

Analysis of the growth of the e-learning industry through sustainable business model archetypes: A case study.

Nuria Calvo, University of A Coruña

Oskar Villarreal, University of Basque Country

ABSTRACT

Information and communication technologies applied to education through e-learning innovative solutions emerge as a relevant driver of change in the publishing industry, involving not only the supply of new educational resources, but also a reduction of paper consumption used in the traditional book edition. The dual goal of this paper is, firstly, to identify sustainable business model archetypes that illustrate the behavior and potential growth of firms in the e-learning industry and, secondly, to provide evidence of the existence of these archetypes through the study of strategic actions and managerial perceptions in a case study of rapid internationalization in this industry. The analysis follows a two-stage method. First, the main behaviors of e-learning firms are identified and grouped in sustainable business archetypes and the research proposals defined. Then these proposals are applied to a case study of the e-learning industry. This analysis furnishes evidence to conclude that the alliance of software firms with publishers becomes a driver that allows e-learning firms to overcome some of the limits of their growth model and maintain sustainable business models.

Key words: sustainable archetype, international strategy for SMEs, single case study, born-global firm, e-learning industry.

1. Introduction

Sustainable systems involve multiple relations between environmental protection, economic performance and societal welfare (Glavič and Lukman, 2007), often guided by innovations. In this sense, the application of information and telecommunications technologies (ICTs) to education involves social and organizational innovations known as e-learning systems that affect not only the way individuals learn but also the competitive configuration of the educational contents industry and its impact on the environment. In this regard, firms demand new strategic approaches adjusted to the requirements of these innovations. Based on a recent review of theories of the firm and their contributions to corporate sustainability, Lozano et al. (2015) propose a 'Sustainability-Oriented Theory of the Firm' and Tamayo et al. (2017) define a strategic eco-innovation model to identify and understand how and why eco-innovations are developed.

One of the direct environmental impacts of the application of ICTs to the publishing industry is the abandonment of the production of paper-based books, reducing wood pulp consumption in this industry. The world's forest area was reduced by 14% between 2005 and 2010. Together, just five countries (Brazil, Russia, Canada, United States and China) provide more than half of the world's entire forest cover (FAO, 2004). Over the last five years, the USA became the leader in world pulp consumption, and was responsible for around 17% of wood use in the EU. The paper book production process is the main consumer of wood in the EU (17% from 2005 to 2010) because this material is being used for printing graphic papers, composed of newsprint, printing, and writing paper (Eurostat, 2011). Other costs such as energy consumption and the use of industrial machinery during the paper production process are also included in the total environmental impact cost assumed by the publishing industry. However, these costs are also relevant in the e-learning industry, although it is not yet possible to compare the different impact of these costs in both industries.

From a strategic perspective, e-learning systems based on the use of ICTs have changed the configuration of the publishing industry over recent years. ICTs applied to educational aims are able not only to ensure that society has more access to education, but also, through e-learning applications, to reduce paper consumption utilized in traditional book publishing, which involves a dual economic-environmental impact. In this sense, ICTs applied to advanced learning also contribute to sustainable behavior in the private sector (Lozano et al., 2013). From an economic perspective, North America has become the first e-learning market, with 85% of total deal value, followed by Europe, which held 10.2% of total deal value in 2012 (Ibis Capital, 2013). However, there are differences in the behaviors of the main participants in this industry. Software firms with a strategic niche focus are becoming relevant providers of technical solutions for e-learning contents, and they seek rapid internationalization, while at the same time publishing companies are delaying their participation in e-learning business models because of the high investment they previously shouldered in paper-based business models.

Because of the economic relevance of this issue and its social implications, it is important to answer the research question: Can the growth pattern of e-learning companies be modeled through SBMAs (Sustainable Business Model Archetypes)? From the analysis of SBMAs defined by Bocken et al. (2014), this paper identifies the archetypes most linked to the value proposal and the main behaviors in the e-learning industry from 2000 to 2015. Application of this conceptual framework to a case study of rapid internationalization in the e-learning industry enables us to study strategic actions and managerial perceptions in the internationalization decision-making process and to provide a new conceptual framework for future research.

1.1. Rapid internationalization and SBMAs

The literature on rapid internationalization has identified the pace, scale, and pattern of internationalization as relevant dimensions to explain this growth model in different industries (Aspelund and Moen, 2001; Shrader et al., 2000; Bell et al., 2003). Regarding social and environmental impacts of firms growth, some researchers have also proposed SBMAs that group business model innovations according to innovation focus (either technological, social, or organizational) (Boons and Lüdeke-Freund, 2013). These archetypes let us understand the way some business models support sustainability (Yip and Bocken, 2018). In this sense, identification of SBMAs in the growing industry of e-learning can involve a higher contribution to superior customer value and the sustainable development of companies and society (Lüdeke-Freund, 2010).

Following the classification by Bocken et al. (2014), SBMAs are grouped into innovations with a (1) Technological, (2) Social or (3) Organizational orientation. The technical grouping includes business model archetypes that use technology to maximize materials and energy efficiency, to create value from waste, and to substitute traditional processes with renewables and natural processes. The social grouping includes business model archetypes with a dominant social innovation component, because they deliver functionality rather than ownership, adopt a stewardship role, or encourage sufficiency as key business value. Further, business model archetypes in the organizational grouping have a dominant organizational innovation-change component, because they change the firm's social responsibility perspective towards society and the environment and develop scale-up solutions. In this sense, researchers have applied SBMAs to understand the business models that support sustainability overall in manufacturing industries (Bohnsack et al., 2014), but there are also applications in different industries like banking (Yip and Bocken, 2018) and new approaches to the canvas tool that evaluates the sustainability potential of specific business models (Joyce and Paquin, 2016). Similarly, the strategic eco-innovation model (Tamayo et al., 2017) enables an understanding of the way in which internal and external factors interact in the eco-innovation process, and the main relationships between the agents involved in this process at the level of the generic (macro level), specific (meso level) and internal environment (micro level).

SBMAs allow us to identify and group sustainable behaviors in line with innovation focus, considering at the same time the impact on civil society and the natural environment. In recent years, researchers have studied business models including environmental and social requirements (Joyce and Paquin, 2016). In this sense, there are new insights that state the existence of business models more capable than others of supporting value creation (Bocken et al., 2014) and innovation for the whole industry (Carayannis and Campbell, 2009, 2010).

Nevertheless, despite previous research there is still a lack of studies that analyze the growth rate of these business models in a specific industry.

1.2. Research gaps and objectives

This analysis is focused on the emerging e-learning industry. In this environment, application of the latest ICT advances to the education sector is changing the strategic configuration of publishing companies, educational institutions, and training departments in many companies (Ibis Capital, 2013; Docebo, 2014; Crossknowledge, 2011). Technological improvement and the design of high-capacity networks for sharing data

have made it possible to solve some of the limitations of traditional learning methodology, facilitating both access to information and the adaptation of programs to individual needs (Ibis Capital, 2013), although it is important to nuance that the mere application of ICTs to educational contents is not a recipe for increasing learning, and produces quite the opposite effect (Ettinger et al., 2006). Meanwhile, none has defined any SBMAs for the e-learning industry, and there are no explicit models that predict the growth pattern of born-global firms in this industry.

The dual goal of this paper is, firstly, to identify the archetypes that illustrate the behavior and potential growth of firms in the e-learning industry and, secondly, to proffer evidence of the existence of these archetypes through the study of strategic actions and managerial perceptions in a case study of rapid internationalization in this industry.

1.3. Overview of the e-learning industry

The e-learning industry has maintained and even increased its growth since 2000 (Ibis Capital, 2013). The data also shows market acceptance of e-learning solutions in companies, especially in primary and secondary schools (Docebo, 2014). Within academic institutions, though, there is still a gap between those that believe e-learning solutions are of critical importance, and those who actually go ahead and include the development of these solutions in their strategic plan (Ibis Capital, 2013).

