

## Article

# Digital Transformation for Business Model Innovation in Higher Education: Overcoming the Tensions

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**Abstract:** The higher education sector is in the eye of the hurricane of the digital revolution, immersed as it is in an ongoing digital transformation (DT) process that is expected to result in significant changes in the current business model. Despite the relevance of this transformation, little remains known about how the business model is innovated (BMI), due to the impact of digital transformation in the context of higher education institutions (HEI). This research explores the impact of DT on the HEI business model, through analyzing the case of a traditional university, conceived non-digitally. The results present the HEI understanding of DT, the main tensions arising from the DT process for each of the business model dimensions, and the anticipated solutions for solving these tensions. Additionally, the results uncover the existence of an emergent (non-formalized) envisioned business model, which is a visualization of how the current business model is expected to be innovated, due to the impact of DT. The main originality of this paper is in addressing a research gap at the intersection of DT and BMI in the HEI context.

**Keywords:** business model; business model innovation; digital transformation; university; higher education institution; tensions

## 1. Introduction

Digital transformation (DT) and business model innovation (BMI) are hot topics in both the business and academic areas, and, although the two concepts are often related, they are not necessarily the same thing. For example, while deploying new digital technologies enables organizations to be more competitive [1], it is not necessarily a business model innovation, even when it may be one of the means or drivers to that end. There are numerous examples of how digitalization is changing the rules of entire industries, and how the business model is being innovated in the process [2,3]. New players are appearing alongside innovated-digitalized business models: Airbnb has changed the rules of the hospitality industry; Uber has brought a revolution to the mobility sector; Netflix has changed how people watch TV and movies; and Coursera is not only connecting students and professors, but is probably shaping the next-generation university. Both DT and BMI are probably inevitable. The question is not if but rather how an organization is adopting DT and managing BMI [4]. These change processes will likely create tensions in the current resources and capabilities base, driving significant tensions that will need to be effectively managed. In short, the ever-changing interconnection of DT and BMI is likely to generate organizational difficulties, brought about by the tensions generated in implementing new technologies, developing new skills, optimizing existing resources and creating new ones, targeting new customer segments, and so on. Identifying and managing these DT–BMI tensions will be essential to succeed and to achieve a new operating business model.

DT has recently attracted a considerable amount of interest from scholars and practitioners, given its enormous potential impact on products, services, innovation processes, and business models [5]. The connection between DT and business models has been established [6,7], but it is argued that more research is needed to understand the role of this DT in the field of business model innovation [3], to be able to understand the impact of digitalization on BMI [2], and to explore how business models can be digitally transformed [8].

Despite its particularities, the arena of higher education institutions (HEI) will likely face challenges similar to those encountered by the more “regular” business sectors. There are currently initiatives that are shaking up the entire sector, for example the “No-Pay MBA” project, a new player in the HEI sector whose value proposition is offering a packaged combination of MOOCs from leading business schools to obtain an MBA-level business education at a fraction of the cost [9], or “The Power MBA” in Spain, which offers a low cost program based on the micro-learning technique (i.e., learning through small training pills), where successful managers and entrepreneurs impart most of the lectures via virtual campuses.

In recent years, there has been a slow but systematic adoption of business practices in HEIs [10], although the business model concept remains mainly in use in the context of private companies [11]. Some recent research, however, attempts to understand how the business model concept can be applied to universities [12], despite the little knowledge about business models and BMI in the HEI sector, compared to the large body of knowledge on business models related to the area of business. Since DT is an ongoing process, the challenge for traditional HEIs is to manage existing business (branding, rankings, specialization), while at the same time building for the future, to avoid becoming “the dinosaurs of the education area” [9]. The constant emergence of new digital technologies creates both challenges and opportunities to change the functioning of HEIs, both internally (e.g., virtual campus) and externally (e.g., social networks), likely evidencing a gap in resources and capabilities to manage this digital transition, and generating tensions which must be overcome if HEIs are to make the right decisions to survive and thrive in the future.

Having identified the importance of DT and BMI also for HEIs and the lack of research on this topic in the HEI sector, the purpose of this paper is to explore what the main emerging tensions and solutions envisaged in the DT process of HEIs are, and how HEIs are assessing these tensions and solutions in terms of their impact and the change they signal for HEIs’ business models. This triple perspective, the intersection of DT and BMI in the HEI sector, is a contribution with respect to previous research, which has, at most, focused on two of the three axes. In accordance with the objectives, the following research questions are formulated:

- RQ1: How do universities understand digital transformation?
- RQ2: What are the main tensions and solutions derived from the transformation process?

This paper is organized as follows. First, the extant research on DT, BMI, and their intersection is reviewed, with a specific focus on the state of the art for HEIs. Second, the methodological approach used to answer the present research questions, an in-depth case study of a traditional HEI, is explained. Third, the empirical results are presented, including HEIs’ understanding of DT, the perceived tensions arising from DT and their impact on BMI, and the envisaged solutions to these tensions. Last, the findings and conclusions are discussed.

