Massive Open Online Courses and economic sustainability

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MASSIVE OPEN ONLINE COURSES AND ECONOMIC SUSTAINABILITY

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Abstract

Millions of users around the world have registered on Massive Open Online Courses (MOOCs) offered by hundreds of universities (and other organizations) worldwide. Creating and offering these courses costs thousands of pounds. However, at present, revenue generated by MOOCs is not sufficient to offset these costs. The sustainability of MOOCs is a pressing concern as they incur not only upfront creation costs but also maintenance costs to keep content relevant, as well as on-going facilitation support costs while a course is running and re-running. At present, charging a fee for certification seems to be a popular business model adopted by leading platform providers.

In this position paper, the authors explore possible business models for courses, along with their advantages and disadvantages, by conducting a literature study and applying personal insights gained from attending various MOOC discussion fora. Some business models discussed here are: the *Freemium* model, sponsorships, initiatives and grants, donations, merchandise, the sale of supplementary material, selective advertising, data-sharing, follow-on events, and revenue from referrals. This paper looks at the sustainability of MOOCS as opposed to the sustainability of MOOC platforms, while observing the tight link between them.

Abstract in Danish

Millioner af brugere fra hele verden har registreret deres deltages til MOOCs (Massive Open Online Courses). Der er hundredvis af universiteter (og andre organisationer) som tilbyder MOOCs. Det koster titusindervis af kroner at lave og udbyde en MOOC. Lige nu kan indkomsten fra MOOCs ikke dække disse omkostninger. Derfor er MOOCs i fare, og deres levedygtighed bør undersøges. Der er mange forskellige typer omkostninger, såsom udviklings omkostninger, videreudviklings omkostninger og undervisnings støtte. Den mest populære indkomst i dag er salg af certifikater, disse s'lges af alle de lederende MOOC udbydere.

I denne artikle vil forfatterne undersøge andre alternative indkomst mulgheder og undersøge deres respektive fordele og ulemper, via en litterær gennemgang suppleret med personlige observationer og oplevelser fra MOOC deltagelse og udvikling. Diverse indkomst muligheder bliver undersøgt: *Freemium* modeller inspireret af mobil telefon spil, sponsorships, tilskud, donationer, salg af forskellige typer varer og undervisningsmaterialer, selektive reklamer, deling af data, opfølgnings møder og turer, samt indkomster fra henvisninger. Denne artikle bruger et perspektiv baseret på den individuelle MOOC, dette perspektiv står i modsætning til den hidtidige literære fokusering på MOOC udbyderes levedygtighed, selvom der er en tæt sammenknytning mellem disse perspektiver.

Abstract in Romanian

Milioane de utilizatori din întreagă lume şi-au arătat interesul pentru Massive Open Online Courses (cursurile online deschise şi în masă) oferite de către sute de universităţi şi alte organizaţii la nivel mondial. A crea şi a oferi astfel de cursuri implică costuri de mii de lire sterline. în prezent, însă, veniturile generate de către aceste cursuri MOOC nu sunt suficient de mari pentru a acoperi costurile. Sustenabilitatea acestor cursuri a devenit o problemă presantă, întrucât trebuiesc suportate costurile directe de creare, costurile de întreţinere pentru a menţine conţinutul relevant, precum şi costurile de a le menţine în stare de funcţionare. în prezent, mulţi furnizori de acest tip de învăţământ adoptă un model de afaceri care percepe o taxă de certificare a studiilor.

în acest raport, autorii explorează modelele de afaceri posibile pentru cursuri, impreună cu avantajele şi dezavantajele lor, prin efectuarea unui studiu de literatură şi aplicarea perspectivelor personale obţinute din participarea la diverse foruri de discuţii MOOC. Unele modele de afaceri discutate aici sunt: modelul *Freemium*, sponsorizări, iniţiative şi subvenţii, donaţii, mărfuri, vânzarea de materiale suplimentare, publicitate selectivă, impărtăsirea de date, evenimente ulterioare, şi venituri din recomandări. Această lucrare analizează sustenabilitatea cursurilor MOOCS, spre deosebire de durabilitatea platformelor MOOC, precum şi legătura stransă dintre cele două.

Abstract in Portuguese

Milhões de usuários ao redor do mundo têm se registado em cursos online abertos e massivos (MOOCs) oferecidos por centenas de universidades (e outras organizações) em todo o mundo. Criar e oferecer esses cursos custa milhares de libras. No entanto, atualmente, a receita gerada por MOOCs não é suficiente para compensar estes custos. A sustentabilidade dos MOOCs é uma preocupação constante como eles incorrem não só os custos de criação iniciais, mas também os custos de manutenção para manter o conteúdo relevante, bem como os custos de suporte e facilitação enquanto um curso está em execução. Atualmente, a cobrança de uma taxa para o certificado esta sendo um modelo de negócio adotado por muitas plataformas de ensino.