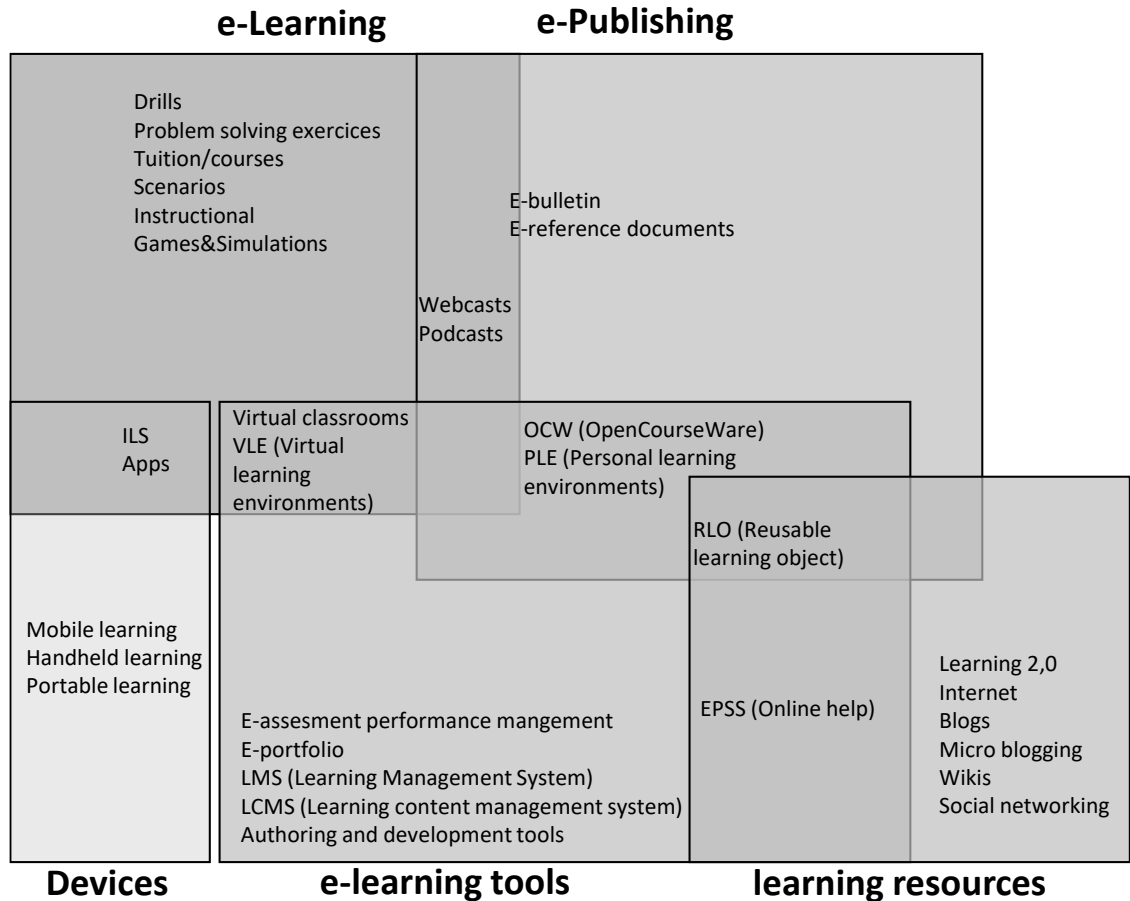
Earlier applications of e-learning showed that such technological tools do not automatically guarantee high levels of learning (Snyder, 2000; Ettinger et al., 2006, Fernández Díez de Lastra, 2001). Ettinger et al. (2006) demonstrated that the mere act of uploading paper materials to a software platform may reduce motivation and, thereby, some learning outcomes. Discussion of these problems generated a second wave of development of new e-learning models (Servage, 2005). Because of the different approach to learning fostered by the new model, it was argued that the e-learning system needed a different pedagogical system (Roy, 2006). In consequence, various firms focusing on the management of educational contents for e-learning have sprung up over the last decade. These firms offer teams of experts in pedagogy, scriptwriting, and technical knowledge who all work to create personalized educational paths and take advantage of all the possibilities offered by enhancing learning software platforms. Further, the development of e-learning educational materials has in fact produced an increasing demand for standard rules to facilitate the compatibility of contents and software platforms (Singh and Reed, 2002; Orbea, 2008).

The application of ICTs to learning is transforming each stage of the education industry, and it is also enhancing methods of creating, storing, distributing, and producing learning content. New devices and systems to increase learning management emerge as new tools to support the learning process through digital contents (Ibis Capital, 2013), while blended learning approaches combine face-to-face classroom learning experiences with online learning experiences (Garrison and Kanuka, 2004). The audience for e-Learning includes pre-K-12, K-12, higher education, further/adult/social education, professional education, and corporate training, all of which constitutes an important market. The cost for education has been rising faster than inflation for decades (OECD, 2011), and this represents a big opportunity for all stakeholders involved in the e-Learning sector. In this sense, North America dominates the industry in value and number of deals, and is the first market for e-learning industry, but the UK and Spain are currently leading the adoption of e-Learning in Europe (Ibis Capital, 2013).

With regard to the supply of educational resources, the application of ICTs to the creation of digital contents and management tools has shaped two avenues of supply to the industry: e-learning, and e-publishing, which group the supply of e-learning applications into devices, e-learning tools, and e-learning resources (Figure 1).

Software companies offer these products directly to final users, or through publishing companies. In addition, software companies also offer to publishers specific e-learning tools and resources to enable publishing companies to create and manage e-learning contents.

Figure 1. An overview of the e-learning industry



Adapted from IBIS Capital (2013).

2. Methods

This analysis follows a two-stage method. In the first stage of the process, the main behaviors of e-learning firms were identified and grouped in sustainable business archetypes, following Bocken et al.'s (2014) classification. Then, considering growth trends in this industry, the main variables involved in their growth archetype were identified, following Braun's approach (2002), and the research proposals were defined. In the second stage of the process, the study proposals were applied to a Spanish company (NETEX), a relevant example of rapid internationalization in the e-learning industry, following a single holistic case study design adapted from Villarreal (2017) and Villarreal and Landeta (2010) and applied in previous studies (Villarreal, 2008b; Villarreal and Calvo, 2015).

2.1. *Identification of archetypes and growth patterns*

The industry data was gathered from strategic analysis reports produced by the e-learning industries (Ibis Capital, 2013; Docebo, 2014; Crossknowledge, 2011) and from consultation with experts in this industry at international e-learning industry meetings (ExpoLearning) in 2014 (18-19 July, Bogotá) and 2015 (5-6 March, Madrid). The information about the industry trends and supply of e-learning solutions was obtained from a first focus group of 16 experts in 2014 attached to public institutions of education (37.5%) and private companies engaged in the creation and distribution of e-learning products (62.5%), and a second focus group of 32 experts in 2015 (28.1% public institutions, 72% private companies). Universities, research institutes and employment services were represented in the public institutions. Software developers, consulting firms, publishers and the training departments of big companies involved in the energy and health industries were also represented in the private sector. In 2014, participants of the focus group came from Spain, Colombia and Ecuador, and they focused on the analysis of the impact of different models of e-learning at organizations, emerging trends regarding with MOOCs, gambling and data, international framework of the quality standards of the e-learning models and future opportunities for e-learning suppliers. In 2015, participants came from Spain and USA and they focused on the impact of technology in the e-learning models, legal issues, competencies development through e-learning processes and collective impacts of e-learning at public and private organizations. We used the classification made by Bocken et al. (2014) to identify the archetypes that were most linked to the value proposal and the main behaviors of the e-learning industry between 2000 and 2015, and the most relevant variables for explaining these behaviors.

Individuals in organizations take decisions based on economic and strategic constraints following a rational approach. Economic models of organizational behavior (organizational economics) presume that human behavior is rational or bounded rational (Simon, 1978), although the effects of the size, sign of the reward and the delay between decision and consequences are relevant variables for explaining human decisions (Thaler, 1981). However, there is no evidence that supports the existence of SBMAs as a planned framework for the decisions of firms in any industry. In consequence, it is necessary to study the behavior pattern based on the individual decisions of e-learning firms to see if these behaviors can result in a collective SBMA effect on the industry.

From this perspective, this analysis was also aimed at identifying the following growth patterns of e-learning firms as SBMAs:

1. The production of digital contents for publishers increases the perception of the e-learning firm's need to invest in learning products that are less pollutant than paper books (Technological archetype)
2. The innovative vision of managers to offer access (not ownership) to digital products without the need to depend on paper textbooks will increase the perception of the e-learning firm's need to invest in providing shared-used products (Social archetype)
3. Organizational designs involving other stakeholders in the firm's value chain will increase the e-learning firm's perception of the need to invest in creating alliances with e-learning industry stakeholders than in the paper-based industry (Organizational archetype)

2.2. Case study

To illustrate how an innovative strategy in education can expand a firm's frontiers through SBMAs, the method used was a single holistic case study design, adapted from Villarreal (2017) and Villarreal and Landeta (2010), and applied in previous studies (Villarreal, 2008b; Villarreal and Calvo, 2015). This design was devised using the most relevant contributions to this methodology (Eisenhardt, 1989; Yin, 1994, 2012, 2014; Maxwell, 1996), taken from a literature review. This allowed us to implement a series of protocols to test the theoretical framework against the real case studied.

