. 2009

[5] OECD. An international benchmarking analysis of public programmes for high-growth firms. In: LEED Programme; Paris. 2013

[6] Henrekson M, Johansson D. Gazelles as job creators: A survey and interpretation of the evidence. Small Business Economics. 2010;**35**:227-244

[7] Hathaway I, Litan R. Declining Business Dynamism in the United States: A Look at States and Metros. Washington, D.C.: The Brookings Institution; 2014

[8] Mason C, Brown R. Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship. The Hague, Netherlands: OECD; 2014

[9] Shane S. Why encouraging more people to become entrepreneurs is bad public policy. Small Business Economics. 2009;**33**(2):141-149

[10] Lerner J. The future of public efforts to boost entrepreneurship and venture capital. Small Business Economics. 2010;**35**:255-264

[11] Feld B. Startup Communities: Building an Entrepreneurial Ecosystem in Your City. New York: Wiley; 2012

[12] Carland JW, Hoy FS, Boulton WR, Carland JC. Differentiating entrepreneurs from small business owner: A conceptualization. Academy of Management Review. 1984;**9**(2):354-358

[13] Gartner WB. What are we talking about when we talk about entrepreneurship? Journal of Business Venturing. 1990;**5**(1):15-28

[14] Storey DJ, Greene F. Small Business and Entrepreneurship. Harlow: Prentice Hall; 2010

[15] Nightingale P, Coad A. Muppets and gazelles: Political and methodological biases in entrepreneurship research. Industrial and Corporate Change. 2014;**23**:113-143

[16] OECD. High-growth Enterprises: What Governments Can Do to Make a Difference. Paris: OECD Studies on SMEs and Entrepreneurship; 2010

[17] OECD. Financing High Growth Firms: The Role of Angel Investors. Paris: OECD Publishing; 2011

[18] Acs ZJ, Muller P. Employment effects of business dynamics: Mice, gazelles and elephants. Small Business Economics. 2008;**30**(1):85-100

[19] Mason C, Brown R. Creating good public policy to support high growth firms. Small Business Economics. 2013;**40**:211-225

[20] Brown R, Mason C. Inside the high-tech black box: A critique of technology entrepreneurship policy. Technovation. 2014;**3412**:773-784

[21] Passaro R, Quinto I, Thomas A. Start-up competitions as

learning environment to Foster the entrepreneurial process. International Journal of Entrepreneurial Behaviour & Research. 2017;**23**(3):426-445

[22] SEP (Startup Europe Changing). Startup and Scaleup Ecosystem Recommendations for Policy Change. 2018. Available from: https://startupeuropepartnership.eu/

[23] Brown R, Mawson S, Mason C. Myth-busting and entrepreneurship policy: The case of high growth firms. Entrepreneurship & Regional Development. 2017;**29**(5-6)

[24] Isenberg DJ. How to start an entrepreneurial revolution. Harvard Business Review. 2010;**88**(6):41-49

[25] EC (European Commission). Digital Entrepreneurship Scoreboard 2015. Brussels: Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs; 2016

[26] EC (European Commission). Fuelling Digital Entrepreneurship in Europe. Background Paper. 2014. file:///C:/Users/utente/Desktop/file%20scaricati/Digital%20Entrepreneurship.pdf

[27] Nambisan S, Baron RA. Entrepreneurship in innovation ecosystems: Entrepreneurs' self-regulatory processes and their implications for new venture success. Entrepreneurship Theory and Practice. 2013;**37**(5):1071-1097

[28] Isenberg D. The Entrepreneurship Ecosystem Strategy as a New Paradigm for Economic Policy: Principles for Cultivating Entrepreneurship. Babson Park: Babson College; 2011

[29] Napier G, Hansen C. Ecosystems for Young Scaleable Firms. FORA Group; 2011. www.kauffman.org/~/media/kauffman_org/z_archive/resource/2012/5/irpr_2012_napier.pdf

[30] Brown R, Mawson S. Targeted support for high growth firms: Theoretical constraints, unintended consequences and future policy challenges. Environment and Planning C: Government and Policy. 2016;**34**(5):816-836

[31] Isenberg D, Onyemah V. Fostering scale up ecosystems for regional economic growth. Innovations: Technology, Governance, Globalization. 2016;**11**(1-2):60-79

[32] Blank S. The Four Steps to the Epiphany: Successful Strategies for Products that Win. Pescadero (US) K & S Ranch; 2013

[33] Bosma NS, Sternberg R. Entrepreneurship as an urban event? Empirical evidence from European cities. Regional Studies. 2014;**48**(6):1016-1033

[34] Audretsch DB, Belitski M. Entrepreneurial ecosystems in cities: Establishing the framework conditions. The Journal of Technology Transfer. 2017;**42**(5):1030-1051

[35] Kilby P. Hunting the heffalump. In: Ibidem, editor. Entrepreneurship and Economic Development. New York: The Free Press; 1971

[36] Carree MA, van Stel A, Thurik AR, Wennekers S. Economic development and business ownership: An analysis using data of 23 OECD countries in the period 1976-1996. Small Business Economics. 2002;**19**(3):271-290

[37] Acs ZJ, Arenius P, Hay M, Minniti M. Global Entrepreneurship Monitor 2004 Global Report. Babson Park, MA, USA: Babson College. p. 2005

[38] Reynolds PD, Bygrave WD, Autio E. Global Entrepreneurship Monitor GEM. Executive Report. Babson Park, MA: Babson College; 2003

[39] Audretsch DB. Entrepreneurship: A Survey of the Literature. Brussels: European Commission: Enterprise Directorate General; 2002

[40] Vesper KH. New Venture Strategies. Englewood Cliffs: Prentice-Hall; 1990

[41] Thomas A, Passaro R. Entrepreneurship and firm performance. An approach based on entrepreneurs' subjective characteristics. In: Dossena G, editor. Entrepreneurship Today. Milan: McGraw-Hill; 2010. pp. 99-122

[42] Thomas A, Passaro R, Marinangeli B. Entrepreneurial Behaviors and strategic paths in innovative SMEs: Evidence from Italy's Campania region. Global Business and Organizational Excellence. 2015;**34**(5):51-62

[43] Mason C. Public policy support for the informal venture capital market: A critical review. International Journal of Small Business. 2009;**27**:536-556

[44] Feldman MA, Francis J, Bercovitz J. Creating a cluster while building a firm: Entrepreneurs and the formation of industrial clusters. Regional Studies. 2005;**39**:129-141

[45] Brown R, Mawson S. Trigger points and high-growth firms: A conceptualization and review of public policy implications. Journal of Small Business and Enterprise Development. 2013;**20**:279-295

[46] Brown R, Mason C. Raising the batting average: Re-orientating regional industrial policy to generate more high growth firms. Local Economy. 2012;**27**:33-49

[47] ScaleIT. 2018. Available from: www.scaleit.biz/

[48] EC (European Commission). Digital Transformation of European Industry and Enterprises. DG Internal Market, Industry, Entrepreneurship and SMEs; 2015

[49] Brynjolfsson E, McAfee A. The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies. New York: WW Norton & Company; 2014

[50] Brown R. Mission impossible? Entrepreneurial universities and peripheral regional innovation systems. Industry and Innovation. 2016;**23**(2):189-205

[51] Delgado M, Porter ME, Stern S. Clusters and Entrepreneurship. Journal of Economic Geography. 2010;**10**(4):95-518

[52] Mason C, Harrison RT. After the exit: Acquisitions, entrepreneurial recycling. Regional Studies. 2006;**40**:55-73

[53] Stam E. Entrepreneurial ecosystems and regional policy: A sympathetic critique. European Planning Studies. 2015;**23**(9):1759-1769

[54] Feldman MP, Zoller T. Dealmakers in place: Social capital connections in regional entrepreneurial economies. Regional Studies. 2012;**46**:23-37

[55] Isenberg D. Worthless, Impossible and Stupid: How Contrarian Entrepreneurs Create and Capture Extraordinary Value. Cambridge: Harvard Business Review Press; 2013

[56] Passaro R, Quinto I, Thomas A. The impact of higher education on entrepreneurial intention and human capital. Journal of Intellectual Capital. 2018;**19**(1):135-156

[57] Thurik R, Stam E, Audretsch D. The rise of the entrepreneurial economy and the future of dynamic capitalism. Technovation. 2013;**33**(8-9):302-310

[58] Lusch RF, Nambisan S. Service innovation: A service-dominant logic perspective. MIS Quarterly. 2015;**39**(1):155-175

[59] Kallinikos J, Aaltonen A, Marton A. The ambivalent ontology of digital artifacts. MIS Quarterly. 2013;**37**(2):357-370

[60] Florida R, Adler P, Mellander C. The city as innovation machine. Regional Studies. 2017;**51**(1):86-96

[61] Malecki EJ. Connecting local entrepreneurial ecosystems to global innovation networks: Open innovation, double networks and knowledge integration. International Journal of Entrepreneurship and Innovation Management. 2011;**14**:36-59

[62] Nambisan S. Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. Entrepreneurship Theory and Practice. 2017;**41**(6):1029-1055

[63] Iordache C, Mariën I, Baelden D. Developing digital skills and competences: A QuickScan analysis of 13 digital literacy models. Italian Journal of Sociology of Education. 2017;**9**(1):6-30

Chapter

Strategic Use of Zero-rating of Mobile Data

Bronwyn Howell and Roslyn Layton

Abstract

The digital economy, characterised by goods exhibiting high instantiation and low reproduction costs frequently created and distributed over multisided platforms, poses challenges for the pricing of products and services. As convergence occurs between applications and transport, flexible ways of pricing internet access and content are being developed. One frequently used pricing strategy is 'zero-rating'—where traffic for specific applications is not counted against the 'cap' in an internet user's monthly access plan. This pricing strategy has drawn much criticism from net neutrality advocates, but it is far from clear that the policy is harmful. Using an economic analysis based upon relaxing assumptions in the simple model of perfect competition, so that it more closely reflects the complex internet ecosystem, we assess the extent to which it is plausible for zero-rating to be used to harm competition, consumer welfare and incentives for application innovation. We develop five questions to assist inquiry into the potential harm or benefits arising, which can be applied by competition authorities, regulators and the firms concerned to assist in sorting the cases less likely to be harmful from those that warrant further investigation.

Keywords: zero-rating, economic analysis, regulation, competition, strategic interaction

1. Introduction

The digital economy, characterised by goods exhibiting high instantiation and low reproduction costs frequently created and distributed over multisided platforms, poses challenges for the pricing of products and services. Unlike for most physical goods, it no longer follows that the optimal price for any individual item will be a simple function of its cost of production, or even that the individual consuming the product or service should be the one that pays for it [1].

Information goods providers are increasingly adopting strategies subsidising the consumption of information goods by bundling them with other goods, or by utilising multisided platforms whereby revenues in excess of costs raised in transactions with customers of one product type (or side of the platform) are used to subsidise below-cost purchases by consumers of another product type (or side of the platform). For example, consumers receive 'free' (or discounted) newspapers, television and radio channels when advertising revenues offset the costs of providing the printing and broadcasting infrastructure required for the content to reach consumers. 'Virtuous cycles' arise as advertising revenues subsidise the costs of

readers or viewers accessing content, thereby increasing consumer welfare, at the same time as having more readers and viewers increases the value to advertisers and hence the price that platform operators can charge them [2]. So long as there is careful balancing of demand elasticities on both sides of the platform, having prices varying from marginal cost on both sides can be both profit- and welfare enhancing [3, 4, 24].

Such practices have, however, proved particularly challenging for regulators and competition authorities entrusted with the pursuit and protection of competitive markets for the long-term benefits of consumers. Successfully engaging in above-cost pricing in at least one market requires the firm to have some degree of market power, while using the surpluses to subsidise another potentially alters the competitive dynamics in that market as well [5]. Inevitably, the interests of consumers of one product must be traded off against those of another. Furthermore, in the context of increasing disintermediation of once-integrated firms and their replacement by complex contractually co-ordinated supply chains for the relevant products and services, it is no longer obvious that one specific firm or even one market is the appropriate focus for attention. While a mandate clearly exists for competition authorities and regulators to be interested, it is far less clear that their historic precedents and inquiry methods based on historic structure-conduct-performance (SCP) models of industrial organisation established to deal with single firm or markets and non-information goods are suitable for governing commercial interactions in the new context.

The complexities are highlighted by 'zero-rating'. This occurs when internet service providers (ISPs) do not count the data traffic used to service specific applications (supplied typically by third-party content and application providers—CAPs—who may also be using advertising revenues to subsidise production costs) against the data traffic 'cap' allowed in an internet user's access (subscription) plan. Data transmissions for these applications are effectively 'free to the user', whereas data transmissions serving other applications incur an effective positive price. Regulators and telecommunication authorities in many jurisdictions have been required to adjudicate allegations of the use of zero-rating to harm competition in both the ISP and CAP markets, and thereby to cause harm to consumers collectively, and disproportionately to different consumer groups. Telecommunications regulators have been lobbied to impose rules prohibiting its use entirely, or at least permitting it only in very restricted circumstances.

To date, regulators and competition authorities have generally responded cautiously, by eschewing outright prohibition of zero-rating in favour of case-by-case analysis, as was explicitly required in the United States Federal Communications Commission's (FCC) subsequently repealed 2015 Open Internet Rule [6]. Following repeal, case-by-case jurisdiction has persisted under generic competition law overseen by the Federal Trade Commission, as occurred prior to 2015, and has always prevailed in countries such as Australia and New Zealand, where no specific net neutrality regulations have been introduced. In contrast, the European Union's approach, encapsulated in its 2016 Net Neutrality Regulation, is more prescriptive.

Nonetheless, even with case-by-case evaluation, regulators and competition authorities face many difficulties in assessing economic harms and benefits. Not least is defining the relevant market(s). Benefits and harms may accrue in multiple markets, many of which may be far-removed from both that in which the firm engaging in the pricing practice is deemed to be operating (e.g., in CAP markets not ISP markets) and the territory over which the relevant authority has jurisdiction (e.g., a CAP operating from a different country to the ISP). Further decision-making complications exist due to extensive use of bundling of internet and content access with other products and services (e.g., with fixed and mobile voice applications, and pay television, in classic 'triple' and 'quadruple' play subscriptions), and

the fact that little may yet be known about consumer valuations and preferences in markets for products that are comparatively new [7]. While the Body of European Regulators for Electronic Communications (BEREC) has endeavoured to address this complexity by issuing a set of guidelines for member state regulators to assist in implementing the European Net Neutrality Regulation [8], they have proven problematic. Their focus on legal compliance with the directive rather than detailed assessment of the economic harms and benefits in different circumstances has resulted in considerable variation between member state regulators' interpretation and application of the rule, creating both controversy and uncertainty about the acceptability of zero-rating pricing strategies across the notional single communications market to which the commission aspires [9].

Given the levels of economic complexity invoked by zero-rating, and the lack of theoretical and empirical evidence to date to inform both firms seeking to adopt the practice and regulators and competition authorities seeking to maintain fair and competitive markets (on balance, most that has been produced finds the practice NOT harmful), the development of some general economic principles for evaluating its effects is indicated. This chapter represents a first step in this direction. The contribution is five questions, which can be used as a preliminary filter to assess the likelihood of a specific instance of zero-rating being harmful to total welfare, thereby necessitating either caution on the part of a firm potentially implementing it, or justification on the part of competition authorities and regulators contemplating expending their scarce resources on a more intensive investigation.

We begin by outlining the general arguments for and against the use of zero-rating. Next, we summarise key economic characteristics of the internet ecosystem in which zero-rating offers are being made. Then, beginning with the models of perfect competition upon which theories of competitive harm were developed in classical SCP thinking, we demonstrate how successively relaxing the model assumptions when it is applied to the commercial interaction between ISPs and end users leads to the identification of circumstances where zero-rating may be more or less harmful to total welfare. The theoretical economic methodology used for this inquiry draws upon and extends the similar approach used by Greenstein et al. [21] and Gans and Katz [10, 11] in their inquiries into specific examples of zero-rating. The result is the five questions, which are summarised in our conclusion.

2. Zero-rating, net neutrality and competitive harms

Calls for the banning of zero-rating offers have arisen in the context of wider advocacy for increased regulation of ISPs to impose a particular view of an internet where ISPs are required to treat every data packet equally—in regard to both technical and financial characteristics. Calls for ISPs (but not the providers of content and applications used on the infrastructure) to operate in this neutral, non-discriminatory manner—so-called net neutrality—derived from Wu's [12] seminal paper.

Particular concerns have been voiced about ISPs charging some content and applications providers (CAPs) but not others to deliver their traffic to end consumers, even when those payments are not associated with traffic prioritisation (so fall outside the so-called 'hard' network neutrality regulations [13] precluding such behaviour). ISPs, however, are continually looking for new revenues in order to finance the newer, more capable networks required to transport a burgeoning volume of content and application data between CAPs and end users, in addition to winning new customers and amortising general network costs.

Some neutral internet proponents (e.g., [14, 15, 28]) have argued that 'zero-rated' internet access plans, frequently offered by mobile providers, should be prohibited.

These plans do not count data used for selected ('zero-rated') applications against the data downloading 'cap' specified within the monthly access fee. End users face a lower effective price for using the selected application than for other applications that are not 'zero-rated'. The ISP may or may not charge the selected CAPs to recover the costs of delivering their data to end users. 'Zero-rated' plans are seen by net neutrality proponents as a form of unfair price discrimination[1] against those internet users who do not access the selected content. It is also argued that when ISPs selectively zero-rate data relating to large established CAPs, smaller and newer rivals will be foreclosed, thereby harming incentives for application innovation, regardless of whether or not ISPs charge CAPs. A further argument is that application variety will be harmed because smaller, newer providers may not have the resources to pay ISPs to zero-rate their traffic, leading to their applications being eschewed by end users preferring the zero-rated options.

Others, however (e.g., [10, 16, 17, 25, 27]), contend that preventing all instances of zero-rating will necessarily rule out some cases (e.g., those analogous to advertising in newspapers) where payments on both sides of a two-sided market may be necessary for both an application and the additional infrastructure needed to service demand for it to be commercially viable in the first place. They also suggest that zero-rating will facilitate higher internet use in total (and therefore higher welfare) than if payments were restricted to only one 'side' of the internet platform. The potential welfare gains from higher internet use may be especially valuable in developing countries where the ability to pay for additional data use is very low [18]. They argue for a more nuanced approach, where each case is considered on its merits, so that the interests of all participants in highly complex internet-enabled ecosystems can be assessed [9, 19, 29, 30].

To date, no consistent view has emerged amongst regulators and competition authorities of what constitutes anti-competitive use of zero-rating. In the United States, much press has been directed at T-Mobile's zero-rating of its Binge-On application, but the FCC has found no harm. In Europe, the Belgian regulator found Proximus use acceptable according to the BEREC guidelines [31], and two National Regulatory Authorities (NRAs)—Austria and Croatia—found zero-rating acceptable when assessed against BEREC's commercial criteria. However, the Dutch NRA found Deutsche Telecom had infringed in zero-rating its free music service. The decision was struck down on appeal, but on grounds that the NRA decision exceeded EU law, rather than on its commercial merits.[2]

3. The internet ecosystem and zero-rating

Zero-rating offers take place in a complex internet-enabled ecosystem consisting of multiple intertwined two-sided platforms, of which ISPs are just one of many in the commercial chain linking senders and receivers of data [20, 21, 32]. **Figure 1** illustrates how in this ecosystem, payment flows need not necessarily follow data flows. The systemic interaction of payments and data flows means that actions at any one segment of the ecosystem can have material consequences at any other part.

[1] A distinction needs to be made between legal definitions of discrimination—where two people with observable differences are treated differently (e.g., racial or gender discrimination) and economic discrimination—where two people with different economic characteristics are treated differently (e.g., where those with low willingness-to-pay are charged a low price and those with high willingness-to-pay a high price). The latter case may frequently lead to a more efficient outcome. However, in the former, the individuals may have identical economic characteristics, so charging different prices is not welfare-enhancing.

[2] Autoriteit Consument & Markt, "ACM Not to Appeal Ruling on Net Neutrality | ACM.Nl," News, May 23, 2017, /en/publications/publication/17267/ACM-not-to-appeal-ruling-on-net-neutrality.

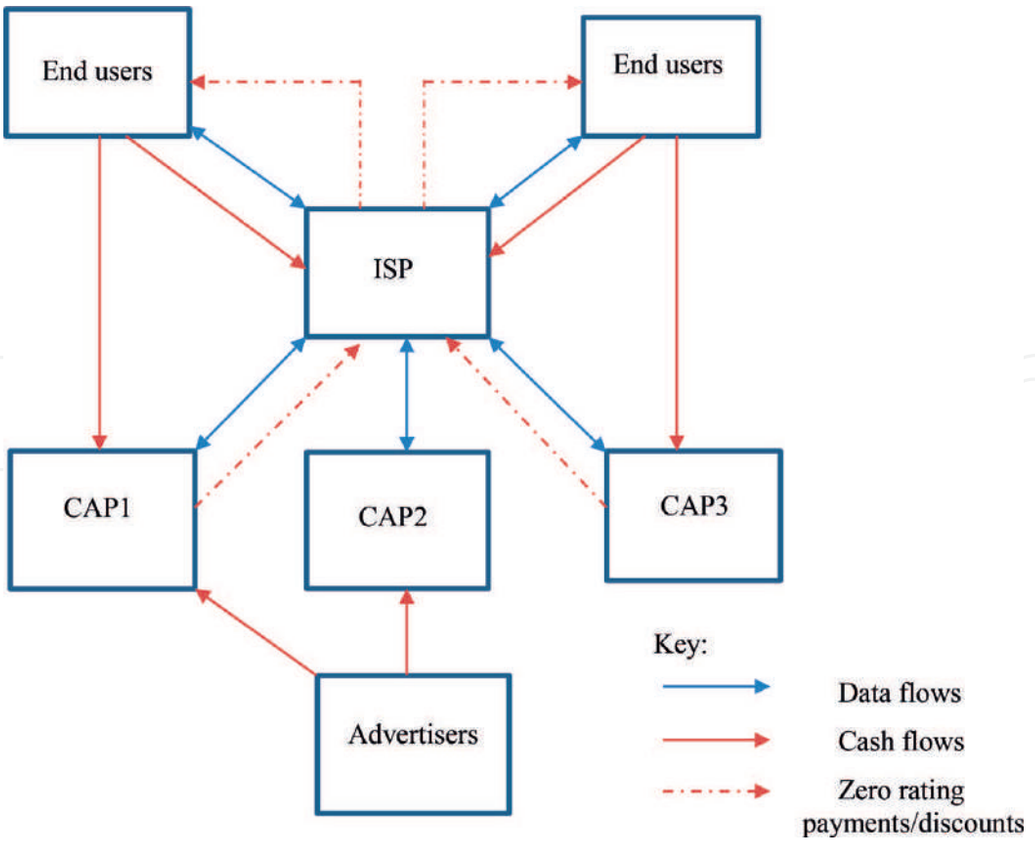

Figure 1.
The internet-enabled ecosystem.

3.1 Complex interactions

Net neutrality advocates assert that innovation at the CAP 'edge' of the ecosystem unconditionally dominates innovation at the ISP core. In this view, ISPs' sole commercial functions are to serve the internet data transmission requirements of their end users. ISPs should not have commercial interactions with CAPs—thereby precluding any possibility that selected CAPs can pay ISPs to prioritise (i.e., discriminate against) traffic related to their applications over that of their rivals. By extension, any arrangements whereby ISPs discount the charges relating to specific applications (i.e., zero-rating) are seen as price discrimination. Both practices are seen to discriminate amongst CAPs, so are antithetic to the objective of promoting the internet ecosystem as an engine of innovation [22]. Van Schewick [15] uses this argument to question the efficacy of T-Mobile's zero-rating of content on Binge-On, as do critics of Facebook's Free Basics. Indeed, Lemley and Lessig go so far as to suggest that ISPs should not charge CAPs for data delivery as a form of subsidy for application development activities.

In contrast, ISPs claim that they have been required to build ever-more-capable networks (for example, from 2G to 3G, 4G and now 5G mobile, and fixed fibre and wireless) to serve the vastly increased demands placed on them to deliver ever-larger amounts of data at ever-faster speeds to meet the demands of specific applications [26]. A handful of application types—notably audio and video streaming—require vastly more sophisticated network capabilities than others—for example, simple websites. As not all consumers use these applications equally, and some applications—for example, those relating to time-critical bilateral interactions—need to be treated differently from others—e.g., one-way streamed data—then some degree of discrimination (both in terms of traffic management and pricing, such as charging CAPs in some instances as well as ends users) is essential if their networks are to be operated efficiently and effectively.

Regulators and competition authorities are charged with promoting competition in each of the relevant markets in order to protect the long-term interests of consumers. This dynamic welfare criterion is predicated upon the assumption that the long-term interests of consumers in each of these markets are a suitable proxy for the long-term interests of the ecosystem as a whole. Thus, balance is required between short-term and long-term factors. Furthermore, what is optimal at one time of the ecosystem lifecycle may not be optimal at another [33, 34]. To the extent that social preferences may override the economic considerations, then the costs of imposing those preferences must be recognised in both the total welfare foregone, and the transfers that those preferences engender between ecosystem stakeholders. Moreover, a single stakeholder may participate in the ecosystem in multiple capacities, and these may vary over the ecosystem lifecycle. The dilemma for regulators and policy-makers is to decide what to take into account when developing a framework for assessing cases of zero-rating, and deciding how and when to intervene.

3.2 Derived demands

The dilemma is exacerbated because end-users' demands for ISP services are not determined solely by their own interaction. An ISP connection is of no value to an end user if it is not used to access internet applications. ISPs operate two-sided platforms connecting CAPs and end users. The relevant products for any zero-rating inquiry are the complex bundles of internet access and application use that end users consume. Internet connection value cannot be considered in isolation—it is dependent upon the value the consumer places on the applications accessed. The ISP may supply some of these applications, but for the most part, consumers' value of the connection is contingent upon being able to access a vast range of applications provided by third-party CAPs.

A nontrivial observation arising is that, for the most part, ISPs do not have strong incentives to impede their consumers' access to the preferred applications, for fear of losing them—and their revenues—to rival ISPs [21]. If favouring one application harms access to or use of another, then likewise this will likely reduce both the number of ISP customers and the ability of the relevant CAP to earn subscription and advertising revenues. Ipso facto, this reduces the incentives for ISPs to use pricing to strategically foreclose selected third-party applications—especially those consumers valued highly—unless they are compensated by the CAP. However, as the market power (measured by the consumer base) of highly valued CAPs vastly exceeds that of any individual ISP, and they have very wide (global) reach whereas ISPs are geographically specific, it is most unlikely that they will engage in contracting in each of the vast number of local geographic ISP markets in order to foreclose their CAP rivals. It cannot be discounted that locally specific CAPs might find such a strategy advantageous with regard to a rival facing the same geographic limitations.

3.3 Complex tariffs

ISPs can charge consumers a flat fee, a usage-based fee or a combination of the two for internet access. Consumers' internet access purchases are determined by trading off the fixed price paid for access and any usage charge against the benefits of accessing and utilising applications. Menus of two-part tariffs bundling access and usage charges are generally welfare enhancing relative to a single flat-rate or solely usage-based tariff as they allow users with different valuations associated with different usage levels of even a single application to self-select the tariff that gives them most surplus [35].

A zero-rated tariff applied to a specific application is simply a tariff with no usage-based component—that is, a flat fee. Flat fees are most advantageous for those with the highest expected usage, (e.g., video gaming) as they will utilise it up to the point where no further benefits will be obtained. This is necessarily more than if usage is charged at marginal cost (noting that network congestion is a significant externality proportional to utilisation that is imposed by users when utilising applications). If the higher costs associated with higher usage levels are to be recovered in user fees, a single flat-rate tariff will be higher where usage is higher that when it is lower. Metered tariffs (including plans with flat-rates within a given data cap, that rise as the data cap increases) are an efficient means by which ISPs may recover revenues from each consumer rising in proportion with the costs that usage imposes on the ISP (including the costs of congestion that lower service quality for all users).

3.4 Heterogeneous end users

However, metered tariffs will arise in practice only if consumers are heterogeneous in their valuations of application usage. If all consumers value their connections identically, then there will be one tariff that is efficient for all users, and there will be no incentive for ISPs to offer any other tariff. Consumers' valuations of internet application usage are inherently heterogeneous because different users will prefer to use different applications for different purposes. Some will prefer applications requiring high usage (e.g., video streaming) while others will prefer applications with lower resource demands (e.g., web browsing, email). Even consumers preferring a single application will vary in their use of it due to personal preferences and resource constraints—for example, time to watch streamed video and the cash to pay for the connection.

Consequently, internet access as sold by ISPs is not a homogeneous good—it varies with the application preferences of the consumers using it. Consumers with higher valuations for a single application will consume more resources than those with lower valuations. If metered tariffs are intended to recover higher revenues from higher-using consumers of a single application, then offering a zero-rated tariff for that application is inconsistent with the ISP's objective to recover its costs in usage fees. Assuming that the ISP does not recover the revenues lost from zero-rating application usage from the application provider, and it costs the same to deliver a unit of each application to the end user, then it is strategically illogical for the ISP to charge for the usage of one application and zero-rate usage of the other. Costs remain unchanged, but revenues will fall.

Hence, in the simplest case, as zero-rating by an ISP discounts revenues received from selected end users on the consumer side of the ISP platform, it must necessarily be associated with compensatory revenue streams—for example, higher fees charged to non-selected users, charges on the CAP side of the platform, or revenues from other sources, such as taxation or advertising—if in the long run the ISP wishes to remain solvent.

4. Competition: relaxing the assumptions

The principal arguments against zero-rating promulgated by net neutrality advocates rest on the one-sided logic that all end users should pay the same price for internet access, regardless of whether the market for the product in question conforms to the assumptions of perfect competition. In this model, the marginal unit supplied will be sold at its marginal cost of production, and this cost will determine

the price paid for all other units sold. This leads to a statically efficient outcome, with maximum total welfare.

However, for this to be achieved, other specific market conditions must be met. Importantly, the product sold must be perfectly homogeneous, there must be perfect information, no transaction costs, no externalities, and no barriers to firms entering or leaving the market. There must be perfectly divisible output (i.e., no scale economies). All participants are price-takers—that is, no firm can charge more than the efficient price and remain in the market, and consumers must pay that price if they value the product at that price or above.