Neste artigo, os autores exploram possíveis modelos de negócio para os cursos, junto com suas vantagens e desvantagens, através da realização de um estudo de literatura e aplicação de conhecimentos pessoais adquiridos através da participação em vários fóruns de discussão em Moocs. Alguns modelos de negócios discutidos aqui são: o modelo *Freemium*, patrocínios, iniciativas e subvenções, doações, produtos comerciais, a venda de material suplementar, a publicidade, o compartilhamento de dados, eventos, e as receitas a partir de referências. Este documento analisa a sustentabilidade dos MOOCS em oposição à sustentabilidade das plataformas de ensino que offerece os Mooc, enquanto observa a estreita ligação entre eles.

Abstract in French

Des millions d'utilisateurs du monde entier ont recours aux MOOCs (Massive Open Online Courses) proposés par des centaines d'universités et d'autres organisations dans le monde. Créer et mettre à disposition ces cours entraine de grandes dépenses, mais les revenus générés actuellement par les MOOCs ne suffisent pas à couvrir les frais de production. Assurer la viabilité des MOOCs est une préoccupation majeure en raison des coûts initiaux de création, des coûts d'entretien pour actualiser les contenus, et des coûts de maintenance des réseaux permettant d'accéder aux MOOCs. À l'heure actuelle, faire payer une contribution pour attester du suivi d'une formation à la fin d'un cours semble être un modèle populaire adoptée par les principaux fournisseurs de plates-formes.

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Dans ce document de position, les auteurs identifieront les divers modèles d'affaires possibles pour financer les cours, en analysant leurs avantages et leurs inconvénients, dans le cadre d'une étude réalisée à base de documents, enrichie par des visions personnelles acquises a force de suivre des divers forums de discussion sur les MOOCs. Les modèles d'affaires analysés dans cette étude incluent le *Freemium*, les partenariats, les subventions, les dons, le marchandisage, la vente des produits complémentaires, la publicité sélective, le partage de données, des événements associés, et les recettes provenant de parrainages. Cette étude se penche sur la viabilité des MOOCS par opposition à la viabilité des plates-formes qui hébergent les MOOCs, tout en observant le lien étroit entre les deux.

Key words: massive open online courses; MOOCs; return on investment; sustainability; business models

Introduction

The European Commission (2014) defines a Massive Open Online Course (MOOC) as:

> *"an online course open to anyone without restrictions (free of charge and without a limit to attendance), usually structured around a set of learning goals in an area of study, which often runs over a specific period of time (with a beginning and end date) on an online platform which allows interactive possibilities (between peers or between students and instructors) that facilitate the creation of a learning community. As it is the case for any online course, it provides some course materials and (self) assessment tools for independent studying" (p.2).*

These courses are offered mainly by universities, and, increasingly, institutions around the world are joining various MOOC platforms to offer their courses.

The literature on MOOCs is growing (Liyanagunawardena, Adams & Williams, 2013). However, there is little published discussion on the business and financial aspects of MOOCs (Bulfin, Pangrazio & Selwyn, 2014). Thus critics have questioned of the sustainability of MOOCs. This position paper explores possible business models for courses and their advantages and disadvantages as discussed in the review literature and draws on personal insights that the authors have gained from attending various MOOC discussion fora.

Economic sustainability

The online Oxford Dictionary defines *sustainable* as "able to be maintained at a certain rate or level" (Oxford Dictionaries, n.d.) and Cambridge Dictionaries Online defines it as "able to continue over a period of time" (Cambridge Dictionaries Online, n.d.). Business studies literature uses various definitions of *economic sustainability*. Doane and MacGillivray (2001) present a collection of such definitions. The authors of this paper adopt the following definition by Found and Rich (2006): "Economic sustainability is the ability of the firm to survive. In short, economic sustainability is the ability to extract, in some time period, revenues that far outweigh the costs of operating the firm and thereby securing the future of the firm." In this paper, we observe MOOCs through this lens of economic sustainability.

At present MOOCs are widely perceived to be *free* courses. However, MOOCs are not free to create or to support. In fact Valentin et al. (2014) argue that "[t]he myth that MOOCs are free should be dispelled" (p.6). It is estimated that the University of Edinburgh, the first UK institution to join the Coursera MOOC platform, has spent on average £30,000 (about USD 45,000) on each course from development to delivery (Parr, 2013), thus demonstrating that MOOCs are certainly not *free* to create and offer. There are various reasons as to why institutions are prepared to invest in MOOCs.

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Initially many elite institutions considered MOOCs to be tools to assist with marketing, recruitment, brand enhancement, improved educational access, and research and development activity (Haggard, 2013; Kassabian, 2014). Jenner (2014) notes that as the MOOC market place becomes more crowded the *early mover* advantage diminishes while at the same time other *collateral* benefits of offering MOOCs emerge. Jenner presents a set of 35 collateral benefits for active MOOC institutions, categorised under reputation, innovation, delivery, infrastructure and student outcomes.

