

Abstract

In an era when novel educational technologies are constantly introduced to the marketplace, often accompanied by hyperbolic claims that these ground-breaking innovations will transform the educational landscape, decision makers in educational institutions need a methodological approach for examining the innovative potential of new educational technologies. This paper employs a framework based on business model analysis to evaluate the innovative potential of new educational technologies. A short discussion of organizational innovation is followed by a presentation of the business model concept and a framework for analysing the strategic impact of a novel technology on an organization's business model. The proposed framework is presented in the context of educational organizations in general, and that of higher education and the MOOC phenomenon in particular. Decision makers and researchers of innovation in higher education can use this business model analysis framework to systematically evaluate the potential strategic value of an educational technology to a particular higher education institution.

Keywords: business model, innovation, MOOC, higher education, strategy

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Cutting through the Hype: Evaluating the Innovative Potential of New
Educational Technologies through Business Model Analysis

How can we evaluate the potential of a new educational technology? This question attracts public attention on a periodic basis as new educational technologies move toward the peak of the “Education Hype Cycle” (Gartner, Inc. 2014), which tracks the rise and fall of expectations from novel technologies in the education sector. The recent emergence of the MOOC (massive open online course) phenomenon stands out as one recent example of such a technology (Pappano, 2012), but MOOCs are but one example of the challenge of evaluating the innovative potential a new technology holds for the education sector (e.g. Singer, 2015).

The value of information technology (IT) to organizations has been debated for a long time (e.g. Carr, 2004), and the challenge of evaluating IT's impact on organizations is significant (Hsieh, Rai, and Xu 2011; Kohli and Grover, 2008; Lin, 2009; Melville, Kraemer, & Gurbaxani, 2004). This challenge further increases when attempting to understand the impact of a new information technology on an entire sector and especially on the highly diverse and complex educational sector. The goal of this paper is to provide decision makers in educational institutions (especially higher education institutions), as well as researchers of innovation in education, a systematic process with which to evaluate the potential impact of a novel educational technology through a business model analysis of its innovative potential. We begin with a presentation of two concepts: innovation, and the business model.

Innovation

One useful definition of innovation is a “multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace” (Baregheh, Rowley, & Sambrook, 2009). We learn from this definition that, in contrast with the popular conception that the title "innovation" can be applied to anything which is new, the management literature emphasizes that the *idea* is only the beginning of the innovation process, and that in order to innovate, organizations need to transform the idea into something tangible which enables them to "advance, compete and differentiate themselves". In other words, innovation happens if and only if the idea leads to activities which improve the organization's ability to achieve its *goals*. Therefore, when evaluating an innovation, the ultimate measure of its value is its impact on the organization's goals. Thus, no matter how novel and unexpected a new idea is, or how well the idea can be transformed into a product, service, or process, it is not an innovation until it positively impacts the goals of the organization, and it is not a significant innovation unless that impact is significant. A famous historical example of the difference between a good idea and a valuable innovation, is Thomas Edison’s first invention, an “electrographic vote recorder and register” (US patent 90,646) which could instantaneously tally votes in Congress. It never found a market because, as Edison was disappointed to learn, Congressmen perceived the slowness of the voting process not as a "bug" that requires fixing, but rather as a feature of the democratic process that they can use for their benefit (Landau & Rosenberg, 1986).

Another common misconception about innovation is the focus on technological innovation at the product level, and neglect to acknowledge the importance of other forms of innovation, mainly service and process innovations.

Although services and processes are less tangible than artefacts such as instruments, machines, gadgets, software, etc., the influence of novel or improved processes and services on the ability of organizations to better achieve their goals is just as significant. A good historical illustration of this is the success story of the Ford Motor Company in the early twentieth century. This success is widely attributed to Ford's moving assembly line that made the high-volume production of the Model T possible. It is less known that before setting up the assembly lines, Ford introduced two more innovations to the automobile sector. The first innovation was a decentralized system of assembling, distributing and selling automobiles. The second innovation was a reporting system about inventory levels at each of the assembly, distribution and selling units. The high-volume production line allowed the efficient production of large numbers of automobiles, but unleashing this capability without a system that could reliably report market trends and inventory levels of finished cars could easily have led to over-production and to commercial failure (O'Brien, 1997). It was the combination of the technological innovations with the innovative processes and services that enabled the Ford Motor Company to adjust its production capability to sales of Ford cars around the country and to achieve the market differentiation that led to its success.