Requiring all units to be sold at the same price does not of itself make a market more competitive (i.e., render the perfectly competitive outcome) unless all of the other conditions are met. In this section, we will demonstrate that as practically none of these assumptions prevail in the complex market for internet access discussed in the previous section, simplistic calls to prevent zero-rating are insufficient to guide decision-making.

First, we show that when the assumption of homogeneous goods is relaxed, it is most unlikely that zero-rated tariffs can be used to foreclose rival applications. Instead, we demonstrate that requiring the same price to be charged for accessing products costing different amounts to produce obscures crucial underlying differences in costs on the supply side and user preferences on the demand side. This leads to our first three questions to be posed by those undertaking case-by-case assessments of zero-rating examples. Next, we relax the assumptions of perfect information and absence of transaction costs in the exchanges between ISPs and their end consumers, and their effects on barriers to entry for new CAPs and ISPs. This leads us to question the competitive positioning of the party objecting to an ISP using zero-rating prices—and our fourth question for assessors. It also leads to our final consideration—how the presence of transaction costs creates barriers to entry that lead to entrants and not incumbents favouring zero-rating policies. This leads to our fifth question, regarding the strategic options available to CAPs and ISPs that render financial transactions between them an adjunct to zero-rating that makes the strategy not only pro-competitive but also welfare-enhancing.

We note that in this analysis we are considering only instances of pricing of data transfer as a strategy for zero-rating. We do not consider cases of payments for data prioritisation. The examples we consider therefore have the appearance of the price discrimination to which Wu [12] and Van Schewick [15] raise objections, rather than being artefacts of paid data management, which are considered in other literature.

4.1 Relaxing the constraints: homogeneous products and heterogeneous users

In net neutrality discourse, ISPs could strategically zero-rate a selected application to steer end users away from using another application and towards the favoured one. This could occur if the ISP is also the CAP for the favoured application, whereby it could foreclose another ISP offering a similar application, or to foreclose a rival stand-alone CAP. However, such foreclosure can only occur only if the end users perceive the applications as perfect substitutes: that is, the applications are homogeneous.

If the two applications offer materially different value propositions to end consumers (i.e., the assumption of homogeneous products in the perfect competition model is relaxed), then the zero-priced application will not be able to force the positive-priced one from the market so long as there are consumers who prefer the positive-priced one over the zero-rated one by more than the discount embedded in the zero-rating offer [11]. As demonstrated above, as end users are also

inherently heterogeneous in their content preferences, it is quite unlikely that the requisite conditions for foreclosure will occur unless the applications concerned are indistinguishable.

The inability for 'free' offerings to foreclose those with a positive price is observed with broadcast television and newspaper providers. Free-to-air television and free newspapers have not foreclosed pay television and newspaper subscriptions. Indeed, some consumers willingly consume both, even when some of the content overlaps, because the additional value offered by the pay version is sufficiently high enough that it overcomes the price differential. Arguably, the presence of the two different newspaper forms has led to greater content variety, with subscriber newspapers providing a professional journalist-based news service, and free newspapers relying more upon content generated by readers (e.g., local school and sports reports) and advertisers.

This leads to our first question to be posed about zero-rating offers.

Question 1. What very close or perfectly substitute applications accessible over the ISP's connection, costing the same to deliver, are likely to be foreclosed by the zero-rated application(s)?

The closer are the non-zero-rated application(s) to the zero-rated one(s) in the perception of the end users, then the more likely it is that the non-zero-rated applications will be crowded out. However, there are very few applications meeting this requirement that are truly close substitutes. For the most part, CAPs such as Netflix and Hulu are not close or perfect substitutes for each other because they contain different bundles of content for which end users have distinct preferences. The applications themselves are differentiated; even if it costs the ISP the same to deliver a Hulu movie and a Netflix one of equivalent specifications. If a consumer preferring Netflix is not prevented from paying the higher usage fee to watch Hulu content if the content available only on Hulu is sufficiently highly valued, then Hulu will not be foreclosed, even in respect of the subset of Hulu-preferring consumers on the discriminating ISP's network.

It might be a concern, however, if the applications in consideration were, for example, two identical cloud storage applications. The zero-rated application will have an unequivocal advantage over the non-zero-rated one, leading to all consumers with a non-zero valuation of using cloud storage opting for the lower-cost one. However, for foreclosure to occur, it is necessary for the applications to be undifferentiated—that is, homogeneous products. Foreclosure of differentiated products will be a function of the degree of differentiation—the more similar they are, the more likely it is that foreclosure will occur.

The logic applied in this simple illustration leads to the conclusion that without some non-neutral pricing signals, over-much (inefficient) investment in CAP variety is possible if equalising the prices faced by consumers and application providers conceals underlying real differences in costs and user preferences.

4.2 Equalising prices conceals underlying cost and valuation differences

Assume now that the two applications are perfectly homogeneous, but one actually costs less to deliver than the other. This could be because the ISP has been able to customise the delivery of one application within its own networks so that it costs less (or causes less congestion) than an otherwise-equivalent one that has not been customised. It could also be that one class of applications can be processed via a different operational process that is less costly, as occurred in Australia and New Zealand in the mid-1990s, when the internet was first becoming popular. At the time, international bandwidth capacity on the PACNET sub-oceanic cable was constrained. Due to asymmetric data flows, Australian and New Zealand ISPs

purchased PACNET capacity under transit arrangements rather than peering. Traffic to and from end consumers over PACNET was more costly to handle than traffic handled under local peering arrangements. The original retail internet plans metered international (PACNET) traffic by volume, but offered unmetered (i.e., zero-rated) local traffic.

In this instance, zero-rating low-cost local traffic but metering high-cost international traffic reflected real differences in underlying costs. Zero-rating that diverts consumers' usage of substitutable applications towards lower cost applications raises efficiency.

This leads to our second question for regulators and adjudicators.

Question 2. Does usage of the zero-rated applications actually cost the ISP less than equivalent usage of non-zero-rated applications?

If the answer to this question is 'yes', then zero-rating would be less harmful to total welfare than the alternative of requiring all usage to be charged at a single price. Under the two-price arrangement, more usage than efficient would be made of the low-cost application, and the high-price usage tariff would have to be above cost to subsidise the additional low-cost usage. Arguably, this could lead to some low-cost applications surviving that would not otherwise be viable if their usage was charged at cost—that is, inefficient over-supply of application variety [11].

However, the alternative of a single positive usage price that does not signal the different underlying costs will lead to more usage of the high-cost application than if it was charged at cost. This usage would have to be subsidised by users of the low-cost application. Increasing the price of using the low-cost application above its cost to subsidise the high-cost usage leads to less usage of the lower-cost application, and at the margin some consumers will give up their internet connections entirely because they no longer receive utility higher than the combined price of access and usage. Without the fixed revenues of these low-cost consumers to offset the higher usage costs of the consumers paying below cost, the average usage cost per unit of traffic handled increases, leading to even higher usage fees and a second depressing effect on the usage of and fees generated by low-cost users. That is, a 'waterbed effect' emerges [23].

Hence, zero-rating of applications with lower costs than non-zero-rated applications is not equivalent in its effects to zero-rating applications with the same costs as their zero-rated counterparts. The difference is material. In a perfectly competitive market, it is necessary for the price signals associated with lower costs to be sent to consumers so that efficiency-raising changes in purchasing behaviours can take place. Concealing information about cost differences (e.g., by averaging the prices for two or more applications) prevents consumers making efficiency-raising choices.

We note, however, that in the New Zealand case, discounting local applications did not crowd out content from foreign origins because they were not substitutes. Indeed, foreign content and applications were overwhelmingly preferred by end users, even though they were more costly.

4.3 Differentiated price and product offers to low-valuers

We now turn to the argument of pro-net neutrality advocates that zero-rating should not be allowed when it enables free or discounted access to a narrow range of internet applications or applications with some functionality removed, when the ISP charges a higher fee for unrestricted access to the 'full service' applications. This restriction is claimed for ISPs, even though the same practice is widespread in the software industry—for example, Microsoft's Office available as a low-price, restricted student version and a high-price, full service professional version.

The advocates claim that restricted offer users cannot participate equally with unrestricted users in a supposed 'right' to access the full potential benefits of all

applications and content available on the entire internet. Any arrangement that allows differentiated access to that content is seen as an infringement of that right. Zero-rating that reduces access charges in exchange for reduced functionality is therefore 'unfair discrimination'. Free Basics, where potential internet users in developing countries are offered free access to a restricted range of applications, but can access the full versions when paying a monthly internet access subscription, is frequently cited as such an infringement.

In principle, zero-rating access to a restricted-functionality application is no different to an application provider choosing to make some content available freely, and releasing other content only when some other obligations—for example, paying a fee, or sharing personal information—have been met. Access providers can set different tariffs for using different versions of the application if they really do invoke lower costs (e.g., stripped-down versions with lower data consumption), as per question 2. However, these versions may also be associated with compensation from the CAP to the ISP, especially if the low-cost version stimulates more low-value consumers to purchase connections, increasing the value available to the CAP from advertising. Furthermore, it is the application provider and not the ISP who makes the decision about restricting the application range to self-selecting end users. Preventing application providers from offering these discount arrangements appears at odds to the net neutrality argument that edge providers and not ISPs exercise control over internet content. If the range of content is restricted by applications providers—for example to foreclose other application providers—then it would seem more properly a matter to be addressed by generic antitrust provisions rather than internet access regulation.

Moreover, the presumption that all end users should pay identical prices to access the same applications ignores economic realities. The expectation that all consumers pay the same price for a product is an artefact of perfectly competitive markets. If all consumers pay the same price, then those with higher valuations of the bundle receive more surplus than those with lower valuations. Perfect equity in access prices for homogeneous good cements in place extreme inequities in surplus distribution. Price discrimination (different prices for the homogeneous good) effectively transfers surplus from high-valuers to low-valuers and leads to higher total consumer numbers without reducing total welfare. Where scale economies are present (as occurs in both ISP services and most CAP products, as they are mostly digital products with near-zero reproduction costs), then total welfare increases as well. Product differentiation (e.g., offering a subset of functionality for a lower price) leads to higher consumer numbers in total than with a single price for the undifferentiated good. Price discrimination and product differentiation therefore both appear consistent with (or at least are not per se harmful to) increased product variety, larger total numbers of internet users and ongoing innovation in the internet ecosystem. That does not mean that the practices might not, in some circumstances, lead to negative outcomes. Rather, it reinforces the merits of a case-by-case analysis rather than prescriptive prohibitions.

Price and product differentiation are important ways of enabling individuals with low valuations of internet use, or facing significant financial constraints, to become internet users, The former case occurs in mature markets, when the last-remaining individuals have not yet connected because the value they place on the connection is less than even a very modest single price charged. The latter case arises in developing economies, where income constraints pose significant barriers to purchase for large numbers of individuals. While subsidising connection fees through a tax and redistribution system may induce purchase in the former group, subsidising via applications may be more effective because the application is the primary determinant of the value derived. It also offers a superior means of

subsidising in the latter case, because surpluses generated by users in developed economies can be transferred via the application and access bundle to subsidise those in developing economies. Thus, wealth transfers across national borders can occur without the need for government intervention.

This gives rise to our third question for regulators and adjudicators.

Question 3. Is zero-rated access to a subset of applications primarily intended to increase the number of individuals using the internet?

The purpose of this question is to separate out instances of zero-rating that are more likely to lead to positive network effects arising from larger total numbers of internet connections from instances that may arise from other motivations—for example to change the range and usage of applications by individuals already purchasing internet connections.

4.4 Relaxing the constraints: perfect information and no transaction costs

Having considered the implications of relaxing the constraints of product (and consumer) homogeneity, we now turn to the assumptions of perfect information and zero transaction costs that attend the perfect competition model, and their effects on barriers to entry and exit.

Imposing the assumption of consumer homogeneity reduces the amount of information available to both ISPs and CAPs to customise their offerings to individual consumer preferences. Information that would otherwise have been efficiently signalled or screened in customised offers can only be obtained subsequently by other means—inevitably with higher transaction costs. In the long run, this would seem to impose impediments to, rather than incentives for, the development of new applications and contracting arrangements. That is, banning zero-rating because the practice may pose entry barriers for new application providers must be balanced against the entry barriers that will be created if information about underlying consumer heterogeneity that would be efficiently signalled, screened and shared if zero-rating proceeds cannot emerge due to regulatory intervention banning the practice.

While banning zero-rating has been justified by the potential for ISPs to raise the costs for new application providers, it is equally plausible that banning prevents both application developers and ISPs from learning about and creating offers that cater to these underlying differences. Thus, existing ISPs and CAPs might prefer the information not to be surfaced if in doing so, opportunities were created for new entrants to take advantage of consumer heterogeneity to create new offers, attract consumers away from the exiting providers and appropriate a disproportionate share of the new consumers yet to purchase internet connections. Likewise, existing end users obtaining high surpluses under a single price might be unwilling to share those surpluses with new consumers who will participate only with implicit subsidies.

This gives rise to our fourth question for regulators and adjudicators.

Question 4. Who has requested that an instance of zero-rating be investigated?

If the request has come from existing ISPs, then it is plausible that the motivation may be to foreclose competitive entry by rival ISPs. If it has come from existing CAPs, then the motivation may be to foreclose competitive entry by new applications provides. If it comes from existing end users, then the motivation may be to lock in existing surpluses and not have to share them with new or future internet consumers. On the other hand, if the request to investigate has come from new or potential ISPs or CAPs then the claim that it creates an entry barrier may be credible. It seems most unlikely that a non-end user would ask for an inquiry about the legality of a zero-rating offer that would cost less than the alternative price. Similarly, it is also unlikely that a low-valuing existing end user who would be better-off using the restricted zero-price offer would request an inquiry.

4.5 Positive search costs and barriers to entry

In markets with heterogeneous products, consumers with different preferences, and information asymmetries that make it costly, if not impossible for consumers to identify the attributes of the products or the fit with their preferences before they have been consumed, a more appropriate model for analysing interaction is monopolistic competition. In this model, within a range of products there will be one that will be the best match for a given consumer with given preferences. At any given price, this product gives the consumer the highest possible surplus.

However, the consumer cannot identify in advance, which is the best match. Nor can the provider accurately identify the best consumers for the offer. The consumer can select one offer at random—so long as the surplus from this purchase is not negative, the consumer has gained at least some increase in surplus. Where the consumer will use a service multiple times (or make multiple purchases), the gain from purchasing the same product/service is known. There may be a better match available (higher gain) from buying a different product next time—but there is also a risk that the different product is a worse match than the existing one. The consumer could have had higher surplus if instead the first product had been purchased. There may also be switching, learning and adjustment and other investment (transaction) costs associated with each product. Buying from a second supplier means a second set of these costs—which is avoided if second and subsequent purchases are made from the first supplier. Together, these comprise 'search costs' (a form of transaction costs). The larger are the search costs, and the smaller is the expected benefit of the second product over the first, the less likely it is that the consumer will try to find a better match, even though there is definitely a better one out there. Thus, high search costs lead to suppliers having some market power over their existing customers—akin to monopoly—even though there are many different variants of the product—competitors—available for consumers to choose from.

Almost certainly, the markets for internet application adoption and usage are monopolistically competitive. Customers make investments in using specific applications (learning costs, emotional investments, etc.) that make them reluctant to try new variants. When a new application enters a market where customer preferences are already well established, overcoming these high search costs is likely one of the most significant barriers faced. The more mature is the application market, the more established are these preferences and the harder it will be to overcome them. Even if the new product is superior to all others in the market, customers will be reluctant to try it, because they do not know that it is better for them until they have tried it. If the same price is charged for the new and existing products, the new product will attract very few new customers, because of the high search costs customers face. In this case, the only way that the new product will attract new customers is by charging less than the existing products—that is, undertaking to meet the search costs incurred by the customers. For this reason, new products in markets exhibiting these characteristics are typically introduced with free trials.

However, if a new internet application is offered free of charge to consumers, because the costs are recovered from advertising or other sponsored revenues (e.g., donations, tax funding), it is not possible to discount the application cost to encourage switching. The only way that potential customers' search and switching costs can be reduced is by reducing the internet access charge. Hence, zero-rating may be the only viable way of inducing existing consumers to try a new application. Not being able to offer zero-rating thus constitutes an entry barrier to new applications seeking to compete with established ones. Just as in question four, it will be existing applications providers, and not new entrants, who would prefer that zero-rating not be allowed. However, it is important to note that there are two different reasons for coming to this conclusion.

This gives rise to our fifth question for regulators and adjudicators.

Question 5. Do consumers of the zero-rated application and its rivals make payments to applications providers separate from their payments to ISPs?

If the answer to this question is 'no', then the party with the most plausible reason to use a zero-rating strategy may be a new entrant. Preventing zero-rating then may lead to barriers to entry that protect incumbents. If the answer is "yes', then the situation is more complex, and further investigation is warranted.

5. Conclusion

In sum, therefore, the economic analysis reveals that the strategic motivations for using zero-rating are complex, and turn on a wide range of contextual factors, across all parts of the internet ecosystem. The five questions posed here tease out some factors to inform all ecosystem participants, but especially policy-makers and regulators.

The questions both draw upon, and highlight the fact that, the internet ecosystem is as complex, dynamic and adaptive system that defies simplistic definitions, and cannot easily be analysed or governed using simple frameworks developed for an environment with simple, linear relationships where cash flows closely followed product flows. To the extent that the ecosystem closely intertwines the activities of ISPs and CAPs with end users, it is no longer sufficient for regulators and competition authorities to consider zero-rating as solely an activity governed by the strategic intentions of ISPs alone. The questions posed in this chapter are not intended to substitute for detailed case-by-case analysis based upon economic principles of welfare maximisation, but rather stand as a complement to the frameworks currently being used in regulatory and judicial processes to assess likely harms and benefits.

There is much still to learn about competition and regulation of this complex ecosystem, but the questions here go some way to ensuring that scarce resources are used to investigate the cases most likely to be welfare harming.

Author details

Bronwyn Howell[1]* and Roslyn Layton[2]

1 Victoria Business School, Victoria University of Wellington, Wellington, New Zealand

2 Aalborg University, Denmark

*Address all correspondence to: bronwyn.howell@vuw.ac.nz

References

[1] Evans D, Schmalansee R. The antitrust analysis of multi-sided platform businesses. In: Coase-Sandor Working Paper Series in Law and Economics, 623. 2012

[2] Shapiro C, Varian H. Information Rules: A Strategic Guide to the Network Economy, Boston. Massachusetts: Harvard University Press; 1999

[3] Parker G, van Alstyne M. Two-sided network effects: A theory of information product design. Management Science. 2005;**51**(10):1449-1592

[4] Rochet J-C, Tirole J. Two-sided markets: A progress report. The Rand Journal of Economics. 2006;**37**(3):645-667

[5] Carlton D, Perloff J. Modern Industrial Organization. 4th ed. Boston: Addison & Wesley; 2005

[6] Bring D, Leighton W, LoPiccalo K, Matraves C, Schwarz J, Waterman D. The year in economics at the FCC, 2014-2015. Review of Industrial Organization. 2015;**47**(4):437-462

[7] Howell B, Potgieter P. Bundles of trouble: Can competition law adapt to digital pricing innovation? Competition and Regulation of Network Industries. 2018;**19**(1-2):3-24

[8] Body of European Regulators for Electronic Communications. Draft BEREC Guidelines on implementation by National Regulators of European net neutrality rules. 2016. Retrieved from: file:///C:/Users/howellbr/Downloads/6075-draft-berec-guidelines-on-implementation_0.pdf [Accessed: July 27]

[9] Howell B, Layton R. Differentiating Neutrality and Non-Discrimination: A Politico-Techno-Economic Evolutionary History of the Internet and the Network Neutrality Debate. American Enterprise Institute, forthcoming; 2016

[10] Gans J, Katz M. Weak versus strong net neutrality: Corrections and extensions. Journal of Regulatory Economics. 2016;**50**(1):99-110

[11] Gans J, Katz M. Net neutrality, pricing instruments and incentives. NBER Working Paper 22040. 2016

[12] Wu T. Network neutrality, broadband discrimination. Journal of Telecommunications and High Technology Law. 2003;**2**:141-178

[13] Gans J. Weak versus strong net neutrality. Journal of Regulatory Economics. 2015;**47**:183-200

[14] Lee R, Wu T. Subsidizing creativity through network design: Zero-pricing and net neutrality. The Journal of Economic Perspectives. 2009;**23**:61-76

[15] Van Schewick B. T-Mobile's Binge On Violates Key Net Neutrality Principles. Mimeo; 2016. Retrieved from: https://cyberlaw.stanford.edu/downloads/vanSchewick-2016-Binge-On-Report.pdf [31.03.2016]

[16] Frieden R. A primer on network neutrality. Intereconomics. 2008;**43**(1):4-15

[17] Krämer J, Peitz M. A fresh look at zero rating. Telecommunications Policy. 2018;**42**(7):501-513

[18] Elaluf-Calderwood S, Layton R. Zero-rating: Do hard rules protect or harm consumers and Competition? Evidence from Chile, Netherlands & Slovenia. Paper presented at TPRC, August 2015. 2015

[19] Frieden R. Can internet service providers lawfully enhance or degrade third party content. 2017. Retrieved from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2935274 [Accessed: 04.12.2018]

[20] Faulhaber G. Economics of net neutrality: A review. Communications & Convergence Review. 2011;**3**:53-64

[21] Greenstein S, Peitz M, Valletti T. Net Neutrality: A fast lane to understanding the trade-offs. NBER Workign Paper 21950. 2016

[22] Lemley M, Lessig L. The end of End-to-End: Preserving the architecture of the internet in the Broadband era. U.C. Berkeley Public Law and Legal Theory Research Papwer No. 36. 2000

[23] Katz M. Wither US. Net Neutrality Regulation? Technology Policy Institute Working Paper. 2016. Retrieved from: https://techpolicyinstitute.org/policy_paper/wither-u-s-net-neutrality-regulation/ [Accessed: 23.07.2016]

[24] Filistrucchi L, Geradin D, van Damme E, Affeldt P. Market definition in two-sided markets: Theory and practice. Journal of Competition Law and Economics. 2014;**10**(2):293-339

[25] Howell B. Non-neutral net neutrality: Asymmetric regulation strikes again! TechPolicyDaily.com. 2016. Retrieved from: http://www.techpolicydaily.com/internet/non-neutral-net-neutrality-asymmetric-regulation-strikes-again/ [Accessed: August 14]

[26] Laffont J, Tirole J. Competition in Telecommunications. Cambridge, Massachusetts: The MIT Press; 2001

[27] Layton R. BEREC's guidelines on zero rating are another "economics-free zone": Populism is the guiding principle. 2016. Retrieved from: http://roslynlayton.com/berecs-guidelines-on-zero-rating-are-another-economics-free-zone-populism-is-the-guiding-principle/ [Accessed: 27.07.2016]

[28] Van Schewick B. Network Neutrality and zero-rating. Attachment to Barbara van Schewick's Ex Parte in the Matter of Protecting and Promoting the Open Internet submitted February 19, 2015 to the Federal Communications Commission GN Dkt. No. 14-28. 2015. http://apps.fcc.gov/ecfs/document/view?id=60001031582

[29] Yoo C. Beyond network neutrality. Harvard Journal of Law & Technology. 2005;**19**(1):1-76

[30] Yoo C. Wickard for the Internet? Network neutrality after verizon v. FCC. Federal Communications Law Journal. 2014;**66**(3):415-466

[31] Belgian Institute for Postal Services and Telecommunications. BIPT analysis of zero rating of apps in the Proximus offers. 2017. Retrieved from: https://www.bipt.be/public/files/en/22099/Report_Zero_rating_Proximus.pdf [Accessed February 2 2019]

[32] Krämer J, Wiewiorra L, Weinhardt C. Net neutrality: A progress report. Telecommunications Policy. 2013;**37**(9):794-813

[33] Yoo C. The changing patterns of internet usage. Federal Communications Law Journal. 2010;**63**(1)

[34] Howell B. Separation anxieties: Structural separation and technological diffusion in nascent fibre networks. New Zealand Institute for the Study of Competition and Regulation Working Paper. 2014. Retrieved from https://www.econstor.eu/bitstream/10419/106840/1/816646821.pdf [accessed 25 July 2019]

[35] Howell B. Flat rate tariffs and competitive entry in telecommunications markets. New Zealand Institute for the Study of Competition and Regulation Working Paper. 2010. Retrieved from https://researcharchive.vuw.ac.nz/xmlui/bitstream/handle/10063/4053/Tariff_Structure_and_Competitive_Entry_BH.pdf?sequence=1 [Accessed 25 July 2019]

Chapter

Toward Clarifying Human Information Processing by Analyzing Big Data: Making Criteria for Individual Traits in Digital Society

Keiko Tsujioka

Abstract

The purpose of this research is to solve those problems in education by indicating criteria for individual differences of cognitive mechanism when students interact using digital devices so that teachers would be able to instruct students with appropriate teaching strategies in collaborative learning. From the results of experiments for clarifying information processing by analyzing students' various data (Big Data processing), there was a tendency of an interaction comparing students' performance with the first and the second semesters between visual type and auditory type.

Keywords: individual differences, human information processing, criteria, cognitive schemas, decision-making, personality, prediction of behavior

1. Introduction

About two decades ago, digital instrument has begun to prevail in society, and the arrival of peoples' cognitive revolution has been forecasted [1]. Teachers also have begun to concern with the behavior of learners, so-called digital kids or students, because the latest technologies and information have been introduced one after another at the present field of education. On the other hand, however, it is questionable whether those technologies and information are understood conveniently.

Practically, it seems difficult for teachers to find out teaching strategies with using appropriate digital devices. It is not clear what has changed since the digital transformation of society and what are the causes of the change and their effects, because the individual differences of cognitive mechanism have not been clarified yet.

Accordingly, we have developed the measurements of individual traits concerning with human information processing as a fundamental research so that teachers might be able to understand those students more and instruct them appropriately depending on the criteria for individual traits.

The experiments of this system have been conducted under conditions of presentations either sound voice or written letters. We have collected and analyzed various data, for instance, their replies and response time (decision-making time), after their listening or silent reading.

In the practical experiments of collaborative learning which have formed depending on students' individual traits, they have continuously had interactive communication among team members, even using text message through learning management system (LMS). Consequently, high-stake assessments of students have become significantly higher than those of previous students formed by traditional methods [2]. On the other hand, we have found that there were differences among teams when we have compared their results.

We have checked students' data concerning learning, for instance, their reports, text message among team members for subjects so that we can analyze those data with reaction time (decision-making time), and the so-called Big Data processing and analysis [3]. The purpose of this Big Data analysis is to clarify the cognitive mechanism during learning processes along with the hypothesis from the model of human information processing.

With results of Big Data analysis, we have found that there are two types of traits (visual type and auditory type) and they have proved the relation between those traits of information processing and learning effects in collaborative learning. For instance, members of an unsuccessful team have formed by the similar traits of information processing (three of four members), in contrast, those of a successful team has consisted of different traits.

Therefore, it is supposed that individual traits such as personality and cognitive style in terms of information processing might help teachers to make collective decisions, for example, instruction and forming team members. Consequently, we would like to propose the results of the measurements and analysis as criteria for teaching strategies so that teachers can make their decision for forming interactive team members from the prediction of students' behavior.

2. Previous study

We will need to refer to the previous study when we address to find the method on how to indicate changing cognitive mechanism caused by transforming to digital society. We have become able to communicate each other in real time from distance by exchanging mails, text message, and other social network system instead of audio media like telephone and videoconference system (**Figure 1**).

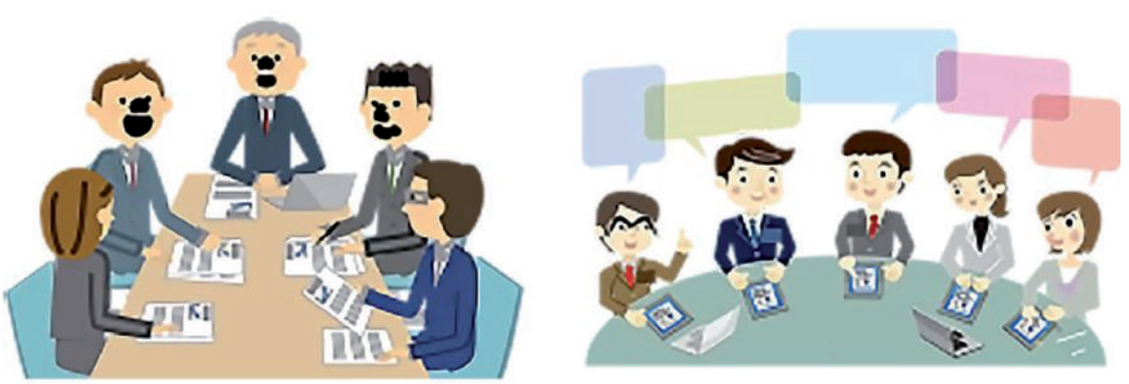

Figure 1.
Conceptual diagram of paper vs. digital.

It is supposed from reaction time that it is not the same information processing by communication media of sound voice and letters because the different organs perceive and input various kinds of information which are not transformed to the same digital encoding [4]. Though the same grammar, words, and meaning are consisted in one language, they are used by different media: sound voice and letters. From aspects of grammar and meaning, they are similar media; it might make their features clear when they are compared with decision time which is measured from beginning of presenting a short sentence by each media until individual decision-making of participants, like the comparison of familiarity between them in terms of words [5].

With regard to those learning effects, it is reported that comprehension is higher in reading the texts aloud than silent reading [6]. Moreover, it is reported the experiment, whether participants read letters silently changing them into sound or not, has shown that the former cases are better comprehensions than latter ones [7].

There is another question, however, whether this result is always right or not, because there are two kinds of orthographic in Japanese case, which are kana and kanji (a phonogram and an ideogram) [8, 9]. In the case of an ideogram, we understand the meaning as a symbol without changing to sound phonetically. From those reasons, it is assumed that the orthography like Japanese kanji might bring about individual differences of cognitive style regarding to information processing [10].