### 1.1. Theoretical Framework

Some authors have defined digital transformation as ‘the combined effects of several digital innovations bringing about novel actors, structures, practices, values, and beliefs that change, threaten, replace or complement existing rules of the game within organizations, ecosystems, industries or fields’ [13], p. 58. Although there is no commonly accepted definition of DT [3], there is consensus that enterprises aspire to update or create new business models [14], improve their operations, and generate unique experiences for their customers [6] as an outcome of this process. The increasing possibilities

of digital technologies to generate data [15] and to extract information from this data has made digital transformation inevitable for businesses [4], requiring skills not only for data generation and exchange, but also for the analysis and translation of that data into action-based information to improve decision-making [3]. Thus, the steadily increasing adoption of digital technologies is leading to the development of new business models in almost every industry, providing new means of value creation, delivery, and capture [16].

There are multiple conceptualizations of BM, a recent example being ‘BM is a systemic understanding of how an organization orchestrates its activities’ [17], p. 3 for the purpose of value proposition, creation and capture, which also acknowledges that a BM is not just what the firm does, but how it does it. Business model innovation in turn refers to ‘the search for new rationales for the firm and new ways to create and capture value for its stakeholders’ [18], p. 464. Agreement is increasing on the impact of BMI on organizational results [19], and its potential contribution to shaking the foundations of a sector and threatening dominant companies has been established [20]. In fact, BMI may arise from one or several of its components, namely value creation, value offer (or value proposition), and value capture, with varying levels of predominance [8], p. 3. In a recent systematic review of the BMI literature, the authors [21] highlight that little research has been produced on the drivers or antecedents of BMI, while other authors [22] identify the contribution of new digital technologies as an important driver towards business model transformation. From a different but related perspective, delivering BMI is considered to be a foremost capability of the digital era [23].

### *1.2. Digital Transformation for Business Model Innovation*

Although some authors argue that the digital transformation of business models is still poorly understood [24], there has been some research aimed at better understanding the interaction between digital transformation and business model innovation [3], the impact of digitalization on BMI [2], and how business models can be digitally transformed [8]. What is commonly agreed upon is the critical role that digital technologies play in the digitalization of the business model, offering new opportunities for organizations to develop a more varied spectrum of business models [25].

Extant research states that the digital transformation of business models is based on a sequential process of activities and decisions, which may affect a single or multiple business model dimensions, or even the whole business model [3]. It has also been established that business models originate from the digital business strategy [6], that digitalization influences the entire business model [26], and that it is increasingly important to include the perspective of digitalization within the business model design process [4]. Given that digital business models determine a different rationale [27], and in light of digital technologies’ increasing incorporation into the firm’s operations, new ways to explain the business model will be needed [4], presenting multiple challenges for managers in traditional industries. Some research has identified the barriers and enablers of digital business model transformation, establishing that the dominant rationale is that of most significant barriers for the transformation of the business model from traditional to digital [28] HEIs, like any other kind of organization, are also affected by the inertia of the dominant rationale of their current BM, representing a barrier to leverage opportunities from BMI [12] such as the ones derived from DT.

Although some research has been carried out on the potential enablers of the DT of business models, and some frameworks for how to successfully execute this process have been provided [3], the general reality is that the challenges or tensions involved in digital transformation and their impact on business model innovation have been little explored.

### *1.3. Digital Transformation, Business Model Innovation and HEI*

The business model concept, although designed primarily for the private sector, has recently been explored in the field of universities [11,12,29]. For example, some research has examined how entrepreneurial activities developed by HEIs contribute to shape their business model [11]. Others have taken a business model perspective to analyze the opportunities and challenges presented

to European HEIs by new technologies, especially digitalization and new societal and economic challenges [12]. These authors point to the importance of expanding and digitalizing the offer, developing entrepreneurial skills and an entrepreneurial culture among both staff and students, increasing the transfer of specialized knowledge to industry and society, and developing new sources of revenue.

Regarding the impact of digital transformation in the context of HEIs, recent research states that avoiding DT is not an option, and that HEIs are forced to adapt to technological changes if they want to stay relevant [30]. In the same vein, it is argued that implementing new technologies is inevitable, that HEIs must obligatorily implement new technologies to be digitally relevant, and that the real challenge is the right execution of available digital plans and strategies, engaging and empowering students, staff, and the faculty in the process [31].

Other lines of investigation focus on how digital transformation impacts professors and students [32], and how the challenge of addressing the academic digital gap by developing the digital skills of professors is of particular importance, since students are already highly motivated to use digital tools for learning. Other research has investigated how distance learning and related digital technologies (MOOCs, SPOCs, social media, and so on) have the potential to remodel education and corporate training industries in the near future, anticipating the disinvestment of players that do not adapt enough [9]. Others have explored how information and communication technology (ICT) has increased the opportunities and challenges for universities to create and distribute knowledge, placing HEI managers at the center of a difficult and ambidextrous task: adapting HEIs to the future era of education (both from a business and digital solutions point of view), and at the same time safeguarding the role of HEIs in society [10]. In this line, some claim that HEIs should play a critical leading role in contributing to shaping new socio-technological realities in order to stay relevant and useful as an institution, instead of being concerned with trying to follow all the digital trends, or implementing all the constantly emerging new digital tools [31]. This means that HEIs should manage the new ongoing challenges and tensions, due to technologically-led fundamental changes that significantly impact the teachers' role and students' expectations (e.g., new teaching methods, new ways of learning, and so on) with a more purpose-driven mentality, instead of a technology-driven mindset [31].