Innovation and Higher Education

What about innovation in the higher education sector? On the one hand, universities are perceived as hotbeds of innovation and of research and development, and sources of technology transfer to the private sector. On the other hand, many criticize universities for their inability to stay relevant and to provide their students

with the tools to succeed in the knowledge economy (Bercovitz & Feldman, 2005; Debackere & Veugelers, 2005; Doss, 2015). The key to understanding the challenge of evaluating innovation in higher education institutions (HEIs) is to remember that innovation is measured by its potential to allow organizations to improve their ability to achieve their goals. In order to evaluate innovation in higher education then, one needs agreement on the goals of HEIs, and that is not a simple task given the different stakeholders. Economists might evaluate the innovation at HEIs by measuring their teaching and research efficiency (Abbott & Doucouliagos, 2003; Johnes, 2006) but these measures often do not capture important aspects such as the innovativeness of the graduates (Lundvall, 2008). Others will suggest additional goals such as maintaining academic freedom (Altbach, 2001), financial viability and other goals (e.g. Modell, 2003). Additional barriers to innovation result from the difference between organizational goals and the goals of groups within the organization. For example, Schneckenberg (2009) suggests that motivational and habitual traits of academic staff, as well as their cultural values, create forces that counter institutional efforts to enhance innovative usage of e-learning technologies. When the organizational goals are clearly defined, and when these goals are prioritized by the organization both in rhetoric as well as in practice, innovations that promote the achievement of these goals can be nurtured and can succeed (e.g. Hannan, 2005).

Business Models

The “business model” is a loosely defined concept, which entered academic and popular management discourse in the last two decades, mostly in the context of

high-tech and Internet-based businesses (DaSilva & Trkman, 2014; Osterwalder, Pigneur, & Tucci, 2005). A useful definition by Osterwalder et al. (2005) is:

A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, to generate profitable and sustainable revenue streams. (pp.17–18)

Thus, a business model is first and foremost a tool to express the logic of a specific firm. It expresses this logic by describing (1) the value the firm offers its customers, (2) how the firm's infrastructure (resources and processes) allows it to create, market and deliver this value, and (3) the financial consequences of these activities. Since this paper targets decision makers who do not necessarily have expertise in strategic management or in the management of technology and innovation, we will simplify and describe organizational business models using only these three components: the customer value proposition component, the infrastructure (resources and processes) component and the financial component. The principles presented here, however, apply to any of the many formats used for business model analysis (Zott, Amit, & Massa, 2011).

There is some confusion between the business model concept and other concepts such as financial model, economic model, revenue model, business process model, business plan, etc. (DaSilva & Trkman, 2014; Osterwalder et al., 2005). These concepts are related, but distinct from the business model concept. Another common misconception is that business models apply only to for-profit businesses. Although the business model concept was developed in the context of for-profit organizations, it

is applicable to non-profit organizations such as educational institutions in general, including HEIs (Kalman, 2014).

To demonstrate the concept of a business model, we will describe how it can be used to compare and contrast different organizations. For example, organizations in different sectors that use the “rental” business model have many similarities, no matter whether they rent out cars, wedding apparel, or hotel rooms. The similarities include the need to hold and maintain significant stock levels and the fixed costs associated with these stocks, the personnel dedicated to serving the ever-changing customer population, the tendency to offer a relatively wide range of prices from basic to luxury, and more. A complementary example is organizations within the same sector that operate according to different business models. For example, the automobile industry has several different business models, such as car rental, sale of new cars and sale of used cars.

Despite significant differences between organizations, business model analysis allows identifying commonalities and exploring alternatives to existing ways of doing business. A famous historical example is the innovative business model developed by Swift and Company in the late nineteenth century for the meat packing industry in the USA. Instead of shipping live cattle from the Midwest to East Coast markets for slaughter and sale by local butchers, the company realized it could increase efficiency by slaughtering the cattle in the Midwest and shipping only the dressed meat to the markets on the East Coast. This innovation required significant changes to the business model, such as the setting up of refrigerated freight cars and warehouses (infrastructure: resources and processes), as well as a change in the attitude of the consumers (customer value proposition), but once these were achieved the business model of the whole industry changed (Teece, 2010). Such an innovation that leads to

a disruption of an industry's business model has been labelled "disruptive innovation" (Bower & Christensen, 1995), and famous recent examples include the disruption of the airline industry by the "low cost" business model of companies such as EasyJet, or the disruption of the video cassette/disk rental business model by the online delivery of videos by companies such as Netflix.