At the launch of FutureLearn (www.futurelearn.com) in 2013, the UK's main MOOC platform, the Open University's Vice Chancellor, Prof Bean, was quoted on twitter, as saying that "#moocs will be the digital shop fronts of unis [universities]" (see Figure 1), indicating that marketing and brand enhancement are indeed priorities.

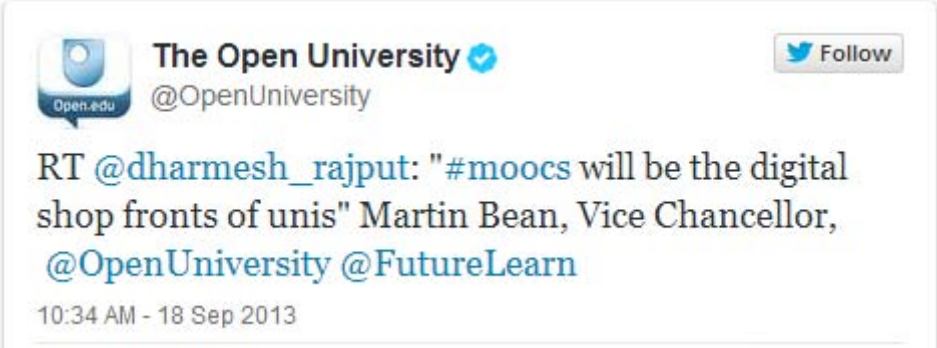

Figure1. Tweet by the Open University

Costs

Kassabian (2014) reports that various levels of both initial and ongoing investments were seen in early MOOC-adopting elite private universities (e.g. Columbia, Duke, and Harvard); however, the investments, though significant in terms of cost, were modest when compared to the overall budgets of these elite private universities. The Massachusetts Institute of Technology and Harvard University have together committed USD 60million to edX, while Coursera has raised USD 16million through venture funding (Kolowich, 2012a). These investments by MOOC platforms and universities provide a glimpse into the amount of funding required to set up platforms and produce and offer courses.

The most common type of platform cost agreements between institutions providing MOOCs and the leading platforms appears to be revenue-sharing. Rivard (2013) states that Coursera entered into a funding agreement with the State of Tennessee, such that Coursera would receive USD 25 per participant and USD 3,000 per course. On the other hand, the edX platform provides a range of options for institutions offering MOOCs through their platform. The *university self-service model* allows participating universities to use the edX platform as a free learning management system but on condition that part of the revenue generated be shared with edX. In these courses, the first USD 50,000 generated by the course, or the first USD 10,000 from each recurring course, will be taken by edX, after which the university and edX will share revenue equally. The *edX supported model* offers production assistance in return for USD 250,000 for each new course and USD 50,000 for each re-run. In this model, revenue sharing is 70:30 between the university and edX respectively. On the other hand, Coursera offers the universities 6-15% of gross revenue but there is no requirement for a minimum payment (Kolowich, 2013).

Hollands and Tirthali (2014) categorise MOOC resource requirements and costs as *production resource requirements* (i.e. personnel, platform costs, videography, assessment, obtaining copyright permissions, refreshing MOOCs that are to be re-run, delivery resource requirements and other institutional services required to support MOOCs); and *consumption resource requirements* – that is costs incurred by the institutions that are integrating MOOCs created by others into their own courses (i.e. search costs to find comparable courses, material adaptation costs, licensing fees, supplementary materials, assessment, space costs, staff salaries, certification, and the cost of technology). Haywood and MacNaull (2013) categorises the investment in MOOCs according to whether they are a one-off cost or per MOOC (per offering) cost. One-off costs are identified as those arising from: video facilities for MOOC materials, copyright clearance, and administration for agreements with the platform provider and senior lead. On the other hand, academic staff time, teaching assistants' time, support staff time and the use of facilities are categorised as per MOOC costs. Additionally, the cost of updating course materials must also be taken into account, as content for some subjects – for example computer science or international relations – may need more frequent updates than other subjects – for example an English literature or history course. Thus it is important to identify ways in which MOOCs can generate income to cover these costs and become economically sustainable.

After studying MOOCs offered by four different institutions (Large Midwestern University, American Museum of Natural History, University of Manitoba and Teachers College, Columbia University), Hollands and Tirthali (2014) estimate the total cost of a MOOC to be between USD 39,000 and USD 325,300. It is worth noting that the cost of an eight-week MOOC offered by Teachers College, Columbia University was estimated to be USD 38,980 while a five- to eight-week MOOC offered by Large Midwestern University was between USD 203,770 and USD 325,330, showing the variation in costs for MOOCs of similar lengths.

