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Leveraging Digital Entrepreneurship Through Collaboration Between Incumbent Firms and Entrepreneurial Ventures: An Inbound Open Innovation Perspective

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Considering that traditional research and development (R&D) models cannot keep up with the disruptive advances, the incumbent firms should consider external sources for obtaining and commercializing digital innovations. By contrast, entrepreneurial ventures have the necessary tech development skills and agility to create digital innovations. There has never been a better time for incumbent firms and entrepreneurial ventures to collaborate. One paradigm that establishes such mutual beneficial partnership is called "inbound open innovation". Based on a multiple-cases design, this research provides evidence of the benefits, the degree of co-creation required, and the various collaboration schemes that emerge through an open innovation initiative.

Keywords: open innovation, entrepreneurial co-creation, collaboration, incumbent companies, digital entrepreneurship

Introduction

Agile innovation process is today highly prevalent across the new product development community. A particular strength of agile development is that it moves away from "introverted" development where the team building the system is detached from the customer (Morgan & Conboy, 2010). Instead, with agile process, the customer is constantly in the loop, suggesting improvements and reviewing every phase. This increased customer involvement results in a more innovative and valuable products. However, while the customer plays an essential part in the agile process, this practice could be extended to include multiple stakeholders and even other organizations. Entrepreneurial ventures (i.e., start-ups) can be an important channel to become exposed to agile teams, lean approaches, and fresh thinking. Increasing the engagement of those ventures can bring digital innovation and new business models, and expand business into new markets much quicker and less risky. Entrepreneurial ventures also have the necessary capabilities and specialized tech development skills and thus can play a key role within the new product development process. Besides the customer, the new form of digital

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entrepreneurship is regarded as an important source of external knowledge for creating innovation. The trend toward democratization of innovation (Von Hippel, 2005) applied not only to the customer engagement but also to digital entrepreneurship. It is useful to consider how the agile process can benefit from becoming more "open", e.g., by opening up the boundaries of incumbent organisations to include other stakeholders besides the customer. The starting point for this research is therefore an effort to propose a collaborative perspective between incumbent firms and new ventures and thus making incumbent companies incorporate a digital innovation culture and become more entrepreneurial.

By contrast, it is much simpler for entrepreneurial ventures to recalibrate traditional business models. Digital entrepreneurship is broadly defined as producing and commercializing digital artifacts and/or where novel digital technologies play a key role for value creation (European Commission, 2015). This new manifestation of entrepreneurship is also termed as e-entrepreneurship, cyber-entrepreneurship, or technopreneurism (Foo, 2000; Davidson & Vaast, 2010). These formations are better at being agile and risk-taking and are known for their culture of experimentation and the vision of the founders. In addition, today's environment is characterized by cheaper technology costs, easier routes to customer acquisition, and better forms of direct monetization. All these conditions suit nimble, talented, and digital ventures able to iterate technology innovations and systems.

There has never been a better time for incumbent firms and digital entrepreneurship ventures to collaborate and accomplish win-win partnerships (Miller & Bound, 2011). Until now, incumbent firms have viewed such ventures as competitive threats or they lack confidence in an entrepreneurial venture's ability to move from idea to marketability in the context of a broader business strategy. Meanwhile, digital ventures have seen incumbents as cumbersome for disruption and they often question the incumbent's commitment to supporting the growth of their businesses. Such gap should be closed. To do so, various collaborative mechanisms have been developed to allow incumbent companies to plug into the innovative and nimble entrepreneurial ventures ecosystem.

Although during the last decade, such collaborations are becoming a global trend and the initial results seem to satisfy most of the stakeholders in the development of digital solution and innovative systems, other problems arise and make it more difficult for the incumbent companies to take advantage of the outcomes. Poor coordination activities and synergies, absence of commercialization strategy for the digital innovations, and lack of established schemes of collaboration are some of the reasons that do not allow for the scaling that is required.

One mechanism that has a great potential to establish a mutually beneficial partnership between incumbent firms and entrepreneurial ventures is "open innovation", a paradigm that assumes that "firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as firms look to advance their technology" (based on the most commonly used definition in the literature by Chesbrough, 2003, p. 24). The term "open innovation" has gained a lot of definitions. A coherent body of knowledge highlights such conceptual ambiguity (Dahlander & Gann, 2010) and the need to consider different categories of openness Acha (2007). Conceptually, it is a more distributed, more participatory, more decentralized loom to innovation, and based on the point that valuable know-how today is widely distributed, and no organization, no matter how capable or how large, could innovate effectively on its own. No research has focused on the role of other stakeholders in agile development besides the customer (Morgan & Conboy, 2010). Nor has research looked at

how principles of open innovation could complement an agile approach (Beck, 2000). Within this context, the objectives of this research are as follows:

- To examine how the incumbent firms leverage digital entrepreneurship through an inbound open innovation process;
- To provide case evidence of the benefits and challenges raised by the implementation of an inbound open innovation process between incumbent firms and entrepreneurial ventures;
- To recognize the power of the inbound open innovation process as a means for co-creating innovative solutions and systems with entrepreneurial ventures.

Related Studies

The relentless parade of technology innovations is unfolding on many fronts and has the potential to truly reshape the conventional business models (Chesbrough, 2010). Considering that traditional research and development cannot keep up with today's pace of innovation, large companies should struggle to incorporate an innovation culture and become more entrepreneurial. However, the huge investments, high failure rates, uncertain returns and distant payoffs all count against emerging technological innovations and in favor of established way of doing the work (Tellis, 2013).

By contrast, it is much simply for new ventures to embrace innovation and recalibrate traditional business models. Technology innovations lie at the heart of startups considering that these formations are better at being agile and risk-taking, and are known for their culture of experimentation and the vision of the founders. Nevertheless, they lack precisely what the big companies have to spare: infrastructure, brand, market space, consolidated, excellence in processes, and other capabilities to help them develop global solutions.