Business Models and Higher Education

The recent MOOC phenomenon led to an extensive discussion of business models in higher education (Burd, Smith, & Reisman, 2015; Dellarocas & Van Alstyne, 2013; Liyanagunawardena, Lundqvist, & Williams, 2015; Yuan, Powell, & Olivier, 2014), and the disruption of these models (Christensen, Horn, & Johnson, 2011; Vardi, 2012). Most of the discussion of MOOCs and business models focuses only on the financial component of the business model. Liyanagunawardena et al. (2015) suggest ways to monetize MOOCs through grants and donations, licensing MOOCs to other institutions, charging students for value-added services such as tutoring or the provision of verified certificates, sale of supplementary materials such as textbooks, follow-on paid events such as tours, merchandising, advertising, or referrals to potential employers. Dellarocas & Van Alstyne (2013) describe a "framework for organizing MOOC business models" that identifies potential payers (states, students, employers, sponsors and others) and potential products or services they might pay for (course content, data and analytics, student labour and complementary services). Burd et al. (2015) explore business models for MOOCs in higher education and after a detailed analysis of several cost and income scenarios conclude that "In light of the cost/revenue balance highlighted above, institutions

must recognize that such strategies are unlikely to result in direct financial reward if they wish to offer MOOCs or expand MOOC-type activity" (p. 47). They conclude that the value of MOOCs is in enhancing institutional awareness in local and global markets. Even Yuan et al. (2014) who discuss sustainable online learning from a strategic and organizational perspective, present only two components of the business model: the customer value proposition and the financial component. The fact that business models of higher education are actually being discussed by academics and by decision-makers is important (de Langen, 2011; Sancho & de Vries, 2013), and it underlines the fact that higher education institutions are organizations that are governed by the same principles that govern other organizations. Nevertheless, most of these discussions ignore the extensive diversity of business models in the higher education sector, over-emphasize the financial component of the business model, and do not pay enough attention to the customer value proposition and to the infrastructure components. These limitations weaken the ability of organizations to perform a business model analysis of innovations, and will bias their conclusions.

The diversity of business models in academe is quite wide and was rarely discussed before 2012. The business model of the research university that combines extensive research with undergraduate and graduate education is different from the business model of the teaching intensive (US-based) community college, which in turn is different from other business models such as the European open university business model, the for-profit university model, or the research institute business model. Additional differences between business models of academic institutions are the result of national differences in the way higher education is regulated and funded in different countries.

Discussions of higher education strategy too often make sweeping generalizations without taking into account different business models. For example, the student population that forms the core audience of the traditional research university is very different from that of the for-profit university, the community college, or the open university. Accordingly, we can observe differences in the skills required from faculty at these institutions, in the funding of these institutions, in their cost structure and so on. For example, Kalman (2014) compares the business model of traditional universities with that of open universities such as The Open University in the UK (www.open.ac.uk), showing that the former focus on offering recent high school graduates a three-to-four-year bachelor's degree in an environment that also facilitates extensive social activities, romantic opportunities, political and societal involvement, etc., while the latter focus on more mature students who wish to combine full-time employment with their undergraduate education. Accordingly, a traditional university's business model includes a significant investment in facilities such as physical campuses, green lawns, dormitories, etc., while open universities invest more in distance education technologies, in processes and resources that enable students to perform all administrative tasks from a distance, and so on. Maintaining a good fit between the customer value proposition of a university, and the other components of its business model (its infrastructure – resources and processes, and its financial component) is at the heart of its success, and universities that do not harmonize the different components of their business model are less likely to succeed (Christensen et al., 2011).