According to Yuan, Powell and Olivier (2014) the "[q]uality and financial viability are key considerations for making online learning programmes successful and sustainable" (p.14). This is echoed in the review literature: for example in the case of the Distance Education Modernization Project in Sri Lanka (Liyanagunawardena, Adams, Rassool & Williams, 2014), Liyanagunawardena (2012) writes: "[a]s the project [Distance Education Modernization Project] had progressed with an unrealistic expectation for cost recovery and sustainability, the government [in Sri Lanka] will have to subsidize the costs in order to use the available facilities and to maintain NACs [NODES Access Centers – similar to a telecentre]. In addition to the repayment of a 32-year loan, the project incurs maintenance and upgrading costs that will also have to be borne by Sri Lankan tax payers.". Considering the contemporary provision of MOOCs, it is difficult (if not impossible) to identify MOOC offerings that are economically self-sustaining (that is, runs without the host institution or some form of grant supporting its operation).

As reported in the Times Higher Education, UK universities' spending on marketing increased by 22.4% between the financial years 2010-11 and 2011-12 to £31.9 million (Matthew, 2013). Initially, MOOCs offered by some universities were funded by marketing budgets [personal communication]. However, an institution's marketing budget must contribute to the sustainability of the institution by attracting paying students. The return on investment or the "financial return for investing in a program, process, initiative or performance improvement solution" [relating to a MOOC] (Phillips & Jack, 2005, p.1) are not clear at present. However, there is some evidence to show that MOOCs do provide a return on investment.

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There is evidence to suggest that MOOCs have influenced students positively when choosing which university they will study their degree programme at. All freshers (incoming undergraduates) at the School of Systems Engineering at the University of Reading who attended the orientation programme were surveyed to identify the reasons for their choice of university, and at least 10% of the students mentioned that the MOOC "Begin programming: Build your first mobile game", the School's first MOOC, offered through the FutureLearn platform, had been a reason for their choice. Grainger (2013) reports that some 35 students who applied for University of London International Programmes indicated that they had taken one of the four MOOCs offered by the University of London. MOOCs have also channelled interested learners to paid-for online courses. At the time of writing, the University of Southampton had received expressions of interest from thousands of students for their master's degree programme that was advertised (via a hyperlink) in a FutureLearn MOOC. However, at present not many examples of such conversions are to be found in the review literature and the accuracy of the data could also be questionable as some platform providers are yet to implement reliable mechanisms to capture such vital information.

As shown above, MOOCs in fact are an expensive endeavour for institutions. Though universities are initially willing to invest resources in MOOCs, if they do not provide a sufficient return on investment it is unlikely that they will be funded in the future. Therefore, authors believe it is timely to consider possible business models that are likely to contribute to the economic sustainability of MOOCs. Even though there has been interest in sustainability of MOOCs in the review literature, many of these articles looked at models that would support MOOC platforms (Kolowich, 2012a; Raths, 2013; Valentin et al., 2014) rather than courses. Because many of the institutions offering MOOCs on these platforms are partnering with the platforms, a proportion of the money made by the platform will be received by the institutions to be fed back into courses they offer. In this paper the authors discuss various business models that are currently in use and could possibly be used by MOOCs (as opposed to MOOC platforms) to make them self-sustaining.

Methodology

For this position paper we conducted a literature study on SCOPUS and ISI Web of Knowledge databases and Google Scholar using the search term: "MOOC" AND ("Money" OR "Business models" OR "Economics"), discounting MOOCs on economics or the like, and using authors' insights gained from: symposia such as FutureLearn Academic Network and Evaluation of Learners' Experience of e-learning; EU MOOC projects such as MOOCs for Web Talent Network; MOOC workshops such as MOOC design patterns workshop series; and academic conferences such as eMOOCs. In this paper the authors present a taxonomy of business models that would create economic sustainability for MOOCs.

Analysis

In this paper we use the strategic analysis tool, the SWOT framework (strengths, weaknesses, opportunities and threats), to analyse various income generation methods that could be employed in MOOCs. SWOT analysis is a well-known strategic analysis tool. However, the exact origin of the term is unknown (Helms & Nixon, 2010). The SWOT analysis was described by Learned et al. (1969) and has since grown to be a key method used in the analysis of complex strategic situations to assist decision-making. SWOT analysis juxtaposes reflections on internal strengths and weaknesses against external opportunities and threats, creating a 2x2 grid that summarises a complex situation.