3. System

3.1 Model of information processing

According to previous study, the model of information processing for one short sentence is devised (**Figure 2**). At first, information about letters consisted of a sentence presented as a subject would be perceived (a: input), and then they would be conveyed and processed with a series of letters or a block of words in order to be comprehended (b: problem solving). Next, the meaning of the information would be decided (c: decision-making); then the result of the decision for meaning would be encoded to perception which would be processing next information continuously (d: feedback control). The procedure from (a) to (b), (b) to (c), (c) to (d) would be repeatedly until the problem of the subject would be solved and selected the answer (h: decision-making) and then output it (i).

While those processing might be continued repeatedly, another feedback control might transfer the meaning of words from (c) to higher brain functions

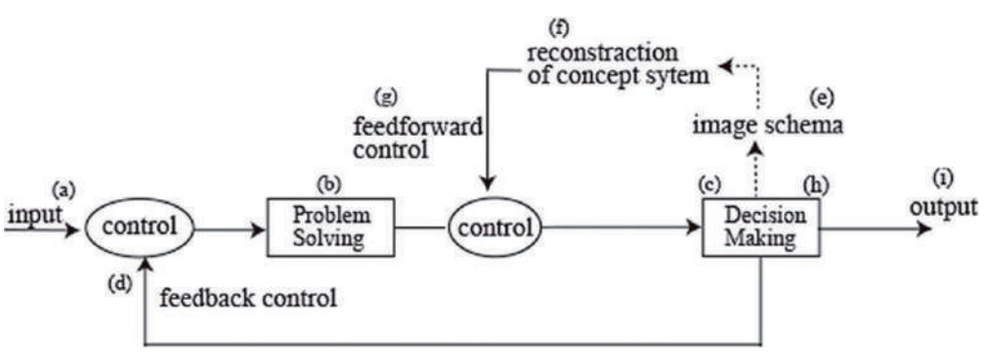

Figure 2.
Model of human information processing system.

by image schema (e) in order to confirm existing meaning or concept of those words or sentences. When those words or sentences are unknown for subjects, they might refer to existing concepts which were constructed by perception of other organs, and then their own new concepts would be reconstructed (f) before decision-making for meaning of words or sentences (c) and adjusted by feed-forward control (g).When you are citing sources, the citations should be set in a numbered format. All the references given in the list of references should be cited in the body of the text. Please set citations in square brackets keeping the below points in mind.

3.2 Hypothesis

There would be two types of traits hypothetically, visual type and auditory type, from the model of information processing. In the case of visual type, information might be mainly processing a circle of (a)→(b)→(c)→(d) repeatedly, and then finally decision-making would be done on (h)→(i) processing. On the other hand, in the case of auditory type, they might add another processing circle of (e)→(f)→(g). In this case, they might be referred to the existed concept which has been constructed by auditory information processing. From those viewpoints.

Hypothesis 1: In the case of auditory type, letters are supposed to be encoded to phonological sound. Consequently, the correlation coefficient between decision time and the number of words or duration of reading aloud (sound voice presentation) might be higher than those of visual type.

Hypothesis 2: The decision time of visual type is faster than those of auditory type because the former ones are supposed to not transform words from letters to sound.

In the next section, we will prove whether those hypotheses are correct or not by experiments.

4. Methods

Questionnaires of personality inventory for a psychological testing (YGPI) have been presented one by one as experimental subjects [Appendices 1 and 2]. YGPI consisted of 120 questionnaires with one short sentence each. Because of making the reliability of the test higher, those questionnaires are presented by reading aloud to subjects in order to fixed interval for selecting answers. It is important for a coefficient of confidence that subjects are brought about replying in time by effort because those regulations make their mental state similar.

For that reason, in the case of testing by paper and pencil, questionnaires of YGPI are not presented by written letters, but sound voice. On the other hand, in the case of testing on display, even presenting them by written letters are controlled the interval of the same condition as sound voice. Accordingly, when we have developed measuring system for cognitive traits of language information processing in terms of written letters, we decided to regulate time of presenting, along with each questionnaire by sound voice.

Participants are required to evaluate their behavior in everyday life whether the questionnaire is the same or not comparing with those of themselves and chose the answer among “yes,” “no,” and “either one” within 3 s after finishing the presentation of a questionnaire. As an instruction of testing, participants are also required to reply quickly without deliberating on making decision in order to prevent from no choice within the time.

4.1 Pilot

4.1.1 Purpose of pilot experiments

The aim of pilot experiments is to find out what have been changed in digital society from cognitive aspects in education. Along with this purpose, experiments and analysis are planned. In the field of education, we are able to choose media, such as sound voice or written letters, using digital materials, for instance, digital textbook and electronic blackboard. Accordingly, we have planned experiments for two kinds of comparison between sheet (paper)/PC and sound voice/letters.

4.1.2 Experiment 1

(1) Subjects: Three kinds of experiments (presenting questionnaires by sound voice and reply on the sheet (OCR), presenting questionnaires by sound voice and reply on display, and presenting questionnaires by written letters and reply on display). (2) Participants: 29 high school students of the first grade (male 13, female 16).

4.1.3 Experiment 2

(1) Subjects: Three kinds of experiments (presenting questionnaires by written letters and reply on the sheet (OCR), presenting questionnaires by written letters and reply on display, and presenting questionnaires by sound voice and reply on display). (2) Participants: 7 university students (male 5, female 2).

4.2 Preliminary experiments

4.2.1 Purpose of preliminary experiments

The purpose of preliminary experiments is to validate reproducibility concerning with the calibration of measuring system, the method of testing, and the results of analysis (comparison between visual type and auditory type).

4.2.2 Subjects of preliminary experiment

Under the same quality and conditions, experiments of presenting questionnaires by sound voice or written letters and replying on display have planned twice with counterbalance of the order.

4.2.3 Participants

Students of the same university, 28 females of freshmen.

4.2.4 Duration

From January to March in 2015.

4.3 Practical experiment

4.3.1 Purpose of practical experiment

The aim of a practical experiment is to examine the validity of criteria for traits of cognitive style in terms of information processing.

4.3.2 Participants

Students of the same university, 98 females of freshmen.

4.3.3 Method

Before starting classes, two kinds of testing, sound voice and letters, have been planned along with the method of preliminary experiments. The members of teams will be decided for collaborative learning depending on their personality which is measured by sound voice experiment. The observations in class will be recorded on their learning process. The interaction on LMS among members of their team will be also observed and recorded. The other data, for instance, results of performance (high-stake assessments) and reports (low-stake assessments), decision time of YGPI, and so on, will be gathered.

4.3.4 Duration

From April in 2015 to March in 2016.

4.4 Methods of analysis

The purpose of these analyses is to make traits of cognitive type in terms of information processing clear by comparing correlation between the number of words and duration of presenting sound voice (**Table 1**) and decision time.

4.4.1 Pilot

Each average of decision time will be calculated for every number of words; those figures will be shown by graphs. Next, different media such as paper, digital, sound voice, and letters have been compared.

4.4.2 Preliminary experiments

Each average of decision time will be calculated for every number of words; those figures will be shown by graphs. Next, it will be compared by the same media between first and second experiment. And then, it will compare the strength of correlations and variance by standard deviations.

The criteria, which are decided by the correlation coefficient between duration of presenting sound voice and decision time (**Table 2**), will decide the type—whether visual or auditory. Then, the decision time will be compared between those two types.

the Number of Words in Questionnaires	1	2	3	4	5	6	7
Frequency (the Number of Qusetionnaires)	1	12	13	27	25	30	12
Avarge Duration of Presenting Sound Voive (sec.)	0.76	1.01	1.38	1.79	2.18	2.49	2.74

Table 1.
The number of words and its frequency and duration.

	Media	Sound (sheet)	Sound (display)	Letters (display)	the Number of Words	Duration of Sound Voice
Comparison	Sound (sheet)	—	0.39	0.15	0.35	0.43
	Sound (display)	0.39	—	0.34	0.49	0.58
	Letters (display)	0.15	0.34	—	0.17	0.18
	the Number of Words	0.35	0.49	0.17	—	0.86
	Duration of Sound Voice	0.43	0.58	0.18	0.86	—

Table 2.
Correlation coefficient (pilot experiments 1).

4.4.3 Practical experiments

After gathering data of 98 participants by measuring decision time, they will be divided into visual or auditory type depending on the criteria which is decided by the preliminary experiment.

And then, whether this criteria of two types are verified or not by comparing results of decision time between preliminary and practical experiments.

Moreover, the results of students' performance practically will be compared by two types between first and second semesters.

5. Results

5.1 Results of pilot

1. Comparison between digital and paper materials

The average of decision time by digital was faster than those of paper (**Figures 3** and **4**), and the correlations with the number of words of digital were stronger than those of paper (**Tables 2** and **3**).

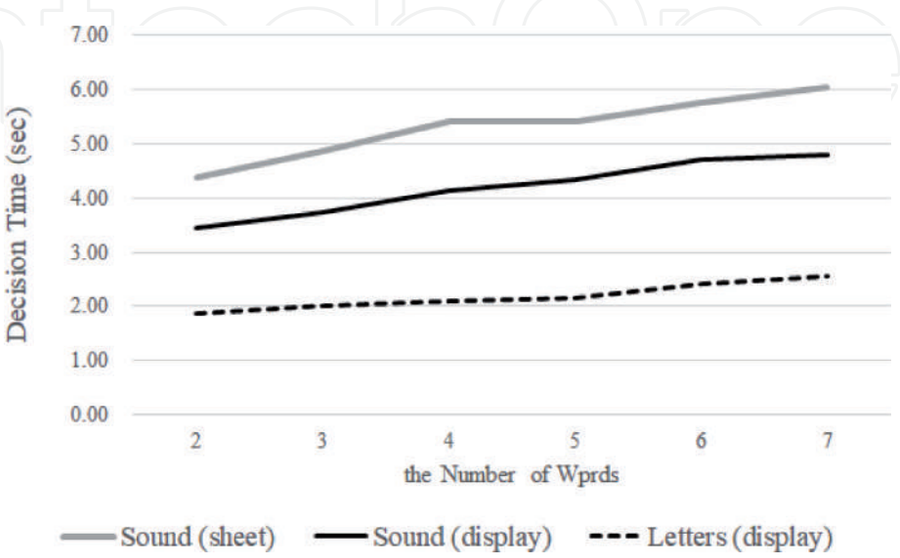

Figure 3.
Comparison of decision time during testing with paper or digital presented questionnaires by sound voice (paper or display) and leteers on display.

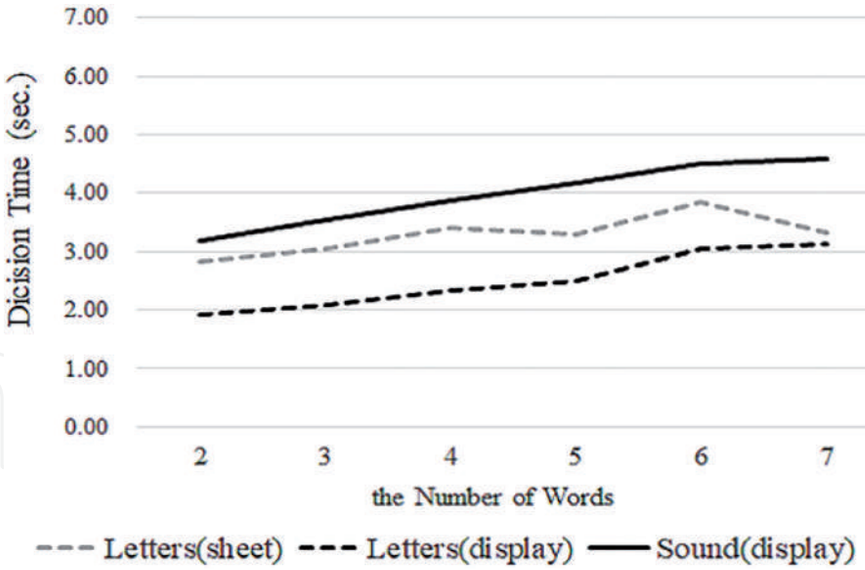

Figure 4.
Comparison of decision time during testing with paper and digital presented quessionnaires by letters on paper or display and sound voice with digital.

Media	Letters (sheet)	Letters (display)	Sound (display)	the Number of Words	Duration of Sound Voice
Letters(sheet)	—	0.17	0.16	0.13	0.16
Letters(display)	0.17	—	0.39	0.31	0.30
Sound(display)	0.16	0.39	—	0.53	0.60

Table 3.
Correlation coefficient (pilot experiments 2).

2. Comparison between sound voice and letters media

The average of decision time of sound voice presentation was longer than those of letters (**Figure 4**).

5.2 Results of preliminary experiment

1. Verifying reproducibility

From the results of presentation by sound voice, there were no differences observed in terms of the average of decision time for each number of words between first and second experiment, in addition to correlation coefficient and dispersion (**Figures 5** and **6**). In the case of letter presentation, the results of comparison between the first and the second experiment were similar to those of sound voice, but the second average of decision time was faster than the first ones (**Figure 6**).

It is supposed the dispersion of decision time of letter presentation is larger and caused individual differences when comparing with sound voice presentation.

2. Comparison between visual and auditory type

There was no difference between visual and auditory type regarding the average of decision time and correlation coefficients (**Figure 7**).

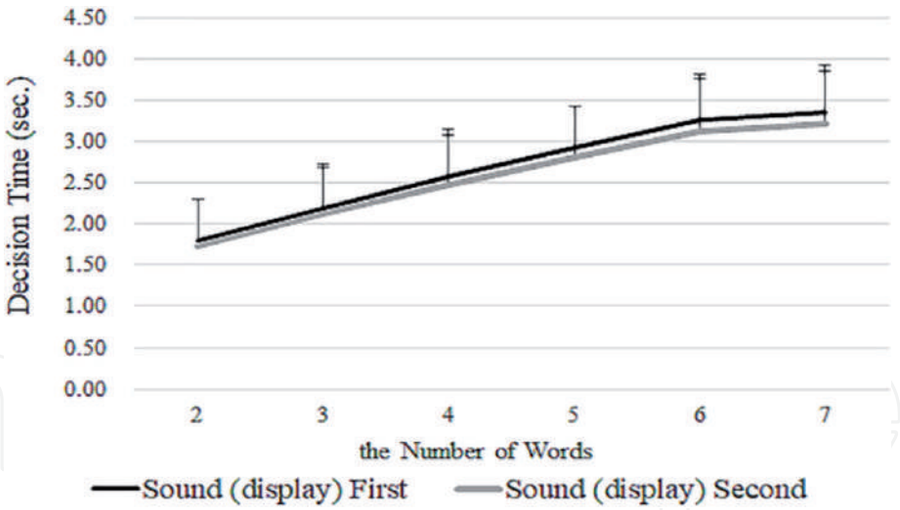

Figure 5.
Comparison of decision time between the first and the second by sound voice.

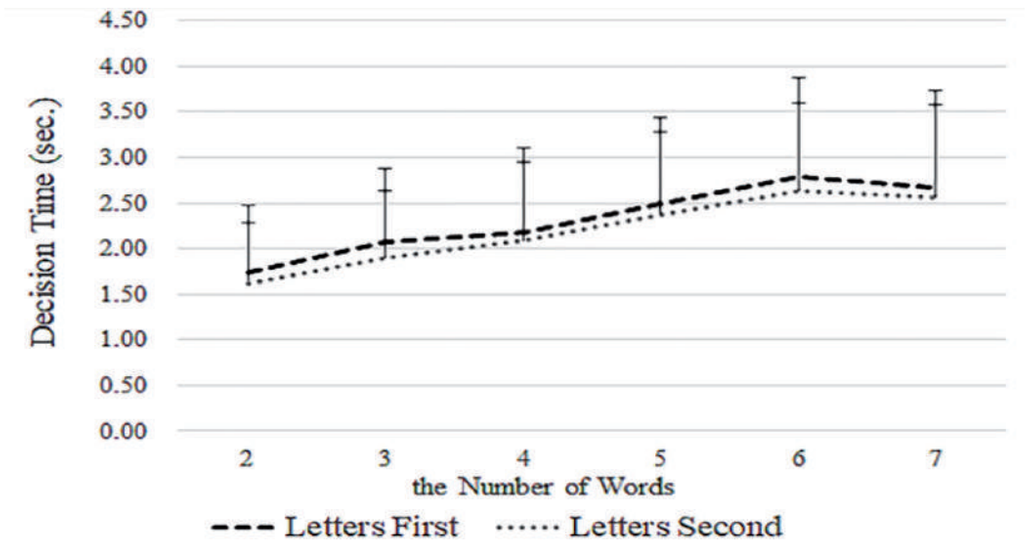

Figure 6.
Comparison of decision time between the first and the second by letters.

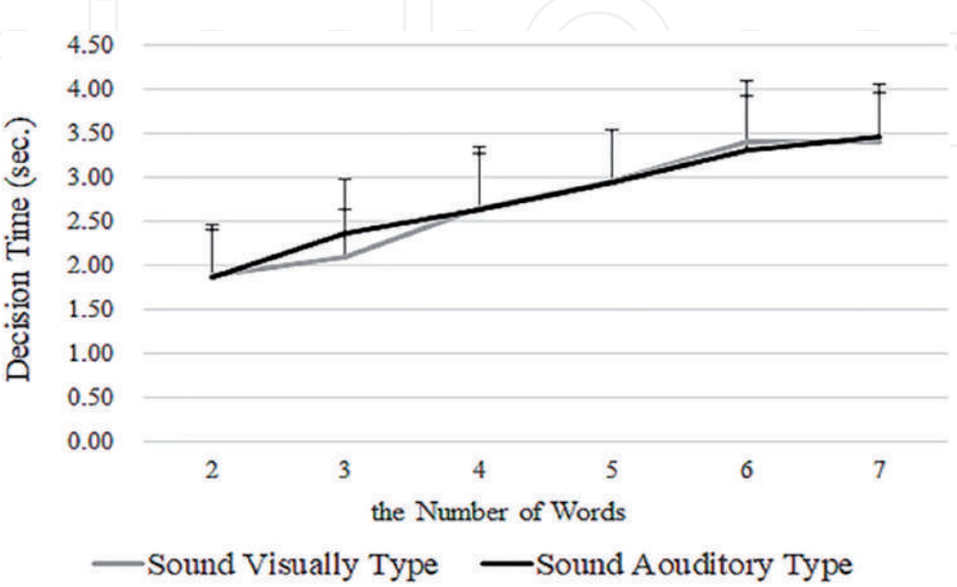

Figure 7.
Comparison of decision time between visual and auditory type by sound voice.

In the presentation of letter case, the average of decision time for visual type was faster than auditory type (**Figure 8**, **Table 4**).

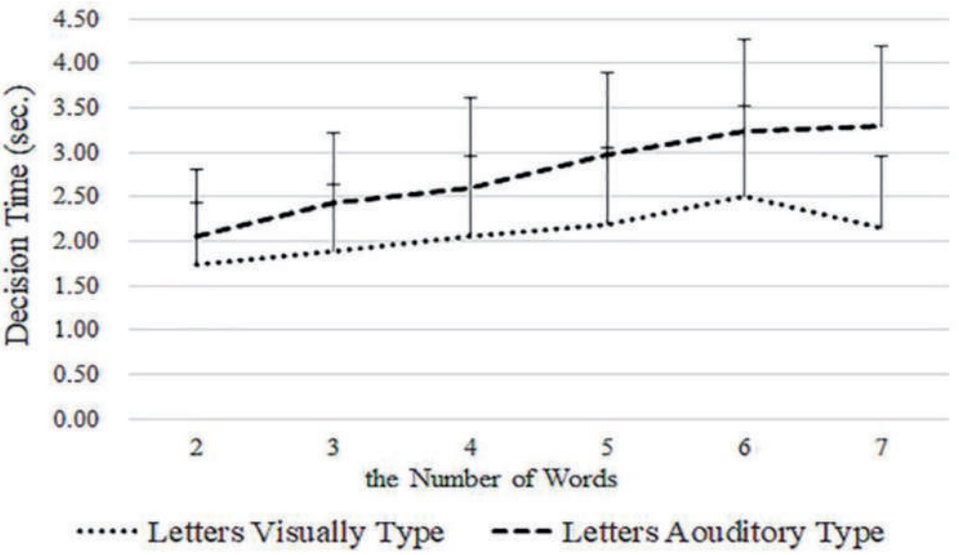

Figure 8.
Comparison of decision time between visual and auditory type presented by letters.

Cognitive Style	Correlation Coefficient
Visual Type	r <0.3
Auditory Type	r >0.5
Intermidiate Type	0.3 =< r <=0.5

Table 4.
Criteria of cognitive style for information processing.

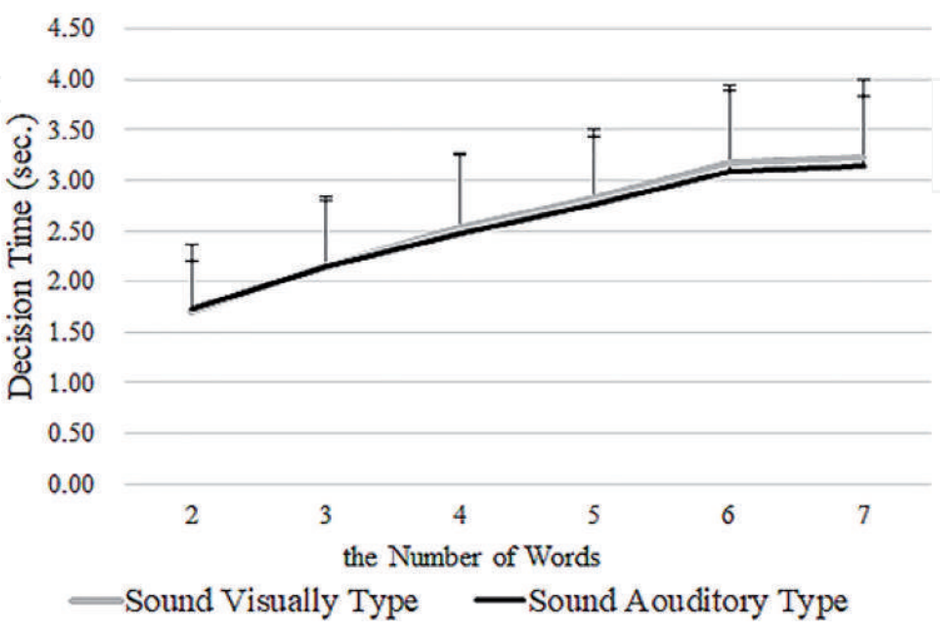

Figure 9.
Comparison of decision time between visual and auditory type presented by sound voice (practical experiment).

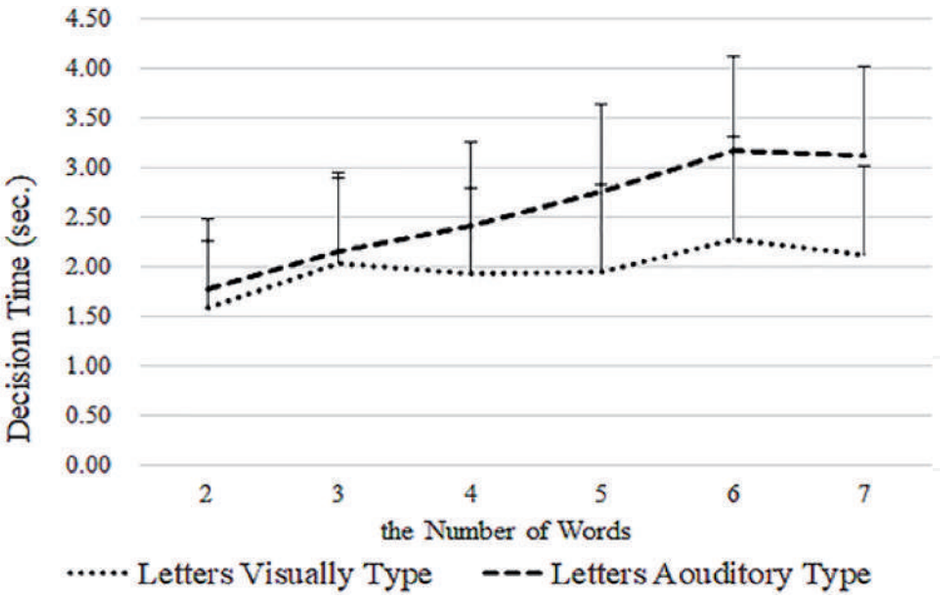

Figure 10.
Comparison of decision time between visual and auditory type presented by letters (practical experiment).

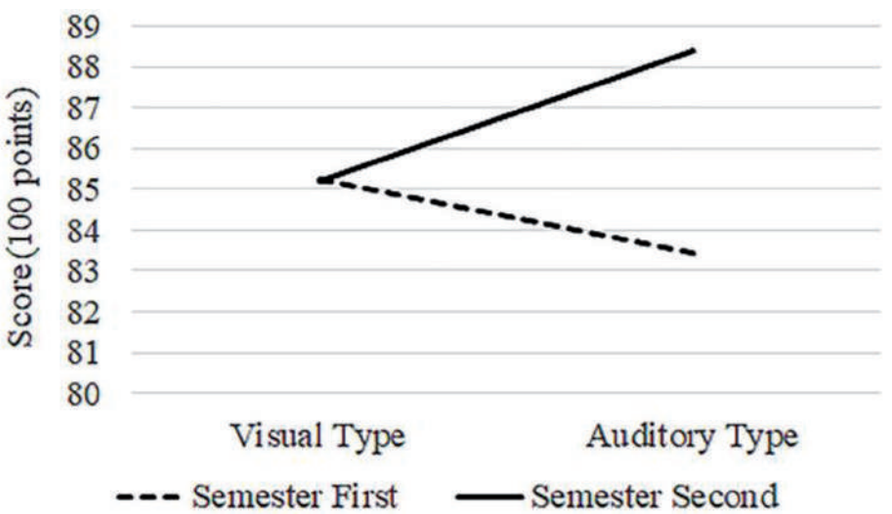

Figure 11.
Comparison of students' performance the first and second semester between visual and auditory type.

Because there were observed similar results between the first and the second experiment, it is supposed the reproducibility of measurements, method of analysis, and the criteria are verified.

5.3 Results of practical experiment

There were 12 students of visual type and 31 students of auditory type, according to the criteria of cognitive type in terms of information processing. There were no differences of the results in sound voice presentation between types regarding to the average of decision time depending on the number of words (**Figure 9**). In contrast, there were differences of the results in letter presentation between two types, regarding the average of decision time and the strength of correlation between decision time and the number of words (**Figure 10**). The tendency of a reciprocation between visual and auditory type concerning with the results of students' performance between the first and the second semester (**Figure 11**) was observed.

6. Discussion

6.1 What has been changed in digital society?

We have implemented the comparative experiments comparing paper and digital materials based on model of information processing (**Figure 2**). The results of measurements of individual decision time by digital materials were observed faster than those of paper. It was supposed to be caused more strongly by time constraints of digital materials than paper ones. In other words, it seems that the periods of time for decision-making were more unrestricted in condition of paper materials than digital ones. In the paper material case, participants were free to fill in their answers on sheets after the next presentation of questionnaire has been begun; on the other hand, in the digital material case, the display has already moved to the next page; then they were not able to reply their previous answer. From this reason, it was supposed the decision time by paper materials is longer than digital ones.

Especially in the presentation of letter case, participants were free to read silent questionnaires on the sheet freely, and then their decision time has become longer than others. In the PC case, each questionnaire is presented on display, and when the next questionnaire is presented, the display is moved to the next page at the same time by automatic migration from the program. From those reasons, in the letter presentation case, participants are not allowed to read previous questionnaires again after the display moved to the next page. It seems that the correlation between decision time and the number of words in digital materials case becomes higher than those of paper.

Through the basis of these results, there is more strict time in the digital material case, and this condition might have effects on decision time. In other words, participants might have been affected on their mental state in the digital material condition because they might feel that they need to decide strictly faster than paper ones. From those results, time bar has been added on display so that participants can feel more comfortable reducing their anxiety.

6.2 Toward clarifying information processing

Preliminary experiments have been conducted to examine the reproducibility for calibration of measurements toward a practical experiment. It is supposed that the reproducibility has been recognized because there were little differences in results regarding to the average of decision time between the first and the second experiments. The correlation coefficient of decision time with period of reading aloud (presented questionnaires by sound voice), comparing between Experiment 1 and Experiment 2, were similar without significantly differences. Concerning with the standard deviation of decision time, the case of letter presentation has been larger than sound voice case. It means that there exist individual differences in traits of cognitive style regarding to information processing.

Accordingly, the criteria of visual and auditory type have been decided provisionally by measurement of decision time depending on correlation coefficients with duration of sound voice presentation time. The results of the examination showed that there were no differences of decision time of sound voice presentation; on the other hand, in the case of letter presentation, the average of decision time for visual type is significantly faster than those of auditory type. Moreover, in the case of auditory type, the correlation coefficients between decision time and duration of sound voice presentation have been higher than visual type. For those results, it is supposed the hypothesis by the model of information processing is examined and proved (**Figure 2**).

6.3 Effects of changing

Those results of preliminary experiments have proved the validity by practical experiments with 98 participants (**Figures 9** and **10**). The indicator of learning effectiveness by high-stake assessment on their performance has shown the tendency of two-factor interaction between visual type and auditory type. From the interpretation on the model of information processing (**Figure 2**), it is supposed that there might be more opportunities for auditory type to reconstruct their concepts from various information when they are learning than visual type.

6.4 Teaching strategies

We have studied about the optimization of forming team members (collective decision-making) by personality (individual decision-making) as teaching strategies [11]. In this case, it is presumed that the learning effect has been improved by interactive communication among team members smoothly, comparing with traditional method of team forming which had decided by order of a student number. On the other hand, when the team members were decided by their personality in order to improve their performance in practical class, there were successful or unsuccessful teams. Looking at cognitive types, the latter has involved the same type of traits (three of four) with regard to the information processing but not personality. From this viewpoint, it is suggested that the method of optimization of forming team members might have been better with criteria for traits of cognitive type in terms of information processing in order to improve learning effectiveness.

7. Conclusion

In this paper, we have conducted experiments toward clarifying human information processing and examined the influence of digital materials in education. Moreover, the criteria for individual differences of information processing have indicated the impact on learning effectiveness. Consequently, the criteria of students' individual traits might help teachers make their plans, such as teaching strategies. It is also supposed that the appropriateness has been proved by the results of analyzing various data concerning with learning, for instance, students' performance, reports, and observation in class. On the whole:

1. What have been changed by digital materials, and what are the causes and how the effects have prevailed?

In education, the materials have been transformed from paper to digital. From the results of our research, it is suggested that the time limitation of digital materials might be strict more strongly than paper and it might have caused their anxiety for learners carrying their mental baggage.