A good example of a university adopting MOOCs in a manner which is consistent with its unique business model is the Open University's (UK) establishment of FutureLearn, as described by Weller and Anderson (2013). As they explain, the

emergence of MOOCs represented both an opportunity and a threat for a purely distance education institution such as The Open University. By establishing FutureLearn as a separate company, in consortium with other UK universities and cultural institutions, the Open University kept itself on the cutting edge of this emerging innovation (MOOCs), and developed MOOCs that positioned online education as a valuable form of lifelong learning. All the while, the Open University maintained a clear differentiation between MOOCs and credit-awarding courses. This allowed the university to gain strategic benefits such as refreshing its innovative image, and creating an experimental space for exploring new pedagogy, models of support, and use of technology (Sharples et al., 2012) without risking damage to its core products. Similarly, Hoxby (2014) explains why highly selective institutions of higher education such as Harvard will risk destabilizing their own business model if they give credit to their own students for MOOCs led by their own faculty.

The Influence of Innovation on the Business Model

While headlines about disruptive innovations are becoming widespread, truly disruptive innovations, which disrupt the business models of incumbents, are still quite rare. Most novel ideas are harnessed by existing businesses and organizations to further their organizational goals, and innovation is defined by the success of this process. Whether or not innovation is incremental or radical, its measure is in its influence on the organizational goals, and this influence is often accompanied by modifications to components of the business model: an improvement to the customer value proposition, a financial improvement, or an improvement of the processes or resources that enable the organization to provide value to its customers. Hence, one of

the important questions to ask about a novel idea is whether it can improve the organization's existing business model. We'll now examine this idea in the context of a novel educational technology concept such as the MOOC.

Much has been written about the ways MOOCs can support universities' goals (Allen & Seaman, 2014; Dellarocas & Van Alstyne, 2013; Hollands & Tirthali, 2014; Jansen & Schuwer, 2015; Yuan et al., 2014), and these organizational goals can be linked to the different components of universities' business models. MOOCs can be used to improve the customer value proposition, for example, by (1) enhancing the current face-to-face educational offerings by adding online components that enable blended learning (e.g. Bruff, Fisher, McEwen, & Smith, 2013) or "flipping" the classroom (Milman, 2012); (2) providing students with more flexibility; and (3) exposing students to top professors from other universities. MOOCs can also be used to improve the infrastructure component of the university business model, for example, by (1) augmenting the university's marketing through the national and international exposure the MOOC receives; (2) stimulating innovation by faculty and staff through exposure to new forms of educational technologies and online pedagogies; (3) providing extensive amounts of data about student learning; and (4) improving advising by giving students the opportunity to freely sample a MOOC or several MOOCs before they commit to selecting a course or major. Finally, MOOCs can also influence the financial component of university business models, for example, by (1) lowering costs; (2) offering participants the option to pay for certification and other services; and (3) receiving payments from other institutions that use the MOOC, and more (Nazeeri, Moore, & Benjamin, 2015)

It is important to note that a specific aspect of MOOCs can influence several business model components. For example, flipped classrooms that allow professors to

spend less class time on lecturing and more on interacting with students can improve student satisfaction and thus boost the customer value proposition component of the business model. Flipped classrooms can also make teaching at the university more attractive for excellent professors and thus boost the (human) resources aspect of the infrastructure component of the business model. Also, note that universities with different business models will benefit from an innovation like a MOOC in different ways. While a traditional university oriented to face-to-face teaching might benefit from MOOCs as an opportunity to experiment with distance education, a distance-teaching university that distinguishes itself through the personal attention its students receive in its small and professionally moderated online classes might be more hesitant to develop highly impersonal MOOCs. Instead, it might focus on leveraging MOOCs created by other universities to augment the learning resources available to its students, or it might focus on MOOCs as a way to further its life-long learning (LLL) agenda. In other words, while e-learning is a core capability in the business model of a distance-teaching university, it is of secondary importance in the business model of a traditional research university, and this difference will influence the impact of an innovation like MOOCs on the respective business models of the different universities.

Business Model Analysis of New Educational Technologies

How can we harness our understanding of the link between innovation and the business model of educational institutions to help us evaluate the innovative potential of new educational technologies? This can be achieved by applying the principle that the measure of a new educational technology's innovativeness is the extent to which it

improves the business model of the higher educational institution. Figure 1 describes the steps decision makers at a specific institution can follow in order to explore this question.