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Results

Hollands and Tirthall (2014) highlight the fact that many of those they interviewed when exploring why institutions offer MOOCs expressed concern about their sustainability. Burd et al. (2014) presented different business models that could be applicable to MOOCs including: "(a) charging for certificates, (b) linking students with potential employers, and (c) charging for supplementary services." Dellarocas and van Alstyne (2013) identified five different groups who could be paying for MOOCs – states; students; employers; sponsors; and other platforms – and then considered what each group may be willing to pay for. Kalman (2014) discusses how MOOCs may impact on the business models for universities, focusing on *variable costs minimisation* (VCM), where a small number of participants pay for *premium* services, concluding that VCM-based MOOCs are unlikely to be a model that supports developing online education. Aparicio, Bacao and Oliveira (2014) differentiate between MOOCs which are instructor-led (so-called xMOOCs) and community-based (so-called cMOOCs), but identify sponsorship and platform data as the main streams of revenue for both types of MOOC. Hoxby (2014) suggests that MOOCs will only be financially sustainable for a small number of prestigious institutions, and that other models of online education (non-MOOCs) may be more attractive to a great number of institutions from a financial perspective. Teplechuk (2013) declares that "it is evident that business models are under-developed for MOOCs, and mechanisms for economic and financial sustainability are unclear", demonstrating the need for possible business models for MOOCs.

Discussion

Informed by review literature and other discussions in MOOCs fora, in this section authors provide an account of possible revenue models for MOOCs.

Initiatives and grants

It is worth mentioning that at the beginning of the OpenCourseWare project, which aimed to publish course syllabi, lecture notes, reading lists, problem sets, assignments, simulations and other materials openly on the web for non-commercial educational purposes, and considered to be the first "open access initiative of its kind" (Walsh, 2011), the Massachusetts Institute of Technology (MIT) had received generous financial support from William and Flora Hewlett Foundation and the Andrew W. Mellon Foundation (MIT OpenCourseWare, 2006).

An early example of a funded free online course is the MUVEnation Programme, co-funded by the General Directorate of Education and Culture of the European Union, to improve innovative pedagogical approaches in schools in Europe. Under this programme a free online course was developed, which was taken by more than 200 teachers from across the world (Perez-Garcia, 2009).

Similarly, initiatives and grants could be used to create and offer MOOCs. The government, The European Commission or corporations could use their budgets to commission the creation of courses to address skills gaps to benefit the economy.

For example, the UK government's National Cyber Security Programme (a £860 million or about USD 1,276 million investment on the part of the UK government) has supported the development of the course "Introduction to Cyber Security" (www.futurelearn.com/courses/introduction-to-cyber-security) offered by the Open University on the FutureLearn platform as a part of its strategy to improve cyber security skills at all levels among the citizens. At the time of writing (February 2015), the course is on its first iteration with another iteration planned for April 2015.

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In 2014 the British Broadcasting Corporation (BBC) announced a new initiative to inspire digital creativity (BBC, 2014) and the year 2015 is set to be the year of digital creativity. Together with the FutureLearn platform, the BBC will promote courses related to digital creativity through this initiative.

AT&T, one of the largest US telecom/network provider, gave a USD 2million subsidy towards the start-up costs of Georgia Tech's Online Master of Science in Computer Science programme. The online course hosting agreement between Georgia Tech and the MOOC platform Udacity (www.udacity.com) is publicly available (GTRC/Udacity Massive Online Master's Degree Amendment, 2013) and shows that, under the assumptions made, the revenues should exceed the costs in its third year of operation (Hollands & Tirthali, 2014). Similarly, other MOOCs that start up with initiatives and grants should make a conscious effort to make the course economically sustainable after the initiative or grant expires.

Donations

Free software, Wikipedia and open education resources initiatives such as MIT OpenCourseware accept donations from the public and this could well be used as a business model where learners could contribute (if they wish) to the maintenance and facilitation of a course. At present not many MOOC platforms seem to provide the facility for donations. For example, in the third iteration of the "Begin programming: Build your first mobile game" (https://www.futurelearn.com/courses/begin-programming) course offered by the University of Reading in 2014 on the FutureLearn platform, a participant wanted to make a donation[1]; however, at the time the technology was not in place to support this.

In 2012 Wikipedia raised USD 20 million from its annual plea for donations, with more than one million people around the world contributing during its 46-day fundraising campaign (Liedtke, 2012). Similarly MOOCs could raise money through donations if the platforms allow a link to be included so that the interested parties could donate to a particular course. The donations could come from course students, alumni or well-wishers.

Sponsorships

Courses can be created and offered in collaboration with the industry where industry sponsorships are used to cover the costs of course production and/or offering. For example, the two-part course "Teaching computing" (https://www.futurelearn.com/courses/teaching-computing-part-1), offered by the University of East Anglia on the FutureLearn platform, that was aimed at primary and secondary school teachers in the UK to prepare them for the challenges of the new computing curriculum was sponsored by British Telecom and Computing At School (part of British Computer Society, also funded by professional bodies and some leading IT companies).