2. There have been increasing opportunities of communication by text media like SNS in real time.

From the results of those experiments, it is assumed that the learning by digital materials with texts might have been caused by clearing individual differences of cognitive style concerning with information processing and effect on learning.

3. From the results of Big Data analyzing, it was assumed that the criteria for traits of cognitive style in terms of information processing by letters might suggest teaching strategies.

A. Appendix 1

the Number of Words	Number	Questionnaires (Letters)	Questionnires (Sound)
2	1	無口である	Mukuch de Aru
	2	感情的である	Kanjyouteki de Aru
	3	心配性である	Sinpaisyo de Aru
3	4	用心深いたちである	Youjijnbukai Tachi de Aru
	5	気が変わりやすい	Ki ga Kawari Yasui
	6	人のあつかいがうまい	Hito no Atukai ga Umai
4	7	自分はいつも運がわるい	Jibun ha Atsukai ga Umai
	8	たびたび考えこむくせがある	Jibun ha Knagaekom Kuse ga Aru
	9	気持ちを顔にあらわしやすい	Kimochi wo Kao ni Arwasi Yasui
5	10	色々違う仕事がしてみたい	Iroiro Chigau Shigoto ga Shitemitai
	11	新しい友達はなかなかできない	Attarashii Tomodachi ha Nakanaka Ddekinai
	12	色々な世間の活動がしてみたい	Iroirona Seken no Kadudo ga Shite Mitai
6	13	色々な人と知り合いになるのが楽しみである	Iroirona Hito to Shiriai ni Naru noga Tanoshimi de Aru
	14	人は私を十分認めてくれない	Hito ha Watashi wo Jyubun Mitomete Kure Nai
	15	会話の最中にふと考えこむくせがある	Kiwa no Saichu ni Huto Kangaekomu kuse ga Aru
7	16	理由もなく不安になることが時々ある	Wake mo Naku Huan ni Naru Koto ga Tokidok Aru
	17	実行する前に考えなおしてみることが多い	Jikko Suru Mae ni Kangae Naosite Mirukot ga Oi.
	18	なかなか決心がつかず機会を失うことが多い	Nakanak Kessin ga Tuka zu Kikai wo Usinau Koto ga Oi

B. Appendix 2

the Number of Words	Number	questionnaires (in English)
2	1	I am a reticent person.
	2	I am a sentimental person.
	3	I am a worrier.
3	4	I am an extremely cautious person.
	5	I am capricious.
	6	I am good at dealing with people.
4	7	I am always unluky.
	8	I sometimes tend to think deeply.
	9	I am easy to betray my emotion.
5	10	I would like to do various kinds of jobs.
	11	It is difficult for me to make new frinds.
	12	I would like to be extremely acitve in variety of wolrd.
6	13	I am pleasure of meeting with a lot of people.
	14	People would not accept me adequetly.
	15	I am prove to think deeply during converstion.
7	16	Sometimes I become nervous without any reasons.
	17	I have frequetnly reconsidered before a plan.
	18	I have often lost chances because I could not decide immediately.

DOI: http://dx.doi.org/10.5772/intechopen.86037

Author details

Keiko Tsujioka
Institute for Psychological Testing, Toyonaka City, Osaka, Japan

*Address all correspondence to: keiko_tsujioka@sinri.co.jp

References

[1] Gardner H. The Mind's New Science: A History of the Cognitive Revolution. New York: A Member of the Perseus Books Group; 1987. 401 p

[2] Tsujioka K. Development of Support System Modeled on Robot Suit HAL for Personalized Education and Learning. EITT. Society of International Chinese and Education Technology; 2017. pp. 337-338. DOI: 10.1109

[3] Tsujioka K. A Case Study of ICT Used by Big Data Processing in Education: Discuss on Visualization of RE Research Paper. ICIET, Association for Computing Machinery; 2018. pp. 160-164. ISBN: 978-1-4503-4791-4

[4] Card SK, Moran TP, Newell A. The Psychology of Human-Computer Interaction. Hillsdale, NJ: Lawrence Erlbaum Associates; 1983

[5] Amano S, Kondo T. Modality dependency of familiarity ratings of Japanese words. Perception & Psychophysics. 1995;**57**(5):598-603

[6] Elgart DB. Oral reading, silent reading, and listening comprehension: A comparative study. Journal of Reading Behavior. 1978;**10**:203-207

[7] Takahashi M, Tanaka A. Cognitive processing during silent and oral reading: Cognitive load and phonological representation. Cognitive Studies. 2011;**18**(4):595-603 (in Japanese)

[8] Gernsbacher MA. Resolving 20 years of inconsistent interactions between lexical familiarity and orthography, concreteness, and polysemy. Journal of Experimental Psychology. American Psychological Association, Inc. 1984;**113**(2):256-281

[9] Morton J. Interaction of information in word recognition. Psychological Review. 1969;**76**(2):165-178

[10] Kimura Y. Concurrent vocal interference: Its effects on kana and kanji. Quarterly Journal of Experimental Psychology: Section A. Human Excremental Psychology. 1984;**56**

[11] Tsujioka, K. A Case Study of Using Big Data Processing in Education: The Method of Matching Members by Optimizing Collaborative Learning Environment, In Social Media and Machine Learning , Edited by Cano, A., Account/IBAN number: HR2424840081104542506, in printed

Chapter

Evaluating Information Technology Strategic Planning Process: Lesson Learnt from Bruneian Small Businesses

Afzaal H. Seyal

Abstract

The chapter investigates the 85 small and medium organizations in Brunei Darussalam within the context of information technology (IT) strategic planning process. The study results reveal that although the surveyed Bruneian SMEs are familiar with IT strategy basic methods, however, the use of any of the basic IT strategic development process is at the grassroot level. The results further found that only three methods have indirect influence on IT strategy development such as critical success factors, transaction cost, and balanced scorecard. Conclusion from these findings further suggests that no statistical difference exists among SMEs on the basis of organization size and industry sector. These findings are useful for both the researchers and practitioners. For researchers, it helps in building a theoretical foundation in developing the repository of organizational use of IT strategy basic methods and for practitioners to gauge the performance of SMEs in relation with developing IT strategy basic methods in designing the relevant policies.

Keywords: IT strategy, strategic planning methods, small and medium enterprises, Brunei Darussalam

1. Introduction

The adoption of Information Technology among business organizations have entered the maturity stage especially with the advent of Web-based developments, new opportunities have been brought into the organizational functions and business processes that has enabled them to meet the market demands and to sustain their capacity building. However these latest trends and changes in technology have brought several challenges to the businesses especially to the SMEs who are overloaded with global competition, economic downturn, and fierce competition in changing customers' demands that has pushed these SMEs to reengineer their business processes. Such challenges demand effective capabilities and competitive solutions. The business organizations started using information technology as a tool to get strategic and competitive advantages. The organizations started using their resources strategically so as to reduce the cost and gain more profit and become productive in customer relationship. To achieve these strategic options, organizations started deploying various strategic planning processes. While the benefits of

adopting strategy as a tool to get the business gains among the big businesses became viable, the SMEs started adopting the similar practices coupled with the Internet technologies, new business approaches like e-business and e-commerce soon became familiar and being widely used across the globe. Information Systems are linked with business strategy, management skills, and decision-making to enhance the competitive advantage to achieve the overall organizational success [1]. Researchers have focused on the process of strategic information systems planning (SISP) since the 1970s [1, 2]. SISP further help business to innovate, create new products, reduce cost, and enhance relationship with customers [3, 4]. Unfortunately, majority of SMEs could not be successful in their business endeavors, mainly due to the reasons that these small businesses are not exploiting their full resources mainly due to lack of strategic planning process. This situation continues to exist in almost all the economies especially in the developing countries. A right choice for SMEs to meet these market-driven forces is to increase using ICT to significantly improve their competitive capabilities [5].

In their study, Bhagwat and Sharma [5] stated that IT has a vital role in an organization's sustainability and growth. This further supports the study that found impact of IT usage on organizational performance is positively related [6]. Azyabi [7] studied IT/IS strategy development among Australian SMEs and that has provided the basic motivation to conduct the study in Brunei. Secondly, up to our knowledge, no prior research was undertaken in Brunei focusing SMEs from IT strategic development point of view. On these rationales, this pioneering study was conducted to investigate the main strategic issues of Bruneian SMEs with two basic objectives:

1. To find out the extent to which the SMEs are using or familiar with IT strategy development methods

2. To investigate the difference in the use of basic strategy development method on the basis of organization size (small or medium) and industry sector (manufacturing and non-manufacturing).

1.1 Role of the SMEs for nation's economy and importance of IT strategy to SMEs

The SMEs are considered as a major backbone for the national economy especially in the developing nations. It is true to the Bruneian business environments as well. The first report on Bruneian SMEs [8] has recommended the enhanced use of information technology to gear up a task of improving SME functionality for the overall economic development. The report has highlighted the slow diffusion of technology and has further recommended the strategic directions in adopting new technology. In their study, they not only considered the adoption of new technologies as a strategic issue but also rated the adoption of new technologies as number 9th critical success factor out of 11 that would be contributing toward the success of SMEs.

In the past, most of the researchers [9–11] have suggested that SMEs have the following characteristics: small management team, strong owner influence, centralized power and control, lack of specialist staff, multifunctional management, lack of control over business environment, limited market share, short-term strategic planning, low employee turnover, and reluctance to take risks. Some other studies [11–13] suggested that most SMEs avoid sophisticated software and applications, lack necessary expertise to fully utilize the benefits of technological innovations, and associate their ongoing success with vendor support and vendor expertise.

While discussing the strategic planning among SMEs, we should consider both the dimensions of strategic planning process: (1) strategic planning process to gauge

and monitor the performance of SMEs and (2) strategic information technology planning (SITP) process that includes the planning process for the IT resources. However, in its own context, the term is interrelated as some organizations consider it as one process, whereas other SMEs deploy strategic planning process at the outset and then continue it with SITP. The strategic planning on the performance of SMEs has been discussed extensively in theory and in literature [14–16]. Strategic planning is concerned with the establishment of long-term organizational objectives and the development and implementation of plans to achieve them to further improve the organizational performance [16]. In other words, SMEs not only make long-term planning but also systematically plan at operational level to evaluate both internal (within organization) and external (competitive environments) factors [17].

The focus of this study is not to examine overall strategic planning practices in SMEs but from the Information Technology Strategic Planning (ITSP) process, in particular. Thus examining and evaluating ITSP not only lead to the firms' performance but to find an answer as how the capacity building of the firm in the competitive environment is sustained. Literature provides the full support that most importantly SMEs engage in strategic planning process is less likely to fail [16, 18, 19]. In addition to the above discussion, we should consider the changing business dynamics with the advent of the Internet and Web services including the m-services. These emerging trends have imposed new challenges and change the strategic planning process henceforth.

1.1.1 The Bruneian context

The study focus solely on SMEs located in Brunei Darussalam—small island in South China Sea located at the equator between Singapore and Malaysia with a small population of 0.4 million[1]. About 57% of the population is aged from 20 to 54 years old. The country is ruled by 29th Sultan of Brunei His Majesty Sultan Hassan-ul Bolkiah—the most visionary leader. The country is economically rich with main industry of petroleum and petrochemical based with total GDP of 11,96 billion USD in 2016 with per capita GDP of $76,700 in 2017. The unemployment rate remained 6.9% in 2017 (http://www.theodora.com/wfbcurrent/brunei/brunei_economy.html). The government has been encouraging economic diversification mainly into business service, financial service, hospitality and tourism, transport and logistics, and manufacturing primary resources. The diversification is aimed to provide business opportunities for SMEs. Brunei is made up of microenterprises, small and medium enterprises at the percentage of 52, 44, and 3%, respectively, of the registered business. Majority of SMEs are in wholesale and trading businesses with the inclusion of service-based SMEs. The primary resources sector, Islamic financial market, and halal market have been identified as key growth area for local SMEs. The government provides various forms of assistance such as financing entrepreneurial development, investment incentive, technology transfer, infrastructure, and various other facilities. The SMEs development plans are in accordance with the national long-term plan at the Principles of Asia-Pacific Economic Council (APEC). APEC identified five major priority accesses for the development of SMEs: human resource development, information access, technology and technology sharing, and financing and market access.

In Brunei, only 8% of total private sector business establishments fall in the category of large businesses including foreign banks, shipping and insurance companies and Brunei Shell Petroleum, and its various subsidiaries. The remaining 92% covers the SMEs that also fulfill the 74% of nation's employment needs (www.

[1] All the statistical data about Brunei was extracted from http://www.heritage.org/index/country/brunei

bsmenet.com). The Bruneian SMEs are facing the same problems of not doing their business strategically in order to get the competitive advantage [20].

Because of the relative importance of the SMEs within the context of Bruneian business, it is very important to agree on the definition of SMEs, as contribution of SMEs may be estimated only on the basis of what definition for SMEs is accepted in a country. For simplicity, we stick to the definition of Yap et al. [13] for this study. Accordingly, they defined small organizations having 50 or less employees and medium-sized organizations having employees size from 51 to 250.

1.1.2 Strategic planning process among SMEs

While discussing the strategic planning among SMEs, we should consider both dimensions of strategic planning such as (1) strategic planning on the performance of SMEs and SISP among SMEs. However, both are interrelated; if the SMEs deploy strategic planning process at the outset then, there is a strong possibility that these SMEs will use the SISP. The strategic planning on the performance of SMEs has been extensively discussed in the theory and prior literature [13–16]. Strategic planning is concerned with the establishment of long-term organizational objectives and the development and implementation of plan to achieve them in order to improve the performance of an organization and to set up the directions by developing policy measures [15]. In other words, SMEs must have long-term plans as well operational plans to evaluate both external and internal factors [18, 19]. Since the focus of this study is to highlight the SISP in SMEs so that we can find an answer by doing this, how capacity building of these firms in the competitive environments can further be achieved?

Within the context of SMEs, we need to discuss the different views for the strategy; it can be acknowledged that it is difficult to come up with one single definition for the strategy concept. There are various definitions such as Seth and Thomas [21] who defined strategy as a plan that aligns the enterprise aims, process, and policies toward achieving better allocation for organizational resources. Andrews [22] provided another definition: "Strategy is a plan for the control and utilization of organizational resources to achieve desired corporate goals (e.g. gain market share, image) and gain advantage over competitors." Similarly, Gibcus and Kemp [23] defined strategy as a "coordinated plan that gives the outlines for decisions and activities of a firm and is focused on the application of the resources that a company has, and the disposal of these resources thus enabling the firm to achieve its own goals." For this research, the term strategy is defined as follows: a plan that is intended to provide the organization with better resources' control and utilization and competitive advantage. Finally, the terms IT and IS are two separate terms but are often used interchangeably. For the purpose of this study, we use the term "IT" to represent both IT and IS and IT strategy as "a plan for controlling, using, and utilizing IT/IS resources to gain competitive advantage over rivals."

IT can help organizations in leveraging competence and increasing the competitive advantage. It assists organizations in achieving their strategic and operational goals [24], and thus IT/IS is considered to be a significant factor for SMEs' success. However, IT/IS needs to be managed effectively to achieve these benefits. According to Earl [25], IT strategy provides organizations with the most important systems that contribute to competitive advantage. These systems could be internal systems which aim to improve efficiency and effectiveness of business operations or external systems. Earl [25] summarizes the objectives and importance of IT strategy in these benefits: facilitating alignment of IT investments with organization objectives, managing IT resources in an efficient and effective way, and establishing IT architectures and policies in the organization. Blili and Raymond [6] point out that those SMEs have to look for long-term advantage from information systems and they should recognize

the significance of the right investment decisions. They link the strategic planning for information systems with an organization's survival. They also consider the rapid change in technology as a motivator for having effective strategic planning for IT.

Some studies [26–28] found that about 75, 76, and 80% organizations engage in strategic IT planning, but strategic IT plans were not implemented extensively. Lederer and Sethi [29] found that only 24% of the projects in the strategic IT plans had been initiated more than 2 years into the implementation stage. Gottschalk [30] in his study of four Norwegian organizations found that 42% of the projects in the formal IT strategy had been implemented after 5 years. Ward and Griffiths [31] found that despite a belief in its importance in the past decade, many organizations have developed perfectly sound IT strategies that had been left to gather dust. Similarly, Falconer and Hodgett [32] in their Australian survey found that proportion claiming to undertake strategic IT planning ranged from 58% in large organizations to 29% in medium-sized organizations and only 19% in small organizations.

Based on the above discussion, it can be shown that SMEs are a significant factor for a country's economy that can be safely be marked as an engine of growth for the nation's economic development. However, SMEs are facing many competitive and environmental problems. One of the creative and effective solutions for these problems is using IT in an appropriate way. However, formulating IT strategy, which is driven by business strategy and objectives, could provide a smart and efficient use of IT resources in SMEs. Recognizing this, it appears that formal approaches to developing IT strategy would benefit SMEs. In the next section, we review the previous literature to establish a link with this study.

2. Review of literature

Literature is full of studies that has not only highlighted the various IT strategies that are applied and used among SMEs [25, 31, 32, 39, 40] but also included studies that highlighted the benefits of having IT strategic methods [7, 25] and studies focusing on the barriers to IT strategy development [7, 51]. At the outset, review of the literature was examined from more general studies focusing on the impact of the strategic IT processes on the organizations to the specific studies that has provided a base for this study.

The past several studies were conducted to find out the strategic role of information systems and the impact it brought to the businesses. Pyburn [33] conducted an exploratory study that involved IS managers and top management. He noted that following factors are very critical in influencing the success or failure of SISP, namely, (1) perceived success of the IS manager, (2) volatility of the business, (3) complexity of the IS environment, (4) IS managers' and top management personality, and (5) physical proximity of the IS manager to the senior managers. Pyburn's work was basically focusing on top management as a determining factor for SISP success, but he ignored several important aspects such as techniques, processes, and implementation issues. Sexton and Van Auken [34] found in their longitudinal analysis that survival rates of SMEs which apply formal strategic planning process are higher. Several other researchers emphasized the success of SISP among SMEs is related to the managers [15, 35]. Some others studies [36, 37] focused solely on managers' characteristics and their impact on strategy development. However, the generalization of these studies is limited to owners/managers' characteristics. Similarly, King and Teo [38] suggested various factors that need to be understood such as management commitment and impact on firm performance, return of investment, and increased market share. Researchers like Peppard et al. [39] and Maharaj and Brown [40] suggested supporting organizations in

determining potential opportunities to deploy Information Systems (IS) with great competitiveness. The organizations such as SMEs should deploy IS in certain phase such as strategic awareness, situation analysis, and strategic conception to strategic formularization to strategy implementation leading toward change management action plan to finally evaluating the strategic plan.

The trend in SISP got its first turn with the first version of the Nolan stages that appeared in 1979 [41] and explained the dynamics of increasingly vital production factor called the information technology. His theory provided a widespread framework of development of IT in organization. Jackson [42] studied several strategy concepts to find out the best practice and how companies are best organized for competitive advantages through IT. In addition to it, several approaches were considered such as suggested Earl's five approaches [43, 44] and Segars's [44] rational adoption of the strategic IS planning process with the SISP success. Earl [43] classified SISP experience with five categories if SISP approaches: (1) business led, (2) method driven, (3) administrative, (4) technological, and (5) organizational. His findings suggest that each of the five distinct approaches have a different likelihood of success with the "organizational" approach being the most effective and "method driven" the least effective approach. Segars [44] conducted an empirical study of over 250 top IS executives to investigate the issue of design dimensions of planning systems and the influence of internal (within system) and external (system and context) coalignment on SISP. The findings suggested that SISP is multidimensional concepts and strategic planning systems that exhibits high level of comprehensiveness, high level of formalization, control focus, top-down planning flow, and high level of participation and consistency that are directly associated with SISP success and termed this approach as rational adoption.

Miller and Cardinal [45] claim that strategic planning provides better results than non-planning. Ward and Peppard [46] stressed on the reconciliation of the IT and business to improve competitive advantage. Bergeron et al. [47] studied two well-known planning methodologies: Porter's [48] value chain and Wiseman's [49] strategic thrust for identifying IT opportunities from a competitive advantage perspective. The result indicated that while there were overall similarities between the two methodologies, however, Wiseman strategic thrust framework is more applicable for organization in unstable environments. Gottschalk [50] stressed on the need for improved implementation of IT, failure to do could lead to lost opportunities, non-fulfillment of the objectives, and problems in future planning. He suggested understanding the link between strategic plan and implementation within the organization. Jantan and Srinivasaraghavan [51] studied the IT deployment process and competitive advantages among 81 Malaysian business organizations and confirmed that strategic deployment of IT does affect the level of competitive advantage among the organization. Factors such as good technology management, innovation culture, and strategic planning and training were found to influence on the organizational competitiveness.

Gordon and Gordon [52] conducted a pilot study of eight Fortune 500 manufacturing companies to find out the interaction between IT and business units as a key to success. Bergeron et al. [53] studied 110 small enterprises and suggested a contingency model based on the notion of "fit" between the organization's management of IT, its environment, strategy, and structure that has brought a significant difference. Allen and Helms [54] suggested linking strategic practices and organizational performance to Porter's [55] generic strategy. He provided a list of critical strategic practices that are significantly associated with the organizational performance for each of Porter's generic strategies: differentiation, focus differentiation, cost leadership, and focus cost. In addition, a number of other studies like Ghobadian and O′ Regan [35] and Gunther and Menzel [37] focused on specific industry sectors. They concluded that SISP practices are influenced by the industry types.

Whereas some studies like Sharma [56] and Adendorff et al. [57] are limited to a single-case study. There is no surprise that several studies in strategic planning were conducted in developed world like UK-based study of Ghobadian and O′ Regan [35] and Pemberton and Stonehouse [58]. Gunther and Menzel [37] studied in Germany and Polatoglu [59] studied in Turkey. However, the results of these studies are not related to the developing countries because of various economics, social, and cultural differences. Majama et al. [60] conducted a study among Botswana's SMEs and found that strategic planning efforts do exists within SMEs, but most of these firms engage in strategic planning activities to a limited extent. The study focused on barriers of not doing the SISP in form of owners/managers' limited knowledge of strategic planning. Results show that some of these SMEs do not plan because of the size of the business. Some of these SMEs admitted of not having any final business decision-making process leading toward poor or no planning at all.

We now examine the specific studies that have provided a framework for this study. Earl [25] provided a classification for IT strategy models which he called "framework of frameworks." It includes three main categories of frameworks: (1) Awareness frameworks which include three subsets of frameworks: refocusing frameworks, impact models, and scoping models (2) Opportunity frameworks which include four subsets of frameworks: systems analysis frameworks, application search methods, technology fit frameworks, and business strategy frameworks (3) Positioning frameworks which include three subsets of frameworks: scaling frameworks, spatial frameworks, and temporal frameworks Earl [25] provided examples for each subset. These examples were investigated by Levy et al. [61] in the UK context to find out their applicability to SMEs. The results of that study are as follows: The awareness frameworks are of value for SMEs because they enable them to understand their environment. This will help SMEs to set their business goals effectively and to decide the changes required to achieve these goals. Examples for this category are the strategic opportunities framework, Porter's generic strategies, and information intensity matrix. In the opportunity frameworks, the systems analysis frameworks and business strategy frameworks are very useful for SMEs. On the other hand, application search methods and technology fit frameworks are less useful for SMEs because they depend on extracting information from business strategy which may not always exist. The example given of a business strategy framework is Porter's five competitive forces model; the example of a systems analysis framework is Porter's value chain; and the example of application search methods is customer resource life cycle. The positioning frameworks are the least applicable frameworks for SMEs, except scaling frameworks which help to identify the role of information systems in SMEs. The examples given for scaling frameworks are the Strategic Information Systems Grid, sector information management grid, and stages of growth models.

In addition to these studies, Blili and Raymond [6] proposed two main approaches for the IT strategic planning: top-down and bottom-up. They stated that the first approach is more suitable for SMEs because it reflects the importance of IT in the view of top management. They developed information systems strategy (ISS) model for IT strategy, and this model consists of various IT basic methods. In their proposed model, they suggested that Critical Success Factors (CSFs) method to be used to analyze the priority and significance of the business activities which lead SMEs to the high performance. They recommended that CSFs should be combined with Porter's value chain and transaction cost method.

Similarly, Levy and Powell [62] built on the ISS model of Blili and Raymond [6] in SMEs. The new model consists of three stages: business context, business process, and strategic content. Each stage includes objectives to be achieved through some basic methods. The business context analysis helps a business to define three main aspects: the business strategy and objectives, the business environment, and

the competitive environment. These three analyses can be performed by some basic methods such as CSFs, PESTEL, balanced scorecard, and information intensity matrix. The business process analysis is concerned with three aspects: determining the processes that add value for the business, reviewing if the organization is using the appropriate IT to perform the core processes, and finally, analyzing the organization's current IT tools and functions. These analyses are to be accomplished through some basic methods such as value chain method, Strategic Information Systems Grid, and soft systems methodology (SSM). The strategic content analysis aims to provide recognition for the required IT that can satisfy the organization's objectives. They suggested such techniques as MIT'90 and the 3D model of information systems success for this purpose.

Salas et al. [63] within the Australian context provided an approach to IT strategy development that was based on the Blili and Raymond's [6] work. The model consists of two complementary views: top-down which is done by top management to identify the business objectives and environment and bottom-up which is done by operational managers to analyze the major processes. Both views are targeted to specify the required IT to fulfill the business objectives. They adapted the Strategic Options Development and Analysis (SODA) model to perform the top-down view and business process analysis and modeling to perform the bottom-up tasks. **Table 1** list IT strategy basic development methods that have been used to form the models discussed.

Azyabi [7] conducted a study of 34 SMEs in the Victorian State of Australia that used IT strategic development methods, perceived benefits, and encountered barriers, as pointed out in the previous section and motivated to conduct this study

No.	Basic IT strategy methods	Literature sources
1	Strategic opportunities framework	Levy et al. [61], Benjamin et al. [63]
2	Porter's generic strategies	Levy et al. [61]
3	Information intensity matrix	Levy et al. [61], Levy and Powell [62]
4	Porter's value chain	Blili and Raymond [6], Levy et al. [61], Levy and Powell [62]
5	Customer resource life cycle	Levy et al. [61]
6	Porter's five competitive forces model	Levy et al. [61]
7	Sector information management grid	Levy et al. [61]
8	Strategic information systems grid	Levy et al. [61], Levy and Powell [62]
9	stages of growth models	Levy et al. [61]
10	Balanced scorecard	Levy and Powell [62]
11	Transaction cost	Blili and Raymond [6]
12	PESTEL	Levy and Powell [62]
13	Strategic Options Development and Analysis (SODA)	Salas et al. [63]
14	Soft systems methodology	Levy and Powell [62]
15	3D model of IS success	Levy and Powell [62]
16	Critical success factors (2000)	Blili and Raymond [6], Levy and Powell [62]
17	MIT'90	Levy and Powell [62]

Table 1.
IT strategy basic development methods.

in Brunei, and found that only three methods are found to have indirect influence on IT strategy development: critical success factors, transaction cost, and balanced scorecard. The major benefits include achievement of organizational efficiency, facilitating alignment between business and IT strategies, and improving organizational performance. The most significant barriers to develop IT strategy are financial and human resources limitation and lack of time and focus on day-to-day operations. The results further reveal that small-sized enterprises are less familiar with critical success factors and transaction cost than the medium-sized enterprises. However, there is no difference among manufacturing and service organizations in facilitating alignment between business and IT and obtaining competitive advantages. Small-sized enterprises experience bottleneck and barriers through lack of relevant IT experience and lack of time and focus on day-to-day operation than medium-sized organizations.

Azyabi [7] research has some weaknesses in the form of small sample size and generalizability; however, it is unique in the Asia-Pacific region and has further provided a source of motivation to conduct a similar study within the context of Southeast Asia. In fact from the review of the literature, it was found that researchers have conducted the studies from various dimensions, and no consistent pattern could therefore be applied leading toward a big research gap in the literature. As mentioned, most of these studies were conducted in the Western worlds, and the findings might or might not be applicable to this part of the globe. Up to our knowledge, no such study has focused on the multidimensional aspect of the strategic IT development process, benefits of using, and barriers of not using the strategic development process within Southeast Asian perspective. There is another gap that exists within Southeast Asian perspective, and the present study could fill in the research gap. Although the business environment and business volume among Bruneian SMEs are very different than their Australian counterparts, however by conducting this study, we would be able to find empirical evidence as how one of the Southeast Asian economies and strategic business development approach is different. The findings may further be utilized to generalize among other Southeast Asian context.

3. Methodology

3.1 The instrument

The purpose of this study was purely descriptive in nature. Creswell [64] suggested that descriptive research is to collect data about an existing situation or issue. Yin [65] suggested that survey is an appropriate method for descriptive research. In the light of the above cited discussion, a questionnaire adapted after an Australian study [7] was used for this study. The questionnaire consists of two parts, starting with Section A that collects information on the demographical data about the respondents, organizations, and IT functions. Section B collects information about the IT strategy development methods. Section B is further divided into four parts: collecting information about awareness framework, opportunity frameworks, positioning frameworks, and other frameworks. The data is collected on five-point Likert scale starting with 1 as "fully used," 2 as "partially used," 3 as "familiar and has indirect influence," 4 as "familiar but not used," and finally, 5 as "unfamiliar." So their final mean values of less than 3.00 mean either fully or partially used, and mean values around 3.00 indicate familiar but indirect effect, and finally, mean values of above 4 indicate either not used or unfamiliar with the strategic development.

3.2 Instrument validity and instrument reliability

There are several types of validity measures such as face validity and construct validity. Campbell and Fiske [66] propose two types of validity: convergent and discriminating validity. Convergent validity is measured by average variance extracted for each construct during the reliability analysis that should be 0.5 (50%) or better. **Table 2** shows the reliability values for the various constructs with variance extracted, and all the values are above 50%, thus providing a sufficient evidence of convergent validity. Similarly, Cronbach's α [67] for the constructs ranging from 0.80 to 0.90 further indicate a sufficient level of reliability. In general results show that both validity and reliability requirements are met.