Extant research generally underlines the importance of DT in HEI and its impact on different publics (students, staff, and professors) and processes (technology implementation, knowledge generation, and distribution, etc.), and as a generator of digitally-driven opportunities [9]. However, there remains a gap in the research on the challenges arising from the process of adopting DT and changing business models accordingly. In this line, there are some unanswered calls for new research to not only investigate the role of DT in the field of BMI [3], but also to understand the application of the business model concept for the entrepreneurial university of the future [12], thus uncovering the need for more research at the intersection of DT, BMI, and HEI.

## 2. Methodology

To answer the research question on what the main tensions and solutions that emerge in the DT process of HEIs in terms of BMI are, this paper employs an exploratory research design, using a single case study of a public higher education institution in Spain. Case studies provide qualitative, rich data, and enable the study of contemporary managerial challenges [33]. Given the theoretical immaturity of DT and BMI in the HEI context, the adoption of a single case study is appropriate, as it enables a more thorough research enquiry to be able to come as close to the research phenomena as possible. Through using the qualitative approach of the case study methodology, this research has observed the experiences of its participants immersed in their real context, enabling the effect of digital transformation on value creation, value proposition, and value capture to be investigated. Table 1 presents a summary of the methods and interviewees involved, including relevant details regarding the latter's background and experience at the institution and in their current function. Diversity in function, position occupied, contractual relationship with the institution, and a relatively long-time

connection with the HEI, enabling them to have a vision of the transformation, were the selection criteria for participation, making those selected the most suitable informants. The single case selected is a public, traditional, medium- to small-sized university, born non-digitally, purposefully selected and expected to be highly illustrative, given that it potentially faces strong tensions to embrace DT.

**Table 1.** Methodological Summary and Interviewees.

Methodological orientation	Qualitative Exploratory research Discourse analysis						
Technique	Case study						
Number of cases	One						
Field work	Interviews: November 2018 to January 2019 Secondary data: October 2018 to January 2019						
Primary source of information	Individual interviews						
Participant selection	Purposive sampling Executive committee members, executive positions Criteria: heterogeneity by function, position, contractual relationship E-mail approach						
Instrument used	Semi-structured questionnaires						
Main topics of the interview	Digital transformation concept Impact of the digital transformation Main digital transformation innovations Main challenges and opportunities derived from digital transformation Tensions derived from the digital transformation process, and solutions						
Setting and data collection	Interviews conducted at the workplace Interview guide provided in advance Audio recording Field notes by authors during and after interviews Additional/missing/incomplete information requested after the interviews						
Data analysis	2 coders Coding: Primary codes—Themes; Secondary codes—Sub-topics; Aggregate dimensions Themes derived from the data						
Secondary sources of information	Public data: website, annual reports, HEI presentations, press news						
Number of informants	6	1	1	1	1	1	1
Informants work position	Total	ED	VRSP	VRQT	DUM	MD	AD
Function		Planning and coordinating campuses	Strategic Projects	Quality and Transp.	Digital services	Coordinator of Master	Admin.
Background		Philology	Physics	Math.	Comp. Science	Engineering	Admin.
Duration of interview (minutes)	553'	104'	66'	120'	108'	73'	82'

**Notes:** HEI, higher education institution. **Abbreviations:** ED (Director), Executive Director of the Sectoral Campus Program, Head of the Planning and Evaluation Office. VRSP (Strategy), Vice Rector Strategic Projects. VRQT (Quality), Vice Rector Quality and Transparency. DUM (Technology), Digital University Manager. MD (Teaching), Master Director. AD (Administration), Administrative Department.

The first part of the interview guideline was adapted from a previous research work on BMI in Industry 4.0 [8] and consists of five blocks. The interviewee profile (tenure in the HEI, current position and main responsibilities, degree of participation in the DT process) is covered in Part A. In Part B, the interviewee's understanding of the DT concept is explored, together with the main associations of



