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Open educational resources (OER) Edupreneurship business models for different stakeholders

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Abstract

This paper contributes in establishing Open Educational Resources (OER)-based edupreneurship business models for different stakeholders. It restages the emergence of OER in higher education institutions (HEI) within educational entrepreneurship, hereafter edupreneurship. Then, it presents three analyses based on OER literature and environments. Finally, it introduces four edupreneurship business models for different stakeholders. First, it reviews the literature to identify and align existing OER business models to deduce a pattern linking OER provision, organizations' investments and users. Second, it applies Osterwalder and Pigneur's business canvas (Osterwalder and Pigneur 2010) to analyze value creation opportunities and activities within OER environments. Third, it examines OER environments to elicit the elements used for generating revenue streams. Consequently, four edupreneurship business models are provided to resolve some of the complexities found in OER environments and support stakeholders in deciding their ventures. The paper concludes that OER environments process unstable amalgamation of networks that continually changes to adapt to the complexity, multi-functioning and multi-processing of customers and providers' motivations. OER projects disrupt the educational market worldwide. This is not due to the ÓER humanistic view of Openness as 'free of charge' and 'for free use' but to Openness being a premium business value that creates edupreneurship opportunities within the digital age.

Keywords Open educational resources · Educational entrepreneurship · Edupreneurship · OER business models

1 Introduction

This article restages Open Educational resources (OER) as an edupreneurial opportunity within the field of education, and progress to describe entrepreneurship and

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[1] Shinas, Oman

business models that might interest different OER stakeholders. The Creative Commons OER-project (n.d.) shows a number of definitions of OER. Commonly, OER are digitized educational content, materials and tools that are developed by individuals or educational institutions to be openly available on the internet for all interested parties. They might be freely accessed; at no cost by a wider community of learning seekers, instruction providers and industrial trainers, and eligible for use and distribution within the public domain or under open licensing such as copyleft or common creative licenses. This permits the 5Rs of the materials; Retain, Reuse, revise, Remix, and Redistribute commercially/non-commercially while crediting the author in all the different forms (Wiley 2014). OER is facilitated by the openness of the internet and the development of World Wide Web which enable different types of communication, accessibility, sharing and participation activities as well as the availability of vast variety of open educational and none educational systems, tools and resources. In general, OER could refer to a digital object developed intentionally for educational purposes or used within educational context. The following section aims to restage OER as an edupreneurial opportunity within online education. The literature review is guided by the following research question: What is the real value of OER in the digital culture?

1.1 The perplexity of openness

OERs progress could be read in four phases based on the most controlling characteristic of its literature and advancements, which is Openness. These phases are; firstly, Openness is a moral or humanistic value, secondly, Openness fragmentation, thirdly, Openness is a business value, and fourthly, Openness is a perplex or opens a new educational market.

The first phase is at emergence or pre-emergence, where OERs are hallowed in unprecedented ways through introducing them to developing countries as will be available 'for the whole of humanity' (UNESCO. 2002). This has defined Openness as a humanistic value and OERs is linked to human rights (Geith and Vignare 2008) and the provision of knowledge and education as (a global) public goods. OERs Openness is put on the resource provision as free of charge and without restrictions rather than the development of the internet and the World Wide Web as an open communication platform of the upcoming culture and generation (see next section). To a great degree, this has also detached Openness from its former use in open universities offering opportunities 'to open up access to formal higher education qualifications' (Havemann 2016). Simply, it has pertained the provision of educational resources to a humanistic moral valuation of higher education institutions (HEI) and the expectations from them to participate in such offering. At early stages, almost all OER publications focused on forwarding this view of Openness. However, this moral value or mystic nature of Openness was unsustainable as the shift to a 'pretended openness' was realized in later reviews (Peter and Deimann 2013).

The second phase of OER literature focuses on the fragmentation of Openness through interpretations, reinterpretations and the eliciting of working definitions of Openness and of OER (Weller 2014; Havemann 2016; Cronin 2017). Research shifted to ownership or licensing paradigms, and to identifying the mixed and multiple goals, motives, and 'perceived benefits' or motivations of OER funders and/or providers

(Stacey 2010; McGill et al. 2013). Stacey (2010) pointed out 'no OER initiatives are *fully open*.[1] None are placing resources directly into the public domain.' At baseline, commonly used licenses copyright the permission of use and the author's ownership. Not being *fully open* is further set as degrees within social, technological, legal and financial categories of openness in OER (Hodgkinson-Williams and Gray 2009). The fragmentation allows the emergence of new reconciliations and models but also ends up the concept of Openness as a whole.

The third phase is the recent OER literature arguing for OER sustainability, revenue streams and business models. As the development of a phenomenon is affected by its emergence, the humanistic view of Openness has played a great role in launching OER but Openness in OER has progressively turned into a business value adding a moral flavour without an actual object to the term. The conflict between Openness and business is monetary. Monetary; addressed by terms such as 'free of charge', 'at no-cost' and 'low cost', is the matter of business conversations, not of moral or humanistic ones. Openness has become a manipulatable value through which a business effect is realized. Openness is operationalized elastically as a value that could be attached or detached from an object such as a resource, a service or an individual. Openness in OER, simultaneously, refers to that which is closed in its own context (Supporting examples are elaborated in OER business and revenue models sections of this paper). Casserly (2007) points out that OER is a disruptive innovation that could possibly compete with traditional school structure and higher education. They address the opportunity of alleviating the gap of enabling students to acquire the needed competencies of twenty-first century. These competencies are attributes of the digital culture of the leading economies (Casserly 2007). OER might have realized those effects distinguishing the current offering of education, which through, it challenges the traditional business models sustainability and the models of paid content within the digital domain (Weller 2014).

The fourth phase, Openness is a perplex or opens a new educational market. The obligation towards humanity will remain a dimension of OER but OER do not need to represent a humanistic value of Openness. For example, Alison.com states 'everyone has a right to an education and that education should be free'. David Wiley, a founder and chief of Lumen learning, is a proponent of openness in education and his contributions to the fields of open content and OER are undeniable (Wiley 2010). However, both Alison and Lumen learning are for-profit enterprises.[2] In the 2nd world OER congress, UNSECO (2017) announced that MOOCs are not OER. This announcement was rationalized based on considering that MOOCs only offer fair-use rights or rights stated in specific licenses, while OER 'must be available on an open license which allows users to legally use/reuse and modify them'. However, it could be argued that the open license has fair-use rights as it is legally bending the user and the material use to the ownership of the authors or institutions. MOOCs, similar to OERs in other format such as repositories, uses a mixture of resources and media format (video, pdf, doc. and hyperlinks ... ect.) with different scales of availability and accessibility. Second, MOOCs can be and are used/reused, repurposed, adapted by teachers and learners as well as integrated in the teaching and learning processes and blended learning.

[1] My emphasis.
[2] Alison. https://alison.com/about/company-details. Accessed Jan 19 2019.

Furthermore, both cMOOCs and xMOOCs were developed to address the free global participation of learners in the courses. MOOCs represent the progress from simple and basic structures models of OER based on material aggregation and content curation to a more structured course design and participative environment optimized by research in multimedia learning and learner experiences. Therefore, they provide improvements in enhancing the achievement of learning and educational value. It is unfeasible to overlook the spontaneous technical and structure development of OERs format into MOOCs as many worldwide governments and foundations adapted the later format (e.g. China: xuetangx, Korea: K-MOOC, Ukraine: Prometheus, Indonesia: IndonesiaX and Jordon: Edraak .. ect. Use openEdx). It would also be impracticable to miss the track OER has destined. OER has changed the economies of education market and simultaneously modified their institutionalized practices and activities as they transfer online not by being Open as 'free of charge' and 'for free use', but through creating value for people and organizations and this value fit well with the digital culture and its fellows (see next section).