3.3 The sample

A questionnaire was sent to 129 SMEs according to a random sampling plan. The SMEs were selected from a key business directory of Brunei (www.goldpages.com). Out of these 127 organizations, 70 organizations responded, and responses from 67 organizations were retained as they were filled by the top management; three were dropped because of the fact that it was not filled as per instructions. This makes the response rate of 52% sufficient for the survey of SMEs especially in a small market of Brunei Darussalam.

4. Data analysis and results

Data obtained from the survey were analyzed for descriptive, frequency, and student's t-statistics by using SPSS version 19, a well-known statistical package.

4.1 Profile of respondents

The first question in this section asked for some basic demographic information about the respondent's job title, gender, and years of experience with the organization. The summary of the responses are given in **Table 3**. Interestingly, 63% of the respondents with responsibility for IT function were male compared to 37% of the females. Similarly, 43% of the respondents were IT/IS or MIS managers compared to 51% as directors, and only 6% were general managers. As presented, 40% of the respondents have 1–5 years of experience with their organizations, with 37% were having 6–10 years of experience, and roughly around 22% have more than 10 years of experience with their organizations.

Constructs	No of items	Mean	Cronbach alpha (α)	Variance extracted
Awareness frameworks	3	3.63	0.88	0.81
Opportunity frameworks	3	3.53	0.80	0.74
Positioning frameworks	3	3.68	0.87	0.80
Other frameworks	8	3.67	0.84	0.60

Table 2.
Reliability and validity.

Organization characteristics	Frequency	Percentage
Job title		
IT/IS manager	29	43
Director	34	51
General manager	4	6
Gender		
Male	42	63
Female	25	37
Years of experience		
1–5	27	40
6–10	25	37
More than 10	22	22

Table 3.
Profile of respondents.

4.2 Profile of organizations

The second question gathered information about the profile of the respondent's organization such as the years of operation, sector, and the number of employees. This section discusses the survey findings about these aspects and a summary is shown in **Table 4**. Interestingly, 24% of the participating organizations have between 5 and 10 years of operation. Very few (4%) have less than a year of operation. The participating organizations with more than 10 years of operation represent about 44% of the surveyed SMEs. Unfortunately, the share of participating companies from the manufacturing sector was only 12%. Others are mostly from service industry (31.0%). Few are from construction and retail sectors (3 and 6%, respectively). However, the good response rate of 30% was from information and commutation technology (ICT). About 55% of the respondent organizations have between 10 and 50 employees, and 45% of the organizations have between 51 and 250 employees. The SMEs with approximate sales between B$ 100,000 and B$ 250,000 cover the highest response of 28%, and about 22% of the participating organizations did not disclose their sales' figure.

4.3 Profile of the IT function

Question 3 asked the respondents if they have a group of people dedicated to the IT function. The findings, as shown in **Table 5**, reveals that a large majority (82%) of the respondents have people who are dedicated for the IT function, while 18% do not have such people.

4.4 IT strategy basic development methods

The survey questioned the participants about their level of use and familiarity with IT strategy basic development methods. They were asked to respond to this question by encircling a number on a five-point scale where 1 means fully used, 2 means partly used, 3 means familiar and has indirect influence, 4 means familiar but not used, and 5 means unfamiliar. A summary of how the surveyed SMEs are

Organization characteristics	Frequency	Percent
Years of operation		
Less than a year	4	6.0
–5 years	18	27.0
5–10 years	16	24.0
Over 10 years	29	43.7
Industry segment		
Manufacturing	8	12.0
Service	21	31.3
Construction	2	3.0
Retail	4	6.0
ICT	20	30.0
Other	12	18.0
Number of employees		
Less than 10	14	21.0
11–50	23	34.0
51–250	30	45.0
Approximate sales		
< $100,000	9	13.4
$100 K to < $250 K	19	28.3
$250 K to < $500 K	18	12.0
$500 K to < $ 1 million	7	10.4
More than 1 million	9	13.4
No answer	15	22.0

Table 4.
Profile of organizations.

	Frequency	Percentage
People responsible for IT function		
No	12	18.0
1–5	23	34.0
6–10	18	27.0
More than 10	14	21.0
People responsible for IT decision-making process		
None	32	48.0
1–5	22	33.0
6–10	7	10.0
More than 10	6	9.0

Table 5.
Profile of IT function.

using and are familiar with the IT strategy basic development methods is shown in **Table 6**. From the table data, it is evident that none of the IT strategy basic development methods are fully or partially used by the participating SMEs. Only three IT strategy basic development methods have indirect influence on SMEs: critical success factors (mean score: 3.10), transaction cost (mean score: 3.13), and balanced scorecard (mean score: 3.28). SMEs are generally familiar with many IT strategy basic methods (e.g., customer resource life cycle, strategic opportunities framework, stages of growth models, 3D model of IS success, Porter's value chain, Porter's five competitive forces, soft systems methodology, Porter's generic strategies, Strategic Information Systems Grid, information intensity matrix, and sector information management grid); however, these methods have no effect on their IT strategy development, and finally SMEs are not familiar at all with such methods as Strategic Options Development and Analysis (SODA), MIT'90, and PESTEL. The mean of these development methods is above 4.00 but less than 4.50, which further indicate the marginal familiarization of these methods.

In order to find any difference between basic strategy development methods and organization size, statistical t-test was conducted and the results are presented in **Table 7**. The results further indicate that none of the IT strategy basic development method is used by the Bruneian SMEs either fully or partially even though the SMEs are familiar with these methods. A comparison was also made with the Australian study and results reveal that two of the basic strategy development methods such as critical success method and transaction cost are significant rather than the balanced scorecard.

IT strategy development basic methods	Mean rating	Ranking	Australian study*
Critical success factors	3.10	1	3.00
Transaction cost	3.13	2	3.00
Balanced scorecard	3.28	3	3.39
Customer resource life cycle	3.34	4	3.85
Strategic opportunities framework	3.39	5	3.88
Stages of growth models	3.61	7	3.94
3D model of IS success	3.84	12	4.06
Porter's value chain	3.68	10	4.09
Porter's five competitive forces	3.60	6	4.15
Soft systems methodology	3.79	11	4.15
Porter's generic strategies	3.67	9	4.24
Strategic information systems grid	3.66	8	4.27
Information intensity matrix	3.85	13	4.27
Sector information management grid	3.81	14	4.27
Strategic Options Development and Analysis (SODA)	4.22	15	4.59
MIT'90	4.33	17	4.69
PESTEL	4.25	16	4.72

**Azyabi [7].*

Table 6.
Results of IT strategy development basic methods.

			T-test for equality of means					
IT strategy basic development methods	**Organization size**	**Means**	**F**	**T**	**df**	**Sig. (2 tailed)**	**Remark**	**Australian study**
Transaction cost	50	3.11 3.16	1.862	–.169	65	0.867	Non-sig	Significant
Critical success factors	50	3.14 3.06	0.993	0.242	65	0.809	Non-sig	Significant
Balanced scorecard	50	3.47 3.06	4.65	1.456	65	0.150	Non-sig	Non-sig

*Significant at 95% confidence level.

Table 7.
T-test results of the use of the IT strategy basic methods based on organization size.

						T-test for equality of means	
IT strategy basic development methods	**Industry sector**	**Means**	**F**	**T**	**df**	**Sig. (2 tailed)**	**Remark**
Transaction cost	Manuf Non-manuf	3.25 3.23	3.39	–0.197	65	0.845	Non-sig
Critical success factors	Manuf Non-manuf	3.75 3.06	0.603	–1.071	65	0.288	Non-sig
Balanced scorecard	Manuf Non-manuf	3.25 3.75	0.435	–0.833	65	0.408	Non-sig

*Significant at 95% confidence level.
Manuf: Manufacturing; Non-manuf: Non-manufacturing.

Table 8.
T-test results of the use of the IT strategy basic methods based on industry sector.

Another comparison was made to explore the differences between industry sectors regarding the same three IT/IS strategy methods. The responding SMEs were divided into two main industry sectors: manufacturing and non-manufacturing. The results (presented in **Table 8**) reveal that there are no significant differences between these two industry sectors regarding the use of three IT/IS strategy basic methods.

5. Discussion

The findings indicate that none of the IT strategy basic development methods are used by the Bruneian SMEs either fully or partially, even though they are familiar with most of these methods. One qualitative question asked respondents to add any further comments about IT strategy development in SMEs. Some of them mentioned that these methods are well recognized in academic field but are not known in the SME context under these terms and names. Furthermore, some respondents reported that these methods could be more applicable for large organizations rather

than SMEs. These reasons may help explain to some extent the absence of the use of these methods among the surveyed SMEs. The results support the study of Majama et al. [60] who found that strategic planning efforts among SMEs in Botswana do exist but to a limited extent. The comparison with Australian study was made to find out the difference between the two categories of organization size regarding the three methods which have indirect influence on SMEs' IT strategy development (i.e., critical success factors, transaction cost, and balanced scorecard). The results of student t-test (in **Table 7**) indicate that small organizations (with less than 50 employees) are less influenced by and are less familiar with the transaction cost and critical success factors than medium-sized organizations (with more than 50 employees). On the other hand, no such significant difference can be observed between these two groups of SMEs toward balanced scorecard. The results partially support Blili and Raymond [6], Boynton and Zmud [68], and Levy and Powell [62]. As far as the use of the IT/IS strategy basic development methods are concerned, our results are consistent with the Australian study [7] that further indicated that none of the IT/IS strategy basic development methods are fully or partially used by the participating SMEs. However, on the basis of industry sector and organization size (**Table 8**), our findings are in contrast with the study (ibid) as on these bases IT/IS strategy basic development methods remained insignificant. This might be due to the business dynamics and business practices of the Bruneian business environment which is less competitive, in practice, and/or lack of top management initiative. In addition, Bruneian SMEs are not struggling for their survival solely on IT [69] and are less influenced by the basic strategy development methods compared to Australian counterpart. However, no such difference is significant between Bruneian and Australian SMEs on the basis of industry sector.

6. Lesson learnt

This pioneering study conducted among Bruneian SMEs has met both of its objectives. As mentioned in the introduction, the main objectives of this study were to investigate the extent to which Bruneian SMEs use or are familiar with the basic IT strategy basic development methods. Regarding the first objective on the use of the IT strategy development methods, it was found that none of the provided basic IT strategy development methods is used by these surveyed SMEs either fully or partially; only three methods have indirect influence on IT strategy development in these SMEs: critical success factors, transaction cost, and balanced scorecard. Nevertheless, these surveyed SMEs are not familiar with SODA, MIT'90, and PESTEL, and surveyed SMEs are familiar with other strategy development methods, but these methods had no effect on their IT strategic development. Moreover, no statistical difference was found with the familiarization with the basic IT strategy development methods on the basis of organization size and industry sector that conclude our second objective. In the practice side, this research assists SMEs in recognizing the importance of IT strategy for SMEs, and it therefore provides an insight of IT strategy development in SMEs. The study further found some similarities in the use of basic IT strategy development methods with Australian SMEs on the basis of industry sector; however, on the basis of organization size, the results are in contrast, and it is because of the more developed business practices of Australian SMEs.

The study findings further provide insight in building up an empirical foundation for understanding the organizational use of IT strategy basic methods, among Bruneian SMEs within the Southeast Asian context. The basic question that needs an immediate attention is from the policy planners that are to find out the reasons why these SMEs are not utilizing the basic IT strategy development methods

especially when they are aware of the benefits of the strategic process. The plausible reason is that Bruneian business environments do not demand the competitive advantage. This was also supported by one of the studies on e-commerce adoption among Bruneian SMEs and had further concluded that Bruneian businesses need to develop a business culture where competitive advantage could be achieved through e-commerce adoption [19]. To deal with the severity of this problem, the CEO of these SMEs along with the policy makers of Bruneian Small and Medium Business Development Authority (SMBDA), with the help of the Ministry of Industry and Primary Resources (MIPR), should address this issue accordingly. We believe that there are some success stories among small businesses, and the planning agencies could further organize a forum where other small businesses can learn from the best practices. We also believe that until or unless the stated barriers were not curtailed or reduced, these SMEs would not be gaining.

As mentioned, one of the biggest constraints faced by theses SMEs with regard to the SISP emerged from lack of owner's awareness, their reactive behavior, and lack of formal employees' participation in business decisions. This can further be improved by either educating the owners' IT skills and abilities or by employing a formal manager-IT support. This can be possibly implemented by the intervening e-government initiative by e-Government National Centre (EGNC). Once the owners are educated and started developing SISP, these SMEs would increase competitiveness, reduce cost, and share knowledge with the members and stakeholders; the overall business processes would finally be improved to get the business, otherwise outside competitive forces will reshape the local business SMEs.

Like every research this study is not free from its weaknesses and limitations. Properly addressing these limitations in the forthcoming researches could improve the findings. Firstly, the small sample size has been a major impediment especially generalizing the results across the region. Secondly, the small contribution of the manufacturing sector among these surveyed SMEs because of the absence of very large share of this sector in Bruneian business has made the sample size bias in nature which is apparently beyond the control of the researchers. Thirdly, the study needs to include barriers of not doing the SISP to highlight the various reasons that need to be addressed by the relevant authorities Finally, most of the items in the questionnaire are self-reported and would further induce response bias, and we did not do any precautions to address this issue. So caution should be used is generalizing the results. We therefore recommend that future studies would address this issue accordingly.

Author details

Afzaal H. Seyal
Department of Computing and Information Systems, School of Computing and Informatics, Universiti Teknologi Brunei, Brunei

*Address all correspondence to: afzaal.seyal@utb.edu.bn

References

[1] tZubovic A, Pita Z, Khan S. A framework for investigating the impact of information systems capability on strategic information systems planning outcomes. In: Proceedings of 18th Pacific Asia Conference on Information Systems. 2014. pp. 1-12

[2] Kamariotou M, Kitsios F. Strategic information systems planning. In: Khosrow-Pour M, editor. Encyclopedia of Information Science and Technology. 4th ed. USA: IGI, Global Publishers, Idea Group, Inc.; Chapter 78. 2018. pp. 912-922

[3] Kamariotou M, Kitsios F. Innovating with strategic information systems planning: A structured literature review. In: Proceedings of the 2nd International Conference on Applied Innovation. 2015

[4] Ullah A, Lai R. A systematic review of business and information technology alignment. ACM Transactions on Management Information Systems. 2013;**4**(1):1-30

[5] Bhagwat R, Sharma MK. Management of information system in Indian SMEs: An exploratory study. International Journal of Enterprise Network Management. 2006;**1**(1):99-125

[6] Blili S, Raymond L. Information technology: Threats and opportunities for small and medium-sized enterprises. International Journal of Information Management. 1993;**13**(6):439-448

[7] Azyabi N. IT/IS strategy development in victorian SMEs. Unpublished Master thesis. Melbourne, Australia: Monash University; 2009

[8] Rafiqual I, Abdullah R, Maya NMS. Report on Small and Medium Enterprises in Brunei Darussalam. Brunei: ITB, Publication; 2001

[9] Delone W. Determinants for success for computer usage in small business. MIS Quarterly. 1998;**12**(1):51-67

[10] Reynolds W, Savage W, Williams A. Your Own Business: A Practical Guide to Success. 2nd ed. Sydney, Australia: ITP Thomas-Nelson; 1994

[11] MacGregor RC, Bunker DJ, Waugh P. Electronic Commerce and SMEs in Australia: An EDI Pilot Study. Proceedings of 11th international BLED E-Commerce Conference, Bled, Slovenia, 1998, June 8th–10th. pp. 284-294

[12] Delvecchio M. Retooling the staff along with the systems. Bests Review. 1994;**94**(11):82-83

[13] Yap CS, Soh CPP, Raman KS. International systems success factors in small business. OMEGA: International Journal of Management Science. 1992;**5**(6):597-609

[14] Hormozi AM, Sutton GS, McMinn RD, Lucio W. Business plans for new or small businesses: Paving the path to success. Management Decision. 2002;**40**(8):755-763

[15] Kraus S, Harms R, Schwarz EJ. Strategic planning in smaller enterprises-new empirical findings. Management Research News. 2006;**29**(6):334-364

[16] Wang C, Walker EA, Redmond JL. Explaining the lack of strategic planning in SMEs: The importance of owner motivation. International Journal of Organizational Behavior. 2007;**12**(1):1-16

[17] Siddique CM. A comparative study of strategic planning practices of SMEs and large-sized business organizations in emerging economies: The case of UAE. Strategic Change:

Briefings in Entrepreneurial Finance. 2015;**24**:553-567

[18] Stonehouse G, Pemberton J. Strategic planning in SMEs-some empirical findings. Management Decision. 2002;**40**(9):853-861

[19] O' Regan N, Ghobadian A. Formal strategic planning. Business Process Management Journal. 2002;**8**(5):416-429

[20] Seyal AH, Rahman MN. A preliminary investigation of e-commerce adoption in Bruneian small and medium organizations. Journal of Global Information Technology Management. 2003;**6**(2):6-26

[21] Seth A, Thomas H. Theories of the firm: Implications for strategy research. Journal of Management Studies. 1994;**31**(2):165-191

[22] Andrews KR. The Concept of Corporate Strategy. Homewood, IL: Irwin; 1971

[23] Gibcus P, Kemp RG. Strategy and Small Firm Performance. Scientific Analysis of Entrepreneurship and SMEs; 2003. http://www.entrepreneurship-sme.eu/pdf-ez/H200208.pdf

[24] Dong X, Liu Q, Yin D. Business performance, business strategy, and information system strategic alignment: An empirical study on Chinese firms. Tsinghua Science and Technology. 2008;**13**:348-354

[25] Earl MJ. Management Strategies for Information Technology. Englewood Cliffs, NJ: Prentice-Hall; 1989

[26] Galliers RD. Strategic information systems planning, myths, realities and guidelines for successful implementation in. In: Galliers RD, Baker BS, editors. Strategic Information Management. Oxford: Butterworth-Heinemann; 1994. pp. 129-147

[27] Finnegan P, Galliers R, Powell P. Investigating Inter-organizational Information System Planning Practices in Ireland and UK. Proceedings of the 5th European Conference on IS, 1997, June 19th-21st, Cork. 1. pp. 281-294

[28] Kearney AT. Breaking the Barrier-IT Effectiveness in Great Britain and Ireland. Report by AT. Kearney for the Chartered Institute of Management Accountants. London, UK: A. T. Kearney Ltd; 1990

[29] Lederer AL, Sethi V. Key prescription for strategic information systems planning. Journal of Management Information Systems. 1996;**13**(1):35-62

[30] Gottschalk P. Technology Management. Bergen, Norway: Fagbokforlaget; 1995

[31] Ward J, Griffiths P. Strategic Planning for Information System. Chichester: John-Wiley; 1996

[32] Falconer DJ, Hodgett RA. Strategic Information Systems Planning, an Australian Experience. Proceedings of the Americas Conference on IS, 1997, Aug 15th–17th, Indianapolis. pp. 837-839

[33] Pyburn PJ. Linking the MIS plan with corporate strategy: An exploratory study. MIS Quarterly. 1983;7(2):1-14

[34] Sexton DK, Van Auken P. A longitudinal study of small business strategic planning. Journal of Small Business Management. 1985;**23**(1):7-15

[35] Ghobadian, O'Regan. Effective strategic planning in small and medium sized firms. Management Decision. 2002;**40**(17):663-671

[36] Burton RM, Hakonsson DD, Lauridsen JT, Obel B. Strategy implementation require the right executive style: Evidence from

Danish SMEs. Long Range Planning. 2012;**45**(2):182-208

[37] Gunther L, Menzel D. Strategizing in SMEs: Between autocratic instructions and autonomous behavior. In: Lange R, Miller E, editors. Proceedings of the International Symposium on Innovation Methods and Innovation Management. Chemnitz; 2012. pp. 56-59

[38] King WR, Teo SHT. Assessing the impact of proactive versus reactive models of strategic information systems planning. Omega. 2000;**28**(6):667-679

[39] Peppard J, Galliers RD, Thorogood A. Information systems strategy as practices: Micro strategy and strategizing for information systems. Journal of Strategic Information Systems. 2014;**23**(1):1-10

[40] Maharaj S, Brown I. The impact of shared domain knowledge on strategic information system planning and alignment: Original research. South African Journal of Information Management. 2015;**17**(1):1-12

[41] Nolan R. Managing the crisis in data processing. Harvard Business Review. 1979;**57**(2):115-126

[42] Jackson C. Building a competitive advantage through information technology. Long Range Planning. 1989;**22**(4):29-39

[43] Earl MJ. Experiences in strategic information systems planning. MIS Quarterly. 1993;**17**(1):1-22

[44] Segars AH. Strategic information system planning: The Co-alignment of planning system design, its relationship with organizational context, and implications for planning system success [unpublished doctoral dissertation]. USA: University of South Carolina; 1994

[45] Miller CC, Cardinal LB. Strategic planning and firm performance: A synthesis of more than two decades of research. The Academy of Management Journal. 1994;**37**:1649-1665

[46] Ward J, Peppard J. Reconciling the IT/business relationship: A troubled marriage in need of guidance. Journal of Strategic Information Systems. 1996;**5**:37-65

[47] Bergeron F, Raymond L, Rivard S. Fit in strategic information technology management research: An empirical comparison of perspectives. OMEGA: International Journal of Management Science. 2001;**29**:125-142

[48] Porter ME. Competitive advantage. New York: Free Press; 1985

[49] Wiseman C. Strategy and Computers: Information System as Competitive Weapon. Ills: DowJones-Irwing; 1985

[50] Gottschalk P. Implementation of formal plans: The case of information technology strategy. Long Range Planning. 1999;**32**(3):362-372

[51] Jantan M, Srinivasaraghavan K. Information technology deployment and competitive advantage of organizations in Penang, Malaysia. In: Proceedings of International Conference on Business Development Strategies in Asia-Pacific, Mar, 21st-22nd. Universiti Brunei Darussalam; 1997

[52] Gordon JR, Gordon SR. Structuring the interaction between IT and business units: Prototyping for service delivery. Information Systems Management. 2000;**17**(1):7-16

[53] Bergeron F, Buteau C, Raymond L. Identification of strategic information system opportunities: Applying and comparing two methodologies. MIS Quarterly. 1991;**15**(1):89-103

[54] Allen RS, Helms MM. Linking strategic practice and organizational performance to Porter's generic strategies. Business Process Management Journal. 2006;**12**(4):433-454

[55] Porter ME. How competitive forces shape strategy. Harvard Business Review. 1979;**57**(2):137-145

[56] Sharma G. Do SMEs need to strategize? Business Strategy Series. 2011;**12**(4):186-196

[57] Adendorff C, Appels G, Botha B. Strategic management: An eastern cape construction SME case study. Acta Structilia. 2011;**18**(2):40-63

[58] Pemberton J, Stonehouse G. Strategic planning in SMEs-some empirical findings. Management Decisions. 2002;**40**(9):853-861

[59] Polatoglu VN. Strategies that work–the case of an e-retailer in an emerging market. International Journal of Emerging Markets. 2007;**2**(4):395-405

[60] Majama NS, Israel T, Magang T. Strategic planning in small and medium enterprises (SMEs): A case study of Botswana SMEs. Journal of Management and Strategy. 2017;**8**(1):74-103

[61] Levy M, Powell P, Galliers R. Assessing information systems strategy development frameworks in SMEs. Information and Management. 1999;**36**:247-261

[62] Levy M, Powell P. Information systems strategy for small and medium sized enterprises: An organizational perspective. The Journal of Strategic Information Systems. 2000;**9**:63-84

[63] Salas KD, Marshall P, Young J. Is strategy formulation in a financial services company: The dual lens approach. Pacific Asia, Conference on Information Systems, Auckland, New Zealand; 2007. Accessed at: http://www.pacis2007.com/

[64] Creswell JW. Research Design: Qualitative and Quantitative Approaches. Thousand Oaks, California: Sage Publications; 1994

[65] Yin R. Case Study Research: Design and Methods. Thousand Oaks, California: Sage Publications; 2003

[66] Campbell DT, Fiske DW. Convergent and discriminant validation by multi-trait, multi-method matrix. Psychological Bulletin. 1955;**56**:82-105

[67] Cronbach LJ. Coefficient alpha and the internal structure of tests. Psychometrica. 1951;**16**:297-324

[68] Boynton AC, Zmud RW. An assessment of critical success factors. Sloan Management Review. 1984;**25**:17-27

[69] Seyal AH, Rahim M. Understanding electronic commerce adoption in Bruneian SMEs: A replication of the application of TAM and perceived strategic value models. Journal of Electronic Commerce in Organizations. 2010;**8**(4):32-50

Chapter

Collaborative Behavior and the Sharing Economy: Pan-European Evidence for a New Economic Approach

Joan Torrent-Sellens

Abstract

This chapter analyzes the sharing economy and collaborative consumption behaviors. The study addresses two lines of analysis. The first is theoretical, and it examines the background, definitions, and conceptual framework of the topic. The second is empirical and brings new evidence through a pan-European predictive analysis. From the theoretical angle, I conclude that the exchange behavior evolves toward a new paradigm, from initial digital formats into sharing formats. And for a more adequate interpretation of the sharing exchange theory, the economy will have to move forward and develop a formal apparatus that takes into consideration a set of relatively unusual principles. In particular a combination of new assumptions: rational/emotional decision-making, individual/prosocial interest, monetary/nonmonetary compensation, and ownership/use, which economics will have to incorporate into the functions thereof. From the empirical perspective, my research provides new evidence about the motivations of collaborative behavior. Particularly interesting is the result that self-employed or entrepreneurs are more prone to value collaborative platforms that are oriented as an alternative. On the contrary, managers and qualified employees have more practical and monetary motivations. Both results, theoretical and empirical, could open the door to new strategic orientations for the development of platforms.

Keywords: sharing economy, collaborative consumption, platform economy, access-based economy, peer-to-peer (P2P) markets

1. Introduction

In recent years, day-to-day economic practice has given us a host of examples attesting to the changing nature of economic exchange. For most people, *Uber* and *Airbnb* are possibly the most recognizable examples but, simply by taking a look at the variety of digital exchange platforms and networks currently available, it is possible to see that economic transactions are profoundly changing. These platforms, which complement or replace traditional markets such as passenger transport or tourist accommodation, are two clear examples of the fact that some of the foundations of the economy are structurally changing [1–3].

This development has often been noted from the perspective of sharing or of collaboration [4, 5]. With the advent of Web 2.0 and social networks, whose major difference from the first digital wave is that they enable and facilitate interactive digitalization [6], sharing has modified the economic exchange. Collaborative consumption is the new form of mass sharing between and among people, principally through peer-to-peer (P2P) digital platforms [7]. It implies the coordinated acquisition and distribution of goods or services for use, it is always done in expectation of some type of compensation (monetary or otherwise), and it places access or use over ownership [4, 8, 9]. In this sense, the key question for management research is to establish how consumer behavior has changed and, as a consequence thereof, how these transformations modify the business strategy [3, 10].

But, how should sharing or collaboration be interpreted? What is new in such forms of collaborative consumption? Do they create the need for us to approach economic exchange from a new analytical perspective? Do we have evidence of these new forms of consumption? What effects does collaborative consumption have on the economic activity? These are some of the questions that have inspired this chapter.

In order to answer them, a wide range of conceptual and empirical studies has been reviewed. The analysis extends from the core to the periphery of the issue. Firstly, the background, definitions, and conceptual frameworks of the sharing economy and collaborative consumption will be addressed. Secondly, the set of motivations explaining their rise will be studied, which allowed me to postulate the research hypotheses. Thirdly, new pan-European empirical evidence will be provided. Fourth and lastly, the main conceptual and empirical corollaries of the research will be addressed and discussed.

2. Digital sharing as economic behavior

The first digital wave was consolidated in the late twentieth century and generates new markets (digital markets) that significantly alter forms of consumption and production. Information goods and services, that is, all goods and services that can be digitalized, play a leading role in digital markets [11]. These goods have particular economic characteristics, such as nonrivalry (public goods), which are experience goods (whose utility can only be determined once they have been consumed), and they have a particular cost structure, with very high fixed costs (production) and decreasing marginal costs (reproduction) tending toward zero. The combination of these properties means that the price-setting rule revealed by all the information, which is equal to the marginal cost in traditional markets, does not work in digital markets. In establishing the value of information goods and services, the price is different from the marginal cost, and external network economies play an important role [12]. In addition, a decoupling of the traditional relationship between ownership and use is starting to occur through dematerialization, as represented by information goods and digital markets [13]. However, interpretative models of digital exchange are still based on rational and intangible decision-making, and individuals maximize its utility or the utility of its network only by taking into consideration individual or collective interests, which are still not collaborative [5].

In the early twenty-first century, a second wave of digital technology gave new impetus to the transformation of economic exchange behavior, which evolved from initial digital exchange into sharing or collaborative exchange. However, to understand this new trend, it is important first to define what sharing is. Sharing can be interpreted as one of the forms of people's economic behavior. Its existence and relevance as a type of exchange in human communities has been demonstrated since the beginning of the civilization [14]. Sharing means going beyond individual interests to take into

account human and social values. Sharing may have functional motivations, such as survival, but it can also be an altruistic act motivated by convenience, courtesy, or kindness toward others. All sharing practices are related to cultural norms, but sharing is much more than an altruistic act that occurs within the family, close social circles, or among friends. Indeed, it can also occur among strangers. In this context, it is possible to define sharing as "the act and process of distributing what is ours to others for their use as well as the act and process of receiving something from others for our use ([14], p. 126)." In an earlier, more socially oriented approach to the issue, sharing has been interpreted as a "nonreciprocal prosocial behavior ([10], p. 331)."

With the emergence of digital forms of sharing behavior through collaborative consumption, the literature has made significant advances [15]. Especially relevant is the differentiation between collective consumption and collaborative consumption. The literature has traditionally taken collective consumption to mean "those events in which one or more persons consume economic goods or services in the process of engaging in joint activities with one or more others ([16], p. 614)." This approach, which includes a wide range of daily consumption practices, such as drinking and eating with friends, or watching a show together, places emphasis on joint participation, though it seems too broad for the purposes of describing the phenomenon of collaborative consumption. For consumption to be collaborative, people need to adopt a specific form of coordination beyond their group behavior: the coordinated acquisition and distribution of the goods or services consumed. In other words, collaborative consumption is "the act and process of distributing what is ours to others for their use ([14], p. 126)."