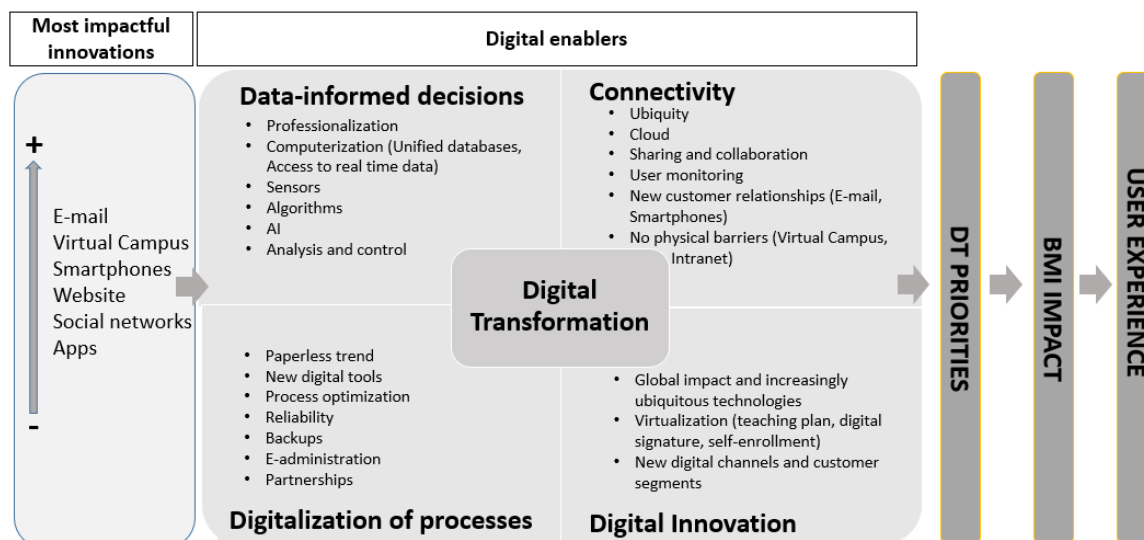
the term DT, and an analysis of the areas of the HEI most affected by this process. The DT process is analyzed in Part C, with an overview of the main stages and achievements made in terms of the DT of the HEI in the last fifteen years, in addition to an examination of the main current challenges and opportunities due to this DT. In Part D, we use the BMI sub-constructs level [34], namely value creation, value proposition, and value capture, to gather the tensions and solutions derived from DT, having conducted interviews about its impact on both the main university functions (teaching, research, and research transfer) and the main interest groups (students, teaching and research staff, administration and services personal, industry, and society). Last, in Part E, the HEI's vision for the future due to the impact of DT is explored. Aside from the qualitative questions used for the interviews, some short quantitative items are employed, to rank and further capture the expected changes in the BM dimensions due to DT. The audio records were literally and entirely transcribed. The data were coded simultaneously, but separately, by two coders using primary codes corresponding to themes, secondary codes for sub-topic within a concrete theme, and main dimensions, with the aim to identify meanings in the transcribed interviews [35]. The coding of sentences or group of sentences was put together, compared (interrater agreement: 0.75) and discussed until reaching an agreement on its codification and analysis.

### 3. Results

#### 3.1. Understanding Digital Transformation

The introductory question of the interview about the concept of digital transformation uncovered many commonalities among respondents, showing that it is commonly understood as an evolutionary process, something that affects and transforms all the main areas of activity (teaching, research and transfer of research, administration). Digital transformation is not only about the adoption of new digital tools and equipment, but it is also about the transformation and automation of all the processes, thus increasing their effectiveness and eliminating any physical processes and barriers through the increased connectivity and digitalization of everything. As stated by one of the participants, *"Digital transformation means transforming from a paper-based university into a university based on digital tools and instruments. This is not just a transformation of equipment, but it is a transformation of all the management processes, and therefore a global rethinking of the management model"* (Director). *"Digital transformation affects all areas; it affects teaching, it affects learning, it affects everything"* (Director). According to respondents, the driver of DT is the enormous and growing capacity to generate data, and, especially, the challenging job of making sense of it. DT is considered something good, something that facilitates advancement, and a leverage to improve what has previously been done more manually and by using paper, making things simpler, faster, and able to be done anytime from anywhere: *"Digital transformation is all those changes that we make with computers that enable the automation of everything that was previously done on papers which were moved from here to there. [...] Now the information is in databases, the processes are based on automated or partially automated processes, and all this ends up giving us a better guarantee. First, we have the correct information, then we secure it in backups, and then we analyze it later on"* (Technology). Digital transformation is a facilitator of professionalization, providing not only more guarantees due to the fully or partially automated processes, but also opportunities for increased business intelligence and customer-centered approaches.

Beyond the understanding of the DT concept, the impact of DT on the main business model dimensions was also explored. The greatest emphasis and largest numerical weights were assigned to new channels, new partnerships, and new customer segments, followed by customer relationships, new technologies/equipment, and with new price and/or cost structures in an intermediate position. At the opposite extreme, the least affected areas were new revenue models, new capabilities, and new offerings. Figure 1 presents a structured summary of the DT concept based on the interviewees' response.



**Figure 1.** Higher Education Institutions (HEI) Digital Transformation Concept.

### 3.2. Tensions and Solutions Derived from Digital Transformation: Evolving the Current Business Model

The respondents pointed out many different tensions for the HEI emerging from the DT process, which the HEI tries to overcome by implementing solutions. Table 2 structures the expressed tensions and solutions organized by business model dimensions.