The company examined in the case study (NETEX) was selected due to its international growth pattern and its valuation in the e-learning industry (in October 2017, this firm was valued in the alternative stock market at 16.4 million euros). Global markets maintain gaps in specific niches that may remain competitive for firms focused on a very specialized strategic approach. The literature has identified the pace, scale, and pattern of internationalization as main drivers of the rapid internationalization of firms (Aspelund and Moen, 2001; Shrader et al., 2000; Bell et al., 2003; Taylor and Jack, 2013). However, there is still a research gap in reaching an understanding of the archetypes that support the growth patterns of these firms.

The use of multiple sources of evidence was aimed at supporting the construct validity of the research proposals (Yin, 2003). Study of the e-learning industry reports and internal documents provided by the company was complemented with a detailed survey of the technical staff (analysts from the internationalization department), two in-depth interviews with the firm's general manager and a third interview with the manager of the international department. The case study database included internal and external documents as secondary sources and audio records, data from the survey and interview notes.

Table 1 shows the methodological design conducted to study the selected firm.

Table 1. Methodological design

Purpose	To find evidence of the existence of sustainable business model archetypes and growth limits through the study of strategic actions and managerial perceptions during the internationalization process of a born-global firm		
Framework	Sustainable business model archetypes (Bocken et al., 2014)		
Unit of analysis/Selection criteria	Unit of analysis: strategic behavior-based focus of a firm Level of analysis: holistic Selection criteria: Single case (NETEX) as representative of born-global in e-learning industry		
Method of research	Combination dynamic simulation/qualitative techniques from a real context		
Design of instruments and protocols	contemporary case study		
Field phase: Data gathering (use of multiple sources of data: triangulation of evidence)	Documentary evidence (documentation and archives)	<u>Internal</u>	Strategic documents provided by the founder and general manager (Carlos Ezquerro) - Future launching of e-learning solutions - Financing projections - New product developments Technical reports provided by the international department and marketing department of NETEX

			Survey conducted with the technical staff of the international department of NETEX
		<u>External</u>	Financial statements of the company (SABI database) External reports of the company
	Interviews	2 Face-to-face interviews conducted with Carlos Ezquerro (general manager and founder of NETEX) (3 hours 30 minutes in recording files) and an interview with Ricardo Álvarez, manager of the International department of NETEX (two hours and ten minutes in recording files)	
Registration and classification of the evidence	Transcription of facts, data, interviews, and documentary review. Examination, categorization and combination of the evidence based on a pre-established structure, generating a database that will facilitate individual case analysis		
Individual case analysis: Operation of the analysis	Connection between the theoretical proposals whose structure is based on the conceptual framework and evidence gathered and classified from the case. Identification of research proposals from the theoretical model that are confirmed in the case analyzed, and creation of a theoretical explanation that improves understanding of the key factors		
Rigor and quality of the study	Validity (constructive, internal and external), reliability and consistency		
General composition and conclusions	Integration of the aims of the study and research proposals with the previous diagnosis and theoretical framework on this phenomenon		
Implications of the research	Academic, industrial, and government level		

2.3. Data analysis

The research on the NETEX growth model was conducted from February 2014 to December 2015. Some aspects of this model signal this company as an exemplary case of accelerated internationalization: global management vision, management commitment, an international proactive niche-specific strategy, and the creation of value-added and personal or organizational networks (Madsen and Servais, 1997; Autio et al., 2000; Shrader et al., 2000; Oviatt and McDougal, 2005; Autio, 2005).

After prior analysis of the secondary sources (external and internal documents) and the selection of the theoretical framework (Sustainable Business Model Archetypes) and research proposals, contact was first made with the firm's general manager to sign a formal protocol of information exchange; then a preliminary survey was developed with the technical staff of the Internationalization Department. After analyzing the answers to this survey, three semi-structured face-to-face interviews were conducted, two of them with founder and general manager Carlos Ezquerro and the third with Ricardo Álvarez, manager of the Internationalization Department. As well as the triangulation of sources of information supporting construct validity, the reliability of the case study was addressed by defining protocols for archiving documents and transcribing interviews (Yin, 2003; Schweizer, 2005).

Table 2 shows the rigor and quality assessment tests used in this case study, employing the methodological criteria developed by Yin (1994), and Villarreal & Landeta (2010). Following these approaches, the use of a single holistic case study reduces the external validity of the analysis for its replication, which should be considered as a limitation of the study.

Table 2. Case study assessment test

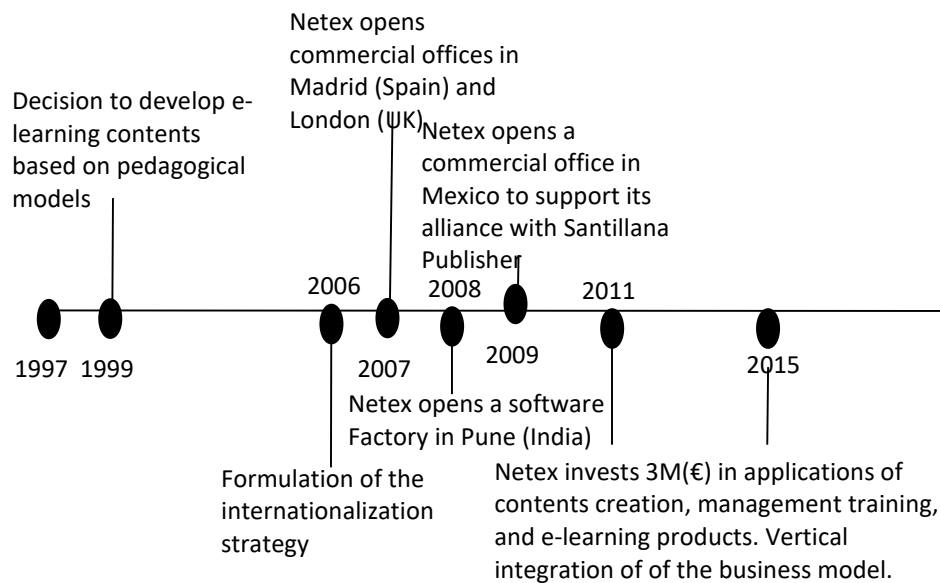
Test	Tactical	Research phase
Constructive validity	<p>Prior analysis of the conceptual context and theoretical framework (<i>theoretical triangulation</i>).</p> <p>Structural design of main conceptual elements based on the “Model of ten strategies of internationalization” (Villarreal, 2008a) (theoretical model).</p> <p>Use of different methods for evidence gathering (<i>methodological triangulation</i>):</p> <ul style="list-style-type: none"> - Documentary review. - Multiple in-depth interviews. - Use of physical, technological, and cultural artefacts. <p>Use of multiple sources of information. (<i>data triangulation</i>) to confirm evidence in different sources:</p> <ul style="list-style-type: none"> - Internal and external, direct (primary) and indirect (secondary). - Varied typology: documentation, files, interviews, questionnaires, databases, real physical context. - Diversity of key informers faced with the same questions. - Critical assessment of evidence compared by source. <p>Quasi-simultaneous and unified process of evidence gathering and analysis.</p> <p>Establishment of chain of evidence.</p> <p>Feedback and interactive contact with informers.</p> <p>Review of case report by key informers.</p> <p>General and instrumental flexibility of the research through cyclical review of the field study and the original structural model.</p>	<p>Review of the literature</p> <p>Research design</p> <p>Evidence gathering</p> <p>Evidence gathering</p> <p>Evidence gathering and analysis</p> <p>Design and gathering</p> <p>Gathering and analysis</p> <p>Composition</p> <p>All</p>
Internal validity	<p>Pattern matching (support in theoretical proposals).</p> <p>Creation of explanation (systematic comparison of the structured literature in the theoretical model).</p>	<p>Individual and replication analysis</p> <p>Individual and replication analysis</p>
External validity	<p>Eclectic and inclusive approach to the theoretical perspectives and focuses on innovation.</p> <p>Use of rival theories in original model (<i>theoretical triangulation</i>).</p> <p>Establishment of unit of analysis and selection of the case based on the potential of knowledge on the phenomenon studied</p> <p>Selection of evidence-gathering methods (<i>methodological triangulation</i>) and information sources (<i>data triangulation</i>) based on the potential for understanding the phenomenon under study.</p> <p>Use of key explanatory factors of rival theories in the case.</p> <p>Consideration of the research results as an initial hypothesis for studies in future lines of research.</p>	<p>Research design</p> <p>General design</p> <p>Identification of unit of analysis and selection of case</p> <p>General design and evidence gathering</p> <p>Individual analysis</p> <p>Composition and conclusions</p>
Reliability	<p>Creation of a <i>study protocol</i> and monitoring of guidelines as a guide for action.</p> <p>Preparation of a <i>database</i> that will organize, integrate, and synthesize the information obtained from the different sources of evidence.</p> <p>Ethical commitment on effort, time, dedication, and specific activities of the key informers involved.</p> <p>Rigorous assessment of ethical aspects in obtaining and analyzing the evidence.</p>	<p>General design and data gathering</p> <p>General design and data gathering</p> <p>General design and data gathering</p> <p>General design, data gathering, and analysis</p>
Theoretical-interpretative consistency	<p>Prior understanding of perspectives and terminology of the phenomenon and the context according to key informers (high degree of empathy with the information source reference frameworks).</p> <p>Use of techniques (starting protocol, open questions, semi-structured interviews) that will allow dialectic initiative by key informers.</p> <p>Systematic critical comparison between the theoretical proposals structured in the theoretical model and those assumed and obtained from the sources of evidence.</p> <p>Critical filtering of the contextual knowledge based on relevant conceptual and theoretical elements established in the theoretical model.</p>	<p>General design and data gathering</p> <p>General design and data gathering</p> <p>Data gathering and analysis</p> <p>Data gathering and analysis</p>
Contextual consistency	<p>Attention to relevant contextual elements for explaining the phenomenon to be studied, even those not explicitly set out in the original model.</p> <p>Consideration of the generic environment of the unit of analysis and critical assessment of the evidence based on the (macro) context.</p> <p>Consideration of the specific environment of the case and critical assessment of the evidence based on the (micro) context.</p>	<p>Evidence gathering</p> <p>Data gathering and analysis</p> <p>Data gathering and analysis</p>

