



Cerdán-Chiscano, M. & Jiménez-Zarco, A.I. (2014).
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eLC Research Paper Series, 9, 45-55.

E-LEARNING AND ENTREPRENEURSHIP: BOOSTING SPIN-OFFS' SUCCESS THROUGH A PROCESS OF ACCELERATION

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ABSTRACT

A new agent has recently emerged within the context of university-based entrepreneurship: that of business accelerators. The main aim of these is to support the growth of spin-offs and raise rates of return for universities on their transfer agreements. This new agent has become consolidated because of the traditional incubators' inability to deal with the diversity of their firms or network with innovative agents of the system. Some of the most frequently used instruments to improve the growth capacity of spin-offs are training pathways for the entrepreneurial team delivered via e-learning.

By analysing an experience of business management training (management and commerce), mentoring and financial assistance for innovation via e-learning at the Autonomous University of Barcelona (UAB) Research Park, this article shows that there has been a 14% increase in the annual turnover of the spin-offs' concerned. Despite these good results, the nature and context of the research (case study) suggests the need to carry on researching into the effects of business growth pathways based on e-learning.

KEYWORDS

e-learning, entrepreneurship, spin-off, firm's success, business acceleration.



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INTRODUCTION: FROM SPIN-OFF INCUBATION TO SPIN-OFF ACCELERATION

Business incubators emerged in the early 1980s to foster and drive the creation of firms in territories. Thus, the construction of buildings to house these new firms as well as training pathways to support the entrepreneur proliferated. Business incubation pathways entail the standardised provision of the key resources for business creation and growth, in particular, access to funding, networking and infrastructure.

Although the so-called science parks, which transfer the results of research conducted in universities, did not proliferate in Europe until the 2000s, the first spin-offs in the university area began to emerge in the United States in the 1980s, and evidence of that emergence is well documented. Within this context, the incubator model in American universities represents a pattern that is worth following because of its results in terms of generating quality work and firms. Based on the paradigmatic examples of Silicon Valley and Route 128, which are linked to prestigious universities like Stanford and MIT, university spin-offs have been part of the university landscape for decades and have been reference models for incubators in Europe and the rest of the world (Alistair et al., 1991; Roberts, 1991).

Over the past decade, Spanish universities have made a strong commitment to the creation of their own science parks. They constitute a perfect tool for achieving distinct yet complementary objectives: to foster dynamism and regional economic development by creating innovative firms and to drive the processes of dissemination and transfer of technology from universities to the business community (Calvo, 2008; Lofsten & Lindelof, 2003). Within this context, it is worth noting that the research results suggest that while science parks have

proven themselves capable of generating new innovative firms, they are not renowned for their excellence in fostering business growth. Empirical evidence has shown that firms located in university incubators are not particularly good at networking with other agents of innovation through an intensive use of information and communication technologies (ICTs), which ends up weakening their growth.

Within this context, university spin-off accelerators have emerged in order to provide a response on two fronts at this point in time. First, in the current social and economic crisis, emphasis has been placed on the need for science parks to be self-funding and, consequently, on the importance of generating incubation programmes that add more value to spin-offs. Second, it has been shown that university spin-offs have little growth capacity, and this leads to lower rates of return for universities on their transfer agreements.

Within this context, it has also been pointed out that there is a need to conduct more in-depth research into the influence of science parks on universities (Link & Scott, 2003) and on national innovation systems (Link & Scott, 2007). The key can be found in creating a perfect environment for fostering competitiveness and a culture of innovation among the institutions forming part of it, thus favouring an exchange of technology and knowledge flows (Squicciarini, 2009). To do that, organisations need to share a geographical space or a series of common services to enable a considerable reduction in costs, although alone neither is enough. In addition, therefore, there need to be strong relationships between the various agents located at a park, laying the basis on which network creation and cooperation agreements can be established (Montoro et al., 2011). The origin and diverse nature of the spin-offs located at a park require support pathways that have higher value and which are capable of boosting business growth based on a firm's true situation.