In the light of the radically changing environment, suggested firms are trying to commercialize external and internal ideas by deploying outside and inside pathways to the market. The field of open innovation has been explored in many studies concerning the notion itself, business models, organization design and boundaries of the firms, leadership and culture, tools and technology, intellectual property, and industrial dynamics and manufacturing. The term "open innovation" has gained a lot of definitions. A coherent body of knowledge highlights such conceptual ambiguity (Dahlander & Gann, 2010) and the need to consider different categories of openness (Acha, 2007). Conceptually, it is a more distributed, more participatory, more decentralized loom to innovation, and based on the point that valuable know-how today is widely distributed, and no organization, no matter how capable or how large, could innovate effectively on its own.

There is never been a better time for large corporations and startups to collaborate and accomplish win-win partnerships (Miller & Bound, 2011). Current attempts emphasize on open innovation by studying the benefits of "coupled" innovation processes, such as R&D collaborations and technology alliances (Faems, de Visser, Andries, & Van Looy, 2010; Un, Cuervo-Cazurra, & Asakawa, 2010). Dyadic collaborative ties are frequently observed for particular stakeholders, such as suppliers (Aylen, 2010; Li & Vanhaverbeke, 2009), competitors (Lim, Schultmann, & Ofori, 2010), and universities (Bercovitz & Feldman, 2007; Cassiman, Veugelers, & Zuniga, 2010), while less common partners have also been identified more recently, as in Holmes and Smart's (2009) study of voluntary partnerships between corporate and non-profit organizations. Moreover, there is an increasing interest in the relative importance of the respective collaborators (Neyens, Halfens, Spreeuwenberg, Meijers, Luiking, Verlaan, & Scholsl, 2010) and more generally, the partner selection process (Emden, Calantone, & Droge, 2006; Slowinski & Sagal, 2010).

While many studies explore bidirectional flows or co-creation more generally (Berkhout, Hartmann, van der Duin, & Ortt, 2006; Gillier, Kazakcı, & Piat, 2012; Hughes & Wareham, 2010), others focus on spillovers that occur through collaboration. For example, De Faria, Lima, and Santos (2010) noted that firms with high absorptive capacity and innovation intensity—those best able to capitalize on incoming knowledge spillovers—were most likely to engage in collaborative innovation. Such collaboration did not significantly predict the firm's appropriability, i.e., its ability to prevent outbound spillovers.

Research Design

The objective of this research is to understand the dyadic co-creation and open innovation between incumbent firms and digital ventures within the new product development process. To address this objective, the research design is based on a multiple-cases design. Case research gained respect in this design for several reasons. Firstly, one reason is that this approach is ideal for answering the "how" and "why" questions (Yin, 2003), allowing for a richer knowledge of non-conceptualized issues, i.e., how incumbent firms leverage digital entrepreneurship through open innovation. According to Yin (2003), they allow for cross-case analysis and the extension of theory, producing more general research results. Given the pre-mature level of such collaborative perspective, they are also suitable for research in areas where theory is not yet well developed (Eisenhardt, 1989) and thus enhance the external validity of this research design. Finally, from an IS perspective, based on the work of Dubé and Paré (2003), the key characteristic of case research, that of holistic investigation, goes well with our intention to realize the complex interactions between incumbent firms and digital ventures within systems development process. In this regard, the access to the real life context brings richness and flexibility to the overall research process, making case research a proven tool for achieving a deep understanding on how incumbent firms are engaged in open innovation.

All three cases concern an inbound open innovation initiative entitled "IDEA (Innovation, Design & Entrepreneurial Action)". The IDEA initiative helps an incumbent firm to work with a group of talents or entrepreneurial teams that consists a digital venture to develop applications and new digital business activities in order to solve specific business issues. The program incorporates the concept of open innovation to boost entrepreneurship in specific market domains (e.g., tourism, health, fintech, etc.), and as a result, it promotes a vertical focus and depth of innovation. The three cases were chosen based on our involvement in coordinating an entrepreneurial venture incubation environment, the Athens Center for Entrepreneurship and Innovation. Participating actively as organizers and facilitators of the IDEA Program helped us obtain exposure to incumbent companies and digital ventures at a level of detail required for achieving a deep understanding on all important aspects when exploring factors that influence their collaboration.

Case A refers to the IDEA Program that was initiated by the information technology & telecommunications (it&t) business unit of an airport company. Airport company is the primary international airport that serves the region of Attica. Paving the way for digital innovation and new entrepreneurship in aviation and tourism, Airport Company has taken part in an IDEA Program and invited new ventures to submit ideas for innovative systems and applications that could contribute to an upgraded airport environment. Some examples of the challenges given are facilitating and improving the overall travel experience for the airport community (passengers, employees, visitors, businesses, etc.), selecting the most effective and far-reaching means of communication, providing personalized services and reference systems, capitalising on social media, and re-adapting location-based services.

Case B refers to the IDEA Program that was initiated by two insurance companies. With the main innovation focus to improve customer engagement, the insurance company through the IDEA open innovation program has invited digital ventures to help the company modernize and reinvent itself and reshape the insurance and healthcare landscape. The participating ventures face some key challenges of the general insurance sector, including travel, home, car, and health insurance. Some examples of the challenges are generating customer experiences with real added value, thereby improving customers' loyalty; developing new systems and solutions through smart homes, mobility and e-health; using IoT-based technologies and wearables to achieve an advantage for their customers.

Finally, Case C refers to the IDEA Program that was initiated by a digital bank that is a licensed e-money institution for operations in the EEA-31 region by the Bank of Greece and offers innovative payment services to individuals, businesses, and professionals, combining maximum security with flexibility and support. In an effort to compete in the marketplace of traditional financial institutions and intermediaries in the delivery of financial services, the digital bank company has invited digital ventures to develop innovative solution for the following challenges: innovative transactions business to business (B2B), business to customer (B2C), peer to peer (P2P) using electronic wallet (e-wallet), card, x-POS, etc.; identification techniques, tokenization, blockchain, and social payments; new models of cooperation with banks (Platform/API bank, PSD2, and Direct Banking); exploiting new and "smart" devices and access networks (smart watch, wearables, webTV, IoT, etc.); cybersecurity; personal finance; alternative lending, customer acquisition applications, loyalty and instant redemption; digital transactions/supplementary services (e.g., gamification).