The course "ICT in primary education: Transforming children's learning across the curriculum" (https://www.coursera.org/course/ictinprimary) offered on the Coursera platform by the University of London was offered in collaboration with the UNESCO Institute for Information Technologies in Education (IITE). In this instance, the resources for the course were derived

[1] Gabriel Ziaja: "This is a really good course and I enjoyed every moment spent at it. It's awesome how there is always one of the tutors active in comments helping everyone, as well as participants helping themselves. What I would want for it is to grow bigger! New videos, new concepts, and etc. Of course I know it would cost resources (time mostly), but would it be possible considering adding some kind of non-mandatory donations to the course? I know not everyone sits on money (me for e.g. as a student :D) but I would gladly (and I bet not only me) drop few bucks knowing if it would help to expand the course (and/or making new ones)."

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from international projects funded by the UNESCO IITE to collate effective examples of teachers' primary practice in various countries.

The University of Leeds has created a course on business innovation in partnership with the British retailer M&S. Videos from the company's archive are to be used in case studies for the course. The course, entitled "Innovation: The key to business success" (https://www.futurelearn.com/courses/innovation-the-key-to-business-success) is hosted by the FutureLearn platform.

As described in the examples above, various levels of sponsorship arrangements for MOOCs could exist in the form of either full course preparation and offering, or partial sponsorship – for example, material preparation or expert service in discussion forums during the course. These types of sponsorships could work well for many organizations. For example an IT firm could offer some of its professional software developers' time as a resource in a programming course. This would reduce the money that would have to be spent on employing teaching assistants, thus reducing the operating costs of the course overall.

Licensing MOOCs to be used by other universities/institutions

Kassabian (2014) suggests that licensing MOOCs to be used by other universities could be a potential revenue generator. At present some universities use MOOCs as educational resources for in-person university degrees. For example, HAN University in the Netherlands uses edX MOOCs as teaching resources for undergraduate courses (personal communication).

The Coursera platform first entered into a contract to license several courses to Antioch University in 2012. Under this agreement, Antioch University would offer versions of these MOOCs as credits in their degree programmes (Kolowich, 2012b). The University will pay the Coursera platform, which will then share this revenue with the universities that created the MOOCs. Data from Hollands and Tirthali (2014) suggests that a licensing fee of around USD 30 per student applies for a Coursera MOOC. An agreement between the Kingdom of Jordan and edX allows the Kingdom of Jordan to pay a licensing fee to edX in order to offer edX courses on the Arabic MOOC portal Edraak (Hollands & Tirthali, 2014).

Elite universities would be able to use this model with other institutions which may want to use their content. However, similarly ranking universities in league tables are highly unlikely to use each other's MOOCs. On the other hand, if the universities are operating in two very different environments – for example they are working in two different languages – licensing a MOOC to be translated and used in another context may provide a good opportunity for the creator university to earn an income and the user university can translate the MOOC into their linguistic and cultural context and offer it on to students at a reasonable cost.

Licensed MOOCs could also be used by other companies (commercial or non-commercial) to create complementary courses or be repackaged for different purposes. Publishing houses could repurpose the materials in a MOOC while a broadcasting company might want to create *byte-sized* content for focused learning; for example two-minute video tutorials on various topics. Repurposing these types of material could create the need for them to be reviewed by an academic team, which could attract a consulting fee, of which a portion could go to the original MOOC.

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Freemium services

The term *freemium* combines the words *free* and *premium*. The freemium business model dominates the digital market place in internet start-ups and smart phone apps (Kumar, 2014). In this model, users can access the basic product at no cost but must pay a subscription fee for premium features or richer functionality. For example, at the time of writing (February 2015), anyone registering with Dropbox (www.dropbox.com) gets 2 GB cloud space of storage free of charge; but anyone requiring more storage will have to pay a subscription fee of £7.99 (USD 12) per month that will give them access to an additional 1 TB (1,000 GB) of cloud space.

In terms of MOOCs, providers can offer freemium services such as additional tutor help or bundled services (for example, tutor help and tutor marked assignments or a premium peer review service where paid students take priority in the peer review process) for the student cohort who are willing to pay a 'subscription fee' for the duration of the course.

The Coursera *Signature track* scheme offered for certain courses come under this model. If a student registers for this scheme at the beginning of the course and pays a fee, and if s/he completes the course with a pass mark that fulfils the requirements of the scheme, s/he is issued with a *verified certificate* as opposed to the *certificate of completion* that non fee-paying completers receive. On 13 September 2013 Coursera announced that they had earned USD 1million in revenue through the Signature Track scheme (Coursera Blog, 2013). A proportion of the revenue will be offered to the University (or course).

Citing the Director of Course Operations at Coursera, Pang Wei Koh, Hollands and Tirthali (2014) write that Yahoo has announced that they will reimburse their employees enrolling in Signature Track courses. It is likely that there will be more demand for paid-for course certification such as Coursera Signature Track and edX XSeries certificates once employers start recognizing these credentials.

In this model students pay up front for a service that, as with a subscription, they may or may not use. For example, after paying for the Signature Track service, if the student does not continue the course, the money paid would be lost to the student. Authors differentiate between this type of service and the next model presented in this paper, *in-course purchases*. These are similar to *in-app payments* where if the user wishes to make a purchase to enhance the service or experience while using the service, they must make a payment.