3. Results and discussion

3.1. Contextualization of the case of rapid internationalization

NETEX is a Spanish born-global firm that offers a new strategic approach in the e-learning industry (Appendix I, Appendix II). The company was established in April 7 of 1997 as an e-learning company, when scarcely anyone really knew this technology. The following year (1998), the managers of this company convinced NETEX to become a partner of IBM. From 1999 to 2015, the managers of this company followed their main strategic focus along the timeline below (Figure 2).

Figure 2. Timeline of NETEX (1999-2015)



The NETEX business model matrix includes two markets (corporates and publishers) and two lines of solutions (e-learning contents and e-learning software) (Table 3).

Table 3. Business model of NETEX

		MARKETS	
		Corporates	Publishers
SOLUTIONS	Contents	Learning Coffee Customized contents	Creation and adaptation of traditional contents to e-learning models
	Software	Learning Cloud Applications for creation, distribution, and management of e-learning contents	Technical developments for creating multi-device digital contents Management software for educational systems

Thus, from a technologically innovative perspective, NETEX offered the technical platform, the pedagogical model, the software factory, and integration of all contents in a complete e-learning business model, for its two target market segments: corporates and publishers.

The firm's growth model was focused on three business models: Corporate B2B (business to business: corporate market), Publishing B2B (publishers' market,) and B2C (business to consumer: standard products for final users). Beneath, a layer of project managers and a content factory with a pool of technical specialists supported each of the business models.

-The corporate B2B model involved consulting work. Since this model demanded an organizational structure that NETEX could not afford, the B2B was not activated as a growth vector in the internationalization strategy.

-The publishing B2B model, however, was an interesting option for international growth, both in the UK (NETEX had a previous relation with the publisher Cambridge Press), and Latin America, through the strategic alliance with Santillana. This type of growth made it possible to keep the software factory in Spain or India, and to move only a small group of employees to take initial requirements and follow up customer expectations through a small commercial office.

-Lastly, the B2C model was planned as a future growth vector where NETEX could eventually implement its e-learning solutions through mobile devices with students in public schools in different countries, through a previous contract with the Government of these countries.

So, the factors that support the growth pattern of NETEX are those that explain the competitive advantage of this firm in the international market: a) an in-depth analysis of the e-learning trends in international markets; b) internal technical competences geared to design and develop valued e-learning solutions in goal-markets and c) the strategic alliances with publishing companies that play the roles of contents suppliers and clients at the same time.

3.2. *Analysis of research proposals and SBMAs*

Following the research question planned at the beginning of the paper, that is, Can the growth pattern of e-learning companies be modeled through SBMAs?, and when the e-learning industry SBMAs had been identified and an exemplary case study selected, the research proposals were applied to the NETEX growth process.

These proposals involved the drivers of the internal decision process for investment in a growth model with the company's actions and the managers' perceptions.

P1: "The production of digital contents for publishers increases the perception of the e-learning firm's need to invest in learning products that are less pollutant than paper books" links the behavior pattern of e-learning industry with one of the technological SBMAs of Bocken et al. (2014). We studied the internal behavior of NETEX (actions) through secondary sources, and the perceptions of its managers through personal interviews, concluding that both (actions and perceptions) were aligned with the research proposals. The long-term strategy of this company was to enter the USA market, and the managers accordingly decided to focus on digital contents production for publishers, investing in their own technology and commercial offices in relevant locations for their key publisher customers (London, Mexico). Therefore, we provided evidence of the existence of the SBMA *Maximize material and energy efficiency* in the case study (Confirmed).

P2: "The innovative vision of managers to offer access (not ownership) to digital products without the need to depend on paper textbooks will increase the perception of the e-learning firm's need to invest in providing shared-used products" links the behavior pattern of e-learning industry with one of the social SBMAs of Bocken et al. (2014) that

is changing the game rules in the contents edition. E-learning solutions enable access to contents without needing the holder (paper book), and allow personalization of the learning process, based on the accreditation of performance standards (Ibis Capital, 2013). As in the previous case, we studied the behavior of NETEX and the managers' perceptions, concluding that NETEX renounced local opportunities for its business that could be profitable in the short-term but stood at a remove from the strategic focus of their managers (internationalization in USA as relevant provider of e-learning solutions). Instead of getting short-term cash flow through these local opportunities, in 2011 the firm invested more than 3 million € in the internal development of e-learning solutions based on individual user needs. The final goal of this strategy was to support the firm's growth on future alliances with the international partners who sold access to the NETEX e-learning platform to the final customers. Hence, we located evidence of the existence of the SBMA *Deliver functionality rather than ownership* in the case study (Confirmed).

P3: "Organizational designs involving other stakeholders in the value chain of the firm will increase the perception of the e-learning firm's need to invest in creating alliances with the stakeholders of the e-learning industry, rather than in the paper-based industry" links the behavior pattern of the e-learning industry with one of the organizational SBMAs of Bocken et al. (2014), "Develop scale-up solutions of the e-learning industry." In this sense, e-learning business models change the traditional partner-supplier-client-competitor relation in the domestic market, expanding these relations to the global market. Thus, the actions of NETEX (increasing production capacity in India and the strategic alliance with the publisher Santillana) were aligned with the initial perceptions of their managers. As for the alliance with Santillana, NETEX broke the traditional provider-company-customer relation, allowing the publisher (Santillana) to use its technology as a competitor. However, in the case of investment in the software factory in Pune (India), the managers reversed the initial action after analyzing coordination problems that accompanied this internationalization. Therefore, we provided evidence of the existence of the SBMA *Develop scale-up solutions* in the case study (Confirmed).

Table 4 shows the relation of the research proposals with actions and perceptions in the case study, and the degree of confirmation of these research proposals.