All three cases concern an open innovation initiative that incorporates the same growing stages: obtaining and searching digital innovations offered by entrepreneurial ventures by submitting and screening several ideas, if this stage is successful, integrating the selected digital innovations with the incumbent firm's R&D activities and business model by submitting further business plan and prototype. However, the three cases are differentiated in the innovation vertical focus and the objectives and challenges. Table 1 presents the context for each case.

Table 1

The Differences and Similarities Between the Three Cases

	Case A—IDEA in airport environment	Case B—IDEA in insurance and healthcare	Case C—IDEA in fintech
Innovation vertical focus	Airport environment	Insurance and healthcare sector	Fintech sector
Duration	June 2015-December 2015	June 2016-December 2016	September 2016-March 2017
Objective/challenges	Facilitating and improving the overall travel experience for the airport community (passengers, employees, visitors, businesses, etc.), selecting the most effective and far-reaching means of communication, providing personalized services and reference systems, capitalising on social media, and re-adapting location-based services.	Generating customer experiences with real added value, thereby improving customers' loyalty; developing new systems and solutions through smart homes, mobility and e-health; using IoT-based technologies and wearables to achieve an advantage for their customers.	Innovative transactions B2B, B2C, P2P using electronic wallet (e-wallet); tokenization, blockchain and social payments; new models of cooperation with banks; exploiting new and smart devices and access networks; cybersecurity; personal finance; alternative lending, customer acquisition applications, loyalty, and instant redemption; supplementary services (e.g., gamification).

(Table 1 continued)

Phases	Three stages: 1) obtaining and searching digital innovations offered by entrepreneurial ventures by submitting and screening several ideas, if this stage is successful; 2) integrating the selected digital innovation with the incumbent firm's R&D activities and business model by submitting further business plan and prototype; and 3) deciding on the commercialization and collaboration mode.		
Participating entrepreneurial ventures	83 to Phase 1, 16 to Phase 2, and 6 to Finals	63 to Phase 1, 15 to Phase 2, and 5 to Finals	104 to Phase 1, 22 to Phase 2, and 8 to Finals
Prizes	Monetary incentives (extrinsic motivation), such as awards and non-monetary incentives (intrinsic motivation)	Non-monetary incentives (intrinsic motivation)	Monetary incentives (extrinsic motivation), such as awards and non-monetary incentives (intrinsic motivation)

In addition, it should be highlighted that the three cases cover different types of incumbent companies in terms of complexity, size, and other factors as has been described by researchers (Miller & Bound, 2011). Table 2 describes the cases providing also their similarities and differences concerning the incumbent company that initiated the program.

The three cases follow the replication logic and are not sampled cases. In this regard, although each individual case study represents a "whole" study, in which information is gathered from various sources and conclusions drawn on those facts, the outcomes from one case are compared with the conclusions from the other cases. This indicates that we talk about literal replication expecting that each case shows the same results. Yin (1994) proposed the usage of around two to three cases for literal replication. The first case can be considered as the pilot case that helped us in deciding the final data collection protocols to be used and the design as a whole. Finally, all the cases can be considered as embedded case studies, as they try to draw conclusions by analysing sub-units of the study object and not the phenomenon as a whole. This means that we are interested in how open innovation leverages the collaboration between incumbent companies and new ventures and we do not investigate the impact of open innovation in every aspect of a company (e.g., worker's behaviour, financial impact, etc.)

To gather the bulk of data, we combined multiple sources of data collection that lend greater support to the conclusions. Hence, the following techniques were chosen as the most appropriate:

- Personal observations during the IDEA open innovation initiatives. We spent a great deal of time and effort to analyze the factors that influence the collaboration between incumbent firms and new ventures. This was accomplished by interacting with both the incumbent firms and the new ventures, from the position of the organizer and thus facilitator of the open innovation initiative.
- Semi-structured interviews with the incumbent companies about specific factors that influence the collaboration with the digital ventures. The greatest value of this technique lies in the depth and detail of information that could be secured. This implies that we could have more control and opportunities to elicit feedback when needed. Also, interviews with the team members of the digital ventures have taken place.

To maintain confidentiality, the names of the incumbent firm and entrepreneurial ventures have been concealed, but a thumbnail description of each is provided.

Table 2

The Differences and Similarities Between the Incumbent Companies

	Case A—IDEA in airport environment	Case B—IDEA in insurance and healthcare	Case C—IDEA in fintech
Specialties	Airport operation and airport consulting	Life insurance, health insurance, property & casualty, assistance services, health services, business insurance	Online payments, payment security, money transfers, and mobile commerce
Industry	Airlines and aviation	Insurance	Internet
Innovation process	Agile, prototype quickly, and fail fast	Sequential, gradual, and avoid failure	Agile, prototype quickly, and fail fast
Mindset	Disruptive innovation ideas	Incremental innovation ideas	Disruptive innovation ideas
Politics/culture	Politics tends to play a lesser role within the layers of management, bureaucratic nature, is epitomised by policy manuals, HR inductions, job descriptions, handbooks and endless reams of meetings	Tend to be less risk averse, being more conservative and catering for their already existing customers by improving what is already there, bureaucratic nature, is epitomised by policy manuals, HR inductions, job descriptions, handbooks	Is far more ad-hoc with employees having more freedom to do as they see right
Ownership	Ownership is divided between the Hellenic Republic (Greek State) and Private Sector in a 55%-45% stake following a PPP scheme for the airport company	Privately owned	Privately owned
Founded	2001	1969	2010
Employees	501-1,000 employees, a more diverse workforce	1,001-5,000 employees, tend to attract those who are looking for job security	51-200 employees, a more diverse workforce
Decision-making process	Delegate decisions to committees or sub-committees, centralized and “informed as much as possible”	Delegate decisions to committees or sub-committees, it is not easy to interact with decision makers, centralized and “informed as much as possible”	Swift and reactive decisions, decentralized and “informed enough”
Openness and transparency	Sustaining a transparent working relationship, openness between supervisors and employees	Lack of communication between employees and supervisors	Sustaining a transparent working relationship, openness between supervisors and employees
Structure/layers of management/authority	Fewer layers of management but centralized decision making	A more hierarchical structure, look like pyramid, with several management layers that reflect a more complex reporting structure	Fewer layers of management, a sense of flat structure