With regards to the value creation dimension, the main tension relates to how digitally transformed new capabilities, new technologies/equipment, new processes, structures, and new partnerships coexist with traditional ones to create value. The challenge is that, at the same time as the digital transformation is considered both beneficial and necessary, there are old organizational dynamics that are in conflict with the new ones, causing important tensions such as inertia, conflicting views, resistance to change, and some frustration.

The main solution to these tensions seems to be an increased professionalization and organizational digital readiness at different levels (skills, capabilities, tools, guidelines, and so on), as the following quotes indicate “[...] *The main tension is that digital transformation collides [...] with a university dynamic that is adapting with effort [...] Tools go ahead of the adaptation of people and internal procedures*” (Director); “[...] *This is arranged professionally, this is arranged with training, with attitude [...]. This demands a very clear model, a very well-defined mandate*” (Director).

**Table 2.** Digital Transformation Tensions and Solutions.

<b>BMI DIMENSION: Value Creation Innovation</b>	
<b>Tensions</b>	<b>Solutions</b>
<ul style="list-style-type: none"> <li>• Build new digital capabilities related to new technology.</li> <li>• Process and structure changes: cost and resistance.</li> <li>• Lack of clear and standardized processes and protocols regarding the management of digital technologies.</li> <li>• A “24-h-accessibility” syndrome (e.g., teleworking).</li> <li>• Lack of “doing it all digital mentality”.</li> <li>• New partners for new relationships.</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous training in new digital capabilities and making participation easy and relevant.</li> <li>• Communicate the benefits of digitalization, coaching, and establishing referents.</li> <li>• Maintain investments in digital technologies to improve the user experience and facilitate adoption.</li> <li>• Develop a technological model to establish guidelines, norms, and a concise activities plan.</li> <li>• Self-impose clear frameworks to manage working and personal areas.</li> <li>• Develop a partnership and collaborative mentality.</li> </ul>
<b>BMI DIMENSION: Value Proposition Innovation</b>	
<b>Tensions</b>	<b>Solutions</b>
<ul style="list-style-type: none"> <li>• Uncertainty about new offerings, due to evolving students’ preferences.</li> <li>• Technical and service limitations to expand the offering (e.g., student authentication, 24 × 7, scattered databases, and so on).</li> <li>• Self-limited regional focus due to traditional offering.</li> <li>• User infoxication and spamming.</li> <li>• Lack of definition of a clear and global social media strategy, due to too much decentralization.</li> </ul>	<ul style="list-style-type: none"> <li>• Benchmarking international top referents.</li> <li>• Doing pilots to experiment with new offering types to expand the offering (e.g., blended, virtual).</li> <li>• Develop a customer-centric mentality to design an attractive offering and experience.</li> <li>• Technology investments and new organizational models.</li> <li>• Individualized and micro-segmented relevant information and resources.</li> <li>• Ask for support from social media experts to develop the centralized strategy, establishing clear guidelines and rules, and developing user capabilities to execute the decentralization.</li> </ul>
<b>BMI DIMENSION: Value Capture Innovation</b>	
<b>Tensions</b>	<b>Solutions</b>
<ul style="list-style-type: none"> <li>• Reduction of old sources of revenues.</li> <li>• Difficult capture of new sources of revenues.</li> <li>• Face global competition.</li> <li>• “Free” business model.</li> <li>• Cost escalation and technological dependence.</li> <li>• Reduction of old sources of costs.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop new offering types to increase the attractiveness (e.g., virtual).</li> <li>• Develop new promotional strategies to reach international markets.</li> <li>• Establish a clear technological model, prioritizing technology decisions, monitoring, and automating as much as possible.</li> <li>• Cost savings through service digitalization.</li> </ul>



As regards the value proposition dimension, respondents state that DT is not generating tensions among students, as made clear by the following quotes: “[...] *Students do not have tensions with digital transformation*”, and “*Students are much more receptive to technologies than us. For them, everything that makes things easier for them will be bought, will be accepted, and will be used [...] (Technology)*”. The main tensions are related to how to make the new education offer attractive, and how to develop a valuable, relevant, and customized relationship with the increasingly globalized student. The main solutions proposed involve being more open to other models, being more customer-centric, and being willing to make decisions and investments to innovate and dare to experiment.

Third, regarding the value capture dimension, DT is not currently generating any significant tensions in revenue generation, but increased global competition and the trend of “free education” (since “digital” has been associated with “free of charge”) seems to be raising some concerns, such as those mentioned in the following quotes: “[...] *Global competition can reduce revenues*”, and “[...] *Now we have 12,000 students. With digital technologies we could have a lot more, but I wonder if those additional students are willing to pay or not*” (Strategy). Regarding possible solutions, respondents mentioned efforts to diversify the sources of revenue through targeting new customer segments. On the cost side, the main tension is the “make or buy” decision with its implications, and the solution involves digitalizing as much as possible to be more efficient.