It might be reasonable, then, if we move OERs away from the hallowation of Openness and restage them within the hallowation of entrepreneurial phenomena in education mostly fit with the disciplinary practice of the field and the transdisciplinary conceptual development conventional to our technological life-hood. Indeed, OER first emerging instances foresaw the 'entrepreneurial evolution' that might disrupt the traditional education (Vest 2001), and recognized OER as a solution for the frustrating educational publishing system of textbooks (Yu 2010). This makes the sway away from the focus on Openness to the focus on Opportunity feasible although might not be preferable.

1.2 OER Edupreneurship and culture change

Although edupreneurship is a historical type of enterprise, the coined concept emerges nowadays to express a similar transdisciplinary conceptual development as OER and other emerging concepts. Edupreneurs are entrepreneurs or entrepreneurial individuals while their activity is 'strategically intertwined with education' (Cordiner 2017). OER edupreneurship could be defined in relation to entrepreneurial individuals or institutions taking OER initiatives. The term *intrapreneurship* might fit the earlier OER initiatives as they were developed within the frontier of the educational organizations, outside the frameworks of their existing businesses and depart from the organizations customary (Antoncic and Hisrich 2003; Teltumbde 2006). Soon after, they took entrepreneurship ventures as they manifest into projects within independent organizations or independent parts of organizations operating OER-systems which is defined as 'a set of participants in a network of OER producers and users' (de Langen and Bitter-Rijkema 2012). A critical change appeared in this stance when entrepreneurs moved from being 'supporting players' to assume leading and competing roles with traditional educators as they themselves started offering education. This has been accompanied by changes in offering education and courses as the new entrepreneurs bring to public education profit and scale that characterizes the private sector (Chubb 2006). This could also be viewed within the changes in the educational culture and the provision of education. Some examples include:

The credit framework One of the main changes is the credit framework so long used in HE. This has catered for the modular programs that provided 'more economical and efficient methods of "delivery"' as well as enabling interdisciplinary & combined degrees (Trowler et al. 2003). Modularity is the general format of open courseware (OCW) and xMOOCs. As these are content-based, it becomes easy to provide a short video for a lesson, with assessment questions that can be handled within short time.

Professional knowledge The transformation of the nature HEI from being organized around 'knowledge-oriented' activities (Boezerooy 2006) to become more 'vocationally-oriented' (Becher and Trowler 2001) is apparent. This is due to the influence of business models and market approaches that change the university's role from providing scientific disciplinary knowledge to provide professional knowledge to accommodate the job market (Streeting and Wise 2009). A movement that has led to the deprofessionalization of academia.

Digital natives and net generations The theorization of the relationship between the digital technology and human being, especially those born within the twenty-first century, as having different ways of living, learning, embodiment and even thinking patterns is broadly discussed (Diana and Oblinger 2005). The recognition of this fundamental change in human evolution is not only in the field of education but other fields such as philosophy, feminist theories, art and literature - some other literature distinguished them as being the posthumans (see Katherine Hayles publications for example). In the educational context, Prensky (2001) has taken this argument to language where digital natives are 'native speakers' of the digital language of computers, video games and the internet, and 'digital immigrants', those who were not born in the digital age but adapted to them at some later point in their lives, will always speak outdated language. The latter, will need to reconsider their methodology and content (Prensky 2001). In practice, digital natives use the technology as extension to their bodies. For example, they use mobile phones as an external memory for saving their notes, timetables and event reminders. These become more accessible to them rather than memorizing & recalling them. Lectures and services should be available and accessible to them from anywhere.

New representations of student-models New student-models have come into view due to the change in the business models in HE. Students as consumers, participants and co-creators of content, giving students more control over the knowledge they want to be presented, its formats and methods. The student as consumer approach models are argued to promote 'have a degree' instead of 'be learners' views leading to content at market rate (Molesworth et al. 2009) and to get students into poorer academic performance (Bunce et al. 2017). However, this approach still applies as long as it gets higher student's satisfaction. This change means the influence of 'students as consumers' and industry on the academic culture played an active role in navigating higher education as a market (Streeting and Wise 2009).

The previous points are not comprehensive but they give some induction to the development of edupreneurship within the educational organizations and internet committees. Edupreneurs' characteristics could be framed within three perspectives. First, they work within the field of education as more focus is given to their educational

experience, practices and activities, skills as well as environment. Second, their work has social and economical impacts where their abilities and willingness are tuned towards creating value for others (Lackéus 2015). As social agents, they are 'visionary thinkers' who are motivated to reshape and reform the public education within and without the current institutions (Smith and Petersen 2006; Tanner 2014). They should be capable to identify, discover and exploit opportunities (Shan and Venkatarama 2000) within the changes and alternative approaches in education to come up with new movements, systems or organizations. Economically, they develop and manage for-profit or not-for-profit educational enterprises and systems. In this sense, they should be able to identify the methods to transform their experiences and knowledge into profitable value, content and/or services. Finally, they share the general development process and personality descriptions with t*rue entrepreneurs as they experience a paradigm shift involving* Idealization, Visualization, Verbalization and Materialization (Tharaney and Upadhyaya 2014). In simple words, they have passion and motivation, create wealth from their work to generate wealth for others, collaborate and share globally, be inspired by others but don't copy them, and create their own brand through self-immersion in professional development (Guinan 2013).

In terms of technology, 'digital natives' edupreneurs are likely to know of the role of technology in education, society and economy as well as methods of educating the Net generation & the skills required for incorporating post-human learners within learning circles. Moreover, they should be able to update themselves and increase their awareness of the different technical requirements of systems supporting education, and the importance of communities of practice for learners. Taking the internet and social media for granted, as open platforms, they should develop creative solutions that go beyond the concern of technology to invest in education. Lackéus (2015) argues that when to infuse entrepreneurship in education and what effect to focus on, both should progressively change over time in the educational system. It might be time for edupreneurs to navigate OER as an educational market in order to identify the possible business opportunities through which they could uplift OER value to attend to the digital culture. The analyses and business models provided in this paper might pave the way for them to do so.

2 Methods

This study focuses on developing OER-based edupreneurship business models for different stakeholders. It bases the development of these models on 1) aligning existing OER business models, and 2) analysing current OER platforms and websites. Three OER studies on business models were identified and used for this alignment: Downes (2007), de Langen (2013), and Okoli and Wang (2015). The business models of these studies address areas related to OER funding, motivations, and challenges, respectively.

The analysis of OER platforms and websites focused on a) capturing the dynamics and business opportunities within OER environments, and b) identifying and eliciting revenue streams. For the former, the business canvas of Osterwalder and Pigneur (2010) is applied. In this study, the canvas is used, in the first instance, as a tool for describing OER environments. Then, it is used to define the four OER-based

edupreneurship business models according to its nine building blocks: 1) customer segments, 2) value proposition, 3) channels, 4) customer relationships, 5) revenue streams, 6) key resources, 7) key activities, 8) key partnerships and 9) cost structure.

OER platforms and websites including libraries, repositories, connective cMOOCs and extensible xMOOCs were identified through Google search engine, OER portals and publications and Class Central list (Shah 2017).[3] Initially, this paper intended to use quantitative method of data collection. However, the platforms and websites keep changing their features such as revenue streams, business models and technical descriptions, which make quantitative analysis of OER environments difficult at this stage. The analyses will show that this continual change is currently a characteristic of OER platforms and websites. Therefore, the study used qualitative descriptions to identify the types of revenue streams and the features of OER websites using the canvas building blocks. Then the findings of the three analyses are weaved together into four OER-based edupreneurship business models to be considered by stakeholders interested in OER.