Similarly, the literature has made advances in terms of clarifying collaborative consumption, particularly in relation to the delimitation of the differences between it and other types of consumption with prosocial intentions, such as gift-giving or economic exchanges. A number of earlier approaches associated collaborative consumption with traditional market behaviors such as "sharing, bartering, lending, trading, renting, gifting, and swapping ([7], p. 15)," but that overly broad approach was further delimited, with collaboration being restricted to the coordinated "acquisition and distribution of a resource for a fee or other compensation ([5], p. 1597)."

It is therefore necessary to insist on the fact that collaborative consumption behavior implies the coordinated acquisition and distribution of products or services for use, some type of compensation (monetary or otherwise), and access, often temporary, over ownership. In this respect, the notion of access-based consumption would adequately encompass the domain of and motivations behind collaborative consumption in the sense that "instead of buying and owning things, consumers want access to goods and prefer to pay for the experience of temporarily accessing them ([8], p. 881)."

3. Collaborative behavior in economic thought

Economic research addresses the sharing economy and collaborative consumption as if it were a conceptual umbrella that integrates diverse phenomena related to new forms of economic exchange and economic behavior. This new, sharing interpretation of exchange and behavior [10, 17] has been given many different names. Among them we find "product-service systems" [18], the idea of a consumption "mesh" or network [19], "collaborative consumption" [4, 7], the idea of "prosumers" [20], "commercial sharing systems" [9], "access-based consumption" [8], and even a new form of "crowd-based capitalism" [21]. All of these new exchange practices have two commonalities: "(1) their use of temporary access nonownership

models of utilizing consumer goods and services, and (2) their reliance on the Internet, and especially Web 2.0, to bring this about ([5], p. 1595)."

Conceptually, collaborative consumption behavior has been delimited by two distinct conceptual frameworks (**Table 1**). Consumer theory addresses the phenomenon from the perspective of a cultural and identity-based form of alternative exchange and behavior [22]. It has therefore paid greater attention to the concept of sharing, to types of consumption, and to collaborative markets or to the antiestablishment foundations of sharing [4, 7, 9, 23–26]. In contrast, information systems theory analyses the phenomenon from the perspective of digital P2P platform and network uses and behavior [27, 28]. These two approaches simply place more or less emphasis on the main components of collaborative consumption. While consumer theory has emphasized the analysis of motivations to explain nonownership access and uses, the information systems approach focuses on the study of technology acceptance models (TAMs) and theory of planned behavior (TPB) models that make using collaborative platforms and networks possible. The salient idea behind this second approach is that collaborative consumption operates through technological platforms (Web 2.0 or mobile applications). Within this context, the problem of motivations behind collaborative consumption behavior becomes the problem of motivations explaining the use of online collaborative consumption platforms. Thus, the success of such digital sharing platforms would explain the sharing behaviors of their potential users and resource providers [29]. In other words, participation behavior in collaborative consumption platforms can be formulated as an intent of acceptance and, therefore, can be approached from the perspective of TAMs and/or TPB models [30].

From the information systems approach, we are able to understand collaborative consumption as a "peer-to-peer-based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services ([17], p. 2047)." In fact, this new type of exchange and behavior is an economic and technological phenomenon driven by new development of information and communication technologies (ICTs), advances in consumer awareness, and the proliferation of collaborative online communities that make commerce more social, sustainable, or fairer [31, 32].

Approach	Authors	Definition
Consumer theory (restrictive)	Belk [4]	The acquisition and distribution of a resource for a fee or other compensation (nonmonetary)
Consumer theory (expanded)	Botsman and Rogers [7]	An economic model based on sharing, swapping, trading, or renting products and services, enabling access over ownership
Theory of the firm (efficiency)	Stephany [3]	Value in taking underutilized assets and making them accessible online to a community, leading to a reduced need for ownership of those assets
Information systems (technology acceptance)	Hamari et al. [17]	P2P-based activity of obtaining, giving, or sharing access to goods and services, coordinated through community-based online services
Functional synthesis	Belk [5] Price and Belk [22]	The use of temporary access nonownership models of utilizing goods and services, and reliance on the Internet, and especially Web 2.0, to bring this about

Table 1.
Sharing economy and collaborative behavior: definitions and conceptual frameworks.

4. Toward new economic approaches

I just showed that, through new forms of collaborative consumption, exchange behavior evolves the economy toward a new interpretative paradigm, from initial digital markets to sharing markets. Sharing exchanges incorporate and reveal a lot

Characteristics	Initial digital exchange	Sharing exchange
Technology	ICTs and Internet 1.0 (noninteractive digitization)	ICTs and Internet 2.0 (interactive digitization) Social networks and social media
Products	Information goods and services (digital ownership)	Digital uses of goods and services (information or knowledge intensives)
Good properties	Nonrivalry (public goods)	Divisibility (rival goods become public)
	Experience goods	Experience uses
	High fixed and low marginal costs	Low fixed and marginal costs
Markets	Digital, noncoincident, and semiregulated	Digital, noncoincident, and unregulated (temporary and diffuse economic activity)
Key market stakeholders	Consumers and businesses engaged in e-commerce	Consumers/producers and businesses/platforms that coordinate electronic exchange
Golden rule of the market	Price differs from marginal cost	Price or fee equal to marginal use
	Price does not reveal all the information	Information is revealed before the price or fee
Efficiency sources	Network economies	Sharing economies
	Cheap inputs of information and knowledge	Cheap inputs of sharing uses of goods, services, information, or knowledge
Basic process and economic activity	Digitization	Sharing
	Intangibles assets	Disintermediation
Production and labor organization	Networked business and labor	Networked individual
	Temporary work	Contingent work (e.g., gigs)
Ownership/use relationship	Semi-identification between ownership and use (dematerialization)	De-identification between ownership and use (repersonification; use without ownership)
Economic interpretation and market structures	Rational and intangible decision-making	Rational and emotional decision-making
	Individual and collective interest	Prosocial interest (ethics, sustainability)
	Information and knowledge exchanges	Access over ownership exchanges
	Monetary compensation	Monetary or nonmonetary price or fee
	Entry and exit costs (e.g., lock-ins)	Free entry and exit
	Network competition	Sharing competition

Table 2.
Exchange in the initial digital economy and the sharing economy.

of information and knowledge, often before the transaction takes place. The basic sharing market stakeholders are consumers/producers and businesses/platforms that coordinate but do not control sharing exchange [33]. The economic properties of sharing exchange are therefore those of shared uses (divisibility, experience uses, and sharing economies). Many of those properties still need to be studied in much greater depth, and that is especially so for the form of the demand function (price or fee equal to marginal use), for its value creation process through sharing networks, and for the structure of P2P markets [10, 34]. Furthermore, the interpretative apparatus that economics will have to develop in order to address a sharing exchange theory must take into consideration a set of relatively unusual principles. Sharing exchange requires interpretative models that consider a combination of emotional and rational decision-making, individual interest-based as well as prosocial motivations, exchange compensation through a monetary or nonmonetary fee, and the set of sharing economies that it may generate. **Table 2** shows and orders some of the main manifestations of new forms of sharing exchange, comparing them to forms of digital exchange.

5. Motivations of collaborative behavior

The set of driving and impeding forces of participation behavior in digital networks for collaborative consumption is clearly multidimensional and encompasses economic, social, environmental, ethical, and motivational elements that need to be addressed in depth [27]. Among these motivations, the literature has identified: (1) economic benefits, time, space and effort savings, and an awareness of exchange costs [8]; (2) cultural changes linked to a new relationship among goods and services, individual ownership, and consumer identity [5, 7]; (3) a rise in the critical view of excessive consumption [35, 36]; (4) growing environmental awareness [19]; and (5) the desire to belong to a community [4]. Critical mass, idle time, belief in the common good, and trust among strangers have also been identified as predictors of the use and provision of content, goods, and services on digital sharing platforms and networks [7].

However, there is still relatively little empirical evidence of the modeling of or results from digital sharing systems based jointly on the behaviors of their users and providers [28]. For example, a priori, some driving forces have an impact on both groups (such as trust), whereas others only have an impact on one of them (i.e., earning money motivates providers and saving money motivates users). Thus, while participation in digital practices of the collaborative consumption depends on the critical mass of its participants (users and providers), it is necessary to look further into the motivations (joint and separate) explaining participation and collaborative behavior [37]. In accordance with this approach, literature has found that participation in a digital collaborative consumption network was motivated by a broad set of factors such as sustainability, enjoyment, and economic benefits [17]. Along similar lines, a multidimensional set of motivations associated with participation behavior (use and provision) in a P2P network for renting goods and services has been identified. That set of motivations included technological, economic, social, ideological, identity, and prosocial factors [27].

One of the main starting points for collaborative consumption was the evolution from business-to-consumer (B2C) electronic commerce (e-commerce) toward the emergence of consumer-to-consumer (C2C) digital markets. On such P2P platforms and networks, people exchange goods and services on a large scale, often under the banner of an alternative form of consumption that is more social, sustainable, varied, convenient, anticapitalist, or without monetary compensation [14, 38]. In fact, many of the motivations explaining this new form of consumption are actually related to their alternative nature, which differs from that of traditional forms of

ownership consumption [23, 24, 39]. Latest research expanded the scope and studied the motivations of users and providers of P2P platforms in Europe [40]. These literature studies have concluded that the providers' motivations differed from the users. The ideology (better community and increased sustainability) explained the providers' participation, while practical reasons (satisfaction of needs, increased value, and convenience) explained the users' participation. Along the same lines, literature has identified that sharing attitudes are linked to moral, social, and monetary motivations [41]. Similarly, monetary incentives are identified as a necessary but not sufficient condition at the moment of sharing individual possessions with others. In this context, a first working hypothesis could be that:

Hypothesis 1: Anticonsumer or antimaterialist motivations, captured through the possibility of nonmonetary exchanges, predict the provision of collaborative platforms.

The economic literature has also highlighted a number of economic aspects that might be driving new digital forms of sharing. Such motivations may also be rational, pursuing a behavior of utility maximization. This is the case, for example, when consumers replace exclusive and expensive ownership with low-cost uses through an online collaborative consumption service [42]. Along the same line, literature has obtained results that tended toward practical motivations and utility. Specific costs, utility factors, the perceived risk of product scarcity, and familiarity with sharing were the explanatory factors of the likelihood of sharing [8, 9]. Beyond this initial and partial evidence, the most recent literature has broadened the scope of its objectives in relation to both the motivations and the number of consumers and types of collaborative consumption analyzed [43]. Lower prices were found to be the main motivation in all types of goods and services analyzed. Scarcity, the environment, and access over ownership were also important in some of the types of goods and services studied. In addition, it has also been obtained that the intentions to share are explained based on economic, environmental, and social benefits that would be captured through a mediating effect linked to the perceived utility [30]. At the same time, the enjoyment experienced would be explained through a sentiment of belonging to the community where sharing takes place. Thus, and considering the different motivations of users and providers, I could formulate my second working hypothesis as follows:

Hypothesis 2:Practical economic motivations, like price, novelty, and convenience, predict the use and provision of collaborative platforms.

Other studies have advanced our knowledge of the forms of adoption and repeated use of digital sharing platforms [26]. The motivations linked to perceived benefits could explain user satisfaction and the probability of choosing to use those platforms again. Regarding the motivations and barriers to collaborative consumption in a P2P accommodation platforms, literature has found that sustainability, belonging to a community, and financial benefits were the main motivations, while the lack of trust, of efficiency, and of economic benefits were the main barriers [44]. At the same line, a multidimensional set of motivations that explained participation (use and provision) in a P2P network for renting goods and services has been identified [27]. Those motivations were technological (privacy, process risk, the platform's ubiquitous availability), economic (income, resource scarcity, effort expectancy, thriftiness, product variety), social (knowledge and modern lifestyle), ideological and identity-related (anticapitalism, independence through ownership, prestige of ownership, enjoyment in sharing), and prosocial (sense of belonging, social experience, social influence). Thus, my third working hypothesis is related to the barriers to collaborative behavior:

Hypothesis 3:The lack of a responsible person, the lack of fulfillment of service expectations, the lack of information, the lack of trust in the agents, or the lack of trust in the Internet predict (brake) the use and provision of collaborative platforms.

With the idea of broadening the set of motivations and the diversity of forms and stakeholders of the collaborative behavior, literature has also analyzed the role of sociodemographic characteristics [25]. Women and young people were more likely to share most of the products/objects. Particularly interesting is the result that shared consumption had more to do with personal mind-set or psychological disposition than with some sociodemographic aspects, like income levels. In this sense, I can formulate a working hypothesis about the sociodemographic predictors of collaborative behavior:

Hypothesis 4:Sociodemographic characteristics predict the use and provision of collaborative platforms.

6. Pan-European evidence of collaborative behavior

In order to obtain a representative sample and to compare the situation of collaboration consumption in the countries of the European Union, the European Commission [45] dedicated a *Flash Eurobarometer* (number 438) to a survey of the use of collaborative economy platforms. *Flash Eurobarometers* are ad hoc statistical operations consisting of short—landline and mobile—telephone interviews on a topic of interest. *Flash Barometer* 438 obtained data on the use of collaborative economy platforms from a sample of 14,050 citizens aged 15 years and above in the 28 countries of the European Union (Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, the Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, and the United Kingdom) through approximately 500 interviews per country. The universe of the survey consisted of the 412,630,644 European Union citizens aged 15 years and above. The sample design for each country was probabilistic and representative. The margins of error at the 95% confidence level in the case of maximum indetermination (p = q = 50) were +0.4% for the entire sample, and around +1.9% for individual country samples. The fieldwork was carried out on March 15 and 16, 2016.

The questionnaire defines a collaborative platform (CP) as "an Internet-based tool that enables transactions between people providing and using a service. They can be used for a wide range of services, from renting accommodation and car sharing to small household jobs ([45], p. 29)." Based on that approach, the survey asked the respondents about their awareness of such platforms and gave them the following options for their answers on use: (1) unaware (UNAWARE) or "You have never heard of these platforms"; (2) aware but does not use (AWNOTUSE) or "You have heard of these platforms but you have never visited them"; (3) initial use (INIUSE) or "You have been on one or more of these platforms and paid for a service once"; (4) occasional use (OCCAUSE) or "You use the services of these platforms occasionally (once every few months)"; and (5) regular use (REGUSE) or "You use the services of these platforms regularly (at least every month)." For all users of such platforms (TOTUSE), which includes initial use, occasional use, and regular use, the survey also gathered data about providing goods and services and gave the respondents the following options for their answers: (1) no provision (NOPROV) or "No, you haven't"; (2) initial provision (INIPROV) or "You have offered a service on one or more of these platforms once"; (3) occasional provision (OCCAPROV) or "You offer services via these platforms occasionally (once every few months)"; and (4) regular provision (REGPROV) or "You offer services via these platforms regularly (every month)." All providers of such platforms (TOTPROV) include initial provision, occasional provision, and regular provision. The various options

of those two variables were transformed into individual variables. All of these new individual variables were dichotomous, where 1 = the respondent was aware of and used or provided goods or services via collaborative platforms, and 0 = the respondent answered otherwise.

Having stipulated the levels of use and provision, the survey looked at the driving factors (benefits) and impeding factors (problems) of collaborative platforms compared to the traditional forms of commerce of goods and services. Regarding the driving factors, the survey gave those respondents who were aware of and users of collaborative platforms the following options for their answers: (1) service cost (PRICE) or "It is cheaper or free"; (2) service newness (NEWNESS) or "It offers new or different services"; (3) service convenience (CONVEN) or "The access to services is organized in a more convenient way"; and (4) nonmonetary exchanges (NONMONET) or "The ability to exchange products or services instead of paying with money." Regarding the impeding factors, the survey gave those respondents who were aware of and users of collaborative platforms the following options for their answers: (1) lack of a responsible person when problems arise (LRESPON) or "Not knowing who is responsible in case a problem arises"; (2) lack of fulfillment of service expectations (LFULLSERV) or "Being disappointed because the services and goods do not meet expectations"; (3) lack of information (LINFORM) or "Not having enough information on the service provided"; (4) lack of trust in the agents (LTRUSTAG) or "Not trusting the provider or seller"; and (5) lack of trust in the Internet (LTRUSTINT) or "Not trusting the Internet transactions in general." All of these variables were dichotomous, where 1 = the respondent answered positively about the driving or impeding factors, and 0 = the respondent answered otherwise.

Lastly, the survey gathered sociodemographic data in order to be able to characterize the users and the providers of collaborative platforms. Specifically, data were gathered on age, gender, years of education, number of household members, type of locality (village or rural area, small, midsized, or large town/city), and occupational status: self-employed or business person, employee (director, qualified professional, manual worker, and nonmanual worker), unemployed or nonemployed (stay-at-home parent/carer, student, retiree, or unemployed person).

Table 3 shows the descriptive statistics of the variables relating to the use and provision of collaborative platforms in Europe. Regarding awareness and use of collaborative platforms, the survey found that more than half of European citizens were unaware of these new forms of exchange (53.2%), while a further third was aware of them but had never used them (33.9%). Thus, 12.9% of the European population aged 15 years and above stated that they were users of collaborative platforms, with the following distribution: 3.2% initial use (one transacted exchange), 6.5% occasional use (once every few months), and 3.2% regular use (at least every month). In relation to the provision of goods and services via collaborative platforms, of the users of such platforms (12.9%), almost three quarters had never provided any (72.1%). The remaining 27.9% of users (3.6% of the European population) had provided goods and services, with the following distribution: 7.3% (0.9% of the total) had made an initial provision (provided goods or services once), 15.7% (2.1% of the total) had made an occasional provision (once every few months), and 5.0% (0.6% of the total) had made a regular provision (every month).

For those who were aware of (33.9%) and users of (12.9%) such platforms (46.8%), the survey also gathered data about the driving and impeding factors of their use. Among the driving factors, convenience (39.1%) and price (31.4%) were cited the most, whereas service newness (22.4%) and the possibility of carrying out nonmonetary exchanges (21.8%) came some way behind the two main motivations. Regarding the factors that would limit the use and provision of such platforms, the lack of a responsible person when problems arise in the exchange (36.5%) was the main reason given, followed at some distance by the lack of fulfillment of service expectations

	N	Mean	SD	Minimum	Maximum	Skewness	Kurtosis
Awareness and use							
Unaware (UNAWARE)	13,837	0.532	0.499	0	1	−0.128	−1.984
Aware but not use (AWNOTUSE)	13,837	0.339	0.473	0	1	0.682	−1.535
Initial use (INIUSE)	13,837	0.032	0.177	0	1	5.298	26.068
Occasional use (OCCAUSE)	13,837	0.065	0.247	0	1	3.530	10.465
Regular use (REGUSE)	13,837	0.032	0.177	0	1	5.291	26.998
Total use (TOTUSE)	13,837	0.129	0.336	0	1	2.207	2.872
Provision of goods and services							
No provision (NOPROV)	1778	0.721	0.448	0	1	−0.987	−1.028
Initial provision (INIPROV)	1778	0.073	0.259	0	1	3.298	8.890
Occasional provision (OCCAPROV)	1778	0.157	0.364	0	1	1.888	1.567
Regular provision (REGPROV)	1778	0.050	0.217	0	1	4.158	15.303
Total provision (TOTPROV)	1788	0.279	0.449	0	1	0.987	−1.028
Driving factors							
Price (PRICE)	6477	0.314	0.464	0	1	0.801	−1.359
Newness (NEWNESS)	6477	0.224	0.417	0	1	1.324	−0.247
Convenience (CONVEN)	6477	0.391	0.488	0	1	0.449	−1.779
Nonmonetary (NONMONET)	6477	0.218	0.413	0	1	1.368	−0.127
Impeding factors							
Lack responsible person (LRESPON)	6477	0.365	0.481	0	1	0.560	−1.687
Lack fulfilling expect (LFULLSER)	6477	0.259	0.438	0	1	1.099	−0.792
Lack information (LINFORM)	6477	0.186	0.389	0	1	1.614	0.605
Lack trust in agents (LTRUSTAG)	6477	0.250	0.433	0	1	1.154	−0.668
Lack trust in Internet (LTRUSTINT)	6477	0.272	0.445	0	1	1.027	−0.947

Table 3.
The use and provision of collaborative platforms in Europe.

(25.9%), the lack of trust in the Internet in general (27.2%), and the lack of trust in the agents (buyers and sellers) of the exchange in particular (25.0%). Lastly, the lack of information (18.6%) was the reason that the respondents cited the least.

Regarding sociodemographic characteristics, the mean age was 54 years and the majority of the respondents were women (58.4% women, 41.6% men). Of the individuals in the sample, 43.4% had 20 or more years of formal education. From an occupational perspective, of note was the high presence of retirees (37.3%) and of manual workers (20.3%). Most households comprised two members (44.0%). Finally, regarding the localities of European citizens (rural, small or mid-sized town/city, or large metropolitan town/city), the sample was equally divided (into three-thirds). Furthermore, in relation to countries, the sample skewed toward the European Union's most populous countries in central and Eastern Europe (35.7% of the sample).

The basic aim of my study is to find out if these sociodemographic characterization variables, together with the motivation/barrier variables, can be turned into predictors of use and provision behavior on collaborative platforms. To that end, we performed an odds ratio (OR) analysis. Formally, it is usually defined as the ratio of the odds of a condition occurring in a population group to the odds of it occurring in another group. It is a measure of the statistical association between dichotomous variables, which has been widely used in social research for three main reasons: firstly, because the OR determines a predictor and a confidence interval (95% CI) between binary dichotomous variables, which enables probability relationships to be established; secondly, because it is useful for examining the predictive effect of one variable on another, while the other variables remain constant in a logistic regression model; and thirdly, because OR offers a quick and efficient interpretation in case studies and controls.

The interpretation of an OR analysis is as follows. If the value of the OR is less than 1 and the confidence interval (95% CI) is situated below the unit, the predictive relationship between the two variables analyzed is an inverse relationship. If the value of the OR is greater than 1 and the confidence interval (95% CI) is situated above the unit, the predictive relationship between the two variables analyzed is a direct relationship. Whenever the confidence interval (95% CI) includes the unit, the predictive relationship between two variables cannot be determined [46, 47].

If I begin by taking the use of collaborative platforms (n = 1792), the first thing to highlight is that its driving forces are clearly linked to motivations of an economic and practical nature (**Table 4**). Convenience and price are the two main drivers of collaborative platform use in Europe. In contrast, the driving factor relating to nonmonetary exchange, which could be identified as being ideological in an antiestablishment or anticapitalism sense, clearly disincentives the use of collaborative platforms. Among the impeding forces, it should be noted that the lack of fulfillment of expectations in relation to the service offered via the collaborative platform disincentives the use thereof. In contrast, the lack of trust in the Internet would not act as an impediment to total use.

Among the sociodemographic predictors of the use of collaborative platforms in Europe, the analysis performed provides us with a set of results worth highlighting. Firstly, men are more inclined than women to use such platforms. Secondly, the younger age ranges (54 years and below) are more likely to make a total use than the older age ranges. And thirdly, households with more members have a greater probability of having a user of collaborative platforms among them than households with fewer members.

Regarding human capital and occupational status, the joint use of collaborative economy platforms in Europe is also linked to the fact of being a student or having many years of education and to professional contexts of entrepreneurship, managerial responsibility, or being highly qualified. In fact, students or people with 20 or more years of formal education are much more likely to use collaborative platforms

	Users (n = 1792)		Providers (n = 496)	
	OR	**(95% CI)**	**OR**	**(95% CI)**
Motivations/barriers (driving and impeding factors)				
Price	**1.687**	**(1.505–1.890)**	1.063	(0.860–1.312)
Newness	1.094	(0.962–1.245)	1.077	(0.846–1.372)
Convenience	**2.334**	**(2.089–2.608)**	0.953	(0.775–1.173)
Nonmonetary exchange	**0.668**	**(0.580–0.769)**	**1.384**	**(1.062–1.803)**
Lack of a responsible person	1.089	(0.973–1.218)	**0.747**	**(0.601–0.929)**
Lack of fulfillment service expectation	**1.234**	**(1.093–1.394)**	1.234	(0.986–1.544)
Lack of information	1.055	(0.918–1.212)	0.990	(0.760–1.289)
Lack of trust in the agents	**1.217**	**(1.076–1.377)**	1.043	(0.828–1.314)
Lack of trust in the Internet	**0.878**	**(0.775–0.994)**	0.973	(0.767–1.236)
Sociodemographic predictors				
Age				
15–24 years	**1.262**	**(1.039–1.532)**	0.871	(0.578–1.311)
25–34 years	**2.386**	**(2.077–2.740)**	**1.436**	**(1.106–1.866)**
35–44 years	**2.097**	**(1.858–2.367)**	0.989	(0.775–1.262)
45–54 years	**1.420**	**(1.260–1.601)**	0.878	(0.684–1.595)
55–64 years	**0.755**	**(0.680–0.883)**	1.070	(0.815–1.406)
65 years and above	**0.246**	**(0.212–0.286)**	0.727	(0.514–1.028)
Gender (1 = male, 0 = female)	**1.456**	**(1.318–1.608)**	**1.409**	**(1.144–1.736)**
Human capital (years of education)				
Still studying	**1.536**	**(1.240–1.903)**	0.887	(0.570–1.381)
Up to 15 years	**0.170**	**(0.128–0.226)**	1.224	(0.669–2.237)
16–19 years	**0.616**	**(0.553–0.687)**	0.839	(0.664–1.059)
20 or more years	**2.313**	**(2.088–2.563)**	1.170	(0.943–1.453)
Occupational status				
Self-employed/entrepreneurs	**1.828**	**(1.573–2.125)**	**1.843**	**(1.391–2.443)**
Employees—directors	**3.012**	**(2.575–3.522)**	1.006	(0.746–1.356)
Employees—qualified professionals	**2.181**	**(1.832–2.596)**	1.147	(0.820–1.605)
Employees—nonmanagement workers	**1.572**	**(1.403–1.762)**	**0.688**	**(0.539–0.878)**
Employees—manual workers	**0.781**	**(0.626–0.974)**	**1.673**	**(1.087–2.574)**
Nonemployed—parents/carers	**0.598**	**(0.475–0.754)**	0.822	(0.491–1.376)
Nonemployed—students	**1.373**	**(1.092–1.726)**	0.787	(0.482–1.284)
Non-employed—retirees	**0.271**	**(0.237–0.310)**	**0.718**	**(0.527–0.977)**
Unemployed—job seekers	0.886	(0.680–1.153)	1.330	(0.787–2.247)
Household members				
One	**0.598**	**(0.524–0.681)**	1.200	(0.915–1.574)
Two	**1.137**	**(1.029–1.257)**	0.915	(0.742–1.127)

	Users (n = 1792)		Providers (n = 496)	
	OR	**(95% CI)**	**OR**	**(95% CI)**
Three	**1.212**	**(1.067–1.377)**	1.067	(0.821–1.386)
Four or more	**1.203**	**(1.053–1.374)**	0.906	(0.685–1.198)
Locality				
Village or rural area	**0.736**	**(0.658–0.823)**	1.042	(0.824–1.318)
Small or mid-sized town/city	0.940	(0.848–1.043)	0.980	(0.789–1.217)
Large town/city or metropolitan area	**1.419**	**(1.280–1.574)**	0.986	(0.795–1.222)
Country groupings				
Continental Europe[1]	**1.249**	**(1.113–1.403)**	1.207	(0.954–1.526)
Mediterranean Europe[2]	**0.735**	**(0.651–0.831)**	1.000	(0.773–1.294)
Northern Europe[3]	1.058	(0.932–1.202)	**0.748**	**(0.566–0.987)**
Central and Eastern Europe[4]	1.029	(0.928–1.141)	1.028	(0.829–1.276)

Notes: OR: odds ratio and 95% CI: confidence intervals at 95%. ORs and 95% CI in bold are significant.
[1]Continental Europe: Belgium, France, Luxembourg, the Netherlands, Austria, and Germany.
[2]Mediterranean Europe: Greece, Spain, Italy, Portugal, Cyprus, Malta, and Croatia.
[3]Northern Europe: Denmark, Finland, Sweden, the United Kingdom, and Ireland.
[4]Central and Eastern Europe: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia, and Slovakia.

Table 4.
Predictors of P2P platform use and provision in Europe.

than people with fewer years of education. As far as occupational status is concerned, the self-employed and business people, employees who are directors, employees who are qualified professionals, and employees who are nonmanual workers are the most likely to use collaborative platforms. In contrast, employees who are manual workers, stay-at-home parents/carers, the unemployed and, in particular, retirees are much less inclined toward collaborative consumption via platforms.

Finally, the predictors by geographical area also provide relevant information, firstly, because the impetus behind collaborative consumption comes from large towns/cities and metropolitan areas, whereas living in villages and rural areas would disincentive collaborative consumption via platforms. By country, we also observe a greater likelihood to use collaborative platforms in continental Europe—Belgium, France, Luxembourg, Netherlands, Austria, and Germany—whereas in Mediterranean Europe—Greece, Spain, Italy, Portugal, Cyprus, Malta, and Croatia—the situation is the inverse.

The analysis of predictive factors for the provision of goods and services via collaborative platforms (n = 496) in Europe (**Table 4**) reveals a picture that clearly differs from the use of such platforms. Of the motivational predictors of collaborative provision, the first element to highlight is that such provision has a clearly ideological component, in an antiestablishment or anticapitalism sense, because the possibility of doing nonmonetary exchanges becomes a driving factor. Moreover, nonmonetary exchange was the only provision-driving predictor to be identified, because the other economic and convenience factors were not significant. Regarding the impeding forces, the lack of a responsible person would not disincentive the collaborative provision of goods and services.

From the perspective of the sociodemographic predictors, the collaborative provision of goods and services in Europe would be motivated by a much narrower set of factors than the one identified for collaborative uses. Men, the young

population aged between 25 and 34 years, the self-employed or entrepreneurs, or manual workers would be the most likely to make collaborative provisions of goods and services. In contrast, nonmanual workers, retirees, or citizens of countries in northern Europe—Denmark, Finland, Sweden, the United Kingdom, and Ireland—would be the least likely to make collaborative provisions.