Table 4. Relation of research proposals with actions and perceptions

Research proposal	NETEX actions	Managers perceptions	Evidence
1. The production of digital contents for publishers increases the perception of the e-learning firm's need to invest in learning products that are less pollutant than paper books (Technological archetype)	<p>2006: Investment in its own e-learning software (LMS) to support the growth of the publishing industry (alliances with Santillana publisher and Cambridge Press).</p> <p>2007: Investment in a commercial office in London to maintain the relation with Cambridge Press.</p> <p>2009: Investment in a commercial office in Mexico to support the expansion of Santillana Publisher in this country.</p>	<p>"When we entered the publishing market, NETEX multiplied its billing by two. But we also multiplied our staff by two. So, in 2010, we thought: What will become of us? If tomorrow we bill twenty million, will there be 400, 500, 600 of us? No way. So, we decided to grow through our own products, not as consultants, but as the strategic suppliers of educational publishers." (Carlos Ezquerro, founder of NETEX, August 2014).</p> <p>"Our commercial positioning in the UK is an important requirement for the potential USA market, our strategic focus, since the UK is a global business capital of e-learning, and is well connected with Spain." (Carlos Ezquerro, founder of NETEX, August 2014).</p> <p>"We went to Mexico because of Santillana, Mexico, although it is a more immature market in e-learning, which might permit NETEX to position itself in both the educational and the corporate market, is</p>	CONFIRMED

		also of interest to us because of its geographical proximity to the USA market (Carlos Ezquerro, founder of NETEX, August 2014).	
2. The innovative vision of managers to offer access (not ownership) to digital products without the need to depend on paper textbooks will increase perception of the e-learning firm's need to invest in providing shared-used productst (Social archetype)	<p>2011-2012: Investment of 3M (€) in applications for contents creation (Learning Maker), management training (Central Learning), and e-learning products for the educational industry and the professional (corporate) industry.</p> <p>2012-2015: Development of user-based digital products for publishers and new alliances with international partners to sell technology consultation in e-learning.</p>	<p>"We did not want to achieve rapid growth in the local market to the detriment of losing the opportunity of gaining a relevant position in the global e-learning industry. That is why, in 2010, we decided to develop our own products. During 2011 and 2012 we invested over three million euros in it. And, thanks to this investment, which represented a slowdown in turnover, in 2013 we got companies in other countries to sell our products. And we were also considered as the only company at the European level able to participate in the development of international standards for programming e-learning products. For us, that is key to positioning ourselves as an innovative company and to being recognized internationally"(Carlos Ezquerro, founder of NETEX, August 2014).</p>	CONFIRMED
3. Organizational designs involving other stakeholders in the value chain of the firm will increase perception of the e-learning firm's need to invest in creating alliances with the stakeholders of the e-learning industry than in the paper-based industry (Organizational archetype)	<p>2008: Investment in a software factory in Pune (India) to produce digital contents (alliance with a local partner)</p> <p>2009: Strategic alliance with Santillana publisher in Mexico.</p>	<p>"In India 70% of global investment in software and technological developments is concentrated in e-learning, and it is currently where the most talent is being generated in these areas" (Carlos Ezquerro, founder of NETEX, August 2014).</p> <p>"Internationally, the organizational structure of NETEX not only allows us to outplace the software factory geographically (India), but also to do outsourcing through its suppliers and customers. That is only possible through the prior development of authoring tools and technology platforms, which reduces the need to demand technical qualifications for programming contents, and, also, through work performed previously by a pool of NETEX-approved technicians applying those tools; in future this could constitute a new source of income (certifications)." (Carlos Ezquerro, founder of NETEX, August 2014).</p> <p>"In our entry into India (...), even though the costs on paper were lower, we did not take into account that, in practice, the cycle product development was clearly longer than expected (...) In recent months we have been reducing the number of employees in India, leaving only a local coordinator of our activities in the country, plus a small technical team devoted to contents development. The analysis and technological design has been brought back to Spain." (Ricardo Álvarez, manager of the Internationalization Department of NETEX, August 2014).</p> <p>"Regarding our relationship with the Santillana publisher, some people say that it is risky to have so much dependence on one client. However, from our point of view it is not so clear who depends on whom. Of course, NETEX has many professionals working for Santillana but, if we disappear,</p>	CONFIRMED

		<p>the international business model of Santillana could be in danger.” (Carlos Ezquerro, founder of NETEX, August 2014).</p> <p>“Although some people here believed that facilitating the use of Learning Maker to Santillana would reduce its demand for contents, reality showed that this was a very partial view. When you hook the publisher up to this tool, he will get hooked up to your production model. Last year on Learning Maker Santillana had a sales volume of 500 books for distribution worldwide. This exponentially increased our software turnover (through licensing fees), which was also boosted by requests for contents furnishing special requirements for a final batch of digital books for Santillana. At the end of the day, an authoring tool is imitable. Others may appear in the market. If we let our ally have it we will increase the likelihood of that firm choosing us at a later date to help in the production of contents, even though we do not force it to do so by contract. (Carlos Ezquerro, founder of NETEX, August 2014).</p>	
--	--	--	--

According to the classification made by Bocken et al. (2014) and the consultation to experts, Table 5 shows the archetypes that are most linked to the value proposal and the main behaviors of the e-learning industry between 2000 and 2015 and the most relevant variables for explaining these behaviors.

Table 5. Sustainable business model archetypes in e-learning industry

Groupings	Technological	Social	Organizational
Archetypes	Maximize material and energy efficiency	Deliver functionality rather than ownership	Develop scale-up solutions
Value proposal	e-learning products generate less waste and emissions and create less pollution than paper-based products.	e-learning firms provide learning services without users having to own physical books. This reduces the production of materials aligning manufacturers’ and consumers’ interests. The e-learning technology also enables the supply of use-oriented and results-oriented products.	e-learning business models change the traditional partner-supplier-client-competitor relation in the domestic market, expanding these relations to the global market.
Main behaviors	The production of digital contents is one of the drivers of e-learning industry growth. The companies that lead this behavior are publishers (Pearson, Houghton Mifflin Hadcourt, Mc Graw Hill Education and Cengage Learning)	<p>Access to published learning content is more important for the clients of this industry than is ownership of the same content.</p> <p>Publishers are introducing hybrid models (combination of paper-based and digital contents) to preserve margins. However, there is a clear trend towards the migration of physical textbooks to e-books.</p> <p>E-Learning solutions, as opposed to physical textbooks, allow clients to increase the personalization of the learning process.</p> <p>E-learning solutions allow for both subscription-based services and freemium models. The latter will depend on achieving critical mass to layer on chargeable complementary services.</p>	<p>E-learning models allow companies to keep the relationship with digital content consumers as they move from school to the workplace.</p> <p>E-learning ecosystems (contents, technology, users, and administrators) mean that content can evolve away from their initial users. Innovation in management of e-learning contents is leading to a wide range of new businesses</p> <p>Since 2007, the publishing company Pearson has acquired 15 e-learning businesses</p>

		Accreditation of performance standards has become a relevant chargeable service in the e-Learning ecosystem	
Variables	Production capacity Technological capacity R&D investment	The industry's performance standards according to user needs (student) The industry's performance standards according to client needs (publisher) Number of subscriptions to e-learning solutions and complementary services (demand)	Growth pace Growth time Strategic focus of growth towards the collaboration

The archetypes of *create value from waste*, *substitute with renewables and natural processes* (technological), *adopt a stewardship role* and *encourage sufficiency* (social) were discarded because the value chain of e-learning firms are at a far remove from these behaviors, although we can find some marginal behaviors involved in these categories. E-learning firms are more focused on innovating in the learning process rather than designing business models based on the use of the recycling process, social and biodiversity protection, or sustainable consumption.

According to the data gathered, these are the most frequent archetypes involved in the e-learning industry:

- A. Technological: *Maximize and energy efficiency*: e-learning products drastically reduce paper consumption and contaminant emissions from the productive process, when compared to the paper-based industry.
- B. Social: *Deliver functionality rather than ownership*: e-learning firms reinforce the shared use of technological resources. The same learning management system or learning contents can be used by many clients, while ensuring at the same time their adaptation to each user's needs. Therefore, compared to the paper-based industry, the clients do not need buy the books, but only secure temporary access to them. This increases the efficiency of the consumption of resources.
- C. Organizational: *Develop scale-up solutions*: We observed a change in the partner-supplier-client-competitor relation in the e-learning industry as compared to the paper-based industry. Publishing companies play multiple roles in this industry: as contents suppliers, clients of e-learning technology firms, and competitors, because of the current coexistence of e-learning and paper-based books.