2.1 Alignment of existing OER business models

Continuity, sustainability and business models of Open Educational Resources (OER) have become a site of discussion in the field in less than a decade of its hallowation. Withdrawal of funds away from OER is observed (de Langen 2013). Arguments around the meaning and support of its sustainability, continuity and future is brought into view (Downes 2007). Proposals for new business models catering for sustainability, openness, funding and revenue are suggested. Downes (2007) identified nine existing funding models. de Langen and Bitter-Rijkema (2012) and de Langen (2013) argue for a business model centralized around the customer's needs and wants, thus, proposing an 'OER-system' as a value network business model where the exchange of the supplied and demanded is based on the overlapping motives of governments, organizations, users and individuals. de Langen (2013) identifies four business models where if 'open' means free for customers then only the subsidizing model works. He suggests a value network model based on analyzing learning strategies, practices & production in learning network communities where the OER-organizations intermediates between the different stakeholders. Okoli and Wang (2015) suggest ten business models based on consulting leading experts on online education.

Table 1 shows the alignment of these three business models, which brings into realization four group cores.

The first group core is facilitating access to educational resources through reducing public charges and governments' payments where governments, community and institutions make efforts to attend to the needs of their local people and students. This group core lacks sustainability as it depends on donations, community's participation and institutions' support, which are all external sources of OER funding and offering.

The second group core is around integrating technology within the educational process and systems in order to transfer to the digital or online learning. In this regard, institutions try to make the best of technological advances and communication

[3] The list of cMOOCs https://sites.google.com/site/themoocguide/home. Accessed 24 April 2019.

Table 1 An alignment between the three models of funding, motivations and experts

Group core	Scope	Downes (2007) Funding models	de Langen (2012/2013) Motivation	Okoli and Wang (2015)	Examples
1st group core	OER for all Government based funding Learners as community	- direct funding by government agencies	- reduces educational costs & increases its efficiency	- a long-term source of funding, - affected by fluctuating government revenues & political priorities	Canada's SchoolNet project Saylor.org
	OER for all Community based production & funding Learners as community	–base fund (e.g. from charity foundations) Endowment - donations from community	- subsidize due to perceived importance of education	- fund is not sustainable because it isn't regular or dependable - content creation by MOOC students - must depend on a few core people to be successful, - once those people left, the community fizzle out.	Stanford Encyclopaedia of Philosophy Wikipedia Khan Academy
	OER as supplementary material base Organization based funding / organization as community member Learners as students	- contributors pay for maintaining the contribution while contribution is free for others - members pay seed, annual contribution or subscription		- forms cooperative production consortium, - institutions pay subscription fees to use material across larger populations, - restrictions placed on distribution by large institutions (subscriptions) - doesn't work well as the one-size-fits-all offering doesn't meet the needs of each institute	The Sakai Educational Partners Program Merlot.org
2nd group core	OER as a course base (free for all) Organization based funding / organization as profitable institution learners as participants	- funding is part of the institution regular program		- online program of traditional institution - the high tuition is a barrier to students, -institutions are being forced to add this model to their current offerings	MIT OpenCourseWare

Table 1 (continued)

Group core	Scope	Downes (2007) Funding models	de Langen (2012/2013) Motivation	Okoli and Wang (2015)	Examples
				- Content creation by classroom students	
3rd group core	OER as a commercial base (free for all) Organization business/ sponsorship Learners are customers	- sponsorship & commercial advertisement messages (sponsorship) - give something away for free & then convert the consumer to a paying customer, (Conversion)	- give away to get paying students (Freemium)	- paid advertising through OER is a possible source of sustainable funding, - concerns with ethical issues of exposing students to advertising	the MIT iCampus Outreach Initiative (Microsoft) Stanford on iTunes project (Apple) OpenStudy
4th group core	OER as a product – charges placement Organization investment/ business Learners are customers	- exchanges of funding as on exchanges of resources (Partnership)	- hosting other organizations OER (platforming)	- selling course experience only - materials are free but students pay for the education experience such as: - corrected assessments - a completion certificate, - or other value-added - the learners have to clearly perceive a high quality educational service, - does not necessarily lead to the creation of OER	Udacity Monterrey Institute's HippoCampus

methods. The focus is on staff development, education enhancement and building technological infrastructure for the net generation where the students are participant of the transferring process. OER could be used as in blended learning context. This model facing issues related to instructors' workload, incentives, practices and policies within higher education institutions (see Andrade et al. 2011). Once an institution manages these internal issues, this group core becomes more sustainable as the fund and effort come from within the institution. OER are produced and integrated directly into the educational context.

The third group core is using OER or OER platform for commercial purposes such as getting access to prospective students, organizations or institutions, which become the customers of the provision. This could depend on multi-funding sources. The funding and participation comes from profitable parties including OER providers and platform sponsors. The sustainability is conditional as it is based on the satisfaction of the contributing and funding organizations, and the emerging of better alternatives in the market.

The fourth group core is creating business opportunities through the production of OER materials and environments as well as engineering learners' experiences. This group core invests directly on ensuring sustainability as it is based on supplier-buyer partnership.

Each one of these group cores might overlap with the others. For example, OER resulting from the process of institutions technological advancement process could be used for commercial purposes and in the long run provide the institution of mix models of educational systems such as the traditional, the blended and the online or distance education. OER used for commercial purposes could be used by other group cores as supplementary material which will help in fund reduction and facilitating access to some educational materials.

2.2 Eliciting an OER business model

While revenue streams are common in OER environments and platforms, the lack of sustainable business models for OER is reported by different researchers in the field. The business model canvas developed by Osterwalder and Pigneur (2010) is commonly used for the initial analysis of OER projects. Helsdingen et al. (2010) used this canvas to investigate and analyze OER environments in order to establish a success measure based on identifying different groups of OER. They distinguished between two different groups' initiatives. The first one uses OER as an addition to their regular activities or services, and the second one centres their activities around OER with dedicated service to OER community. However, they couldn't find data related to measuring the success of these types of initiatives. They proposed a framework based on goals, desired effects and performance indicators for measuring the success of OER.

The canvas is used as a descriptive tool and applied to OER platforms and websites in order to capture their dynamics and value opportunities. Table 2 shows the general description of OER environments in the first instance. This analysis brings to attention two main issues: the criticality of the outsourcing activities and the complexity of customer segments.

The **outsourcing activities** are instructor-based as the instructor is the one who sets the course content, updates it and provide professional feedback. Some courses on

Table 2 Applying business model canvas (Osterwalder and Pigneur 2010) to OER environments

Key partners	Key activates	Value propositions	Customer relationship	Customer segments
. economic value optimization of the platform through partnership with HE universities . worldwide alliance to enable education & knowledge sharing & equity . multi-type of alliance with for-profit & not for profit organizations - strategic alliance promotion in relation to licensing/ management/ instructional design	. offering publishing, distributing and sharing free or cost reduced content & services . providing virtual space for the meeting of different customers & stakeholders interested in OER . enabling networking & partnerships between multi-organizations such as community, industry & HEI	. providing a means to compare the quality of different HEI & seeking the best content . ensuring the quality of the material through peer reviewing . maximizing the time & resources of partners through content availability & tailoring . enabling potential prospects, approaches & projects based on knowledge sharing & networking	. attracting worldwide audiences, communities of practice, industrial partners & experts . providing different types of feedback & interaction with subject instructors in non formal educational context (e.g. peer feedback, professional feedback, advice & support & dedicated personal assistant) . retaining networks that enable the generation of new relationships . creating social networks through providing learners' profile, points or badges for achievement recognition among community & co-creation of content chances	. general audiences as community & individual learners . OER providers, partners & co-creators . instructors with their expertise & students · HEI providing online courses, advertising for on-campus study, marketing online degree programs · for-profit business & industrial sectors · educational foundations with educational principles & potential approaches · government bodies with financial demands . others
Outsource activities · instructional content & courses development from experts · quality and update management of course content · tuition & guidance from experts	Key Resources . developing platform for instructional content design & educational services . tools & software for on-site content production & management . subject instructors & experts, . instructional designers & technical staff · learning management system (LMS)		Channels awareness through UNESCO, partners & CC Community . advertisements through HEI and community . social media & networks . Web2 & mobile applications	
Cost Structures . cost driven vs. value driven . costs for content & services provision . costs are lowered as more participants & partners get involved . costs for content production and management increase while ensuring quality, course variation and assessment . costs for recruiting experts and technical staff			Revenue Streams . revenue models are presented in Fig. 1.	