7. Discussion: new consumer behavior, new economic approaches

Through an analysis of a representative sample of 14,050 citizens aged 15 years and above in the 28 countries of the European Union in 2016, in this study I have characterized the profiles of users (1792) and providers (496) of collaborative platforms and have identified their motivational and sociodemographic predictors. The main strength of this study is that it provides us with results based on a representative sample of the entire European population; this adds value to the literature because samples that are not representative of the population, or that focus on specific collaborative platforms or consumption, have habitually been analyzed thus far [17, 27, 28]. Two main conclusions were drawn from this analysis.

Firstly, through an odds ratio (OR) analysis, the study obtained a set of forces (motivational and sociodemographic) that are capable of predicting the use and provision of collaborative platforms in Europe. Regarding users, the main driving forces identified were of an economic and practical nature (Hypothesis 2: convenience and price), and the impeding forces would also be situated on this line (Hypothesis 3: lack of fulfillment of service expectations and lack of trust in the Internet). Beyond these results, which are consistent with studies confirming the importance of motivations of practicality and utility in the explanation of the use of collaborative consumption platforms [8, 9, 26, 44], emphasis should be placed on the importance of predictors of a sociodemographic nature (Hypothesis 4). Younger people; men; people living in households with more members; people with more years of education; people within entrepreneurship, managerial responsibility, or highly qualified contexts; people living in large towns/cities or metropolitan areas; and people who are citizens of continental Europe are more likely to engage in collaborative consumption via digital platforms. Given that a number of studies have pointed out that lifestyle is more important than level of income [25], this finding is important because certain sociodemographic profiles were identified that, in population contexts (i.e., in representative samples of the entire population), would incentivize collaborative consumption and behavior.

And secondly, the results obtained for the predictors of the provision of goods and services via collaborative platforms in Europe are clearly different from those for the predictors of use. The first thing to note is that, unlike use—and as some studies have already highlighted [27, 40, 41]—provision has a clearly ideological motivational component (Hypothesis 1). The possibility of doing nonmonetary exchanges is the only predictive provision-driving factor. Among the impeding factors, the lack of a responsible person would not disincentive provision via collaborative platforms. As in the case of users, there is a set of sociodemographic predictors for providers, albeit fewer in number: men, the young population aged between 25 and 34 years, the self-employed or entrepreneurs, or manual workers would be the most likely to make provisions of goods and services. In contrast, nonmanual workers, retirees, or citizens of countries in northern Europe would be the least likely to make such provisions.

Particularly interesting is the identification of categories of specific occupational status that would incentivize or be more sensitive to use and provide P2P collaborative platforms. The self-employed or entrepreneurs would be the most likely to make provisions and uses of goods and services, and this is consistent with

the dual role that research in consumer theory has identified [48]. This result has important implications regarding the management strategy. It is true that management research has identified a group of strategic recommendations for firms that would like to understand and take advantage of the sharing economy [5, 49–51], but literature has not counted occupational status as a predictor. Based on our results, entrepreneurs and self-employed are more prone to value initiatives that are oriented as an alternative of the usual consumption models. Self-employment or entrepreneurship entails a mindset of aspects that firms may desire to attract or promote for some stakeholders. Broadening the set of motivations allows firms to better understand how their stakeholders are more likely or not to be participating in collaborative consumption. Profiles such as entrepreneurs and self-employed have a dynamism that firms may encourage, and understanding how these profiles are motivated is crucial to attack the right people or to develop marketing using the right strategies.

On the contrary, managers and qualified employees have more practical and monetary motivations, so that they are more sensible to sharing initiatives oriented toward the practical utility of sharing. In this context, knowing the practical and useful motivations of managers and qualified workers is also relevant to the firm strategy, especially for those who choose to develop collaborative platforms more oriented to economic optimization than to alternative exchange and behavior.

However, all this new evidence does not yet address the multidimensional set of factors that would explain the transformations of economic behavior related to the emergence of sharing exchange and P2P markets [34, 38, 52, 53]. In my empirical exercise, we have identified a number of additional sociodemographic motivations, but we still know very little about the effects of collaborative consumption and behavior. For example, what form does the collaborative consumption function take? Does it complement or replace the noncollaborative consumption function? What proportion of total consumption does collaborative consumption represent? How does this new form of consumption affect other aggregates of the economy? What is its multiplier? The search for answers to these questions will undoubtedly set the course of future research.

In the meantime, a connection between the conceptual frameworks of the sharing economy should be noted. The salient idea behind this connection is that, through new forms of collaborative consumption and behavior, exchange evolves toward a new interpretative paradigm, from initial digital formats into sharing formats. And for a more adequate interpretation of the sharing exchange theory, the economy will have to move forward and develop a formal apparatus that takes into consideration a set of relatively unusual principles, especially interpretative models that consider a combination of emotional and rational decision-making, individual interest-based as well as prosocial motivations, exchange compensation through a monetary or nonmonetary fee, and the set of sharing economies, that it may generate. In the same way, the business strategy should begin to combine the traditional financial approach to the benefits with the concept of profit, that better summarizes the collaborative behavior.

Acknowledgements

The author appreciates the comments of the participants in the seminars on "The sharing economy in Europe" that the Faculty of Economics and Business of the Universitat Oberta de Catalunya organized on January 11 and 24, 2017, and on January 25, 2018. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

The author does not declare any conflict of interest.

Author details

Joan Torrent-Sellens
Open University of Catalonia, Barcelona, Spain

*Address all correspondence to: jtorrent@uoc.edu

References

[1] Grassmuck VR. The sharing turn: Why we are generally nice and have a good chance to cooperate our way out of the mess we have gotten ourselves into. In: Sützl W, Stalder F, Maier R, Hug T, editors. Cultures and Ethics of Sharing. Vol. 2013. Innsbruck: Innsbruck University Press; 2013. pp. 17-34

[2] Heinrichs H. Sharing economy: A potential new pathway to sustainability. GAIA: Ecological Perspectives for Science & Society. 2013;**22**(4):228-231

[3] Stephany A. The Business of Sharing: Making it in the New Sharing Economy. New York: Palgrave Macmillan; 2015

[4] Belk RW. Sharing. Journal of Consumer Research. 2010;**36**(4):715-734

[5] Belk RW. You are what you can access: Sharing and collaborative consumption online. Journal of Business Research. 2014;**67**(8):1595-1600

[6] Carroll E, Romano J. Your Digital Afterlife: When Facebook, Flickr and Twitter are Your Estate, What's Your Legacy? Berkeley, CA: New Riders; 2011

[7] Botsman R, Rogers R. What's Mine Is Yours: How Collaborative Consumption Is Changing the Way we Life. London: Collins; 2011

[8] Bardhi F, Eckhardt GM. Access-based consumption: The case of car sharing. Journal of Consumer Research. 2012;**39**(4):881-898

[9] Lamberton CP, Rose RR. When is ours better than mine? A framework for understanding and altering participation in commercial sharing systems. Journal of Marketing. 2012;**76**(4):109-125

[10] Benkler Y. Sharing nicely: On shareable goods and the emergence of sharing as a modality of economic production. Yale Law Journal. 2004;**114**:273-358

[11] Shapiro C, Varian HR. Information Rules. A Strategic Guide to the Network Economy. Boston, MA: Harvard Business School Press; 1999

[12] Torrent-Sellens J. Knowledge products and network externalities. Implications for the business strategy. Journal of the Knowledge Economy. 2015;**6**(1):138-156

[13] Varian HR. Intermediate Microeconomics: A Modern Approach. Ninth International Student Edition. London: WW Norton & Company; 2014

[14] Belk RW. Why not share rather than own? The Annals of the American Academy of Political and Social Science. 2007;**611**(1):126-140

[15] Belk RW. Extended self in a digital world. Journal of Consumer Research. 2013;**40**(3):477-500

[16] Felson M, Speath JL. Community structure and collaborative consumption. American Behavioral Scientist. 1978;**21**(4):614-624

[17] Hamari J, Sjöklint M, Ukkonen A. The sharing economy: Why people participate in collaborative consumption. Journal of the Association for Information Science and Technology. 2016;**67**(9):2047-2059

[18] Mont O. Clarifying the concept of product-service system. Journal of Cleaner Production. 2002;**10**(3):237-245

[19] Gansky L. The Mesh: Why the Future of Business Is Sharing. New York: Penguin Press; 2010

[20] Ritzer G, Jurgenson N. Production, consumption, prosumption: The nature of capitalism in the age of the digital

prosumer. Journal of Consumer Culture. 2010;**10**(1):13-36

[21] Sundararajan A. The Sharing Economy. The End of Employment and the Rise of Crowd-Based Capitalism. Cambridge, MA: MIT Press; 2016

[22] Price LL, Belk RW. Consumer ownership and sharing: Introduction to the special issue. Journal of the Association for Consumer Research. 2016;**1**(2):193-197

[23] Ozanne LK, Ballantine PW. Sharing as a form of anti-consumption? An examination of toy library users. Journal of Consumer Behaviour. 2010;**9**(6):485-498

[24] Albinsson PA, Perera BY. Alternative marketplaces in the 21st century: Building community through sharing events. Journal of Consumer Behaviour. 2012;**11**(4):303-315

[25] Hellwig K, Morhart F, Girardin F, Hauser M. Exploring different types of sharing: A proposed segmentation of the market for "sharing" businesses. Psychology & Marketing. 2015;**32**(9):891-906

[26] Möhlmann M. Collaborative consumption: Determinants of satisfaction and the likelihood of using a sharing economy option again. Journal of Consumer Behaviour. 2015;**14**(3):193-207

[27] Hawlitschek F, Teubner T, Gimpel H. Understanding the sharing economy. Drivers and impediments for participation in peer-to-peer rental. In: Proceedings of the 49th Hawaii International Conference on System Sciences. Honolulu: IEEE; 2016. pp. 4782-4789

[28] Matzner M, Chasin F, Todenhöfer L. To share or not to share. Towards understanding the antecedents of participation in IT-enabled sharing services. In: Proceedings of the 23th European Conference on Information Systems. Münster: ECIS; 2015. pp. 1-13

[29] John NA. The social logics of sharing. The Communication Review. 2013;**16**(3):113-131

[30] Barnes SJ, Mattsson J. Understanding collaborative consumption: Test of a theoretical model. Technological Forecasting and Social Change. 2017;**118**:281-292

[31] Kaplan AM, Haenlien M. Users of the world, unite! The challenges and opportunities of social media. Business Horizons. 2010;**53**(1):59-68

[32] Wang C, Zhang P. The evolution of social commerce: The people, management, technology, and information dimensions. Communications of the Association of Information Systems. 2012;**31**(1):105-127

[33] Wiertz C, de Ruyter K. Beyond the call of duty: Why customers contribute to firm-hosted commercial online communities. Organization Studies. 2007;**28**(3):347-376

[34] Einav L, Farronato C, Levin J. Peer-To-Peer Markets. Discussion Paper: 15-029. Stanford Institute for Economic & Policy Research (SPIER). Stanford, CA: Stanford University; 2015

[35] Coyle D. The Economics of Enough: How to Run the Economy as if the Future Matters. Princeton, NJ: Princeton University Press; 2011

[36] Leismann K, Schmitt M, Rohn H, Baedeker C. Collaborative consumption: Towards a resource-saving consumption culture. Resources. 2013;**2**(3):184-203

[37] Shaheen SA, Cohen AP. Car sharing and personal vehicle services: Worldwide market developments and emerging trends. International

Journal of Sustainable Transportation. 2013;**7**(1):5-34

[38] Plouffe CR. Examining "peer-to-peer" (P2P) systems as a consumer-to-consumer (C2C) exchange. European Journal of Marketing. 2008;**42**(11/12):1179-1202

[39] Brodie RJ, Ilic A, Juric B, Hollebeek L. Consumer engagement in a virtual brand community: An exploratory analysis. Journal of Business Research. 2013;**66**(1):105-114

[40] Belloti V, Ambard A, Turner D, Gossmann C, Demkova K, Carroll JM. A muddle of models of motivation for using peer-to-peer economy systems. In: Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems. Seoul: ACM; 2015. pp. 1085-1094

[41] Bucher E, Fieseler C, Lutz C. What's mine is yours (for a nominal fee)—Exploring the spectrum of utilitarian to altruistic motives for Internet-mediated sharing. Computers in Human Behavior. 2016;**62**:316-326

[42] Buczynski B. Sharing Is Good: How to Save Money, Time and Resources through Collaborative Consumption. Gabriola Island: New Society Publishers; 2013

[43] Balck B, Cracau D. Empirical analysis of customer motives in the share economy: A cross-sectoral comparison. Working paper: 02/2015. Magdeburg: Universität Magdeburg; 2015

[44] Tussyadiah IP. An exploratory study on drivers and deterrents of collaborative consumption in travel. In: Tussyadiah IP, Inversini A, editors. Information and Communication Technologies in TourismChamp: Springer; 2015. pp. 817-830

[45] European Commission. The use of collaborative platforms. Flash Eurobarometer 438 Report. Brussels: European Commission; 2016

[46] Greene WH. Econometric Analysis. 7th ed. New York: Person; 2012

[47] Hensher DA, Rose JM, Greene WH. Applied Choice Analysis. Cambridge, MA: Cambridge University Press; 2015

[48] Ertz M, Lecompte A, Durif F. Dual roles of consumers: Towards an insight into collaborative consumption motives. International Journal of Market Research. 2017;**59**:725-748

[49] Matzler K, Veider V, Kathan W. Adapting to the sharing economy. MIT Sloan Management Review. 2015;**56**(2):71-77

[50] Kathan W, Matzler K, Veider V. The sharing economy: Your business model's friend or foe? Business Horizons. 2016;**59**(6):663-672

[51] Habibi MR, Davidson A, Laroche M. What managers should know about the sharing economy. Business Horizons. 2017;**60**:113-121

[52] Rodrigues R, Druschel P. Peer-to-peer systems. Communications of the ACM. 2010;**53**(10):72-82

[53] Galbreth M, Ghosh B, Shor M. Social sharing of information goods: Implications for pricing and profits. Marketing Science. 2012;**31**(4):603-620

Chapter

The Transformation of Business Models in Technology-Enabled M&A: A Case Study of Amazon

Andrejs Čirjevskis

Abstract

Little is known about how a configuration of dynamic capabilities (DC) contributes to the transformation of the business models (BM) of ICT acquirers. The chapter addresses this limitation by taking a strategy-as-practice theory perspective. The inductive (illustrative) case study Amazon.com acquisition of Whole Foods (2017) demonstrate how acquires sense new customer group and new key activity; seize new resources and key partnerships and transform organization by mean of new promotional channels and new customer relationship, therefore change cost structure, create new revenue streams, and develop new customer value proposition. The chapter develops a practice-driven model as a practical guide for scholars who have been studying DCs and BMs, as well as for those who are new to the field.

Keywords: dynamic capabilities, business model, merger and acquisition

1. Introduction

A focal firm's growth strategies and performance are greatly influenced by the integrative type of strategies, collaborative (alliances, networks, joint ventures) or consolidative (mergers, acquisitions), to foster the innovation and to deliver new customer value propositions. In recent years, collaborative and consolidation strategies have received great attention in strategic management literature. Researchers in strategic management argue that the performance outcome of a specific growth strategy is usually affected by the dynamic capabilities and business models [1–3]. What is the research gap in the existing literature on dynamic capabilities and business models? First, dynamic capabilities in merger and acquisition are complex events in the process of sustain completive advantage of merging business for which we have an incomplete understanding, in part because researchers have tended to consider an only explanation of them. What is more, there are very few research papers that applied the dynamic capabilities' framework as a tool of the business analysis of a reinvention of a business model of an acquirer company in M&A processes. Second, the reinvention of business models of acquirers is still an open area for research due to the following reasons. Johnson et al. [4] gave brilliant ideas on a reinvention of business models and their building blocks for focal companies, but still, a question remains, what capabilities are needed in a reinvention of business models in the process of M&A? Pursuing scientific rigor and helping

practitioners to reinvent of their business model, Amit and Zott [5] integrated dynamic capabilities with business model design process, but what about reinvention of operationalized components of the model or building blocks of business models in M&A process? To reinvent building blocks of business models, Kim and Mauborgne [6] recommended to apply "four steps framework: eliminate, reduce, increase and create," namely, to eliminate and to reduce elements of business model thereby to eliminate and to reduce expenses as well as increase and/or create as new some elements of business model thereby to increase a revenue stream and to create a new customer value proposition [2]. However, it is silent about what dynamic capabilities are needed for that.

Capturing valuable insights from the dynamic capabilities' framework [4] and business model canvas [2], this chapter aims to integrate two theoretical perspectives in the cohesive conceptual model. Why is it important to combine the dynamic capabilities and business model literature? Adoption of seminal Teece's framework [7] of dynamic capabilities and operationalized components (building blocks) of business models [2], in online and offline grocery businesses, allowed the construction of the conceptual model for practitioners and scholars, which consequently can be tested by methods of statistical analysis in future research.

The motivation for the research is as follows: the author wanted to know how acquisition-based dynamic capabilities support a reinvention of building blocks of business models. The chapter discusses how a focal firm makes strategic decisions under uncertainty and deals with the commercialization of innovation by means of dynamic capabilities to sense a new demand, capture new resources and partnerships, transform channels and customers' relationship, and deliver a new customer value proposition, particularly, by means of acquiring new technologies, advanced engineering team, and new users' base. That is what Amazon did with Whole Foods in 2017. This case study of Whole Foods acquisition by Amazon was selected due to the following reasons. Firstly, this empirical literature is still at an early stage, and opportunities abound to dig deeper into the linkages between dynamic capabilities (DC), a reinvention of business models, and long-run firm performance. "The research paradigm of dynamic capabilities is still relatively new. Accordingly, illuminating case studies are likely to yield powerful insights" ([8], p. 1400). Secondly, the chapter digs deeper into the acquisition-based DC in M&A to develop an integrated practical example of how dynamic capabilities and building blocks of business models are interrelated in successful M&A process in the ICT industry. The main contribution of the chapter is an emerging conceptual model of research that integrates acquisition-based dynamic capabilities' frameworks [7] and business model canvas [2] together and, thereby, illustrates how acquisition-based dynamic capabilities underpinning a reinvention of business models in M&A process. This conceptual practice-driven model can be a practical guide for scholars who have been studying DCs and BMs, as well as for those who are new to the field. What is more, the chapter has contributed to the interest of the strategy practice group of the Strategic Management Society by answering questions which the group attempt to answer: what are the capabilities required to perform strategy work, and what are the microfoundations of the activities involved in the doing of strategy?

2. Literature review

The recent scientific discussion in the field of strategic management broadly favors the idea of dynamic capabilities in order to overcome potential rigidities of organizational capability building [9]. "The theoretical and practical importance of developing and applying dynamic capabilities to sustain a firm's competitive

advantage in complex and volatile external environments has catapulted this issue to the forefront of the research agendas of many scholars" ([10], p. 917). This is especially true for strategic behavior in the digital economy, as shown in this chapter. This chapter examined DC in the online grocery business industry in which the external environment shifted to some extent from a click (online grocery) to a brick (offline grocery). DC can usefully be thought of as belonging to three clusters of activities and adjustments: (1) identification and assessment of an opportunity (sensing); (2) mobilization of resources to address an opportunity and to capture value from doing so (seizing); and (3) continued renewal of core competencies (transforming) [7]. Sensing implies that the organization must constantly scan, recognize, and appraise opportunities and threats across various markets and technologies. Investigating customer needs is a typical sensing activity. Once an opportunity has been sensed in order to bring the new services, processes, and activities, the organization should seize the opportunity. To seize an opportunity may require renewal and reconfiguration of organizational capabilities and investment in technologies, equipment, and markets. Thus, transforming is how to organize new and old resources for organization's value maximization. One key implication of the DC concept is that firms are not only competing on their ability to exploit their existing resources and organizational capabilities but also on their ability to explore, renew, and develop their organizational capabilities [11]. During the past two decades, research in DC has promised to unlock the understanding of how competitive advantage arises in dynamic markets. However, to date, empirical work has, by and large, focused on what DC is. There has been little work demonstrating how they actually operate and contribute to competitive advantage other than at the conceptual level [12]. Stefano et al. argue that despite the exceptional rise in interest and influence of dynamic capabilities, criticisms of the dynamic capabilities' perspective continue to mount [13]. Common concerns are related to a lack of consensus on basic theoretical elements and limited empirical progress [13]. Specific capabilities that have been identified and studied involve research and development [14], product innovation [15], ambidextrous organizational structures [16], network responsiveness [17], and human capital management [18]. However, there are only a few pieces of research on specific dynamic capabilities that have been identified and studied involving merger and acquisition. Teece argues that it might be "because assets are bundled together often tightly linked inside incumbent firms, it may be difficult to obtain assets in the desired configurations through asset purchase or sale in mergers and acquisitions" [7]. However, by Eisenhardt and Martin [11], practice with homogeneous acquisitions (i.e., those in the related markets) was positively associated with the accumulation of tacit and explicit knowledge about how to execute acquisitions and achieve superior acquisition performance. Making strategically important investment choice on M&A, dynamically capable management team needs such managerial capabilities as sensing and shaping, seizing and reconfigurations (transforming), as well as reinvention and implementation of new business model [7].

Value creation through M&A requires the simultaneous identification of target with similar dynamic capabilities on certain dimensions and different dynamic capabilities on other dimensions. "While similarity is seen as an indicator for efficiency-based synergies (scale and scope), complementarity provides firms with both efficiency synergies and value created from those differences that are mutually supportive. Studies give clear empirical evidence that complementarities are a significant factor for M&A success" ([19], p. 272). Through the interaction of complementary characteristics, value creation does not only derive from cost savings, but the value is also created by a growing turnover and market share [20]. Complementarity has been studied in terms of top management team

complementarity [20], technological complementarity [21], strategic and market complementarity [22], or product complementarity [23]. However, the study in terms of complementarity of dynamic capabilities in M&A is still waiting for researchers.

Proposition 1. The success of consolidative strategies (merger or acquisition) is provided by the degree of similarities and complementarity between the dynamic capabilities of two merging businesses.

In recent year, the business models have received increasing attention of strategy researchers. Business models characterize the focal firm's plan for its value creation and capture [24]. From the point of view of Johnson et al. [4], a business model consists of four main elements, the synthesis of which delivers value, customer value proposition, profit formula, key resources, and key processes. Osterwalder and Pigneur [2] with real 470 business practitioners from 45 countries extended a number of elements and developed Business Model Canvas with nine building blocks: customer segment, value proposition, channels, customer relationship, revenue stream, key resources, key activities, key partners, and cost structure. Slightly adapted Johnson et al. [4] and Osterwalder and Pigneur [2], Teece proposed three main components of the business model: "Cost Model: Core Assets and Capabilities; Core Activities; Partner Network. Revenue Model: Pricing Logic; Channels; Customer Interaction. Value proposition: Product and Service; Customer Needs; Geography" ([25], p. 41). With respect to brilliant contributors to dynamic capabilities and business models' frameworks, there is still a gap in understanding what and how dynamic capabilities lead to new cost structure and revenue streams and how dynamic capabilities foster new value proposition of acquirer's company in M&A process. We must understand how acquisition-based dynamic capabilities transform and reinvent components of a business model acquirer's company.

What exactly is meant by the reinvention of building blocks of business models? The reinvention of building blocks of business meant the process of the transformation of the most important activities, capabilities, and resources of the company to reduce cost, to increase revenue stream, to deliver new customer value proposition, and thereby to sustain competitive advantages. How acquisition-based dynamic capabilities support a reinvention of building blocks of business models? There are three sets of acquisition-based dynamic capabilities which should be developed to transform and reinvent a business model of an acquirer to achieve competitive advantage. The first set of acquisition-based dynamic capabilities (sensing and shaping) is contributing to select new key activities and new customer segments, thereby contributing to an acquirer to shape emerging market demand and new technologies needed. The second set of acquisition-based dynamic capabilities (identifying and seizing) is supporting an acquirer's company to obtain new key idiosyncratic (VRIN) resources and to extend a partnership's networks. The third set of acquisition-based dynamic capabilities (transforming and reconfiguring) is contributing an acquirer's company to transform new customer relationships and promotion channels and, thus, to deliver the new customer value proposition. Thereby, an acquiring company would result in a new cost structure by eliminating and reducing capital expenditure and operating expenses, due to an economy of scope, and would generate new revenue streams by increasing and creating new key activities. A result of those transformation processes, acquirer's company can newly sustain competitive advantage. The theoretical framework of the research is presented in **Table 1**.

Proposition 2. Business model's elements of both acquirer's and the target's companies can successfully fold into the new business model by means of acquisition-based dynamic capabilities and contribute to reduce

Acquisition based dynamic capabilities of the acquirer	Sensing and shaping	Identifying and seizing	Transforming and reconfiguring	Resulting and sustaining
Designing new building blocks (operationalized components) of the business model of acquiring organization:	Sensing new key activities Shaping new customers' segments	Identifying and seizing new key resources Identifying and seizing new key partners	Transforming channels Transforming customers' relationship Reconfiguring new customers value proposition	Result in new revenue streams Result in new cost structure Sustaining new competitive advantages

Table 1.
The theoretical model of research: bridging together acquisition-based dynamic capabilities and reinvention of a business model.

cost, to create a new revenue stream, to deliver a new value proposition, and therefore to sustain competitive advantage.

3. Research design and methodology

"Building theory from case studies is a research strategy that involves using one or more cases to create theoretical constructs, propositions and/or midrange theory from case-based, empirical evidence" ([26], p. 25). Yin defines the case study research method as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used" ([27], p. 23). Some critics suggest case study research is useful only as an exploratory tool or for establishing a hypothesis, and some would claim it is unscientific [28]. When it comes to the validity of qualitative case study research, the validity refers to the extent to which the qualitative research results accurately represent the collected data (internal validity) can be generalized or transferred to other contexts or settings (external validity) [28]. Ultimately, each case can be viewed as a discrete experiment that could be repeated [29].

This chapter seeks to explore how acquisition-based dynamic capabilities underpinning a reinvention of business models in the M&A process. As objects of research, the author selected the company that is especially active and successful in online shopping and particularly in the online and offline grocery business. The unit of analysis is dynamic capabilities. In this research, two stages of research work will be involved. Firstly, to justify propositions, the author did the contextual content analysis which relied on an archival search that included financial statements, annual reports, internal documents, industry publications, and CEO statements to get at a microlevel understanding that really boosts data and the better understanding of the microfoundations of DC and building blocks of business models of acquirers and targets.

Even though a strategy-as-practice or process-based approaches in empirical qualitative research usually have an element of ethnographic or discursive analysis using primary data (sometimes in addition to secondary data, sometimes alone), the current chapter relied on an extensive search of secondary data. The key to secondary data analysis is to apply theoretical knowledge and conceptual skills to utilize existing data to address the research propositions. The major advantages associated with secondary analysis are the cost-effectiveness and convenience it provides [30]. A major disadvantage of using secondary data is that the secondary researcher did not participate in the data collection process and does not know exactly how it was conducted. However, the obvious benefits of using secondary data can be overshadowed by its limitations [31]. Original survey research rarely uses all of the data collected, and this unused data can provide answers or different perspectives to other questions or issues [30]. In a time where vast amounts of data are being collected and archived by researchers all over the world, the practicality of utilizing existing data for research is becoming more prevalent [30, 32].

The aim of the content analysis of illustrative case study of Amazon's acquisition of Whole Foods at 2017 is to explicate the relationship between acquisitions-based dynamic capability and reinvention of acquirer business model and, thus, sustained competitive advantage. Content analysis is a qualitative research method that uses a set of procedures to classify or otherwise categorize communications [33]. Typically relying on archival data to extract criteria of interest to strategic management scholars, content analysis has aided in analyzing corporate strategies [34], organizational boundaries [35], new product development [36], organizational resources [37], strategic groups [38], and joint ventures [39]. Any source of communication such as shareholder letters, interview narratives, video records, speeches, or transcripts from recorded meetings of executives could be used by a strategy researcher as an effective data source for content analysis. It provides a good match theoretically between the information being assessed (how information is being content analyzed) and the context from which it is drawn (does the type of text being used as a source of content analysis data fit the propositions?).

Generally, three broad types of content methodologies exist [40, 41]: human-scored schema, individual word count systems, and computerized systems using artificial intelligence. Human-scored systems involve training of coders to classify text according to specific classification categories. In this system, the first step is a determination of what aspect of text will serve as the unit of analysis (word, phrase, sentence, paragraph, full text). Then, categories are developed for classification, and coding rules are developed for each category. In contrast to human-scored schemas, individual work count systems classify text into several semantically equivalent categories and then use frequency of an occurrence to determine the relative importance of each category in a text [33]. Finally, artificial intelligence systems incorporate features that consider the syntax and lexicon of words [41]. Thus, there is a mechanism to resolve words with more than a single meaning. For this study, the author has chosen human-scored systems and individual work count systems. Dynamic capabilities served as a unit of analysis.

To justify the first proposition, the author has chosen human-scored systems and classified text into three specific classification categories, namely, sensing, seizing, and transforming dynamic capabilities. When it comes to the format of the presentation, the author has adopted a conceptual frame developed by Teece [42]. The conceptual frame helped to unravel data in the text that the author has collected in search of similarities and complementarity of the micro-foundations of the dynamic capabilities of both companies. To justify the second proposition, the author applied an individual work count system, the text has been allocated within nine building blocks of the business model of both companies (as semantically equivalent

categories), and identified compatibilities and complementarity of companies' business models. Then, the author has allocated operationalized components of the business model into each cluster of dynamic capabilities (sensing, seizing, and transforming) to demonstrate how acquisition-based dynamic capabilities underpinning the transformation of the business model. The second stage of research involves a demonstration of the development process of the new conceptual model of research by using illustrative content analysis finding and literature research outcomes. This empirical research helps to fill a gap in the literature which is primarily 75% theoretical and only 25% empirical—focusing on proving the existence of dynamic capability [43]. The chapter discusses and interprets the results of the qualitative and explorative research in the next subchapters.