IDEA: An Open Innovation Program Between Incumbent Firms and Digital Ventures

The IDEA Program is addressed to talented people and top students from leading business schools and technical universities, already established entrepreneurial teams, or entrepreneurial ventures with the aim to engage them in the definition, design, and implementation of innovative solutions and systems related to a specific sector. The objective of the IDEA series program is to stimulate entrepreneurial action by bridging students and young entrepreneurs that have NO IDEA or an initial business concept with companies that have specific problems and need to innovate. Specific objectives of the program are:

- To properly educate the participants in innovation and entrepreneurship;
- To highlight digital innovation in the digital Internet environment, mobile, and new technologies, etc.;
- To offer participants the knowledge and the essential tools to analyze the process of developing a new innovative solutions and systems and the respective entrepreneurial idea, through the effective use of

prototyping and user-experience-testing techniques;

- To analyze and promote new business ideas and models that will provide solutions to the "challenges" in various sectors of the economy and society;
- To create a collaborative environment which will highlight new innovative firms;
- To create a type of "intrapreneurship" meaning transfer an entrepreneurial mindset to individuals in an incumbent company.

The program is structure in three consecutive phases, from problem identification and idea generation to business model innovation, prototype design, and implementation support. The program structure and philosophy are described in more detail in the following paragraphs and are based on the three steps proposed by West and Bogers (2014) for the open innovation inbound process. Figure 1 depicts these phases.

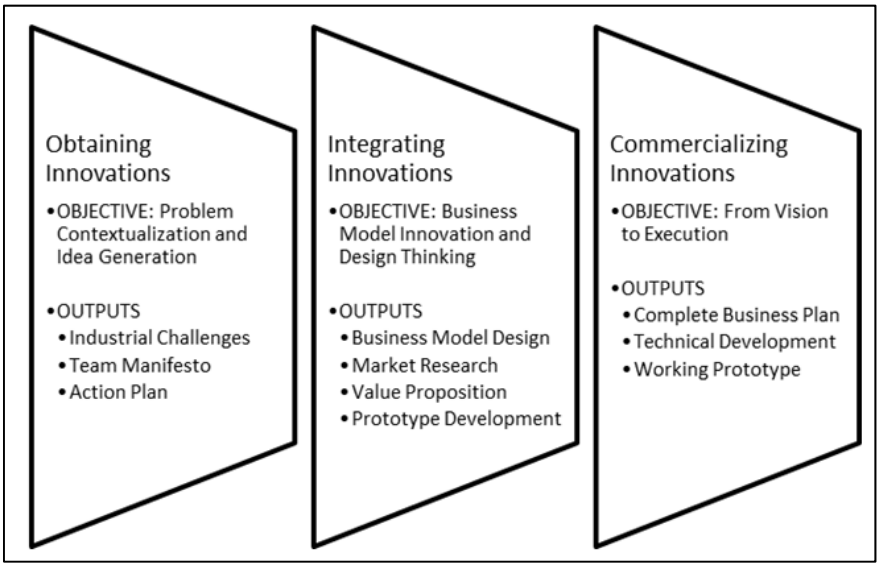

Figure 1. The IDEA open innovation initiative. Source: West & Bogers (2011).

Phase 1: Obtaining Digital Innovations

This phase involves the search for innovation by connecting with external sources, i.e., entrepreneurial ventures. "Searching" is one of the most researched phase of open innovation (West & Bogers, 2014). The first phase of the IDEA Program can be regarded as the "searching" mechanism where the university incubator that organizes this program is acting as an intermediary for broadcast search (Jeppesen & Lakhani, 2010). This phase supports the participating ventures in understanding the business context, identifying business opportunities, and generating innovations. At the beginning of the program, the participants have to get familiarized with the problem context and understand the specific market domain (i.e., health, fintech, etc.). Lectures from the incumbent firm, industry experts, and academics demonstrate the current challenges and issues faced and showcase how upcoming technology innovations have reshaped the entrepreneurial landscape within the specific sector. Team-building exercises are used to support the formulation of teams with complementary skills, including business vision and technical knowledge.

By offering effective monetary incentives (extrinsic motivation), such as awards (Terwiesch & Xu, 2008) or by relying on non-monetary incentives (intrinsic motivation) as often found in open source software (West & Gallagher, 2006), the incumbent company can source entrepreneurial ventures and enable them to get involved

in the system development innovation process. Here, the major challenge is the screening of the entrepreneurial ventures in order to select those ventures with the highest potential to implement a valuable digital innovation. The outcome of this phase is therefore the costless sourcing of external digital innovations offered by entrepreneurial teams or ventures.

Phase 2: Integrating Digital Innovations

Searching and sourcing external entrepreneurial ventures to be involved in the innovative system development process is only half the battle. It is important to align such innovations with the incumbent firm's system development activities and business model. In order to do so, the second phase of the IDEA Program deals with the main building blocks that constitute an innovative business model and evolve around the rapid mock-up prototyping of the digital innovation, including all the steps from the design to the development of a prototype and user testing. This is very important to establish an effective collaborative relationship between the incumbent firm that initiated the open innovation initiative and the participating venture. The focal firm's business model may be an obstacle or may need some modifications (pivoting) to integrate the digital innovation.

Participants are acquainted with the basic principles of marketing and how the system development constitutes a fundamental innovation. The basic elements of any business model (value proposition, customers, revenue streams, channels, resources, etc.) are addressed, while business model canvas is used as the main tool to guide this process. Competition analysis and identification of similar solutions that solve the same or homogeneous problems in the same or similar target market—set the benchmark and help the ventures differentiate and evaluate critical success factors. Finally, the ventures rapidly develop the prototype using tools that produce visually real functional prototypes including images, text, and interactivity. Usability studies (using specific techniques) are also used in iterations, in order to offer valuable feedback and help the participants further improve their prototypes. Feedback and mentoring sessions with other entrepreneurs and industry experts help the teams conclude with their concepts and business model innovation through various iterations. At the end of this phase, the participating ventures should submit an advanced business model and prototype. The outcome of this phase is therefore the selection of the digital innovations offered by entrepreneurial ventures and the requirements and implementation plan for integrating them with the incumbent firm's R&D activities and business model.