enrolment delivery mode are based on professors' discretion.[4] This affects the internal quality and sustainability of OER as a temporal or continual cooperation with subject experts and instructors is required. Although, partnership with universities and the latter offerings should optimize the economical value of platform, the archiving or removal of courses from platform affects the customer relationship. For example, The Open Course Library (OCL) doesn't show a continuation of the project after its completion. No update or addition of new courses is made to the 81 collected courses offered at the initial stage.[5] Dissatisfaction and frustration was reported in a number of cases such as Coursera removals of hundreds of courses as it migrates to a new platform (Gee 2016; Shah 2016), MIT removal the online physics lectures and courses by Walter Lewis after harassment whereas some users believe that the material shouldn't be removed (The Tech 2014, MIT news 2014). A further example is the terms leaving learners unprotected such as in the case of P2PU (non-profit), which reserves the rights to cancel a course, limits the number of participation and terminates user participation for any reason.[6]

Customer segments and relationships' complexity emerges in the multi-role and relationships the participants form in OER environments and real world. While OER environments represent an informal settings, the participants have formal relationships controlled by regulations and financial deems. When these two interface, organizing policies are needed to be called in, especially when finance matters. OER could be expressed by a complex network where the partner could be a customer and a self-benefiter or related to benefiters of the system. Individuals such as learners and instructors could be identified as customers (seeking materials or courses for themselves or others) or prospective customers (might join a paid course offered by their or another institution). They also might be co-creators and authors of courses or publishers of the material especially if they come from a participating university. They might work on a project for a company or a platform partner as part of their degree or as in gig businesses. The participant could be the seller and the buyer of the course at the same time (see the two cases of Lemon and MIT described in the next section).

Questioning issues emerges when students have to pay to access the online material created by their instructors while the actual expenses are part of their governmental, institutional or sponsoring budget. The use or reuse of OER does not require for-profit institutions to deduct the cost of content material from students' fees, which means that OER uses might result in increasing organizations' profit. Similarly, situations involving on-campus students completing their modules online while actual payments from their sponsors might include living, travelling, residential and material costs, which could be avoided through online study or OER use. These situations imply a change in the education market due to resource sharing that call into view the need for international policies. These two points, outsourcing activities and customer segmentation and relationships, indicate the need to consider liabilities, regulations and ethical polices for delivering and using OER and the importance of impeding them is authentic learning scenarios.

[4] Some courses are created by the students or learners.
[5] OCL. http://opencourselibrary.org/about/
[6] P2PU https://www.p2pu.org/en/terms/. Accessed 19 Jan 2019.

Three main **key activities** could be identified in OER environments with their **key resources**: first, the processing of the offering of content material, second, the processing of virtual space for the meeting of different customers and stakeholders, and third, the enabling of partnerships between multi-organizations.

At a base level, OER offers content material and it should satisfy audits' curiosity as they could be learners or instructors looking for supplementary materials. Practices based on OER vary based on the users' objectives, instructors, for example, might use OCW, repositories and open libraries to design their courses or they might engage xMOOCs as alternative in blended instructional contexts. Tools for facilitating course design and authoring are provided, peer reviewing committee, workshops and training are part of OER environments. Although these materials might be accessible, registration and signing up/in is required. For example, some of the courses in Udemy (for profit) are free but still they require signing up to access content,[7] OER Commons request for registration and logging in to save the material[8] and Saylor.org requests users to create an account in order to maximize their course experience, accessibility and progress tracking features.[9]

Besides offering OER website or platform, OER provides a space or a site where customers and stakeholders meet increasing the chance for universities to get more residential or/and online learners as well as for enterprises interested in finding relevant career or skill based programs for their employees. This enables multi-organization partnership, national or international, between academia and industry which could be realized with corporate projects. It should be noticed that some relationships make benefit of the already existing materials, while new relationships could be formed within the platform itself. Therefore, in this case, the platform will have to establish tools to enable that cooperative and collaborative opportunities.

Value proposition A benefit for audits, OER provides a means to compare the quality of educational content of different universities and seeking the best content as well as improving own content. Tailoring programs and networking different groups and organizations has become one of the business models handled by OER. Universities use OER platforms to demonstrate the quality of their education and the expertise of their instructors to broader audiences. As experimental environments, OER websites enable potential prospects, approaches & projects based on knowledge sharing & networking. Projects such as the zero degree initiatives based on training teachers to use OER materials and open textbooks has, admiringly, resulted in saving students from purchasing commercial textbooks (Griffiths et al. 2017). Facilitating the instructional course design, made it possible to attract different stakeholders and tailoring courses based on their needs. Offering credited courses for reduced or lower prices has become important to attract customers. Users might compromise between course quality, time and effort, and course price from a world-class university. The placement of payment at the end of a course or based on user's decision to accredit their knowledge reduces the risk of losing their money or feeling dissatisfied.

[7] An example: The course of ABCs of Instructional design. https://www.udemy.com/the-abcs-of-instructional-design/?dtcode=qLp2WzT22ne1. Accessed 19 Jan 2019

[8] OERCommons. https://www.oercommons.org. Accessed 19 Jan 2019

[9] Saylor.org. https://learn.saylor.org/mod/page/view.php?id=20627. Accessed 19 Jan 2019

OER provision and development incur costs in all aspects of its processes. Although the material itself might be free or at reduced cost, the focus on value propositions and retaining customer relationships through ensuring high quality content, individualized feedback and personalized services to attract broader audiences invite costs increase. Funding of OER websites as projects or initiatives might lead to their end or retirement. Examples of retired projects and initiatives are the Tufts OCW website (2014–2018), WikiToLearn (2015–2017) and Open2Study.[10]

Eventually, this analysis reveals that OER environments are at earlier stages of digital entrepreneurship development. This is signified by pairing the offering of OER resources or services to the lack of loyalty and commitments of the providing bodies towards users and by trying to offer everything for all. The lack of policies and clear-cut licensing controlling the use, reuse and integration of OER with formally offered programs. Frederick et al. (2000) emphasizes that entrepreneurs moving to the web are 1) tempted by 'trying to be all things to all people' and thus overlook customer selection, and 2) believing that the lowest cost and broadest selection will rule the web. However, building trust rules the web and building long-term customer loyalty determines the company's survival.

On the other hand, OER platforms are processing amalgamation of networks through which all the previous identified group cores might work to match and expand their motivations. The amalgam is not stable as individuals/ organizations could enter, exit or shift roles and interests within the environment based on their own commitments, more likely than the providers do. The providers create business values within this amalgamation through building up the opportunities to constitute the expansion and variation of users' motivations. OER environments, thus, reveal continual experimentation with the options of openness of the availability, accessibility, services, customization, personalization and other range of elements while trying to maintain their sustainment. OER environments might develop, change, open or close at any moment.