### 3.3. Envisioned Business Model: Visualizing the Digitally-Transformed Business Model

As the empirical results show, the business model of the HEI is in continuous transformation, due to digital transformation, resulting in the emergence of the aforementioned tensions, which the organization attempts to overcome. When asked about the future vision of change due to digital, the business model components where the most changes are anticipated are new customer segments/markets, new capabilities, new customer relationships, and new processes and structures. Examples of references to customer segments are “*Potential to reach students around the world*” (Strategy) and “*Digital transformation can allow new types of learning and, therefore, access to new student markets*” (Quality). Regarding new customer relationships, there are “*More agility in the relationship*” (Strategy) and “*More evolved apps can change the relationship*” (Quality). These results are consistent, not only with the perception that the digital transformation is both desirable and indispensable, but that it is also a facilitator to professionalize the management of the university, opening new opportunities to expand customer reach (new customer segments) and the customer experience (customer relationships).

Given the commonality of responses regarding the different impacts of digital transformation on the business model, an envisioned business model can be defined (Figure 2), which can be considered a blueprint of the HEI innovated business model, due to digital transformation.

At the level of the envisioned business model, innovation generally permeates the “*how to*”, rather than the “*what*” aspects, with major changes expected in the areas of customer segments and relationships, and key activities. Aligning the willingness to change and developing the ability to adapt to the new reality remain as ongoing challenges and jobs-to-be-done.

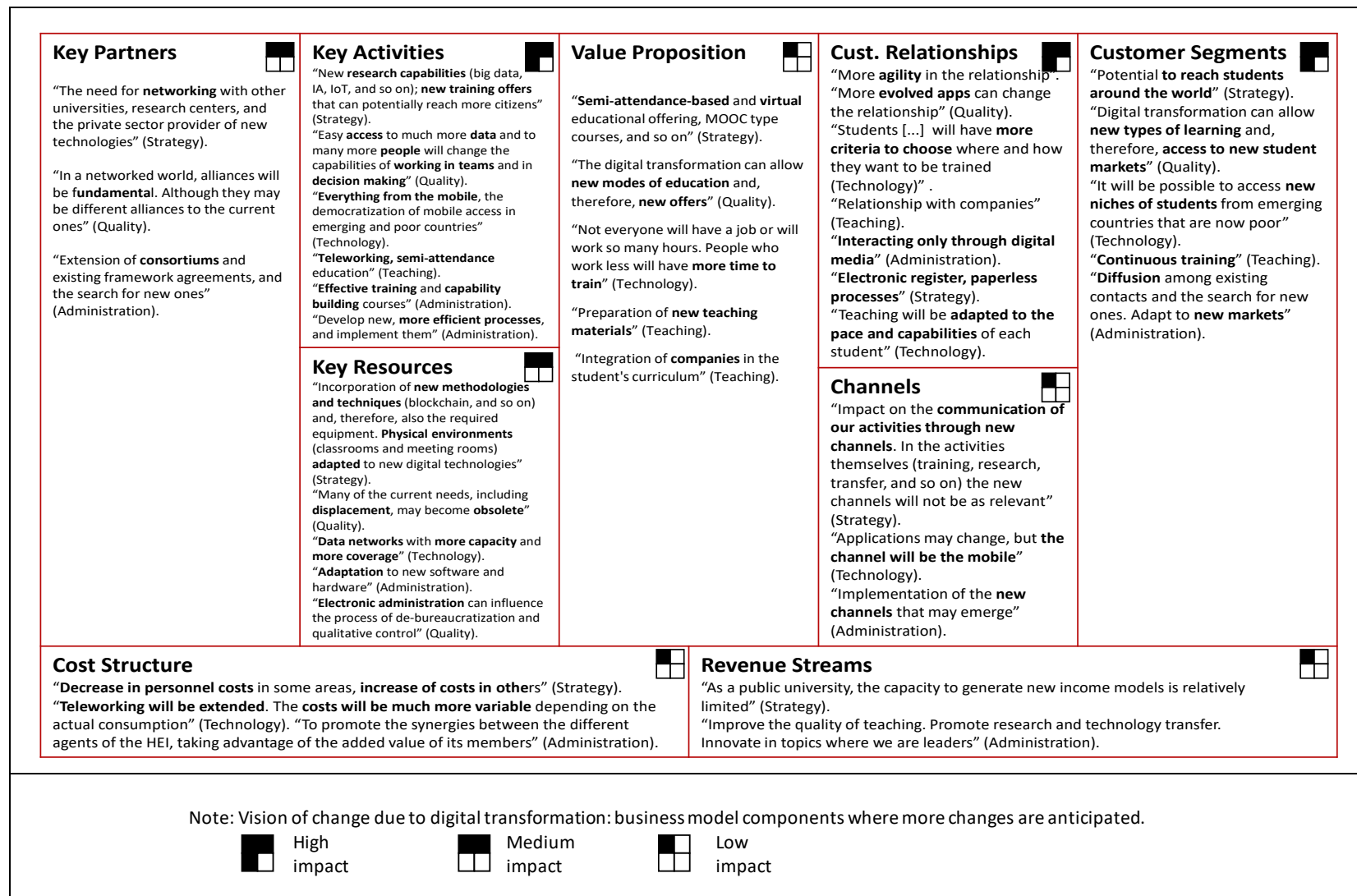


Figure 2. Envisioned Business Model.