Phase 3: Commercializing Digital Innovations

The third phase of the IDEA Program covers the basic issues that must be understood in order to proceed from an idea to an actual solution. This includes managing operations and supply partnership aspects alongside with negotiation; digital marketing, data analysis, social networks, and online promotion strategy; financial considerations covering revenues and costs aspects; legal concerns and management of intellectual property; human resource management and teamwork. At the end of the program (pitching), the participants present their digital innovations along with the proposed business model to a committee of academics and industry experts and the entrepreneurial ventures with the highest potential are selected in order to be further supported in the actual implementation of their innovations (both technical and business-wise).

In this phase, the incumbent firm is focusing on how to commercialize the selected digital innovations offered by the ventures. In the view of Chesbrough (2006), in this phase the incumbent firm should decide on the type of partnership with the entrepreneurial venture and the commercialization mode of the digital innovation. Such decision is dependent on various factors.

Leveraging Digital Entrepreneurship Through the IDEA Open Innovation Initiative: Evidence From Three Case Studies

Applying the IDEA Open Innovation Program in the Airport Environment

In the first case of the IDEA open innovation program, the incumbent firm tried to obtain, integrate, and commercial digital innovations in the air-transport and tourism sector. During the first phase, 83 entrepreneurial teams expressed their interest to collaborate with the incumbent company and get involved in developing innovative solutions. After screening those ventures, 16 of them were selected to develop a detailed business model, implementation plan, and requirements analysis of the proposed digital innovation prototype. At the end of this phase, the incumbent firm offered monetary prizes to three ventures while six ventures were selected to develop their innovation in the real environment of the firm. In this phase, several commercialization and collaboration schemes were implemented based on the specific ventures and innovations. The entrepreneurial ventures are the following:

Venture A1: The digital innovation offered by Venture A1 involves a service that aggregates and compares third-party forecasts with real-time weather conditions in order to measure forecasting accuracy per location and forecasting provider.

Venture A2: The digital innovation offered by Venture A2 involves the effective planning, monitoring, and managing of daily personnel work in large rooms, as well as emergency management. It is a desktop application that contains a suite of functionality that assists with incident management enabling operational efficiency, and future planning. This includes a dashboard that brings all this information together in real-time, showing communication activity and staff location.

Venture A3: The digital innovation offered by Venture A3 involves finding parking spaces in real time.

Venture A4: The digital innovation offered by Venture A4 involves a mobile application/driver for people with disabilities and medical purposes in the airport environment.

Venture A5: The digital innovation offered by Venture A5 involves an application for “smart” tests and shopping through interactive displays. It is increasing online and in-store traffic with a revolutionizing shopping experience and creates environments that allow a shopper to digitally try on and buy apparel & accessories products.

Venture A6: The digital innovation offered by Venture A6 involves an award-winning mobile application that shares cultural stories for indoors and outdoors tours.

In Table 3, we briefly describe the outcomes of the collaboration between the airport company and the entrepreneurial ventures.

In order to describe Table 3, let us give some examples. During the integrating phase of the IDEA Program, the Venture A1 worked with the IT department of the incumbent company to identify the proposed digital innovation aligned with the airport company’s technologies and business model. The proposed solution for weather/air pollution monitoring is complimentary to the existing infrastructure of the airport company, it constitutes of portable equipment which enables the respective department to perform low cost, easy to deploy environmental measurements in various locations within and outside of the airport. The data enable airport company to extract information and knowledge about weather conditions, air, and noise pollution levels, and at the same time, enable entrepreneurial venture to provide added value meta-weather forecast services to the area’s farmers and other professionals. This synergy is also promoted by airport company as CSR towards the

local community. During the commercialisation phase, the entrepreneurial venture and the incumbent firm decided to enter into a commercial supplier-buyer agreement where a procurement contract was signed among the two.

Table 3

The Outcomes of the Collaboration Between the Airport Company and the Entrepreneurial Ventures

Collaboration between airport company and…	Relevance of the digital innovation to the incumbent core business	Degree of engagement and co-creation	Commercialization mode	Leverage analysis and expected outcomes
Venture A1	Low relevance—peripheral business	High, partnership (product co-development, procurement from the new venture)	Commercial supplier-buyer agreement	Accessing specific skills and talent; entering new market; enhancing company's brand; rejuvenating corporate culture; solving business problems
Venture A2	High relevance—core business	High, partnership (product co-development, procurement from the new venture)	Commercial supplier-buyer agreement and shared revenue model	Accessing specific skills and talent; entering new market; solving business problems
Venture A3	Low relevance—peripheral business	Low	No commercialisation mode	Enhancing company's brand; rejuvenating corporate culture
Venture A4	Low relevance—peripheral business	High, partnership (product co-development, procurement from the new venture)	Commercial supplier-buyer agreement	Accessing specific skills and talent; entering new market; enhancing company's brand; rejuvenating corporate culture; solving business problems
Venture A5	Low relevance—peripheral business	Low	No commercialisation mode	Entering new market; enhancing company's brand; rejuvenating corporate culture
Venture A6	Low relevance—peripheral business	Low	No commercialisation mode	Enhancing company's brand; rejuvenating corporate culture

In contract, during the integration phase, there was a lack of commitment of the team of the Venture A3. Although the digital innovation is enough relevant to the core business of the incumbent firm, the main reasons for not integrating to the existing business model can be summarized as: lack of trust and lack of a shared vision between the incumbent firm and the entrepreneurial venture. Contradictory goals and no consensus frustrated the incumbent firm for supporting the entrepreneurial venture. The existence of a manipulative and antagonistic member of the new venture triggered endless discussions and thus no commercialization mode was observed.

Applying the IDEA Open Innovation Program in Insurance and Healthcare Sector

In the second case of the IDEA open innovation program, the incumbent firm tried to obtain, integrate, and commercial digital innovations in the insurance and healthcare sector. During the first phase, 63 entrepreneurial teams expressed their interest to collaborate with the incumbent company and get involved in developing innovative solutions. After screening those ventures, 15 of them were selected to develop a detailed business model, implementation plan, and requirements analysis of the proposed digital innovation prototype. At the end of this phase, the incumbent firm did not offer monetary prizes but five ventures were selected to develop their innovation in the real environment of the firm. No commercialization or partnership has taken place regarding the insurance company. However, insurance company that was the paired incumbent company

that initiated the IDEA Program decided to invest in an entrepreneurial venture. The entrepreneurial ventures are the following:

Venture B1: The digital innovation offered by Venture B1 involves a portable electrocardiograph associated with mobile application and measuring heart rate and vital signs, specially designed for heart patients and chronically ill.