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In Catalonia, there are currently 15 science and technology parks in university settings. They offer physical spaces and support pathways for business creation, as well as a whole range of financial and non-financial services to support the innovative entrepreneur. These support services are characterised by the fact that they are standardised and range from non-financial to financial support measures. Among the non-financial support measures are business plan writing and training day attendance, and among the financial ones is assistance with application processes to obtain public grants to create firms. At a time of deep recession, public authorities and universities are both aware of the importance of designing entrepreneur support pathways suited to a firm's true situation. This new situation builds a new context of relationship between spin-offs and a science park or university. That context is characterised by greater collaboration, which goes further than simply providing a firm with training or with business plan advice. In fact, it is based on collaboration and tailored work,

innovation networks and involvement in a spin-off's decision making. The aim of this change of direction in the way that incubators act is to get the business growth pathways right because, until now, they have been somewhat generic and lacking in objectives set in advance.

One of the new instruments for accelerating the growth of university spin-offs is to train the entrepreneur using e-learning tools, which go further than simply offering entrepreneurial culture training (Sapienza et al., 2004). E-learning as a training tool in business accelerators is delivered within the incubators and represents a true ICT-supported learning process. Although it is necessary for the key resources for a spin-off's growth to be identified first, e-learning has generally been used to identify the resources that the entrepreneur needs, especially in the areas of specialised funding, direct access to investors, management and commerce training, and access to expert mentors in his or her business sector (Welsh et al., 2003).

Table 1. Incubation pathways: traditional incubators versus business accelerators

TRADITIONAL INCUBATOR PATHWAYS	BUSINESS ACCELERATOR PATHWAYS
Standardised services	Tailored services
Non-systematic networking with agents of innovation	Networking with strategic agents of innovation within the setting
The university is not represented at shareholders' meetings	The university is involved in the firm's decision making
Less involvement in business growth outcomes	Involvement in business growth outcomes estimated yearly in advance
Learning pathways for training without using ICTs	Intensive use of ICTs
Non-existence of contingency plans	Existence of contingency plans
Learning focus is centred on programme content	Learning focus is centred on development in the entrepreneur's training
Little assistance is given to the firm throughout the learning pathway	Mentoring and assistance are given to the firm throughout the learning pathway
Firms joining the incubation programme are not filtered	Firms joining the programme are filtered in accordance with clear growth potential criteria

Source: self-created.



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Training pathways delivered via e-learning must have certain characteristics in order to ensure that they work properly. Specifically, 1) pre-selection of firms that have growth potential (scalable product and global potential); 2) networking with the main agents of innovation and with the support of ICTs; 3) a temporary nature: training pathways should not be any longer than one year; 4) quantifiable programme outcomes in terms of growth objectives (turnover and jobs created), and; 5) contingency plan (control and supervision) for the programme outcomes. Table 1 compares business support pathways in traditional incubators and in business accelerators, and the possibilities of e-learning as an instrument for business growth.

E-LEARNING USE IN ENTREPRENEUR TRAINING

E-learning has been defined as “a wide set of applications and processes, such as web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet, audio and video, satellite broadcast, interactive TV, and CD-ROM” (Kaplan-Leiserson, 2002). However, e-learning is not only about training and instruction, but also about learning that is tailored to the individual. E-learning is said to be “pedagogy empowered by digital technology” (Sharma, Ekundayo, & Neg, 2009).

Virtual learning, computer-based learning, virtual classroom, digital collaboration and networking are some of the terms that have been used to define learning that takes place online. The different terms point to a similarly conceived educational experience, where (a) the learner is distant from the tutor or instructor, (b) the learner uses some form of technology (usually a computer) to access the learning material, and (c) the learner uses technology to

interact with the tutor or instructor and other learners, and the learners are provided with some form of support (Allen, Mabry, Mattrey, Bourhis, Titsworth, & Burrell, 2004).

One of the main benefits offered by e-learning is that it can be used to support distance learning through the use of wide area networks. This enables e-learning to be considered a form of flexible learning where just-in time learning is possible. Courses can be tailored to specific needs through either synchronous or asynchronous learning.