In-course purchases

In course purchases can take many forms. For example, FutureLearn offers a *statement of participation*, a printed certificate which can be purchased by participants at the end of the course. Also, some of the courses on FutureLearn offer a *statement of attainment*. A statement of attainment verifies the student's identity and is awarded to students who take the relevant exam conducted by the test partner Pearson VUE. A student can take the exam at a physical test centre operated by Pearson VUE by paying a fee. These we categorise under in-course purchases because the decision to purchase the certificate or sit the exam does not need to be made up front. Thus we differentiate this from freemium or subscription-based services. As with Coursera, FutureLearn offers a proportion of the revenue to the partnering university.

In addition to certificates and proctored exams, institutions could also provide online tutoring for a fee. This could be in the form of synchronous one-to-one tutoring via video conferencing (for example Skype), online chat or via telephone; online tutoring could also be implemented via email or tutor-monitored online discussion forums. A pool of teaching assistants or PhD students could provide the tutoring to paying students. For example, if while studying a MOOC a

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student finds one particular concept problematic s/he could pay for one session of tutoring to get back on track. There could also be additional resources: for example, supplying answers to a quiz or assignment or additional assignments/quizzes with model answers that could be purchased. This would be similar to making an in-app payment in the FarmVille game (https://zynga.com/games/farmville) for Farm Coins, or buying Linden Dollars to spend in the game SecondLife (http://secondlife.com).

Sale of supplementary material

Supplementary course material in the form of an online or physical book or similar could be sold and the revenue reinvested in the course delivery. This could either be presented as an in-course purchase or an independent purchase.

Referral fee

Amazon and other online marketplaces offer sellers referral fees (incentives) for items purchased through their website. Thus links could be created for purchases such as course textbooks or other material, which take the purchaser to an online market place such as Amazon. For each purchase made through these links, the course could receive a referral fee. For example, a course that uses LEGO NXT robot kit such as the "Educational Robots for Absolute Beginners" could create a link directly to a marketplace to purchase the LEGO NXT kit.

Follow-on events

Courses offered as MOOCs could lead to follow-on paid-for summer schools, courses, workshops or other real-life or online events, in which case a percentage of the revenue could be passed on to the MOOC towards making its sustainable. Conferences where MIT and Harvard professors deliver speeches are likely to attract prospective students. Kolowich (2012a) sees a business opportunity in inviting recruiters to these events (recruitment will be discussed in a separate section). Other examples include a course on Roman history offering a follow-on event such as taking a group of students on a guided tour to Rome; a course on archaeology could offer a field visit to one of the archaeological excavating sites; a course on cyber security could offer a webinar where experts in the field would talk about current issues with question and answer sessions. The possibilities could be endless.

Merchandise

Selling merchandise could also bring revenue to MOOCs. As many participants do not seek formal recognition (European Commission, 2014) for completing a MOOC, merchandise that presents their achievement in a playful way could well be attractive to them.

Some MOOC platforms offer a variety of merchandise. For example, the FutureLearn platform opened their *online shop* (shop.futurelearn.com) on 1 December 2014 with a range of products such as posters, bags, souvenirs, stationery and T shirts for sale. Other MOOC platforms also have branded material on offer: for example, Coursera have branded merchandise made available through the Coursera Store (Ng, 2013) and Udacity offer their branded merchandise through their store (udacity.spreadshirt.com). Successful courses could also offer their own branded merchandise, possibly through the platform store, to reduce overheads.

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Selective advertising

Corporations spend millions of dollars in advertising each year. MOOCs could scoop up some of those by allowing selective advertising on their courses. For example, a course on cyber security could advertise anti-virus software while a course on heart health could advertise healthy eating and related products such as sport centre memberships. On the other hand, a course on ancient Egypt could advertise holidays in Egypt. Advertising in MOOCs could be very effective as people signing up for the course have already expressed an interest in the subject. Thus marketing campaigns could be very specifically targeted: for example, advertising in a specialized magazine (e.g. Gibbsons Stamp Monthly magazine or Runner's World magazine) as opposed to placing an advertisement in a newspaper.

However, advertising can create a backlash on a course if there are too many advertisements or distracting advertisements. Free service providers, for example free email accounts such as Google Mail, free video-sharing sites such as YouTube and free social networking sites such as Facebook, use advertising to earn revenue. On the other hand, MOOC providers could also offer a premium paid-for service for participants who would rather pay a small subscription fee to stop advertisements: for example, Spotify (https://www.spotify.com/uk/) music streaming service's premium paid-for service does not have adverts, wheras the free service does.