Venture B2: The digital innovation offered by Venture B2 involves a mobile tracker insurance policy, medical information, and history management.

Venture B3: The digital innovation offered by Venture B3 involves an application creation and monitoring of dietary programs.

Venture B4: The digital innovation offered by Venture B4 involves an application monitoring vital signs and user location, addressed to minors, and elderly drivers.

Venture B5: The digital innovation offered by Venture B5 involves a medical history tracking service and medication.

In Table 4, we briefly describe the outcomes of the IDEA in insurance open innovation program.

Table 4

The Outcomes of the Collaboration Between the Insurance Company and the Entrepreneurial Ventures

Collaboration between airport company and…	Relevance of the digital innovation to the incumbent core business	Degree of engagement and co-creation	Commercialization mode	Leverage analysis and expected outcomes
Venture B1	Low relevance—peripheral business	Low	No commercialisation mode	Entering new market
Venture B2	High relevance—core business	High	No commercialisation mode	Accessing specific skills and talent; entering new market; enhancing company's brand; rejuvenating corporate culture; solving business problems
Venture B3	Low relevance—peripheral business	Low	Investment	Accessing specific skills and talent; entering new market; enhancing company's brand; rejuvenating corporate culture
Venture B4	High relevance—core business	High	No commercialisation mode	Accessing specific skills and talent; entering new market; enhancing company's brand; rejuvenating corporate culture; solving business problems
Venture B5	High relevanc—core business	High	No commercialisation mode	Entering new market; enhancing company's brand; solving business problems

Applying the IDEA Open Innovation Program in Fintech

In the third case of the IDEA open innovation program, the incumbent firm tried to obtain, integrate, and commercial digital innovations in the fintech sector. During the first phase, 104 entrepreneurial teams expressed their interest to collaborate with the incumbent company and get involved in developing innovative solutions. After screening those ventures, 22 of them were selected to develop a detailed business model, implementation plan, and requirements analysis of the proposed digital innovation prototype. At the end of this phase, the incumbent firm offered monetary prizes to five ventures and were selected to develop their innovation in the real environment of the firm. In the following section, we briefly describe the outcomes of the IDEA in fintech open innovation program. The entrepreneurial ventures are the following:

Venture C1: The digital innovation offered by Venture A involves a web platform that enables the user to easily create and deploy complex big data clusters in major cloud IAAS (Infrastructure as a Service) providers. It abstracts from the user vendor specific complexity, it promotes use of best practices and leverages spot instances to achieve maximum cost efficiency.

Venture C2: The digital innovation offered by Venture B involves a fundraising, contract/digital rights management, and digital distribution entrepreneurial venture, aiming to provide a simple, transparent, and robust financial ecosystem for the production of digital media assets.

Venture C3: The digital innovation offered by Venture C involves an entrepreneurial venture in the field of interactive and digital marketing targeting to engage consumers in shopping experiences and other activities through innovative applications and pervasive technologies. It develops a mobile application that rewards users for their presence at particular points of interest.

Venture C4: The digital innovation offered by Venture D is a global online crowdfunding platform that integrates all types of crowdfunding in one place, providing a powerful tool of digital funding mechanism for entrepreneurial ventures, entrepreneurs, and existing companies.

Venture C5: The digital innovation offered by Venture E involves a digital gift card platform where users can buy, send, change, and redeem digital gift cards from their favourite retail brands. Its technology also provides loyalty and reward programmes for all businesses, in a more social and automated way—saving valuable time for business managers and making it more incentive and fun for employees.

Venture C6: The digital innovation offered by Venture F involves an online platform for supermarkets based on sharing economy in order to deliver. Customers can select the physical store of their preference, order their groceries through the website or mobile application, and get them delivered to their place and time of choice, perform it “traditionally”.

Venture C7: The digital innovation offered by Venture G manages documents/contracts trade on the blockchain and uses smart contract to eliminate costs, disputes, forgery, and unnecessary risks.

Venture C8: The digital innovation offered by Venture H combines fit-tech with fintech, by providing instant gratification for your healthy lifestyle. Using its application, every step taken and every healthy meal consumed is converted into points, while completing daily fitness goals rewards with even more. The points can be spent on its online store on discounts and offers for gym subscriptions, dietitians, and fitness stores.

Table 5

The Outcomes of the Collaboration Between the Digital Bank Company and the Entrepreneurial Ventures

Collaboration between airport company and…	Relevance of the digital innovation to the incumbent core business	Degree of engagement and co-creation	Commercialization mode	Leverage analysis and expected outcomes
Venture C1	Low relevance—peripheral business	Low	No commercialisation mode	Accessing specific skills and talent
Venture C2	High relevance—core business	High	Investment	Accessing specific skills and talent; entering new market; enhancing company’s brand; rejuvenating corporate culture; solving business problems
Venture C3	Low relevance—peripheral business	High	Commercial supplier-buyer agreement	Accessing specific skills and talent; entering new market; enhancing company’s brand; rejuvenating corporate culture

(Table 5 continued)

Venture C4	High relevance—core business	High	Commercial supplier-buyer agreement	Accessing specific skills and talent; entering new market; enhancing company's brand; rejuvenating corporate culture
Venture C5	Low relevance—peripheral business	Low	No commercialisation mode	Accessing specific skills and talent; entering new market; enhancing company's brand
Venture C6	Low relevance—peripheral business	Low	No commercialisation mode	Entering new market; enhancing company's brand; rejuvenating corporate culture
Venture C7	High relevance—core business	High	Commercial supplier-buyer agreement	Accessing specific skills and talent; entering new market; enhancing company's brand; rejuvenating corporate culture
Venture C8	Low relevance—peripheral business	Low	Commercial supplier-buyer agreement	Accessing specific skills and talent; entering new market; enhancing company's brand; rejuvenating corporate culture

Cross-Case Results

Presenting our results in detail we emphasize two aspects that are depicted in the classification matrix below (see Figure 2): the axis of the relevance to the business of the incumbent firm and the degree of co-creation between the incumbent firm and the entrepreneurial venture; the first explains whether the solution is dealing with core or peripheral business and the second the collaboration level that is required between the two.