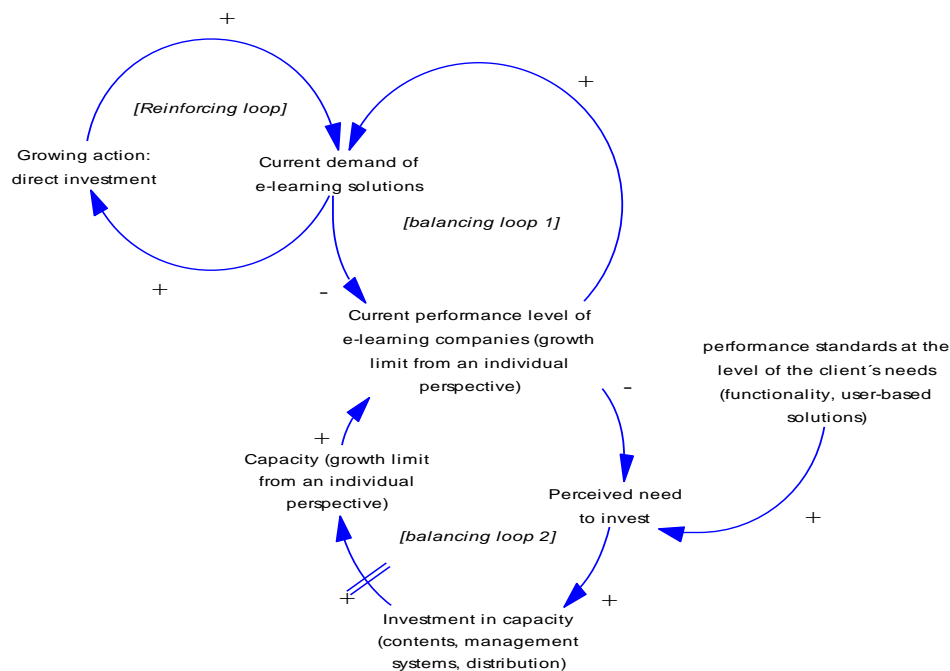
According to the previous analysis, there is evidence to conclude that the NETEX growth pattern follows the behaviors of the three SBMAs identified for the e-learning industry. These findings are aligned with the previous research of Yip and Bocken (2018) for the banking industry and Bohnsack et al. (2014) for the electric vehicles industry.

The evidence found in the study of the e-learning firm supports the drivers of the rapid internationalization studied in the literature in a context of an eco-innovation strategy. According to the strategic model of eco-innovation (Tamayo et al., 2017), the existence of an innovative organizational culture and entrepreneurial vision (internal factors), and a lack of opportunities in the domestic market (external factors), guide the strategy of the firm towards lead markets. Furthermore, the evidence shows how partners and collaboration between industrial, political, knowledge-creation, and social spheres in the same ecosystems are useful for the development and implementation of appropriate environmental solutions, as Carayannis and Campbell's (2009) argue, and Tamayo et al. (2017) confirm.

The SBMAs identified in the e-learning firm are rooted in value proposals that offer new relations between firm and stakeholders. E-learning business models have the potential to provide services that maximize material and energy efficiency, deliver functionality without the need for customers to own the products, encourage sufficiency of resources through the reduction of paper demand, and enable the development of scale-up solutions, expanding the use of learning services and business relations in the domestic market toward the global market.

However, as mentioned above, it is necessary to study the behavior pattern based on the individual decisions of e-learning firms to see if these behaviors can result in a collective SBMA effect on the industry. According to the data gathered, it can be inferred that the maintenance of the current SBMAs will depend on the potential growth limits for this industry. In this sense, the Growth and Underinvestment archetype of Braun (2002) was applied to the e-learning industry to identify its potential limits of growth. Figure 3 shows the causal diagram of growth and underinvestment in the e-learning industry.

Figure 3. Growth and Underinvestment archetype for the e-learning industry

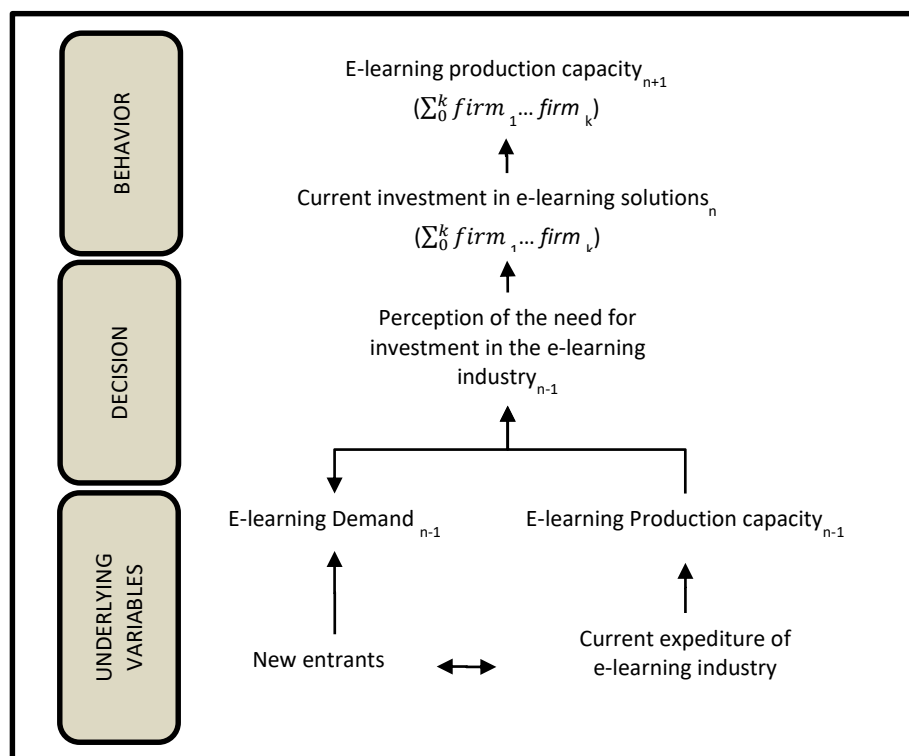


In this causal diagram, the growing actions of investment in new technologies and disruptive solutions in the e-learning industry (direct investment) increase the demand for e-learning solutions, estimated at 46,674.67 (US\$ millions) for 2016 (Docebo, 2017). In turn, the increase in the current demand reinforces the growing action of firms' direct investments, in a reinforcing loop behavior. However, in the short term, an increase in the demand reduces the current performance level of individual e-learning companies, which see that the demand exceeds their production capacity (growth limit), reducing current demand in a balancing loop in the long-term. Analysis of the gap between the current performance of the firm and the performance expected by clients in terms of functionality and user-based solutions will condition the perceived need to invest in the firm. Only if the gap is negative will managers decide to increase investment in capacity (internally or using external alliances). Further, the time delay between the investment and their consequences in increased capacity will condition growth of the

current performance of the firms (balancing loop), involving the behavior of the entire system.

Following the analysis provided by the causal diagram above, a conceptual scheme of the main variables involved in the growth pace of the e-learning industry is proposed (Figure 4). The values of direct investment, demand for e-learning products, new entrants, and the production capacity of the previous years can be retrieved from industry reports (Ibis Capital, 2013, Docebo, 2017). With these values as the starting point, firms could simulate the behavior of e-learning demand and the production capacity of this industry for the next years. According to this approach, the scenario for this simulation should be conditioned by two issues: (a) perception of the need for investment (internal) and b) new entrants in the e-learning industry (external). Thus, the need for investment, a decision variable and key driver of the growth of this industry, will only activate the flow of direct investment if the managers of each firm perceive the existence of a gap between the demand for e-learning products and the current capacity of the firm. However, depending on the delay in the information flow, managers will take this decision using data for the demand and production capacity of the previous year ($n-1$) and the threat of new entrants. The effect of the flow of direct investment in demand and the firm's capacity will not be immediate either, which provides a general picture of the limitations on this industry's growth, when demand stands above the production capacity of these firms.

Figure 4. Conceptual scheme of the growth of e-learning industry



4. Conclusions

This paper planned to study whether the growth pattern of e-learning companies could be modeled through SBMAs. After identifying the most relevant SBMAs in the e-learning industry, there is evidence of the existence of these SBMAs in an exemplary case study (NETEX).

From the perspective of this analysis, there is one driver that lets e-learning firms overcome some of the limits of their growth model. This driver is regarded as the perception of the need for investment in e-learning solutions. The decision made as to whether or not it is advisable to invest should be the result of analyzing the joint production capacity obtained by the alliance of the software firm with the publisher as provider, and the current demand for e-learning solutions based on the current alliance between the software firm and the publisher as client. Following this approach, the alliance between software firms and publishers will reduce the risks associated with growth, reinforcing behaviors linked to sustainable business model archetypes. In this sense, software firms would condition their technological capacity and R&D investment on their current alliance with publishers in their role as providers and clients, while the publishers would condition their production capacity to the current alliance with their technological provider (software firm), in an open-innovation relationship.