2.3 Existing revenue streams in OER systems

This analysis focuses on identifying and eliciting revenue streams used in OER platforms and websites. Challenging the mystic sense of openness, the organizations providing OER, especially in MOOCs format, have started to develop revenue models. While business models focus on identifying ways to create or generate value, revenue (income) models focus on allocating the created value and charge customers for it. OER providers manipulate the scalability measures of the provision of content, accessibility, pedagogic elements with paid verified certifications, credentials and accreditations, as they were able to 'disaggregate teaching from assessment and accreditation for differential pricing and pursuit of marketing activities' (Yuan and Powell 2013). The most common revenue models are based on locking specific elements, features or services from the environment, however, continually, different forms of revenue models

[10] the Tufts OCW web site https://sites.tufts.edu/ocw/, WikiToLearn https://en.wikitolearn.org/Main_Page (last updated report: August 2017) & Open2study (unavailable) https://www.open2study.com/). Accessed 2019-04-23

emerge through controlling information instead of elements. This is applied through mechanisms such as paying for upgrading, time-paced plans, accessing enhanced learning environment, or unlocking of more courses ...etc.

The 'around' OER revenue model, for example, was argued for by David Willy, a founder and chief of Lumen learning which is a for-profit company that provides teachers with LMS to put their OER material free of charge where it charges students $10–$25 per course to access the material. As McGuire (2017) Lumen is charging for the 'added value' that 'could be included in the free OER license'.

Another revenue model that could be recognized is based on the provision of or progressing to a new alternative form of OER where more developed formats of OER are charged. MIT Open Courseware (OCW) developed in 2002 helped when 'a revenue-generating distance-education model was not viable for MIT' at that time (Vest 2004). It was not expected to affect MIT on-campus enrolment and business model and it didn't do so (Janssen et al. 2012) but instead it placed MIT in a 'competitive edge' within the digital age. Progressing from OCW to MOOCs in 2012, MIT resumed its revenue-generating distance-education model through charging fees for its MITx- a set of MicroMasters MOOCs developed for its on-campus Master programs, which are placed on edx platform (MITx MicroMasters 2018). The pricing is based on the learners household income ranging from $100 for income between 0-$25,000 to $1000 for income over $75,000 (https://micromasters.mit.edu/dedp/). A farther progress is realized in 2017when MIT instructors started giving MOOCs for credit for on-campus students where students have the options to meet their instructors at office hours (Shah 2017; Marshall 2017).

Both Coursara (for-profit) and Edx (not-for-profit) apply comparable revenue generating models as they both keep incorporating complex and changing revenue models through adding credit-based courses on their platforms through partnership and value positioning. Currently, a verified certificate starts from $49, a 7-days trail duration is provided after which $49 is paid monthly, self-paced courses are open for 180 days.[11] More recently, they also both develop forms for requesting information for some programs instead of making information available from users.[12] The Open Universiteit (Netherlands) OUNL of Dutch has applied OER as short courses where students pay for the other material and services. Exploring learners stated preferences of using three different scenarios, they found that increasing OER while payment is set for services and participation) increases the possibility of learners registration to the courses (Janssen et al. 2012).

Codecademy started as a mission-driven company, that later on started business model through add-on products and services that they may charge for (Camerota 2015). Codecademy offers a Pro version as 'Pro lets you unlock more courses and unlimited practice and reviews in Codecademy Go app' and applies a time-controlled subscription fee $19.99/m, $17.99/6 m or $15.99/12 m.[13] Users of Alison have to pay €50 to access a course or €99 to access a website and enjoy a distraction free learning environment without being exposed to advertisements.

[11] Accessed 2017-3-7.
[12] Accessed 2019-01-27
[13] https://www.codecademy.com/pro/membership Accessed 2019-01-27.

Figure 1 shows the elicited revenue scales from OER websites & platforms with their elements. The elements are categorized under each scale where 'none' or the basic element at the bottom might be free of charge. Revenue maybe applied per a scale of kind, format or degree availability. For example, in the assessment scale, the provision of a key answer might be free of charge where the provision of professional review and feedback could be a charged service. The positioning of revenue is based on establishing value relationships between these aspects of scales and other elements of OER environments. These value relationships are inconsistent and vary between OER providers.

1. Revenue stream per a scale of course content: This includes both accessing the raw material and engaging with the content. Raw material such as text, images and videos could be accessed free or for lower cost. The material could be read online for free, some charges might be applied to other formats such as pdf. Download or hardcopy printing. Free access is provided to auditing the material, however login information and/or charges are applied to other resources or more interactive versions such as quizzes and exercises. Examples of this could be found on openstax™ where textbooks might be downloaded as PDF format for free, other resources are either locked or chargeable. Some assignments and final exams apply techniques for identity authentication. Project based and industrial and employers are provided with tools enables them to plan their programs and to follow their employees progress.
2. Revenue stream per a scale of audience stands for the parties permitted to access the material. Generally, most courses are open or partially open for free auditing. Students may pay for some material such as in Lumen. Instructors might take OER courses related to their profession. Some courses are not open for general audience. For example OpenSAP which lock some courses for its employees only.[14]
3. Revenue stream per a scale of assessment type: Revenue scale is based on assessment type vs. the provision of professional grading and feedback. Materials providing quizzes and answer key for users to check their work might be free, other computerised marking providing instantaneous feedback or peer feedback might be locked from the auditing audience while available for the registered. Open Learning Initiative (OLI) from Carnegie Mellon University deploys its courses as academic ($25), independent ($10) and open & free versions ($0). While the academic course includes all course material with human & system scored tests and questions, the independent course includes only the-system scored test. The open & free does not includes tests and self-services.[15]
4. Revenue stream per a scale of evidence of achievements type: provision of progress report is free but its duration of availability might be controlled. A verified certificate from the system is chargeable, different charges might be applied if to be signed from the instructor and other charges applies for crediting. Usually there is a benchmark for passing the courses. A courseware content might be provided as free access but taking the course for credit is taken as distance education from contributing colleges. Example of this could be found in cooperation between

[14] https://open.sap.com/ Accessed 2019-04-24.
[15] Open Learning Initiative (OLI) https://oli.cmu.edu/learn-more-about-oli/ Accessed 2019-04-24.

Sofia OER (2004) (a project led by Foothill College to serve community colleges in Calerfonia and funded by Hewllet & Flora). Learners might pay nothing for the course as a unit but pay for taking the course for certificate, credit or as part of a program. FTA material is accessed freely but course is paid 'In order to help keep a roof over his head and to cover other incidental fees, we ask for a donation of 1 Euro per day for the 30 days course or 30 Euro total per participant.'[16]

5. Revenue stream per a scale of Support & community is for accessing forums and discussions with groups or/and instructors. It also controls getting the type and extent of support from the system. For example, a dedicated instructor is considered a charged service.
6. Revenue stream per a scale of access where a material could be free as self-paced or archived. Charges might be applied for extensions and repetitions of the course. For example, IndonesiaX charges €39 for reactivating a course in self-paced mode after it being closed.

This analysis shows us that revenue activities within OER environments are changing continually. Figure 1 reveals that value is attached to different, elements, services or features of the educational environment or system as there is no clear definition of educational resource. For example, a community discussion might be considered as an educational resource or a service based on personal philosophy towards education and the value attached to it. Scalability is applied and operationalized to different aspects of access, availability, education & resources. Multiple revenue streams might be applied within the same platform or website based on the needs and motivations of the provider and user.