The first step is to identify the relevant business model out of the diversity of business models that comprise the higher education system. Most of the public discussion of the innovative potential of new educational technologies in academia deals either with a generic higher education sector or focuses on the “top of mind” elite research universities. Nevertheless, most students do not study in elite universities, but rather in other higher education institutions such as community colleges or distance teaching universities, which operate on the basis of very different business models: their student populations and the goals and needs of these students are different, their infrastructure to support these students varies significantly, as does the nature of their income streams and expenses and other aspects of the financial component of their business model. Thus, we need to evaluate the innovative potential of the new educational technology in the context of the business model of the particular higher education institution under discussion.

[INSERT FIG. 1 APPROXIMATELY HERE]

Fig. 1 Business model analysis of a new educational technology

The second step is to analyse the impact of the new technology on the customer value proposition (CVP) component of the business model. This step underlines the primacy of the customer value proposition in shaping the business model of the academic institution. The customer value proposition defines the

customers of the organization, and how the organization provides value to these customers. The other components of the business model only detail the infrastructure required to provide this value, and the financial aspects that make it possible. The goals of organizations usually focus on the customer value proposition, and a new educational technology that can positively influence this component of the business model has a good chance of furthering the organization's goals, and thus of being truly innovative. In educational institutions, this primacy of the customer value proposition guides us to favour technologies that strengthen the ability of universities to support the needs of students, rather than those that influence other components of the business model. Given that teacher-student interaction and other forms of interpersonal interaction are the key to teaching effectively face-to-face as well as online (Beldarrain, 2006; Bruner, 1966; Fleming, 2003), there is a higher innovative potential for technologies that enhance interpersonal interaction between students and faculty as well as between students. The primacy of the customer value proposition also suggests a higher innovative potential for technologies that assist students who experience difficulties, for technologies that free faculty from low value-added tasks and free up more time to interact with students, and for technologies that open up new opportunities for disadvantaged student populations. It also suggests that applying technologies to achieve goals like replacing faculty and lowering the amount of interpersonal interaction is less likely to be innovative.

The third step is to analyse the impact of the new technology on the infrastructure (resources and processes) component of the business model. Despite the primacy of the customer value proposition component, the infrastructure component of the business model is ripe for benefitting from innovation that does not negatively impact the customer value proposition. In fact, educational institutions are constantly

involved in such innovation, but since most of it is “under the hood,” it barely influences the discourse about technological innovation in education and is taken for granted. For example, students in most HEIs in developed countries can now perform many of the administrative tasks online. They use personalized information systems that add flexibility for the students and automate processes that in the past have required extensive personnel who were only available at specific hours. Highly developed learning management systems (LMSs) provide students access to online resources, to class bulletin boards, and to their evaluations, grades and feedback. Given the importance of process and service innovations, and the interdependence between these innovations and technological innovations, we need to pay attention to the impact of novel technologies on these components of the business model.

The fourth step is to analyse the impact of the new technology on the financial component of the business model. This is the final step since the financial component needs to be considered in light of both the CVP and the infrastructure considerations. For example, a common error is to consider only the upfront costs of a new technology, and ignore the total cost of ownership (Ellram, 1995) which also includes maintenance and other costs which are easy to overlook.

Finally, we use the results of the previous steps to evaluate the overall impact of the new technology on the business model, and if it is positive and the conclusion is that the improved business model will significantly impact the organization's ability to achieve its goals, then the new technology has significant innovative potential.

Despite the apparent linearity and deterministic nature of the decision process described here, the actual process is more iterative and complex: technologies evolve, organizations change, and the educational landscape is dynamic. Furthermore, strategic decisions are rarely absolute, and are impacted by the reality of constantly

shifting priorities. Innovation management is an ongoing component of the strategic management process that takes place alongside other core management processes such as marketing management, financial management or human resource management.

When we evaluate the innovative potential of new technologies on educational institutions, we should acknowledge that it is rare for organizations to adopt new business models. Rather, most innovations are incremental, some are radical, and only a very small number of the innovations are disruptive innovations that lead to the dissolution of incumbents and of their business model and lead to a rise of a whole new class of institutions. It is a good habit to take claims about an educational technology that will revolutionize the system with a grain of salt. Instead of accepting predictions of the demise of the academic sector as we know it (e.g. Harden, 2013), we should ask which of the existing business models is threatened by which educational technologies. Instead of simply tracking the position of an educational technology on a generic educational hype cycle (Gartner, Inc. 2014), we can analyse the technology in the context of specific business models and ask whether it provides a truly superior customer value proposition, and what is its impact on the other components of the predominant business models.