The identification of technological, social and organizational SBMAs in the e-learning industry reinforces the importance of the use of this conceptual model to facilitate the understanding of academics and practitioners about the variables involved in the industry's sustainable behaviors. From a global perspective, e-learning solutions are more environmentally friendly than paper-based products. However, firms will not invest in them if they do not have benefit expectations coming from these solutions, compared with the paper-based models. In this complex industry, old and new entrants are involved. Traditional publishers supporting the cost structure of the paper-based business coexist with technological experts in devices, e-learning tools and learning resources. The former have experience in education, the latter in the most sustainable way of achieving their educational targets. At the end of the day, the growth of the e-learning industry will depend on the perception of the need for investment in solutions of this nature; this perception will evidently be conditioned by the cost-benefit analysis of the existing gap between e-learning demand and e-learning production capacity. This work contributes to an understanding of the implications of the economic variables in investment decisions and industry behavior through the proposal of a new conceptual framework based on the application of the research proposals to a real case.

This analysis extends the research of SBMAs to the study of industry growth models from an open-innovation perspective based on intra- and inter-industry alliances, a systems dynamic approach, and the Quadruple and Quintuple Helix focuses. In this regard, internationalization of sustainable business model archetypes in the e-learning industry may produce not only a huge impact on paper consumption, but also involve a social transformation based on a new model of education. In this regard, the use of e-learning solutions has a dual impact on sustainable development. As this analysis evidenced, the production of e-learning solutions is supported by technological, social, and organizational archetypes but the use of these solutions also lets students participate in these sustainable development models through lower consumption of paper-based books.

As a final point, it would be of interest in the future to study the receptiveness of e-learning students to sustainable archetypes in the e-learning industry when the historical data becomes available and to validate the conceptual framework in other industries to confirm its transferability.

Acknowledgements

The authors wish to acknowledge NETEX professionals Carlos Ezquerro, Ricardo Álvarez, Eduardo López, and Arantxa López , for their deep involvement in the

research, and to express their gratitude to the editor and referees for their useful comments.

This work was supported by MINECO HAR2016-76198P (AEI/FEDER, UE) and Gobierno Vasco, Grupo Consolidado IT897-16.

References

- Autio, E., 2005. Creative Tension: the Significance of Ben Oviatt's and Patricia McDougall's article toward a theory of international new ventures. *J. Int. Bus. Stud.*, 36 (1), 9-19.
- Autio, E., Sapienza, H.J., Almeida, J.G., 2000. Effects of Age at Entry, Knowledge Intensity, and Imitability on International Growth. *Acad. Manag. J.*, 43 (5), 909-924.
- Aspelund, A., Moen, O., 2001. A generation perspective on small firms' internationalization- from traditional exporters and flexible specialists to born globals, in Axinn, C.N., Matthyssens, P. (Eds.), *Reassessing the internationalization of the firm (Advances in International Marketing, 11)*. JAI/Elsevier Inc., Amsterdam, pp. 197-225.
- Bell, J., McNaughton, R., Young, S., Crick, D., 2003. Towards an integrative model of small firm internationalization. *J. Int. Entrep.* 1(4), 339–362.
- Bocken, N. M. P., Short, S. W., Rana, S., Evans, S., 2014. A literature and practice review to develop sustainable business model archetypes. *J. Clean. Prod.*, 65, 42-56.
- Bohnsack, R., Pinkse, J., Kolk, A., 2014. Business models for sustainable technologies: Exploring business model evolution in the case of electric vehicles. *Res. Policy*, 43(2), 284-300.
- Boons, F., Lüdeke-Freund, F., 2013. Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *J. Clean. Prod.*, 45, 9-19.
- Braun, W., 2002. The system archetypes. The systems modeling workbook. Available from http://www.albany.edu/faculty/gpr/PAD724/724WebArticles/sys_archetypes.pdf
- Carayannis, E.G., Campbell, D.F.J., 2009. "Mode 3" and "Quadruple Helix": toward a 21st century fractal innovation ecosystem. *Int. J. Technology Management*, 46 (3/4), 201-234
- Carayannis, E.G., Campbell, D.F.J., 2010. Triple Helix, Quadruple Helix and Quintuple Helix and how do knowledge, innovation, and environment relate to each other? *International Journal of Social Ecology and Sustainable Development* 1 (1), 41–69.
- Crossknowledge, F., 2011. Ipsos (2011). 1º Barometro del e-learning en Europa. Available from <file:///C:/Users/UDC/Downloads/barometro-elearning-europa.pdf>
- Docebo, 2014. E-Learning Market Trends & Forecast 2014 - 2016 Report. Available from <https://www.docebo.com/landing/contactform/elearning-market-trends-and-forecast-2014-2016-docebo-report.pdf>
- Docebo, 2017. E-Learning Market Trends & Forecast 2017 – 2021 Report. Available from <https://www.trainingpressreleases.com/media/30885/docebo-elearning-trends-report-2017-short.pdf>
- Eisenhardt, K.M., 1989. Building theories from case study research. *Acad. Manage. Rev.* 14(4), 532-550.

- Ettinger, A., Holton, V., Blass, E., 2006. E-learner experiences: what is the future for e-learning? *Ind. Commer. Train.*, 38(4), 208-212.
- Eurostat, 2011. *Forestry in the EU and the world: A statistical portrait*, European Commission.
- FAO, 2004. *Forest finance. Trends and current status of the contribution of the forestry sector to national economies. Working paper: FSFM/ACC/07*. FAO: United Nations.
- Fernández Díez de la Lastra R., 2001. La formación online y sus mitos (On-line training and its myths), *Boletín Learnnet Marzo*. Instituto Universitario Euroforum Escorial. http://euroforum.cicei.ulpgc.es/learnnet/bolMar_01/boletin.htm
- Garrison, D. R., Kanuka, H., 2004. Blended learning: Uncovering its transformative potential in higher education. *Internet High.Educ.*, 7(2), 95-105
- Glavič, P., Lukman, R., 2007. Review of sustainability terms and their definitions. *J. Clean. Prod.*, 15, 1875-1885.
- IBIS Capital, 2013. *Global e-learning investment review*, Ibis Capital, London.
- Joyce, A., Paquin, R. L., 2016. The triple layered business model canvas: A tool to design more sustainable business models. *J. Clean. Prod.*, 135, 1474-1486.
- Lozano, R., Lukman, R., Lozano, F.J., Huisingh, D., Lambrechts, W., 2013. Declarations for sustainability in higher education: becoming better leaders, through addressing the university system. *J. Clean. Prod.*, 48, 10-19.
- Lozano, R., Carpenter, A., Huisingh, D., 2015. A review of “theories of the firm” and their contributions to corporate sustainability. *J. Clean. Prod.*, 106, 430-442.
- Lüdeke-Freund, F., 2010. Towards a conceptual framework of business models for sustainability. In: *ERSCP-EMU Conference*, Delft, The Netherlands, pp. 1-28.
- Madsen, T.K. and Servais, P., 1997. The Internationalisation of Born-globals: An Evolutionary Process? *Int. Bus. Rev.* 6 (6), 561-583.
- Maxwell, J.A., 1996. *Qualitative research design: an interactive approach*, Sage Publications, Thousand Oaks.
- Roy, K., 2006. The impact of learning styles on interactivity in asynchronous e-learning. *Perf. Improv.* 45, 21–26. DOI: 10.1002/pfi.4930451026.
- Servage, L., 2005. Strategizing for workplace e-Learning: Some critical considerations. *J. Workplace Learning* 17(5/6), 304-317.
- Simon, H.A., 1978. Rationality as process and as product of thought. *Am. Econ. Rev.*, 68(2), 1-16.
- Singh, H., Reed, C., 2002. Demystifying e-learning standards. *Ind. Commer. Train.*, 34(2), 62-65.
- Snyder, I., 2000. Literacy and technology studies: past, present, future. *Australian Educ. Res.*, 27 (1), 97–119.
- Shrader, R.C., Oviatt, B.M., McDougall, P.P., 2000. How new ventures exploit trade-offs among international risk factors: lessons for the accelerated internationalization of the 21st century. *Acad. Manage. J.*, 43(6), 1227-1247.
- OECD, 2011. *Education at a Glance 2011: OECD Indicators*, OECD Publishing. Available at: <http://dx.doi.org/10.1787/eag-2011-en> (accessed 29 December 2014).
- Orbea, T., 2008. UNE 66181. La calidad de la formación virtual (Quality in virtual learning). Symposium 4th March, Ministry of Industry, Commerce and Tourism. Spanish Government.