## 4. Discussion

### 4.1. Contributions of the Paper

The findings and how they contribute to extant research, particularly at the intersection of DT and BMI in HEIs, are discussed in this section. Regarding the understanding of digital transformation, the results presented here are consistent with previous research. DT is considered as both positive and necessary, and an opportunity to professionalize the HEI, and to better satisfy students' needs and digital expectations. The HEI is feeling the pressure to constantly adopt new technologies and processes to remain a relevant player, as prior research has shown [30,31]. As an example, HEIs feel the need to do more with experimenting with massive open online courses (MOOCs), to follow education trends [9]. Regarding the difficult task of making sense of the growing capacity to generate data, this result is also in line with previous research on how data can improve decision-making [3]. The results also show that DT affects all the university's missions, uncovering the challenge of how to involve the different stakeholders, students, staff, and faculties in this process [31], and especially staff and faculty segments, given that students are more receptive to using digital tools for learning, as prior research has argued [32]. As an empirical contribution, our results show how the HEI business model is innovated, due to DT.

To answer our research questions, Clauss's [34] BMI proposal was adapted to explore the arising tensions, and envisaged solutions for the digital transformation process of the selected HEI. The empirical results reveal the effects for the three business model dimensions. First, regarding the new value creation dimension, the main tension is how digitally transformed new capabilities, technologies/equipment, processes, structures, and partnerships coexist with the traditional ones to create value, pushing the organization to professionalize to be able to overcome these tensions. Second, with regards to the new value proposition dimension, the main tensions are related to the impact of digital technologies on the definition, communication, and delivery to the student of a clear and relevant offering and customer experience, pushing the university to continuously explore, experiment, and invest in different pilots that contribute to becoming more customer-centric, and to taking better data-informed decisions. Third, regarding the value capture dimension, the main tensions are related to the potential risks in the sources of revenue generation, due to global competition and the emergence of free education programs, pressuring the HEI to use digital technologies to expand its market and customer segments, and to simultaneously reduce costs.

With these results, this paper contributes to some recent calls to better understand the role of DT in the field of BMI [3], and to further the application of the business model concept for HEIs [12]. Our findings show that, as different breakthrough technological and digital innovations impact on tertiary education, HEIs start to implement changes in the different dimensions of the business model, progressively transforming it. These dynamics contribute to creating some tension but, given that the digital transformation is generally perceived as useful and fundamental, the organization starts to explore and implement solutions. At the same time, the adoption of solutions accelerates the digital transformation process, hence, the current business model is in continuous transformation and innovated in the process. Due to the pressure of the ongoing adoption and development of new digital capabilities, the HEI is continuously innovating and experiencing its impact on the current business model. While this is done without the clear purpose of changing the incumbent business model, an emergent BMI is produced as a result. These findings regarding the tensions and solutions in the process of DT can be used as a framework basis for further analysis of the implementation of DT, identifying the problems (tensions) to transform the current resources and capabilities base into the future necessary or desired one. The analysis further provides examples of how to deal with these problems (solutions). This analysis can therefore be added to the theoretical body of research in the field of DT, which has, so far, mainly focused on outlining the importance and opportunities arising from DT, rather than on the challenges involved in DT [9].

As suggested in some previous research, BMI often derives from a non-planned process, at least for average market players [36]. Our results show that the HEI is not approaching BMI as a disciplined and systematic process, but is doing so when prompted by the changes occurring and anticipated by DT. To this effect, HEI managers somehow individually build their own future business model—highly influenced by their expertise and management position—which is envisioned, but not formally agreed. This construct is named as the “envisioned business model”, an emergent and evolving business model abstraction, which exists for a considerable period of time between the first DT changes and when they become established in a new innovated business model. The acknowledgement of such a construct is a contribution to the theory of BMI, not only in terms of the results of DT, but also likely of the results of other possible transformations. Using a simile to illustrate the point, if a business model is something “solid”, in the sense that it is formalized, and the different managers’ visions are considered a “gas” state, the envisioned business model could be seen as a “liquid” state, existing in the process of BMI. Following the formal deliberation of this liquid business model, which implies possible adjustments, a consensus may be reached regarding the envisaged business model. Strategically committed to its implementation, the innovated business model can be used as a roadmap to better understand and manage the tensions that emerge due to DT, supporting the transition from the current business model to the new one.

In addition to the contributions emerging directly from the research question, the results presented also confirm extant research in the context of a HEI impacted by DT. For example, our findings support the idea that the business model is permanently evolving [37]. The HEI is verified to be in an ongoing process of business model transformation, due to the impact of DT. This continuous transformation process is also confirmed by the fact that the organizations’ vision for the future requires a different business model than the current one.