2.4 OER-based Edupreneurship business models

This section weaves the above analyses to draw four OER-based business models for different edupreneurs and stakeholders. These models are; the static model, the interactive model, the dynamic model and the transformative model. Tables 3, 4, 5 and 6 define the four models through using the business model canvas developed by Osterwalder and Pigneur (2010). The previously identified revenue scales and group cores are weaved within the business canvas for each model. Figure 2 presents the models with the most distinctive characteristics when compared together. While the static and interactive models are content-based, the dynamic and transformative models are service-based. The static and dynamic models rely heavily on participation from community as they hold principles towards learning, knowledge generation and sharing. The interactive and transformative models relay on partnership between HEI institutions, industry and employers, so they focus on content and skills learn-ability. All models use networking and social media but while the dynamic model uses these as key resources to facilitate knowledge generation and sharing, the transformative model uses them more for increasing business opportunities. In the content-based models, networking has a supportive role especially as advertising channels to the platform. The dynamic and transformative models, which use or produce OER as subordinate

[16] Accessed 2018-2-22.

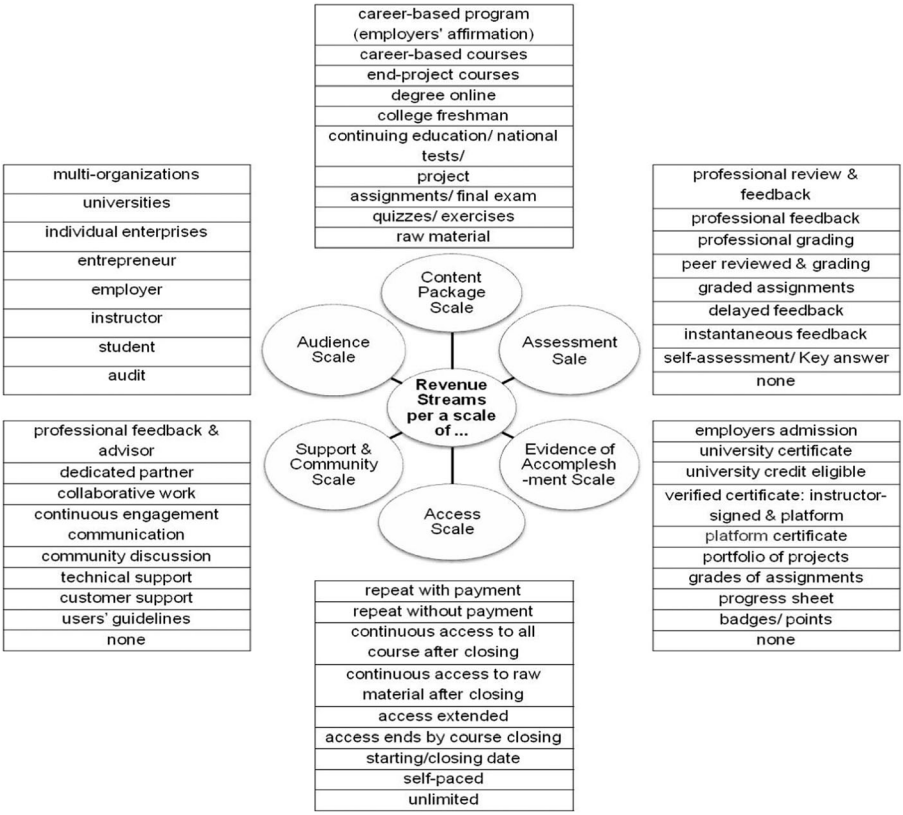

Fig. 1 Revenue scales based on value positioning on educational aspects and OER environments elements

elements within their business networks, are more capable of creating new forms of knowledge and disruptive ideas. These models are more likely to capture future insights and revolutionize the educational markets.

Stakeholders need to set their priorities, missions and most importantly, future prospects while deciding the model to invest on. The edupreneurship business models are described in the following section.

OER static edupreneurship business model Table 3 presents the business model canvas for this model which is content or material based.

Examples of this model are materials for general use, learning objects, repositories, libraries and courseware where the primary use for them is supplementary. The minimums resource requirements could be a host and an Open-source platform that enables searching the content such as DSpace, Kolibri Github or WordPress blogs. Material could also be placed in Wikimedia / Flickr or YouTube. Materials and links could be aggregated, classified and categorized. Teamwork and DIY management are required in this model to put effort in developing the system and promoting it periodically among institution and community members to use and add. The general users, students or instructors could be promoted to participate with and share their materials based on their local needs & interests. On basic terms, for non-profit

edupreneurs such as government institutions and community members, this model might not need revenue streams as it is based on a wider community production and sharing. As for -profit edupreneurs, revenue streams might be placed on content scale and services such as publishing open materials or curation of material for specific purposes which maximizes the organizations' time & reduces its effort for reusing OER. From the business models, this might fit with the first group core as the creation and production processes might require less funding, so governments could still support while considering other priorities.

OER interactive edupreneurship business model As Table 4 shows, this model is based on content-production. Increasing levels of interaction, engagement and engineering learner experiences while focusing on the learn-ability of the content are key for the competition between course providers and platform developers.

Examples of this model are xMOOCs. This requires platform with interactive learning environment such as edx, OpenMOOC, LearnDash, HotPotatoes or Google Course Builder. Other multimedia authoring software and audio/video equipments are required for quality material production. This type might involve edutainment design, multimedia learning theory and approaches. Within these environments, discussion forums are supportive but the content is usually designed for self-study and individual user where the computer plays the tutor or expert role. That's why it inherits the same issues related to distributing educational materials on compact discs (CD-ROM) such as difficulty in updating and reproduction of the educational media. This model is the base for other production models and requires good investment, funding, business planning and working with educational & subject experts. As multimedia production is industry-based, collaboration and funding from partners in the production phases is necessary. Providing high quality samples of content could attracts more potential customers to buy access to unlock other features or access the full content. Multiple revenue streams could be applied mainly through unlocking interactive features of the content that maximizes learners' engagement with the content. This model could fit with blended learning models, where the engagement with course requirements and theoretical content is learner-centred but informative discussions, projects and live collaboration take place on-campus. Planning such project will require arranging meetings for the involved institutions and agreeing on the production model or models. This model might work with the fourth group core as the organization ensures sustainability with the high quality production and offering of interactive learning materials and environments.

OER dynamic edupreneurship business model This model, presented in Table 5, values joint engagement and experiences where knowledge generation, evaluation and valuation is facilitated within an active network of experts and participants. Open and distance institutions and universities could benefit of integrating this model with their business models as they have already established the philosophy and theories concerning autonomous learning.

OER libraries and interactive xMOOCs might be used as resources in the course offerings as they could be available for potential customers for free or reduced cost, but connective cMOOCs are required to ensure the quality and depth of the instruction provision (see Rodriguez 2012 for a comparative study between connective and

Table 3 OER Static edupreneurship business model's specifications

Key partners	Key activates	Value propositions	Customer relationship	Customer segments
. alliance with community as the source of OER material production, collaboration & sharing . educational alliance with organizations, schools & HEI to sustain the development and growth of OER prospects & vision. . sponsoring or donating foundations & institutions **Outsource activities** · material availability is based on users' participations · quality, metadata and descriptions are based on author's discretion . volunteer peer reviewing	. making educational material available for free or for reduced cost .curating, aggregating & organizing material based on directory, classification & categorization models . supporting networking & cooperation opportunities among interested parties . Periodically promoting materials upload, sharing use, reuse & distribution based on local needs & interests through different channels Key Resources . developing a platform or website for material curation, aggregation, organization & management using a free hosting open-source platform such as ATutor, DSpace, EduCommons or WordPress blogs. . supporting the platform with search & browsing optimization techniques . making material available with minimal license restrictions such using open license. . a simple website might depend on Do-It –Yourself (DIY) management system	providing . free/low cost material available for supplementary use . web services for content management, & integration . material evaluation and quality assessment support	. attracting community to participate in material production and sharing . enabling community- based approach to education, new initiatives & prospects of OER and access to communities of practice . providing space & services for organizations to create & manage their own OER content. Channels . awareness through UNESCO, Educational Foundations, partners & CC . social media, newsletters & mailing lists . recommendation from partners, contact, tracking & monitoring . webinars and training workshops for members . profile accounts	. general audience as individual: sharing and using materials · groups with new projects or initiatives related to OER and need to follow community-based approach through networking with a wider audience . organizations needs customized hosting and content management services for their OER · government bodies · fellow members
Cost Structures		Revenue Streams		
. obtaining free/low-price materials from community . self-service tools for material production, description & sharing . volunteer experts for peer-reviewing of material		. small –scale projects might not need to apply revenue but will require interested management team. . content-scale charging for:		