- Oviatt, B.M. and McDougall, P.P., 2005. The Internationalization of Entrepreneurship, *J. Int. Bus. Stud.*, 36 (1), 2-8.
- Schweizer, L., 2005. Organizational integration of acquired biotechnology companies into pharmaceutical companies: The need for a hybrid approach. *Acad. Manag. J.*, 48(6), 1051-1074.
- Tamayo-Orbegozo, U., Vicente-Molina, M.A., Villarreal-Larrinaga, O., 2017. Eco-innovation strategic model. A multiple-case study from a highly eco-innovative European region. *J. Clean. Prod.*, 142, 1347-1367.
- Taylor, M., Jack, R., 2013. Understanding the pace, scale and pattern of firm internationalization: An extension of the 'born global' concept. *Int. Small Bus. J.*, 31(6), 701-721.
- Thaler, R., 1981. Some empirical evidence on dynamic inconsistency. *Econ. Lett.*, 8, 201-207.
- Villarreal, O., 2008a. La internacionalización de la empresa: el modelo de las diez estrategias (The internationalization of the firm: Model of ten strategies). *Revista Internacional Administración y Finanzas* 1(1), 67-82.
- Villarreal, O., 2008b. El caso de CIE Automotive: el crecimiento de un grupo empresarial mediante la internacionalización. *Ekonomiaz* 68(2), 231-263.
- Villarreal, O., 2017. Is it desirable, necessary and possible to perform research using case studies?. *Cuad. Gest.* 17(1), 147-172.
- Villarreal, O., Calvo, N., 2015. From the Triple Helix model to the Global Open Innovation model: A case study based on international cooperation for innovation in Dominican Republic. *J. Eng. Technol. Manage.*, 35(1), 71–92.
- Villarreal, O., Landeta, J., 2010. El estudio de casos como metodología de investigación científica en dirección y economía de la empresa. Una aplicación a la internacionalización. *Investigaciones Europeas de Dirección y Economía de la Empresa*, 16, 31-52.
- Yin, R.K., 1994. *Case Study Research. Design and Methods. Applied Social Research Methods Series, 5. Second Edition*, Sage Publications, Thousand Oaks.
- Yin, R.K., 2012. *Applications of Case Study Research. Third Edition*, Sage Publications, Thousand Oaks.
- Yin, R.K., 2014. *Case Study Research. Design and Methods. Applied Social Research Methods Series, 5. Fifth Edition*, Sage Publications, Thousand Oaks.
- Yip, A.W.H. , Bocken, N.M.P., 2018. Sustainable business model archetypes for the banking industry. *J. Clean. Prod.*, 174(1), 150-169.

Appendix I. Financial profile and employees of NETEX

Financial profile & Employees

Nonconsolidated accounts	31/12/2012 EUR	31/12/2011 EUR	31/12/2012 EUR	31/12/2009 EUR	31/12/2008 EUR	31/12/2007 EUR	31/12/2006 EUR	31/12/2005 EUR	31/12/2004 EUR	31/12/2003 EUR	31/12/2002 EUR	31/12/2001 EUR	31/12/1999 EUR	31/12/1998 EUR	31/12/1997 EUR
	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	9 months
Income	3.443.214	3.864.637	3.285.150	2.498.479	1.878.038	2.307.280	1.314.031	1.200.484	740.901	737.730	480.973	333.088	115.127	104.995	7.822
Operating profit before taxes	57.381	55.815	77.913	38.563	41.866	528.846	71.233	128.283	48.798	37.440	18.119	8.879	-45.459	-2.430	-7.806
Earnings	36.421	35.306	55.101	27.079	31.399	375.167	47.745	87.632	31.594	7.049	149	6.208	-31.680	-2.002	-5.455
Total Assets	5.612.239	5.062.427	3.719.510	3.301.705	2.621.218	2.460.828	1.148.519	480.541	315.396	340.888	322.400	216.249	49.282	35.617	30.150
Equity Capital	1.646.306	1.639.773	1.273.133	1.162.122	1.135.043	1.103.643	729.676	182.056	94.425	62.831	55.782	55.633	-36.131	-4.452	-2.450
Economic profitability (%)	1,02	1,10	2,09	1,17	1,60	21,49	6,20	26,70	15,47	10,98	5,62	4,11	-92,24	-6,82	-25,89
Financial profitability (%)	3,49	3,40	6,12	3,32	3,69	47,92	9,76	70,46	51,68	59,59	32,48	15,96	125,82	54,59	318,65
Liquidity	0,55	1,21	0,97	1,00	1,33	1,77	2,13	1,08	1,40	1,85	1,55	0,73	1,36	1,17	5,34
Liability (%)	70,67	67,61	65,77	64,80	56,70	55,15	36,47	62,11	70,06	81,57	82,70	74,27	173,32	112,50	108,12
Number of employees	88	94	90	67	65	47	42	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Appendix II. Descriptive form of NETEX

Year Foundation	7/04/1997
First productive implementation abroad	India (2008)
First commercial implementation abroad	UK (2009)
Degree of diversification of activities	Several activities related
% of international turnover over total turnover	Range 21%-40%
% of international production (valued at selling price) over total production	<20%
Countries with external implementations	India, UK, Mexico
% of ownership in implantations	>50%
Business partnerships for implementation	India (outsourcing of software factory in 2008-2011) UK + EU (network of partners for distribution of licenses and contents development) Mexico (network of partners for distribution of licenses) Australasia (network of partners for distribution of licenses) USA (network of partners for distribution of licenses)
Reasons for exporting	-Exporting as a growth vector -Diversification of the risk of operating in a single market -Attraction of the foreign market. Penetration in other markets - Internationalization of competitors - Opportunity for exploiting the image of more qualified products and technology
Reasons for international implementations	- Growth opportunities in foreign markets -Care of the local customer that begins an international project -Attraction of foreign markets. Penetration in other markets -Search for technological leadership in top markets (key factor) -Overcoming entry barriers in interesting markets
Degree of internationalization of activities in the value chain	-High level: Production -Medium level: Purchasing -Low level: Human Resources, Finance, Design, and Engineering, Marketing, After sales support Non-internationalized: R & D
Organizational structure of the international implementations	International implementations (IE) depend on an international division that coordinates and centralizes decisions related to international operations
Strategic focus of the internationalization options	-India: this implementation was conceived as a business unit for the development and distribution of e-learning products and services. -UK and Mexico: these implementations were conceived as business units for the distribution of e-learning products developed in the local market, adding high- valued services (consulting and sales support)
Key factors in international competitive strategy	- Cost structure -Qualification of the technical staff -Usability and design of the e-learning products -Technological Innovation of products -Technological Innovation of technical platform for contents development

Appendix III: Structure of survey

Scope	Data
Chronology	<ul style="list-style-type: none"> - Year of firm's creation - Year of first export - Year of first commercial implantation abroad - Year of first productive implantation abroad
General data on the firm	<ul style="list-style-type: none"> - Turnover - Number of employees - Strategic goals - Diversification of activities - Percentage of turnover abroad - Percentage of production abroad - Number of countries-markets - Number of countries-suppliers - Types of international implantations - Organizational implications - Financial implications - International alliances - External competitive advantages
International motivation	<ul style="list-style-type: none"> - General motives - Motives for exporting - Motives for international implantation
Internationalization process	<ul style="list-style-type: none"> - Growth strategy - Cooperation strategy - Entry & Stay strategies - Location strategy - Sequence strategy - Internalization strategy - Structure strategy - Focus strategy
Factors involved in the internationalization competitiveness	<ul style="list-style-type: none"> - Competitive strategy (factors involved)

Appendix IV: Structure of interviews

Scope	Data
International strategic analysis	<ul style="list-style-type: none"> - External analysis - Internal analysis - SWOT analysis
System of international goals	<ul style="list-style-type: none"> - Mission and vision - Goals
Internationalization strategy	<ul style="list-style-type: none"> - Location - Entry & Stay - Growth - Cooperation - Corporate definition - Internalization - Competitive focus - Organizational structure - External focus - Sequence
International alliances	<ul style="list-style-type: none"> - Partners - Characteristics of agreements - Firm's behavior - Policies - Implications in the value chain - Factors involved in the alliances - Legal format of alliances - Competitive advantages - Inconveniences - Structure of property - Joint ventures - Evolution of previous alliances