The characteristics of e-learning make it an excellent tool for use in business. At this level, e-learning has the potential to transform how and when employees learn. Learning can become more integrated with work and use shorter, more modular, just-in time delivery systems. E-learning delivers content through ICTs. Hence, organisations can use e-learning as a way of delivering training consistently to all employees; to update training content when necessary; to reduce the costs of travelling to external training facilities, and to provide employees with on-demand training, anytime and anywhere (Burgess & Russell, 2003).

E-learning, an instructional strategy for imparting required knowledge, skills and attitudes in organisations, is here to stay. Its viability, effectiveness and potential to return tangible benefits to organisations depend largely on how it is designed, delivered, and evaluated. Nowadays, some companies use e-learning in the training of ICT skills, and a growing number of businesses use e-learning in the training of business and soft skills. At Nestlé, for example, e-learning is used to train employees on communication, teamwork, and leadership skills (“Nestlé Widens Course Offers,” 2004), and, at Bank of America, e-learning is the delivery mode of choice for interpersonal skills training (Dobbs, 2000). Some of the most common business and soft skills to be

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taught via e-learning in organisations include management, leadership, communication, customer service, quality management, and human resources skills (Skillsoft, 2004).

David, Salleh, and Iahad (2012) show the positive relationship among ICTs, labour productivity and total factor productivity. Studies have also demonstrated a relationship between the prevalence of ICT at work and the rate of workplace learning. Knowledge and innovation are the keys to organisations' productivity, and e-learning is one of the most effective ways to share knowledge developed through innovation. In particular, e-learning offers small and medium-sized enterprises (SMEs) an unprecedented opportunity to improve their economic performance, and it is a potential solution to their development during the early stages of their lives.

Business training pathways delivered via e-learning are characterised by an intensive use of technology, especially digital technology. ICTs enable conditions to be created in order to obtain, access, organise, process, transmit and generally use information that is managed in educational contexts.

The use of ICTs in business growth support pathways represents an opportunity to network with the main international agents of innovation (public authorities, investors and business angels, financial entities, firms within a particular sector, clusters, and so on), thus providing a new firm with the necessary resources for growth in the global market. That is why financial and non-financial support measures, such as information, training, expert advice through mentoring, contact networks and access to investment, are focused on the project for growth.

Coll, Majós, Teresa, and Onrubia (2001) and Martí (2003) have characterised certain potentialities of ICTs, which change –or can

change– either the learning process or the mental functioning of the trainee when the latter is associated with content information whose support is based on the application of ICTs. The application of ICTs to business creation and growth support pathways helps to train the participant in several areas (Badia et al., 2005): 1) support for understanding the training activity; 2) learning planning, encouraging the entrepreneur's time planning regarding actions that enable the proposed objectives to be attained; 3) provision of content that the entrepreneur is able to acquire in a flexible way in terms of time, and support for knowledge construction; 4) communication and collaboration, which allow the entrepreneur to know when, where, how and to what extent the social and instructional interaction between him or her, the trainer and other learners will take place, and; 5) evaluation of progress on the training pathways. From the viewpoint of the evaluation of the entrepreneur's training, this type of educational help must enable the trainee to regularly find out what progress he or she has made in the learning process, what content he or she has properly learned, what aspects of his or her learning ought to be improved and how to properly construct his or her skills.

E-LEARNING USE IN SPIN-OFF GROWTH: PRELIMINARY EVIDENCE FROM THE AUTONOMOUS UNIVERSITY OF BARCELONA

Making a significant contribution to the development and competitiveness of firms has become a priority for universities. Besides teaching and research, establishing relationships of collaboration and transfer has become the latest mission of universities. Firms tend to collaborate with universities when seeking to attain three major types of objective: efficiency, learning or access



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to knowledge, and adaptation to the setting (García Canal, 1993; Child & Faulkner, 1998). Within this context, it has been noted that firms establish collaborative arrangements with universities for six different reasons: financial, technological, strategic, educational, political and epistemological (Autio, Sapienza, & Almeida, 1996).