4. Data analysis and interpretation

Teece argues that individual corporate histories and illuminative case studies yield powerful insights to dynamic capabilities research. [5]. In a move that surprised the 2017 year, Amazon, the largest online retailer, announced its intention to purchase Whole Foods for $13.7B in cash. Amazon had been dabbling with traditional brick-and-mortar activities for a few years already—from owning a few physical stores to running experiments like "Amazon Fresh" and later "Amazon Go." However, its competitors including Walmart were far ahead than Amazon with revenues of $ 486 billion as compared to Amazon's $136 billion [44]. Some have interpreted Amazon's move as a signal that the online giant is finally giving in and investing big in brick-and-mortar retail. How is this particular acquisition different from any other acquisition where the target firm is attractive because of its business channels and market reach? Most acquisitions are carried out to acquire these target firm's capabilities; how is the Amazon acquisition of Whole Foods different? The answer is this acquisition is carried out to acquire big data of more affluent customers with an interest in eating healthy and sustainable foods spending extra money to purchase. Digging deeper, though, it is clear that Amazon's real interest is in two things: first, the treasure trove of consumer data that comes with this acquisition; and second, Whole Foods private brand product [44]. The big data from Whole Foods customers are literally "rich." What exactly is in the Whole Foods data that Amazon would want? The answer is grocery buying habits and patterns. Preferences and correlations between purchases of different products and even different categories [44]. Jeremy Stanley, vice president of data science for Instacart, one of Amazon's competitors in the grocery space, recently told CNBC: "One of the wonderful things about groceries is that compared to other e-commerce purchases, groceries are habitual and frequent. People need groceries every week" [44]. Amazon can also use its process and technology expertise to take enormous costs out of the supply chain and store operations of Whole Foods while improving the in-store experience. Amazon has mastered the "test and learn" approach to large-scale innovation that most companies aspire to. Whole Foods provides Amazon with an incredible platform for the transformation of industry [45].

Justification of proposition 1. The success of consolidative strategies (merger or acquisition) is provided by the degree of similarities and complementarity between the dynamic capabilities of two merging businesses.

The persistence of existing dynamic capabilities depends on the impetus for change (sensing), the strength of the perceived need to change (seizing), and the managerial capacity to integrate and recombine resources (transforming) as desired [46, 10, 7]. Zahra et al. [10] argue that the lack of success to solve a problem with current capabilities triggers the development and use of new dynamic capabilities.

The research has explored the selected dynamic capabilities of the target's company and acquirer's company. The justification of the first proposition is given in **Tables 2** and **3**. The research has identified several similarities in the dynamic capabilities of two companies. Both companies were successful to sense emerging market demands, to seize opportunities by developing products and platforms, keeping leading positions. Thereby, the dynamic capabilities of sensing and seizing of two companies are quite similar.

However, companies were not always successful in transformation or reshaping resources: Amazon's low grocery's margins, difficulties to deliver food considering their perishability nature, as well as Amazon Go store's technology faced problems. Regarding Whole Foods, there is a massive cost disadvantage compared to their traditional grocery competitors. There are also several complementarities of the dynamic capabilities of an acquirer and a target. One of Amazon's weaknesses is the huge cost of losses due to food items becoming bad, a problem which the company had never faced with toys and books. Even though the grocery business was approximately $ 800 billion per the year 2016 in the USA alone [47], Amazon has limited knowledge and experience in the offline retail environment. That is why, for Amazon Fresh to be successful, the company needed to acquire more expertise in perishable grocery procurement. In contrast, Whole Foods becomes an organic

Products	Sensing	Seizing	Transforming	Result in
Online and offline food stores	Amazon sensed the need for having its footprint in the physical stores combined with online stores. Amazon saw a grocery business as an emerging business opportunity	Amazon set up a subsidiary Amazon Fresh, a grocery delivery service. Later Amazon decided to enter into food and consumable goods manufacturing through Amazon Elements, by establishing a partnership with TreeHouse Food Inc.	In March 2017, Amazon announced Amazon Fresh Pickup, a drive-in-type grocery store for Amazon Prime subscribers. In January 2018, Amazon started up offline retailing Amazon Go, first brick-and-mortar convenience food store on Amazon	Grocery's *margins were l*ow, and its goods were *difficult to deliver* considering their perishability nature. Amazon Go store's *technology faced problem* in tracking over 20 people

Source: Developed by author.

Table 2.
Dynamic capabilities of Amazon before the acquisition of Whole Foods.

Product	Sensing	Seizing	Transforming	Result in
Whole Foods	Whole Foods found that "where food comes from and how it is grown matter" (case)	Whole Foods becomes an organic supermarket which distinguishes itself by offering "highest quality natural and organic products"	Whole Foods attempted to expand to 1000 stores, it could either build stores more closely together or build lower-cost stores in areas that had more price-conscious consumers [32]	Whole Foods has *a massive cost disadvantage* compared to its traditional grocery competitors [32]

Source: *Developed by author.*

Table 3.
Dynamic capabilities of Whole Foods before the acquisition.

supermarket which distinguishes itself by offering "highest quality natural and organic products." However, Whole Foods recent poor performance stems from a major strategic mistake they made about 4 years ago. Whole Foods in its current incarnation is a niche business that can only profitably sell "food for the 1%" but is trying to sell to everyone [45]. Therefore, Amazon can provide resources for future Whole Foods development, and at the same time, Amazon can develop their own offline grocery business.

Justification of proposition 2. Business model's elements of both acquirer's and the target's companies can successfully fold into the new business model by means of acquisition-based dynamic capabilities and contribute to reduce cost, to create a new revenue stream, to deliver a new value proposition, and therefore to sustain competitive advantage.

Having analyzed both Amazon and Whole Foods building blocks of business models, the research justified the second proposition, as shown in **Tables 4** and **5**. The acquisition-based dynamic capabilities helped Amazon to reinvent of building blocks of the business model as follows. Amazon sensed new key activities and new customers' segments for their business: Whole Foods customer has over $1000 per month disposable income. Amazon has a better understanding of the customer than any other retailer. The Motley Fool estimates that over 80 million people are Amazon Prime members. With this big data, it is capable of building analytic models which can predict what these consumers will want, how much they will want, and when they will want it.

Amazon seized new key (idiosyncratic) resources by acquiring Whole Foods logistic system, customer's base, and a key partners' network.

To be successful in the offline retail food segment and in own-brand grocery stores, Amazon needs to have knowledge of traditional retailing and effective supply chain management in both factories and retail stores. Amazon has limited knowledge and experience in the offline retail environment. The company learned about food market through Amazon Fresh but now can learn about food stores or grocery manufacturing. Amazon has good supply chain management in a warehouse for online retail order, but now Amazon is certain whether this experience is transferable to an offline retail store. Hence, Amazon reconfigured new *customers' relationship and channels*.

While Amazon's purchase of Whole Foods enables them to add a tremendous amount of data to their coffers, the true differentiator lies in the company's mastery of using data to better understand their customer's needs, predict shopping behaviour and generate longevity with its loyal customer base [47]. Therefore, Amazon transformed its *customer value proposition,* delivering new value to the clients of both companies and capturing new value for shareholders. "This partnership presents an opportunity to maximize value for Whole Foods Market's shareholders, while at the same time extending our mission and bringing the highest quality, experience, convenience, and innovation to our customers," John Mackey, Whole Foods CEO, said in a statement [49]. Given the jump in Amazon's stock price after the announcement, shareholder approval of the deal has virtually paid its total cost. When people suggest that Amazon has overpaid for Whole Foods, they completely miss this point [45]. Amazon also can help Whole Foods buy high-quality products more cost-effectively and thus improve gross margins while keeping customers satisfied. As results, Amazon can change *cost structure* as well as potentially increase *revenue streams* for mobile professional users and can result in a new competitive advantage. Adding Whole Foods selection of items to its Amazon Fresh grocery delivery service could give the company a competitive advantage against Peapod, FreshDirect, and Google, whose express delivery service now reaches almost 90% of the USA [50].

Building blocks of the business model	**Amazon business model**	**Dynamic capability of Amazon**	**Whole Food business model**
Customer segments (Scope)	• Millennials • Global consumer market (North America, Europe, Asia)	*Sensing*	• The more affluent customer with an interest in eating healthy and sustainable foods spending extra money to purchase
Key activities (Scope)	• Customer focused product development • Well-developed supply chain	*Sensing*	• Natural and organic foods supermarket chain operations • Production of packaged goods, prepared foods, body care, pet foods, and household goods
Key partners (Resources)	• The business alliances and collaborations with logistic partners • Partnership with third-party sellers	*Seizing*	• Supplier and procurement partners • Agriculture and sustainability partners • Whole trade certifier partners
Key resources (Resources)	• Amazon Web Services • Big data analytics • Productive employees • Physical warehouses	*Seizing*	• Distribution & procurement centres • The network of 412 stores across 42 US states, as well as ten stores in Canada, and nine stores in the UK
Channels (Organization)	• Amazon.com • Country-specific online portals • API (for AWS)	*Transforming*	• The network of physical retail outlets • Retail infrastructure, procurement, production, and distribution network
Customer relationship (Organization)	• Fuse data, technology, and content to engage a loyalty program (their best customers) with geo-location reminders to incentivize store visits	*Transforming*	• A full range of products to its customers on a self-service basis through its online sales channel, which enables customers to browse products, place orders, and arranges deliveries
Customer value propositions	• Eliminating the checkout line • Real-time offers via mobile push notifications when customers are in store	*Transforming*	• The diverse catalog of premium products • The commitment to organic and sustainable sourcing • Offering online shopping services on desktop and mobile platforms
Cost structure	• Investing profit back into the technology and the infrastructure	*Result in*	• The procurement of products and supplies

Building blocks of the business model	Amazon business model	Dynamic capability of Amazon	Whole Food business model
	• Research & Development • Low-cost structure		• The operation and development of the online sales channel • The maintenance of IT and communications infrastructure
Revenue streams	• Revenues from product and service sales • Utility computing fees (for AWS) • Economy of scale	*Result in*	• The sale of various organic and fair-trade products

Source: *Developed by author*

Table 4.
Acquisition based dynamic capabilities of Amazon.com in the reinvention of their business model by acquiring Whole Food.

The reinvention of the business model of Amazon.com	Microfoundations of acquisition-based dynamic capabilities of Amazon.com
Selection, sensing, and shaping *new activities* and *new customer's segments*	Amazon is discovering the power of virtual and physical channels that interact seamlessly in support of the customer. Amazon has begun to test that logic with its venture into physical bookstores. Amazon is sensing more affluent customer with an interest in eating healthy and sustainable foods spending extra money to purchase. The proposed acquisition of Whole Foods catapults those efforts and provides extraordinary opportunities for experimentation in and execution of integrated retailing [45]
Identification and seizing *new resources* and *a new partnership*	Amazon did not just buy Whole Foods grocery stores. It bought 431 upper-income, prime-location distribution nodes for everything it does [44]. Amazon has mastered the "test and learn" approach to large-scale innovation that most companies aspire to. Therefore, Whole Foods provides Amazon with an incredible platform for the transformation of an industry
Reconfiguration and transforming *new customer relationship, new channels, and new customer value proposition*. Result in *new cost structure and new revenue stream*	This acquisition gives Amazon to reinvent and reengineer the process of buying, moving, and selling goods of Whole Foods. With 460 locations and a history of highly localized habits and preferences, Amazon will benefit from a trove of data that it can mine to write the future [52]. The brand Whole Foods is a good compliment to Amazon Fresh and Go and allow them to more aggressively target fresh food delivery to the at-home market. Amazon will ultimately be able to tailor the grocery shopping experience to the individual to better understand their needs, predict shopping behavior, and generate longevity with loyal customers

Source: Developed by author.

Table 5.
Bridging perspectives together: the reinvention of the business model and micro-foundations of acquisition-based dynamic capabilities.

5. Findings and discussion

"The literature on dynamic capabilities has addressed the fundamental question of how companies develop the skills and competencies that allow them to compete and gain an enduring competitive advantage… However, the literature does not tell much about the antecedents of new firms' dynamic capabilities" ([33], pp. 919–920). This chapter addresses the latter issue in great depth. The author used contextual content analysis [32] to justify two propositions. The contextual analysis provided a comprehensive solution to the challenge of identifying and categorizing key textual data [51]. Content analysis transformed unstructured data into organized information to give you a competitive edge [51].

When the chapter explored acquisition-based dynamic capabilities and business models of Amazon and Whole Foods, the research found the acquisition enabled a series of strategic innovations to integrate Whole Foods products with Amazon functionality and vice versa. Bridging two perspectives together, **Table 5** demonstrates what and why Amazon did with Whole Foods at the end of 2016 and how acquisition-based dynamic capabilities support a reinvention of building blocks of business models.

Amazon has high dynamic capabilities in *online technology but not in food distribution*. When some dynamic capabilities are missing, a company has the option to develop them internally or purchase them from outside. Amazon needed to acquire more knowledge of the retail market, improve management of its supply chain for the offline retail store, and continue investing in R&D for the grocery retail business. Dynamic capabilities of Amazon and Whole Foods are aligning and allowing them to improve existing products by *sharing' experience, advanced technologies, and broad users' base*. With Whole Foods acquisition, Amazon would benefit as it would get access *to tons of consumers and lifestyle data packed into consumer's buying habits* [44]. Whole Foods is an attractive platform for Amazon for the transformation of an industry. Therefore, two propositions have been justified empirically. Does click successfully meet brick? The integration of Amazon and Whole Foods is not fully finished. Amazon is trying to become Walmart—not just an online megalith but also a physical powerhouse with dynamic pricing and stocking strategy—faster than Walmart can become Amazon [44].

With Whole Foods acquisition, Amazon would benefit as it would get access to tons of consumers and lifestyle data packed into consumer's buying habits [44]. Morgan Stanley analysts think that the new Whole Foods has the ability to close the pricing gap between it and its competitors [53]. Zahra et al. [10] argue that entrepreneurs and other key organizational decision-makers failing with current applications spur attempts to change. However, key dynamic capabilities, such as transforming resource and developing new competencies, might be challenging for Amazon. Should Amazon manufacture its own products to make a higher margin? Could Amazon's offline retail marketing concept be developed globally [54]? To become one of the biggest offline retail players, Amazon needs to educate customers and make a lot of investment. According to Tom Caporaso, the chief executive officer of Clarus Commerce, the Amazon Go business model relied on several recent technological innovations that required more time for testing [55].

Don Stuart, a managing partner at Cadent Consulting Group, concurred that even for the biggest online retailer like Amazon, to make the platform was a huge challenge [55]. What novel have I learned that goes beyond these existing frameworks of dynamic capabilities and business models? How do we need to change these frameworks based on insights from the case? The current research gave

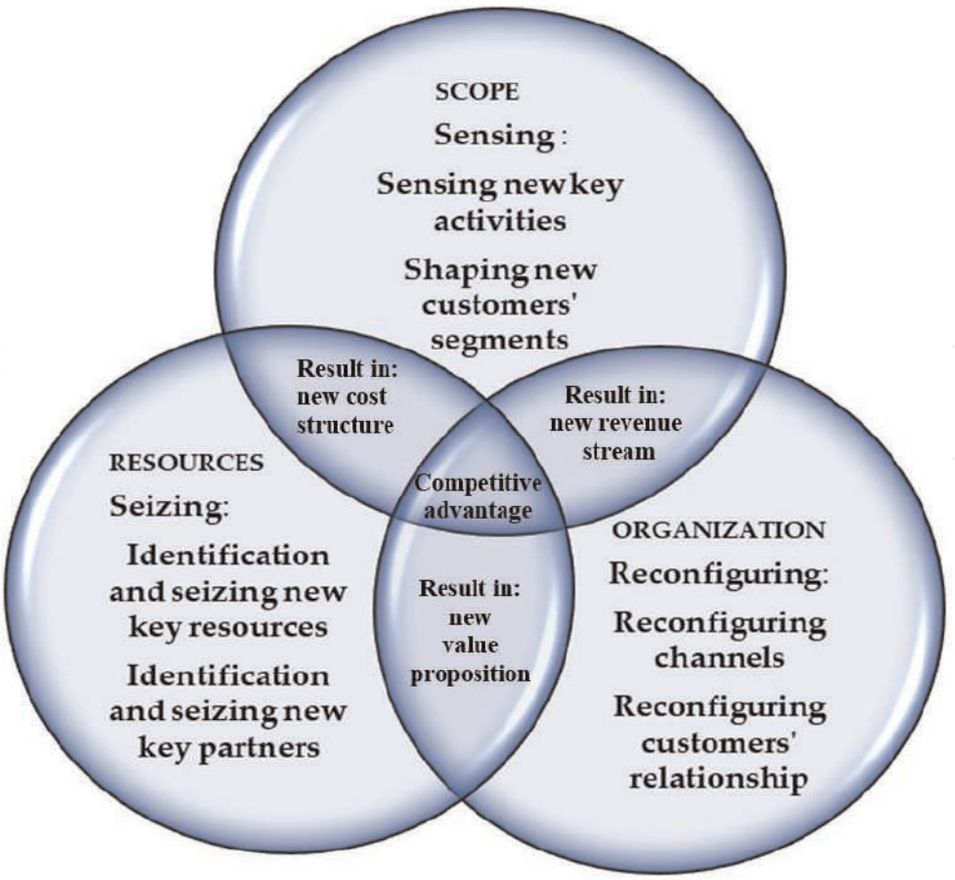

Figure 1.
The conceptual model of future research: bridging together acquisition-based dynamic capabilities and a process of the transformation of a business model.

substantially more insights into the role that dynamic capabilities can play in acquisitions and how dynamic capabilities relate to business model transformation. Besides contributing to dynamic capabilities view on competitive advantages by adding fresh insights about successful acquisition practice, the research core contribution is in the emergent conceptual model for future research on the reinvention of a business model in merger and acquisition process as shown in **Figure 1**. Collis and Montgomery [56] argue that good corporate strategy requires a continual reassessment of the company's scope, requires continual investment in building and acquiring strategically valuable resources, and develops organization ability to marshal them. Thereby, the conceptual model also integrates a great corporate strategy triangle: strong market positions (scope), high-quality resources, and an efficient organization [56] as shown in **Figure 1**.

The conceptual model makes dynamic capabilities more visible, tangible, and to some extent measurable with the help of business model canvas.

6. Conclusion, limitations, and future works

When some dynamic capabilities are missing, a company has the option to develop them internally or purchase them from outside. Teece argues: "In short, the business model outlines the (industrial) logic by which customers are served and money is made" ([25], p. 41). The current chapter contributes to theory and practice by illustrating how this logic works in the M&A process. The model demonstrates that the intersection of sensing and seizing capabilities can result in a new

and more efficient cost structure; the intersection of sensing and transforming capabilities can result in the generation of a new revenue stream. The intersection of seizing and transforming capabilities can result in a new customer value proposition. Thereby, the acquisition-based dynamic capabilities are transforming the acquirer's business model and underpinning the acquirer's competitive advantage. The conceptual model integrates dynamic capabilities and business model perspectives in the new conceptual model for future research that encourages practitioners to grasp an exact relationship between the micro-foundations of each perspective. The conceptual model makes dynamic capabilities more visible, tangible, and to some extent measurable at least on the level of expected results (reduced cost and increased revenue streams). The resulting model is given in **Figure 1** also advances the discourse on DCs and BM.

There are several strong limitations to the research. Due to a limitation of the number of submitted pages, the research has provided only one evidence from M&A practice. Through the small data size and missing validation through a lack of robust analysis, the current chapter serves more as an introduction to the research, then as the results. Thereby, the chapter, being of an exploratory and interpretive in nature, raises several opportunities for future research, both in terms of theory development and findings validation. The conceptual model discussed in **Figure 1** could also be used to generate a number of hypotheses for further empirical testing using a broader sample and quantitative research methods.

What is more, because changing the BM is a central top-management task, there is potentially very fruitful link to top management team (TMT) theory [57]. For example, what dynamic managerial capabilities are more needed in BMI in M&A the process: managerial cognition capabilities, social capital, or human capital [58]? What is more important and what are less important dynamic managerial capabilities for decision-making processes in technology-enabled M&A deals (idea, justification, due diligence, negotiation) and for integration processes in M&A deals (acquisition integration, synergy management) [59]? The study can also be extended in longitudinal and comparative ways.

Acknowledgements

The paper support from RISEBA University of Applied Sciences is gratefully acknowledged.

Author details

Andrejs Čirjevskis
Business Department, RISEBA University of Applied Sciences, Riga, Latvia

*Address all correspondence to: andrejs.cirjevskis@riseba.lv

References

[1] Teece DJ. Business models, business strategy, and innovation. Long Range Planning. 2010;**43**:172-194

[2] Osterwalder A, Pigneur Y. Business model generation, Self-published. Hoboken, NJ, USA: John Wiley and Sons, Inc.; 2010

[3] Christensen CM, Alton R, Rising C, Waldeck A. The big idea: The new M&A playbook. Harvard Business Review. 2011;**89**:1-17

[4] Johnson MW, Christensen CM, Kagermann H. Reinventing your business model. Harvard: Harvard Business Review. 2008;**86**:57-68

[5] Amit R, Zott C. Business model design: A dynamic capability perspective. In: Teece DJ, Leigh S, editors. In the Oxford Handbook of Dynamic Capabilities. Oxford, UK: Oxford Handbooks; 2016

[6] Kim C, Mauborgne R. Blue Ocean Strategy, from theory to practice. California Management Review. 2005; **43**(3):105-121

[7] Teece DJ. Explicating dynamic capabilities: The nature and micro-foundations of (sustainable) enterprise performance. Strategic Management Journal, John Wiley & Sons Ltd. 2007; **28**(13):1319-1350

[8] Teece DJ. Dynamic capabilities: Routines versus entrepreneurial action. Journal of Management Studies. December 2012;**49**(8):1396-1401

[9] Schreyogg G, Kliesch-Eberl M. How dynamic can organizational capabilities be? Towards a dual-process model of capability dynamization. Strategic Management Journal. 2007;**28**:913-933

[10] Zahra SA, Sapienza HJ, Davidsson P. Entrepreneurship, and dynamic capabilities: A review, model and research agenda. Journal of Management Studies, June 2006;**43**(4): 917-955

[11] Eisenhardt KM, Martin JA. Dynamic capabilities: What are they? Strategic Management Journal. 2000;**21**(10-11): 1105-1121

[12] Armstrong KBA, Macintosh R, Maclean D. Unblocking the conceptual log jam: Using a rules perspective to make sense of dynamic capabilities. In: Paper Presented at Strategic Management Society (SMS) 32 Annual Conference "Strategy in Transition". Prague, Chez Republic. October 6-9, 2012. 67 p. Available from: http://prague.strategicmanagement.net/pdf/Prague_Program_WEB.pdf. [Accessed 2018-17-01]

[13] Stefano GD, Peteraf M, Verona G. The organizational drive train: A road to integration of dynamic capabilities researches. The Academy of Management Perspectives. 2014;**28**(4): 307-327

[14] Helfat CE. Know-how and asset complementarity, and dynamic capability accumulation: The case of R& D. Strategic Management Journal. 1997; **18**(5):339-360

[15] Danneels E. The dynamic of product innovation and firm competence. Strategic Management Journal. 2002;**23**: 1095-1121

[16] O'Reilly C, Tushman M. Organizational ambidexterity: Past, present, future. The Academy of Management Perspectives. 2013;**27**(4): 324-338

[17] Kleinbaum M, Stuart TE. Network responsiveness: The social structural micro-foundations of dynamic capabilities. The Academy of

Management Perspectives. 2014;**28**(4): 353-367

[18] Chatterij A, Patro A. Dynamic capabilities and managing human capital. The Academy of Management Perspectives. 2014;**28**(4):395-408

[19] Bauer F, Matzler K. Antecedents of M&A success: The role of strategic complementarity, cultural fit, and degree and speed of integration. Strategic Management Journal. 2014;**35** (2):269-291

[20] Krishnan HA, Miller A, Judge WQ. Diversification and top management team complementarity: Is performance improved by merging similar or dissimilar teams? Strategic Management Journal. 1997;**18**(5):361-374

[21] Makri M, Hitt MA, Lane PJ. Complementary technologies, knowledge relatedness, and invention outcomes in high technology mergers and acquisitions. Strategic Management Journal. 2010;**31**(6):602-628

[22] Kim JY, Finkelstein S. The effects of strategic and market complementarity on acquisition performance: Evidence from the U.S. commercial banking industry, 1989–2001. Strategic Management Journal. 2009;**30**(6):617-646

[23] Wang L, Zajac EJ. Alliance or acquisition? A dyadic perspective on interfirm resource combinations. Strategic Management Journal. 2007;**28** (13):1291-1317

[24] Adner R. Ecosystem as structure: An actionable construct for strategy. Journal of Management. 2017;**43**:39-58

[25] Teece DJ. Business models and dynamic capabilities. Long Range Planning. 2018;**51**:40-49

[26] Eisenhardt KM, Graebner ME. Theory building from cases: Opportunities and challenges. Academy of Management Journal. 2007;**50**(1): 25-32

[27] Yin RK. Case Study Research Design and Methods. 5th ed. Thousand Oaks, CA, USA: Sage publication; 2014. p. 282

[28] Sekaran U, Bougie R. Research Methods for Business: A Skill Building Approach. Chichester, West Sussex: John Wiley & Sons. 2016. p. 448

[29] Yin RK. Case Study Research: Design and Methods. 4th ed. Applied Social Research Series: Sage Publications; 2009;**5**

[30] Smith E. Using Secondary Data in Educational and Social Research. New York, NY, USA: McGraw-Hill Education; 2008

[31] Johnston MP. Secondary data analysis: A method of which the time has come. Qualitative and Quantitative Methods in Libraries. 2014;**3**:619-626

[32] Andrews L, Higgins A, Andrews MW, Lalor JG. Classic grounded theory to analyze secondary data: Reality and reflections. The Grounded Theory. 2012;**11**(1):12-26

[33] Weber RP. Basic Content Analysis. Newbury Park, CA: Sage; 1990

[34] Bowman EH. Strategy, annual reports, and alchemy. California Management Review. 1978;**20**:64-71

[35] Fiol CM. A semiotic analysis of corporate language: Organizational boundaries and joint venturing. Administrative Science Quarterly. 1989; **34**:277-303

[36] Simon M, Houghton SM. The relationship between overconfidence and the introduction of risky products: Evidence from a field study. Academy of Management Journal. 2003;**46**: 139-149

[37] Mishina Y, Pollock TG, Porac JF. Are more resources always better for growth? Resource stickiness in market and product expansion. Strategic Management Journal. 2004;**25**:1179-1197

[38] Osborne JD, Stubbart CI, Ramaprasad A. Strategic groups and competitive enactment: A study of dynamic relationships between mental models and performance. Strategic Management Journal. 2001;**22**:435-454

[39] Merchant H. Revisiting shareholder value creation via international joint ventures: Examining interactions among firm- and context-specific variables. Canadian Journal of Administrative Sciences. 2004;**21**:129-145

[40] Morris RA. Computerized content analysis in management research: A demonstration of advantages & limitations. Journal of Management. 1994;**20**:903-931

[41] Rosenberg SD, Schnurr PP, Oxman TE. Content analysis: A comparison of manual and computerized systems. Journal of Personality Assessment. 1990; **54**:298-310

[42] Teece DJ. Dynamic Capabilities: A guide for managers. Ivey Business Journal, 2011. Available from: http://iveybusinessjournal.com/publication/dynamic-capabilities-a-guide-for-managers/[Accessed: 2016-06-30]

[43] Barreto I. Dynamic capabilities: A review of past research and an agenda for the future. Journal of Management. 2010;**36**(1):256-280

[44] Kumari S, Shah R. Amazon's Whole Foods Acquisition. Banglore: AMITY Research Centers Headquarter. 2017; **317-0289-1**:1-12

[45] HBS Working Knowledge. Amazon, Whole Foods Deals Is a Big Win for Consumers. 2017. Available from: https://www.forbes.com/sites/hbsworkingknowledge/2017/06/17/amazon-whole-foods-deal-is-a-big-win-for-consumers/#706c71347232 [Accessed 2018-17-01]

[46] Penrose E. The Theory of the Growth of the Firm. Oxford: Oxford University Press; 1959. p. 245

[47] Soper S, Zaleski O. Inside Amazon's Battle to Break Into the $800 Billion Grocery Market. Bloomberg. 2017. Available from: https://www.bloomberg.com/news/features/2017-03-20/inside-amazon-s-battle-to-break-into-the-800-billion-grocery-market [Accessed 2018-01-17]

[48] Petro G. Amazon's Acquisition of Whole Foods Is About Two Things: Data and Product. 2017. Available from: https://www.forbes.com/sites/gregpetro/2017/08/02/amazons-acquisition-of-whole-foods-is-about-two-things-data-and-product/#67a70160a808 [Accessed 2018-01-18]

[49] Whitten S. Whole Foods Stock Rockets 28% on $13.7 billion Amazon Takeover Deal. 2017. Available from: https://www.cnbc.com/2017/06/16/amazon-is-buying-whole-foods-in-a-deal-valued-at-13-point-7-billion.html [Accessed 2018-02-17]

[50] Eadicicco L. Why Amazon Bought Whole Foods. 2017. Available from: http://time.com/4828082/why-amazon-bought-whole-foods/ [Accessed 2018-02-17]

[51] SAS® Contextual Analysis. Available from: https://www.sas.com/en_us/software/contextual-analysis.html [Accessed 2018-07-22]

[52] Aziza B. Amazon Buys Whole Foods. Now What? The Story Behind The Story. 2017. Available from: https://www.forbes.com/sites/ciocentral/2017/06/23/amazon-buys-whole-foods-now-what-the-story-behind-the-story/#588dc754e898 [Accessed 2018-01-17]

[53] Fidelity Investment. Amazon's Transformation of Whole Foods Puts the Entire Grocery Industry on Notice. 2017. Available from: https://www.youtube.com/watch?v=ICkoTUbor-U [Accessed 2018-02-18]

[54] Kittilaksanawong W, Karp A. Amazon Go, Venturing into Traditional Retail. Richard Ivey School of Business Foundation. 2017;(8B17M09):21-27

[55] Boyle A. Report Point to Caution Signals for Amazon Go Checkout-free Store. Available from://www.geekwire.com/2017/caution-amazon-go-checkout-free/ [Accessed 2018-01-17]

[56] Collis DJ, Montgomery CA. Competing on resources. Harvard Business Review. 2008;1-13

[57] Foss NJ, Saebi T. Business models and business model innovation: Between wicked and paradigmatic problems. Long Range Planning. 2018; **51**:9-21

[58] Helfat CE, Peteraf MA. Managerial cognition capabilities and the micro-foundations of dynamic capabilities. Strategic Management Journal. 2015;**36**: 831-850

[59] Haspeslagh PC, Jemison DB. Managing Acquisitions: Creating Value Through Corporate Renewal. New York: Free Press. 1991. p. 42