#### *4.2. Implications for Management and Policy*

This empirical research has several practical implications. The findings presented should be of high value for the selected HEI and beyond, given that they are illustrative for other HEIs, providing an in-depth analysis of the concept of DT, the tensions observed, and the solutions anticipated.

First, the commonalities and differences in the responses made by the different managerial level employees, staff, and stakeholders provide information that can be used for improving the adoption of DT, and for building higher levels of consensus where required. This paper points to the importance of understanding DT, acknowledging the type of tensions that are emerging, and finding ways to manage existing tensions, and even prevent future ones by means of solutions. Specific acknowledgment of the existence of an emergent envisaged business model should prompt HEI governing bodies to invest efforts in carrying out a formalized process of a new business model definition. With regards to the solutions visualized by the HEI staff, these are possible sources of ideas to better manage the tensions and achieve the desired results and performance within the plans for DT.

Second, our findings and approach illustrate the application of an integral assessment of the impact of DT, and its nature, tensions, and solutions at the different levels of the business model. This assessment could also be an exercise in which all the stakeholders involved in the HEI participate, helping to establish a shared vision and a roadmap to innovate the business model due to DT. In this regard, policymakers could use this new knowledge to define interventions to promote the DT of HEIs in their regional or national ecosystems, making a contribution to their policy goals e.g., to enhance the quality, inclusiveness, or efficiency of education. These policies can consist in direct subsidies (e.g., grants, direct funding) or indirect incentives (e.g., the recognition of such processes as preconditions to accessing other resources). It is also worth noting that, in the case of public HEIs, governments are formal stakeholders in the governing bodies of such institutions, and can act as agents of change to promote DT.

Third, HEI managers could use the overview of the desired future provided by the envisioned business model to create specific DT plans that contribute to concentrating efforts and to increasing the commitment of the different stakeholders. This more strategic, long-term, shared commitment approach to the DT process would help to overcome the governance problem characteristic of public HEIs, whose tenure is usually of four years duration, usually resulting in a significant change of priorities with the establishment of a new government. Policymakers could also use the promotion of DT plans as a tool for guiding the governance of HEIs towards the essential or desired public goals, forcing longer term commitments.

Fourth, HEI managers could use the business model exercise to benchmark new entrants (high-tech born digital entrepreneurs, usually with superior digital capabilities and a different business model. e.g., “No-Pay MBA”), industry incumbents (traditional competitors from the HEI sector that innovate their BM), and digital giants (e.g., Alphabet, Amazon, and so on). These benchmarks could then be used, not only to infer what strategy leading referents have been following, but, more importantly, to reach conclusions about the envisioned business model they are trying to pursue. These insights would be extremely relevant, helping HEI managers to select what DT-derived experiments and initiatives need to be prioritized (e.g., co-creation, open innovation, entrepreneurial activities, partnerships, and so on), thus accelerating the continuous BMI process. Policymakers can be attentive or active drivers of such experiments to learn about BMI, with the aim of scaling up the developments to other HEIs in their systems, or even to transpose such learnings to other public institutions.

## 5. Conclusions

While DT and its associated tensions are inevitable, facing the situation and finding the appropriate solutions seems to be the way to proceed. A more disciplined, systematic approach to BMI could be a way to overcoming the tensions brought about by the digitalization process. Managers of HEIs could be encouraged to adopt a business mentality. DT will transform the HE sector, and HEI managers need to lead BMI, to position the university as a relevant player in the future. An envisioned business model in response to the impact of digital transformation can be used as a roadmap to anticipate tensions and solutions for the digital transition to an innovated business model.

Moreover, reflecting on the current business model in light of the opportunities and challenges derived from digital technologies helps to understand how to derive benefits from the digital transformation, and how to innovate the business model in all its dimensions (value creation, value proposition, and value capture) to pursue the achievement of the main priorities of the digital transformation process: increased customer centricity and increased business intelligence. The main business model dimensions impacted by the actions taken by HEIs are new channels, new customer segments, and new partnerships. Our research, developed within the context of a HEI impacted by digital transformation, responds to the call for more research on business model innovation in specific contexts [38]. First, this paper contributes to the limited literature on BMI in the HEI sector by helping to understand how the HEI business model is innovated, due to managing the tensions derived from the impact of DT. Second, it contributes with further enquiry at the intersection of BMI, DT, and HEI.

This paper is subject to some limitations regarding its methodology and findings. First, the qualitative approach used, based on a single case, can raise issues concerning the generalizability of the results, even though the aim was not to produce findings that could be extrapolated, but to better understand the dynamics of the transition from a non-digitally conceived HEI to a more digital HEI, and to explore BMI, and, in particular, the tensions and solutions involved in the process. However, more empirical evidence would be helpful to confirm the findings of this single case. Second, given that digital transformation is an emerging field in both research and corporate practice, especially in the HEI context, the embryonic nature of this research and development area must be acknowledged. Future investigation is encouraged to provide a longitudinal perspective of how DT transforms the HEI business models in a practical sense.



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