Table 3 (continued)

Key partners	Key activates	Value propositions	Customer relationship	Customer segments
. involvement of parties/ partners based on value & interest . costs for maintaining the platform might occur . costs for developing new optimization &supportive tools- whenever expansion or further development is intended. . costs for technical support based on the size of institutions- might be required . costs for personalized services such as sub-sites or program coalition.		. additional materials that supplements the main content: lesson plans, tests, exams & lecture notes, key answers ... etc. . material format or type such as printed or more interactive versions . specific services carried on behalf of users, researchers or organizations such as creating grouping specific content for specific purpose and delivering content in certain format . donations & foundations that aims to support a specific group such as students This model could also place revenue on: . publishing content & materials . providing self-personalization techniques &services to organizations based on the types & sizes of service and organization (profit/ not for profit).		

Table 4 OER Interactive Edupreneurship Business Model's specifications

Key partners	Key activates	Value propositions	Customer relationship	Customer segments
. partnership with HEI to transfer online & offer their courses through the platform . partnership with HEI to uplift the platform to market . strategic alliance between different HEI competing on offering best educational & accessibility options, content & expertise **Outsource activities** · Instructional content, quality & updates are based on instructors (usually employed in HEI) · Tuition, guidance & assessments are based on instructors & institutions	. making instructional Interactive Multimedia Learning (IMM) content for self-study/ blended learning available for free or for lower cost than traditional material . engineering learner experiences within the instructional design (building levels of edutainment) . platforming through collaborating with institutions to transform & reproduce their digitized courses Key Resources . physical equipped IMM production centre (including digital media, recording & authoring software & audio/video production equipments) . developing platform & mobile Apps for IMM learning environment used in	. providing free/ cost reduced samples of courses with enhanced learner interactive experience for self study or blended mode of learning . high quality instructional design based on multimedia learning theory and approaches . providing support for course production & evaluation . providing opportunities for programs & degrees through the coalition of some courses together . providing opportunities to compare & assess different versions of the same course provided by different institutions &instructors	. using techniques to retain course takers & get them involved on different offerings · providing personalization techniques such as points or badges to recognize individuals active participation, learner profile, with progress& achievements . supporting learner's autonomy & interaction through computer roles as the tutor or expert role . providing services such as professional or peer feedback, advice & support . retaining course providers to deliver their courses & initiate other activities through the platform . providing space & services for HEI to deliver their courses online & monitor their students' progress . promoting applying for industrial projects, through integrating them within course assessments Channels . reaching students & subject experts through partnership with higher education institutions . providing free samples, self-paced & archived courses for auditing.	. HEI advertising their education to wider audience . HEI & experts want to transfer their courses & degree programs online . general audience as individual learners (e.g. instructors & students) looking for online courses & as potential customers · employers looking for in-service development programs for their staff

Table 4 (continued)

Key partners	Key activates	Value propositions	Customer relationship	Customer segments
	self-study or blended learning. This could be through using xMOOCs platform for example edx, OpenMOOC, LearnDash · making high quality instructionally designed courses requires recruitments of subject expert, instructional designers, web & multimedia developers		. using registration & signing up techniques as well as stats reports to detect potential customers . advertising various types of certification & participating through forums & social media, newsletters & emails	

Cost Structures	Revenue Streams
. costs for content production & reproduction as updating isn't feasible . costs for managing the platform & embedding more automated interactive & assessment techniques in the content . lowering costs or free offering of high quality sample content which attracts more potential customers to buy access to the full content . costs for production for multi operating systems & technological application	. content & assessment scales: The integration of these two controls the level of interaction & engagement (edutainment) with course content which could lead users to require further access, services & credentials . assessment/ feedback scales (as additional services): feedback types, peer reviewing, grading &ranking, discussion boards. . evidence of accomplishments scale: progress report, credits, certificates & badges . access-scale: number of times taking the course/ extension

Table 5 OER dynamic edupreneurship business model' specifications

Key partners	Key activates	Value propositions	Customer relationship	Customer segments
. registered students from HEI institutions & interested participants join within communities to create & generate knowledge . course instructors from different institutions could join together to create & facilitate course provision to students **Outsource activities** · policies & regulations for open online learning courses should be validated & accepted between HEI . creating knowledge is based on students' contributions (participants drop off) which needs filtering . OER or MOOC are used in equivalent with other resources	- providing academic open online learning courses for mixed communities of students & participants as an alternative for traditional instruction . supporting participants to learn, generate, evaluate, value & share knowledge through techniques such as information filtering amplifying, finding, modelling, curating & aggregating . cooperating with OER platforms to use the free resources & add course materials to OER platform Key Resources . instructors & subject experts facilitating the offering of the course . providing online learning environment that enable flexible access & participation for the mixed participants. LMS such as Canvas, Moodle, Desire2Learn & JoomlaLMS could be used (the universities' LMS might be valuable).	. enhancing learners capacities & skills to learn & generate knowledge through facilitated & supervised learning environment . crediting the course which is offered for limited-time enrolment from the facilitators' institutions . maximizing facilitators time & resources while networking & collaborating with colleagues . offering high level of engagement in joint experiences and discussions . social networking among participants is goal oriented as it is used to discuss learning content	. attracting community of participates to participate in knowledge generation & sharing . enabling participatory model of learning based on networking and connective approach . providing dedicated team of professors which allow immediate professional or peer feedback, re anchoring &advice . valuing participants contribution & creativity in knowledge building . supporting learner's autonomy where they follow their own knowledge paths Channels . advertising through HEI, course participants, colleagues, foundations, UNESCO, partners & CC . reviewing content for OER platforms & adding content generated within the course to OER platforms	. registered students & interested participants · team of facilitators interested to follow connective & community-based approach to knowledge generation through networking with a wider audience . HEI advertising their online education to wider audience as potential students · OER platforms to get access to experts, participants & quality materials . Ministries/ government bodies

Table 5 (continued)

Key partners	Key activates	Value propositions	Customer relationship	Customer segments
	. using free synchronous & asynchronous communication channels such as social networks (e.g. Facebook, Twitter, Linkedin) & Google group mailing list & a daily newsletter . making course structure, syllabus & outline available through free means such as Google website		. promoting courses through social media & networks are course channels tools & participate through discussions	

Cost Structures	Revenue Streams
. costs for assigning a group of experts (from registered academic institutions) to facilitate a course provision . costs for technical support for integrating LMS & communication channels to make the content visible . when this course is offered through a HEI, costs are part of the institution regular program as the course is offered as an alternative of traditional & online program with a different pedagogical approach for HEI . costs might be required to give permission for non-registered participants (potential customers) to use facilitators' university tools wherever needed	. evidence of accomplishments: verified certificate: instructor-signed, HEI credit eligible (for online degree) & HEI certificate . access-scale: number of times taking the course/ extension/ dropping the course after a certain period of time . assessment-scale: professional grading & feedback