In conclusion, a business model analysis of novel educational technologies allows us to cut through the hype and reach a more nuanced and actionable conclusion about the innovative potential of a new technology for a specific institution. Performing this analysis can help decision makers avoid unnecessary investments which will not further the organization's goals. It will also prevent the decision makers from ignoring important innovations and from missing important opportunities. This analysis is sensitive to the differences between different

institutions of higher education, and will prevent decision makers from the error of adopting a technology which was successful in institutions with a different business model, but which does not align with their institution's business model and goals. Furthermore, the analysis facilitates a more insightful strategic discussion of innovation in higher education, a discussion that acknowledges the pluralistic nature of the higher education sector, and which is focused on educational goals, on the value higher education provides to students and to society and on innovations that significantly impact our ability to provide this value.

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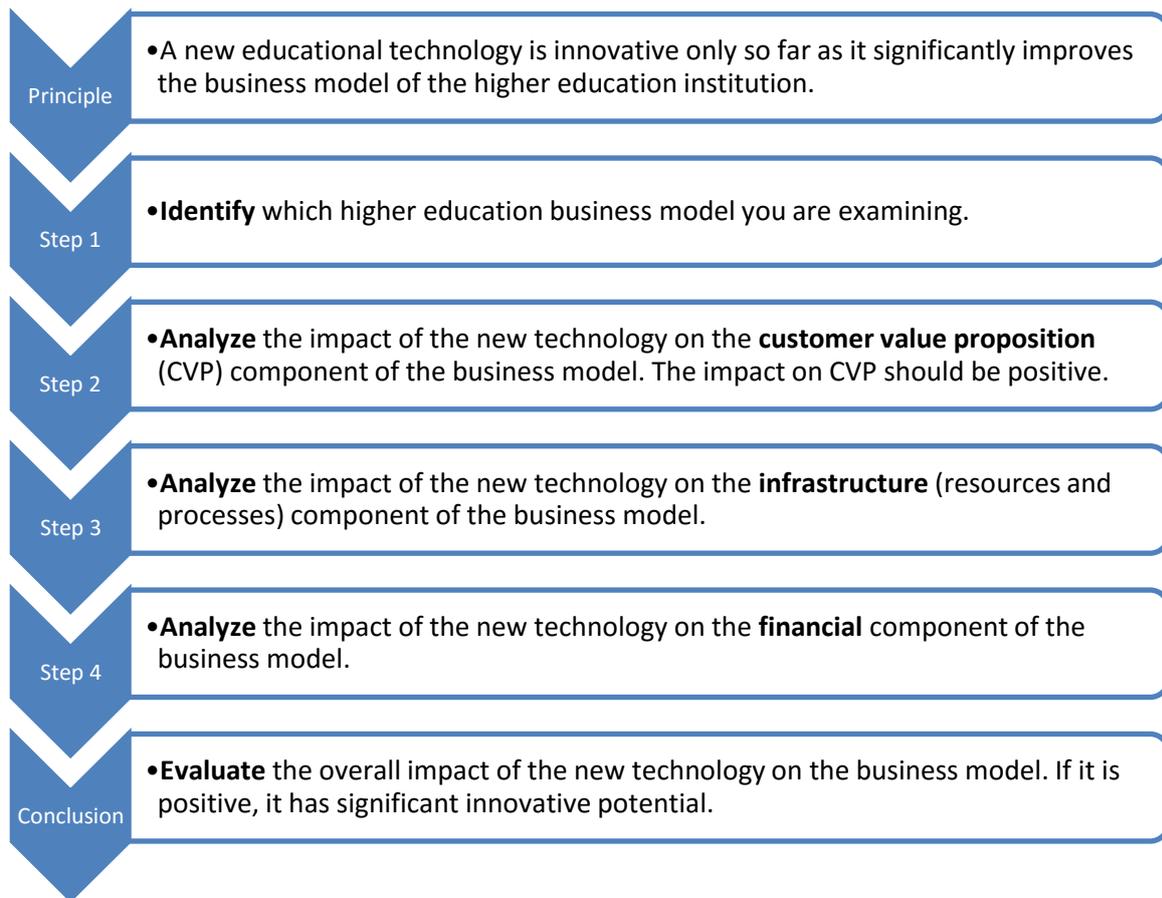


Fig. 1 Business model analysis of a new educational technology