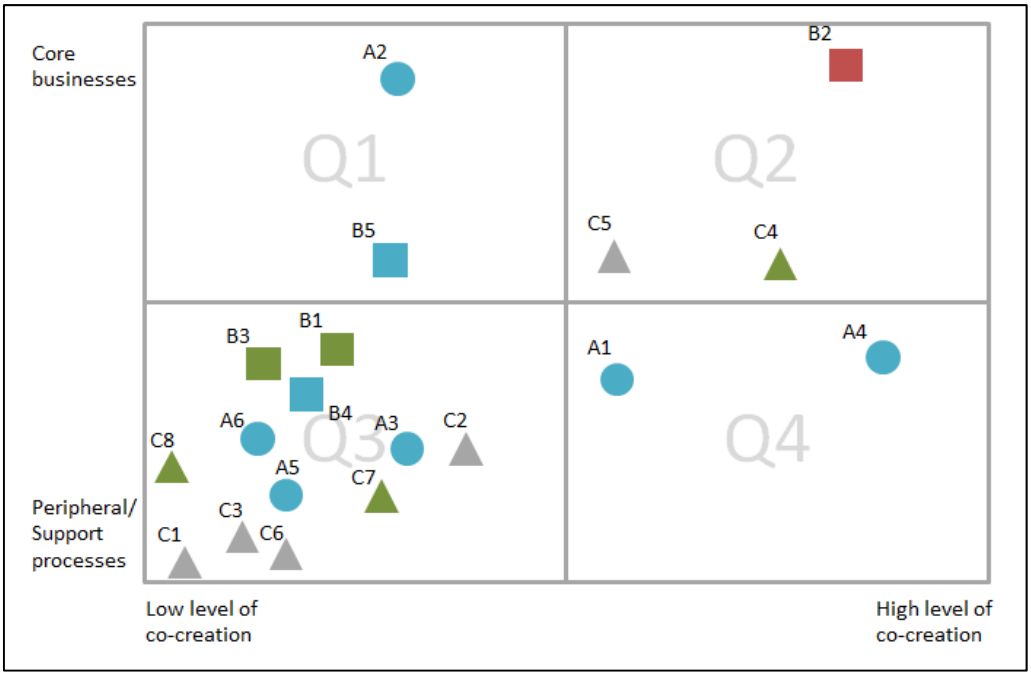

Figure 2. The classification matrix.

These two axes are based on the empirical observation of the three programs. The four different quadrants that are formed by the axes are acting as a classification framework and can significantly foresee the commercialization modes that support these synergies, while at the same time, predict the outcomes of this collaboration based on the engagement of the incumbent firm.

These commercialization modes refer to the potential collaboration schemes that can arise from these synergies and include four options; business support in the certain stages of the development, innovation procurement which acts as partnership on a specified contract, investment with shareholding agreement and acquisition of the entrepreneurial firm from the incumbent firm.

The Quadrants

Beginning with the analysis of the quadrants, four dominant factors can be interpreted: the objective of the dyadic co-creation in each of them, the types of collaboration that can accrue the benefits and the challenges for the incumbent firms.

Q 1: Core Business With Low Level of Co-creation

The first quadrant (Q1) comprises ventures that are related to the core business of the incumbent firm while, in parallel, do not entail high levels of co-creation. For example, the collaboration A2 which was dealing with facility management in the airport environment did not demand much involvement from the incumbent firm's side although it had to do with a part of the core business of the organization. Thus, the new digital venture was able to advance faster given that its flexibility was not largely disrupted by the incumbent firm's rules and slow procedures. Business partnership or acquisition is the most appropriate commercialization modes for this case, as the fact that this is dealing with core business does not leave ground for lack of structure.

Q2: Core Business and High Level of Co-creation

The second quadrant (Q2) depicts cases that are targeting the core business of the organization, but require more effort from the corporate side and higher levels of co-creation in order to produce the final product/service. Examples from this case, such as B2 which, is an insurance application that gives the client the opportunity to have access to his/her insurance contract and personal details. This application requires very high levels of co-creation and collaboration in the development phase as the entrepreneurial venture needs to get not only requirements from the corporate but also integration to the corporate systems. In this case, the most appropriate commercialization mode would be acquisition, as it is one of the core businesses of the firm. In the C5 case, which has to do with e-payments and gift cards and lies in the core business of the corporate, high levels of co-creation are required. However, although the development of the solution does not require a bunch of requirements or integration to the corporate systems, the corporate "adopted" the business modelling of the digital venture and assisted in the faster business development. The collaboration schemes that can be sighted in this case include partnership and investment. In C4, a crowdfunding platform for new ventures is developed and it hits the fintech market as well. In this case, the collaborating corporate has given mentoring and guidance to the entrepreneurial venture, as their knowledge on the field was quite assistive to them. Investment remains the most dominant collaboration schemes in this case as the corporate stays in its area of focus and expertise, while at the same time it expands to other markets. This can also be expanded to acquisition in the future.

Q3: Peripheral Business and Low Level of Co-creation

Going on to the third quadrant (Q3), we have more cases. First is the collaboration of B3, a meal planning application which exists in both B2B and B2C cases. The digital venture does not lie in the corporate core business which deals with the insurance company, but it has to do more with healthy lifestyle and well-being. Although in this case the level of co-creation remains low, the appropriate collaboration schemes are dealing

with partnership, e.g., the corporate shares the solution with a part or all its customers or with investment in the case where the corporate believes in the value of the developed solution and wants to support it in exchange for equity. In case A6, which is also in the peripheral business of the organization working on digital sightseeing tours and relevant services, the airport company decided to offer this solution to the airport customers via a business partnership and, although this is not in its core business, the added value it offers plays a significant role in the customer experience. The cases of C3 and C7 are two more cases that are dealing with peripheral business in the case of fintech; the first one is dealing with interactive marketing and customer engagement, while the second is using blockchain technology in offering smart contracts. Both are taking advantage of fintech characteristics, but none of them is targeting the core business of the organization. Again, in these cases, the corporate offered mentoring and support and the dominant collaboration scheme is investment, as there is no ground for direct collaboration in the corporate environment.