Table 6 OER transformative edupreneurship business model's specifications

Key partners	Key activates	Value propositions	Customer relationship	Customer segments
. multifaceted partnership with physical & online communities to enable reciprocity relationship between buyers & suppliers . cooperation with employers as potential customers & suppliers . physical industries & institutions to access customers . developers of technical facilities & OER programs . local agencies for provision of communication means or places wherever needed **Outsource activities** · commitment of parties especially when multi parties are involved . sustaining the provision of OER content for the required duration	. providing service-based model as they mediates between different OER/MOOCs providers, groups & professionals and industries & physical institutions to respond to the latter's needs . working with industry & institutions to analyze their needs, plan & execute programs to transform their work through tailored and career or project-based OER courses & content . working with OER platforms & communities to solve-problems in relation to potential customers . supporting organizations to transform their training & development plans through reduced digital technological solutions Key Resources . recruitments/ Needs Analyses of the market & industry/ transdisciplinary team management/ intermediating contracts between institutions & industry . databases of mediated partners, platforms & technologies used in educational settings/	. providing viable, cheaper & efficient digital educational/ training solutions . establishing & managing digital/physical networks cooperation opportunities among multi-parties based on partners needs . identifying & leveraging new prospects, potential OER-based markets & contexts for digital educational providers . ensure quality & suitability of provided programs to employers . maximizing organizations & institutions time for planning & determining solutions	. attracting organizations & OER platforms through cooperative & networked settings & by advertising for their businesses . enabling networking and connective approach to a wider more complex businesses . providing dedicated team of experts to determine best & most efficient services, solutions & actions based on customer's needs & help in executing the plan . retaining partners through establishing long-lasting relationship . getting feedback & testimonials from institutions through follow up actions - providing consulting services for companies & institutions through recommending best digital educational & training solutions or courses of actions based on platform or environment characteristics Channels . using a combination of digital & physical communication channels: emails, discussion boards, forums & regular meetings . online & physical advertising through partners & OER platforms providers . identifying new channels for challenging situations	. wide audience of physical companies & institutions · digital communities of technical experts & academics in various forms & with different perspectives · OER providers as potential supplier/ buyer of services content . Ministries/ government bodies

Table 6 (continued)

Key partners	Key activates	Value propositions	Customer relationship	Customer segments
	. keep knowledgeable & updated of new digital services, developments, educational tracks initiatives & prices as potential solutions & customers . use &management of various tools based on customers' needs: Rapid Application Development tools/ Virtual e-learning platforms & environments/ game development environments, OER MOOCs/Object Oriented software & audio/video communication channels		. popularizing through services, events & activities using social media & networks . reviewing content for OER platforms & adding content generated within the course to OER platforms	
Cost Structures		Revenue Streams		
. costs for contract recruitment of academic & technical experts, temporary teams, managers & other staff. . engaging more parties lowers the costs to supply services & solutions . costs for managing the visibility of the service-based platform within the physical & digital worlds		. content-package scale: tailoring-programs, needs of employers: career/ skills/ credit, type of involvement; career-based, end-project . evidence of accomplishments: based on employer admission & satisfaction . access scale: number of times taking the service/ extension . audience-scale: based on size of the organization; individual enterprises, multi-organizations, physical organizations & institutions and type of collaboration: projects/ courses/ degrees . support & community scale: allocating professional advisor or dedicated partner & advertising solutions for parties within different contexts		

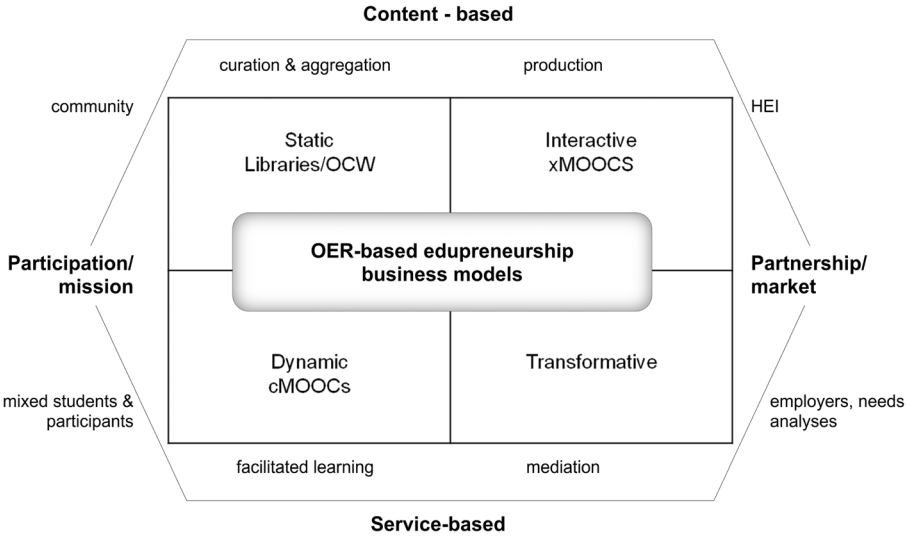

Fig. 2 The four OER-based edupreneurship business models with their most distinctive features

extended MOOCs). This model might focus their instruction on addressing representations of distance and getting learners to implement the content in their local environments, and then feed their applications back into the network. Open and distance learning environment could move beyond the existing OER or xMOOCS by using the content generated by learners as part of the instructional content. In this way, the dynamism is generated by learners' participating with their own content. Edupreneurs managing this model need to establish partnership with subject experts and HEI for certificate accreditation. The sustainability of this model could be ensured through its direct integration within educational contexts as the second group core shows.

OER edupreneurship transformative business model This model, presented in Table 6, is both business-based and market-based.

Example of this model is creating career-based courses, which might not be necessarily based on engagement with theoretical content provision. This model requires the management of complex multifaceted and reciprocity partnership between physical & online communities as buyers & suppliers dominates this model. It focuses on enabling organizations and institutions to enhance their performances and dealing with new requirements. The key for the success of this model performance is to get the trust of the parties through devising the best workable and affordable educational or training solution for them. This, on the one hand, involves the recruitment of skilled teams of researchers, data and market analysts capable of managing diverse industries, their requirements and needs. On the other hand, it requires a rich database with technical assets and solutions. This model could integrate OER as well as other open software and environments and simultaneously, advertise for them through using OER platform or forging partnership between them and other organizations. The openness of the transformative model to different prospects enables it to inspire innovative cultures and to bring innovations to use within the market. The platform will play a mediation or advertising role in this context. This model might work with the third group core as the

organization's focus is on creating, advertising and managing opportunities within other environments and for different stakeholders.

3 Conclusion

The restaging of OER within educational entrepreneurship instead of the humanistic view dominating its publications restages the way it could be thought of, developed and sustained. The obligation towards humanity will remain a dimension of OER but OER do not need to represent a humanistic value of Openness. OER creates value for people and organizations for being a development fitting within their digital culture more than being free of charge and free for use. Humanity isn't in war with business. Business, entrepreneur models and literature could provide structured ways of developing OER environments and maximize their benefits.

The analyses of the revenue streams and the first instance application of Osterwalder and Pigneur (2010) business canvas to OER websites and platforms reveal the complexity, multi-functioning, multi-processing and continual change characterizing OER environments. OER has established complex revenue streams that seem to change continually based on value placement and creation. Eventually, the use of revenue streams defies openness of OER as free of charge & accessible but it does reposition it as a business value within edupreneur and edupreneurial fields. Amazingly, in OER, value isn't created only through the resource, that is usually identified with content or material, or even services such as feedback and coaching but also through other scales such as time scales, numbers of access, levels of achievement and degrees of elaboration or evaluation. All are open-close scales.

Business and entrepreneurship models for OER environments should be thought of based on the opportunity or value they provide to different stakeholders. This paper suggested four OER-based edupreneurship business models based on the analyses of current OER environments that could support decision makers in deciding the venture for their best investment. Future research should investigate the appropriateness and possible alignment of these of these edupreneurship business models with different stakeholders interested in OER.

Data availability Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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