Data Sharing

Matchmaking for employers

MOOCs could offer recruiters not only bright student's details but also examples of their actual work. For example, Johns Hopkins University offers a "data science specialisation track" on the Coursera platform, which consists of nine courses. In each of these courses, students are expected to use GitHub (github.com) to share their class projects for peer assessment. If a recruiter is searching for a data scientist, the ability to find students achieving good marks in the course along with their portfolios of work (projects on GitHub) will provide the recruiter with lot more insight into the capability of the student. Kassabian (2014) shows that in the Silicon Valley, recruiters are paid a fee equivalent to about 20% of the software engineer's starting salary, about USD 15,000 per student hired. Though a controversial topic, sharing learner data with relevant employers or similar could well be a viable revenue model for MOOCs as each match attracts a higher rate of revenue than all other models.

Sharing or allowing other parties to access participants' data has ethical and legal implications. In order to fulfil legal responsibilities, courses could get participants to agree to a statement which gives their consent to sharing their data. However, then there is the ethical dilemma whereby learners who do not want their data be shared but want to take up the course would be obliged to give their consent in order to take up the course. Alternatively, courses could provide participants with the option of opting out of allowing their data to be shared. However, in such cases, the value recruiters or other organizations requesting the data would place on partial data would be much lower than the value they would place on the full set of data. Table 1 summarises the various business models.

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Table 1: SWOT table for identified business models

	Strengths	Weaknesses	Opportunities	Threats
Initiatives and grants	Target specific subject areas where talent is lacking	Political influence Hidden agendas A subject area perceived to be of little contemporary relevance (for example arts subjects in the UK) are unlikely to be funded through this model	Public education Exposure and network building for course teams	Concept of MOOCs modified to show established power opinions. For example, a MOOC Greek debt crisis funded through an EU grant on is likely to show more of an EU bias towards the subject
Donations	Can accept smaller value donations in large numbers	May devalue the course if learners do not accept the concept of donations being used for course development Off-putting to see list of donors	Tapping into different markets	Depends on the disposable wealth of interested parties
Sponsorships	Likely to bring in high value. Attract professional bodies to sponsor courses	Multinationals able to fund MOOC development may lobby their views through the course	Exposure and network building for course teams	Hidden agendas may threaten MOOCs
Licencing MOOCs	Rework can be minimised	Not fit the pedagogical and cultural values of receiving institution	Esteem to the university offering the MOOC Recipient university may gain an advantage by offering a high-ranking university's course	Using a similar ranking university's course may devalue the recipient university's reputation.
Freemium	Only pay for the services you need Fewer overhead payments for students	Fewer overhead payments received by the university	Ability to sell to more	Perceived devaluation of education
Follow on courses	Reinforce learning Extra value to participants	Difficulty of access	Community building and networking	May view courses as a money-making exercise. Third parties or other providers may cease the opportunity.
In-course purchases Supplementary materials Referrals	Targeting educational needs of the participants	May deter potential participants	Special target marketing	Perceived devaluation of education
Merchandise	Small but higher volume income Promotional value	Commercialisation of education	Branding and improved recognition	Inappropriate branding can cause a loss to reputation. For example, in some cultures drinking coffee is looked down upon so branding on a coffee mug may not be suitable in that context Perceived devaluation of education
Advertising	Exposure to materials connected to course adding value to participant's experience	If done incorrectly the same will be a weakness Inappropriate advertising	Improving individual course experience	Devalue course due to the sense of monetorisation
Data-sharing	Higher reward for sharing data	Participants may not register if they are concerned of their data being shared	Participants receive benefits; for example, matched job opportunities Creating better course suits as a result of data sharing Better targeting of courses	Privacy issues Negative connotation of data sharing

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Conclusion

MOOCs thus far have attracted funding from various bodies despite not offering a concrete economic viability model. At present a main income generator in MOOCs is the paid-for certification. In this paper the authors discussed various business models for courses. Some of these are: the freemium model, sponsorships, initiatives and grants, donations, licensing fees, branded merchandise, the sale of supplementary material, selective advertising, data-sharing, follow-on events, and revenue from referrals.

Though these models are all possible ways of generating revenue for MOOCs – some, for example, sharing of learner data – are more controversial and sensitive than others. Nevertheless unless appropriate business models are identified and implemented, the outlook for MOOCs would be problematic.

Recommendations

MOOC providers (institutions and platforms) need to keep account of all expenditure that is involved in offering a MOOC. It would appear that the exact costs of offering MOOCs are not available. These should be recorded in order to move towards sustainability in MOOCs.

These models and mechanisms will have to be tested on various courses and the data of such experiments shared in a way that is commercially confidential but which enables quantification of data.

The models would have to be tried on a greater scale (that is, on various types of courses, platforms etc.) to be able to quantify their use.

Some models may be suitable for a particular type of courses and learner demographics and/or locations, while others may be more appropriate for other courses. Unless these are quantified by sharing data collected in these experiments it is not possible to identify these.

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