Q4: Peripheral Business and High Level of Co-creation

Q4 depicts cases where the level of co-creation is high while the business is peripheral. For instance, the airport environment we have two cases; A1 providing precise weather forecasting with the use of Internet of Things, smart devices and cloud computing and A4 which offers better airport experience to disabled passengers. Although none of them is “highly” core, both are dealing with significant quality and experience issues in the airport environment. Thus, business partnerships are also supportive in this case.

The Shapes and the Colors

In Figure 2, three different shapes and four colors are depicted; the shapes stand for each of the incumbent companies involved and the colors for the commercialization modes that are the most dominant. Thus, circles are for Case A, squares for Case B, and triangles for Case C, while grey stands for business support, blue for innovation procurement, green for investment, and red for acquisition.

The whopping centralization in the second and the third quadrant portrays the relationship between the level of co-creation and the core or peripheral business. Core businesses require a higher level of collaboration and information exchange, while the peripheral or support one could also bear lower levels of synergies. However, exceptions such as cases of peripheral businesses and high levels of co-creation or the exact opposite are giving great results in the market and are actually dealing with products and solutions that differentiate and show competitive advantages over the others.

Staying in the logic of the four quadrants, collaboration schemes see to follow certain rules as well. Business support and partnerships are the dominant options in Q1, as the low levels of co-creation and the information exchange that are required leave ground for them. In the second quadrant (Q2), we have higher levels of co-creation, so the previous alternatives are also extended here more intensively and acquisition is inserted into the frame mainly for core and significant business. In this case, the entrepreneurial culture of the incumbent form is enhanced and access in specific skills and talent are also supported. Business problems are solved and innovative solutions with less risk are entering the market. At the same time, digital ventures are getting access to business development processes and market knowledge, while they work jointly to innovate new products and services.

On the other hand, when we deal with Q3 and Q4, we see potential for acquisition and investment as the incumbent firms become able to expand to new markets, design new products and accelerate by enhancing their brands or image. Digital ventures leverage the access to market knowledge, expertise and mentoring and the

secure investment the incumbent firms are able to provide them with.

Figure 3 summarizes our cross-case results.

Quadrants	Relevance	Degree of co-creation	Dominant Commercialization mode(s)	Main Objectives
Q1	High	Low	Innovation procurement	Solve business problems
Q2	High	High	Acquisition, Investment, Business support	Expand to new markets
Q3	Low	Low	Investment, Business support, Innovation procurement	Expand to new markets, Rejuvenate business culture
Q4	Low	High	Innovation procurement	Solve business problems, Innovate big brands

Figure 3. Cross-case results.

Conclusions

The open innovation process has a great potential in searching for digital innovations to specific problem statements and challenges involving a great number of creative and entrepreneurial minds. Considering that traditional R&D models managed by large incumbent firms are beneficial at embracing innovation within specific already established offerings and customers, but they are not so successful in creating disruptive technological innovations and entirely new markets, such initiative can provide a basis for beneficial two-way corporation-entrepreneurial ventures collaborations.

Such initiative can help the large organization to become agile and fast and move successfully from an idea or technology to actual execution as the success of a technology disruption lies in the people behind all these entrepreneurial ventures. People with high multi-disciplinary and entrepreneurial potential are very scarce and represent the most valuable capital of every company. Entrepreneurial ventures are better at being agile whilst larger organisations have a wealth of business experience and resources. Innovating collaboratively allows everyone to play to their comparative strengths.

During each case study, different forms of open innovation were emerged. One form of collaboration is the large company buying the innovative solution that an entrepreneurial venture has developed within the open innovation program to improve the internal efficiency or service level to its own set of customers. Another form of collaboration can imply a long-term relationship by acquiring or investing in the entrepreneurial venture. These schemes include four options: business support in the certain stages of the development, innovation procurement which acts as partnership on a specified contract, investment with shareholding agreement, and acquisition of the entrepreneurial firm from the incumbent firm.

In addition, the three case studies that concern an open innovation practice underline the role that a university accelerator can take in fostering collaboration among many participants that have conflicting cultures.

This implies that the IDEA initiative can create a type of “intrapreneurship” meaning transfer an entrepreneurial mindset to individuals in an incumbent company.

Crisis conditions that exist in the country are an important factor worth mentioning. These conditions drive ventures to be highly motivated to succeed with entrepreneurial activities. IDEA is very attractive in this context as it represents a great opportunity to work with large companies and to establish a business. The local ecosystem bursts from ideas, and young people who are motivated and thrilled about turning their entrepreneurial vision into reality. A lot of people have studied abroad and come back with new visions and influences.

The journey to open innovation implies that incumbent organisations have access to technological innovations through entrepreneurial ventures in an early stage meaning before they are overpriced in price and the valuation is high. Another important implication of such initiative is that it seeks to reveal any similarities the open innovation model has with the agile process (Morgan & Conboy, 2010), while simultaneously analyses innovation that includes collaboration and knowledge-sharing with customers, partners, competitors, and other relevant stakeholders outside the boundaries of the firm.

The case studies also underline the role that a university accelerator can take in fostering collaboration among many participants that have conflicting cultures. This implies that the IDEA initiative can create a type of “intrapreneurship” meaning transfer an entrepreneurial mindset to individuals in an incumbent company.

Another important factor is the engagement of the incumbent company. Only if the large partner brings critical feedback to shape the case does the commitment of the team rise and with it the quality of the project. A virtuous circle of feedback that drives motivation and creativity is essential. The involvement of top management, particularly for the initial pitch and the final selection of successful cases, is crucial in this regard.

Entrepreneurial ventures and large companies bring each other immense opportunities through collaborations that, if harnessed correctly, create win-win situations for both. In a world where innovation, rather than pure efficiency, is the key driver of long-term success, working with entrepreneurial ventures allows corporates to develop and test new technologies and service solutions with less costs and risk to their core operations. Entrepreneurial ventures are also a source of fresh talent and ideas that can help rejuvenate corporate cultures.

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