However, the potential of universities as a source of knowledge and technology creation and transfer, coupled with their entrepreneurial spirit, has taken the relationship with firms beyond cooperation. At the same time, universities can be service providers, cooperative partners in a project or competitors, thus bringing value to firms. They can do all of these things thanks to instruments that favour business growth: pathways delivered via e-learning in business accelerators, in which it is possible to determine a clear contribution to the value of firms that goes further than simply assisting with their creation. The university entrepreneur sees how the staff at a science park become jointly responsible for business growth, linking organisational functions of networking with the main agents of innovation, which until now have not been observed. Among others, the latter include support for commercial help, involvement in shareholders' meetings and support for negotiations with investors.

Although the results remain to be seen, we can already say that, with the use of e-learning, models that are more committed to business growth are being sought. And, within those models, universities, public authorities, investors, mentors and the main international agents of innovation come together in pursuit of a common objective: to train firms for growth. A summary of the results obtained from an e-learning experience for business growth at the Autonomous University of Barcelona (UAB) is given below.

Created in 2007 as a not-for-profit private foundation, the UAB Research Park is the hub through which three leading research entities operate: the UAB, the Spanish National Research Council (CSIC) and the Institute for Agri-Food Research and Technology of the Government of Catalonia (IRTA). Its aim is to improve knowledge and technology transfer between the university and firms.

The UAB Research Park is positioned as an instrument that facilitates the transfer of knowledge originating at the heart of the university. There are more than 30 research centres located at the UAB Research Park. Specifically, there are 2 environmental science centres, 10 social science centres, 5 biotechnology and biomedicine centres, 3 animal health and food technology centres, and 14 experimental science and technology centres. Business activities are carried out through 50 firms (spin-offs and start-ups), 65% of which belong to the technology sector.

One of the main activities of the UAB Research Park is the creation of firms, as one of the main channels for transferring knowledge to society and for providing qualified students with new employment opportunities.

In 2013, a business incubation support programme was set up, in which 12 spin-off firms took part in order to increase their business growth. The methodology used was a training programme that made an intensive use of ICTs. The activities it comprised were mentoring, training and searching for RD&I funding for businesses in the technology sector.

The action areas were the researcher' financial management and commercial training over a period of one year. The financial results suggest that those firms that had intensified their RD&I and innovation, secured funding through commercial banks or public/private grants and strengthened their commercial

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teams have seen an average 14% growth in their annual turnover figures.

CONCLUSION AND DISCUSSION

At this time of social and economic crisis, when there is increasing pressure on university managers to seek better and more effective ways of managing resources, the business incubation model is being called into question, which is why new business incubation pathways are emerging. Business accelerators support business growth through new training pathways with or via the use of e-learning and networking.

These business accelerators emerge with a twofold objective. First, to offer growth solutions to firms and to increase returns to universities on spin-off transfer agreements. Second, in a global market where support for internationalisation and seeking out international financial instruments is relevant to the growth of firms, it is worth noting that, despite leading to the creation of more university spin-offs and skilled jobs, the observed outcomes of these incubation-stage promotional and educational practices applied

in science parks have been modest in terms of their contribution to the business growth of the spin-offs located in them. In turn, this means that the income that universities earn from university-spin-off transfer agreements is not as high as expected.

As we have seen from the practical case mentioned, the implementation of new promotional practices based on e-learning can be effective in terms of business growth outcomes, especially when the training offered enables the acquisition of knowledge on market functioning or business management.

However, despite the benefits derived from e-learning, it is necessary to consider the existence of certain limitations that may affect the generalisation of the conclusions drawn in this work. First, the conclusions must be viewed with caution, as this is a case study and, as such, the results obtained are limited to the characteristics and circumstances of the institution where, and the moment when, the study was conducted. Second, it is necessary to highlight the diversity of spin-offs located in science parks. This suggests the need to further analyse the different typologies of firms located in science and technology parks, whether technology-based or otherwise.

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