

# Drivers of MOOC Sustainability: a Comparison of the US and India

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***Abstract*** - The dynamics of online teaching and learning have been transformed through the development of Massive Open Online Courses (MOOCs), which are now available as a global commodity with access to an online computing device. This raises the question, whether the factors that drive MOOC sustainability in diverse socio-economic country contexts differ across regions. The article examines this question through a review of the literature on MOOCs, shaped primarily by developments in the USA, and comparing the findings to implementation characteristics of MOOCs in India, identified based on expert opinions. Success factors for MOOCs are identified along four dimensions, (1) MOOC supply and stakeholders, (2) distribution channels, (3) intended learning outcomes and (4) the learning perspectives or demand for MOOCs within diverse contexts. Results point to the research need for formulation and validation of a differentiated MOOC success model, and the need for a careful understanding of regional, contextual characteristics to attain MOOC success in practice.

***Keywords*** - Contextualized Online Education, MOOCs, MOOC Success Factors, Sustainability

## I. INTRODUCTION

Over the past few years the dynamics of online teaching and learning have been transformed through the development of Massive Open Online Courses (MOOCs). MOOCs have changed online learning from being a privilege of university students (in well developed economies), to a commodity in reach of anyone with access to the internet and a computer or mobile device. Initiated through projects at Ivy League universities in the US such as Coursera, edX, or Udacity, MOOCs, have evolved into open and free courses from across the globe (Liyanagunawardena et al., 2013).

Much has been made of the success and sustainability of MOOCs (Zhan et al. 2015), as they require significant resources to develop and distribute, frequently provide little or no profitable returns to their creators, and draw on a student group that declines considerably throughout course operation. The question is particularly relevant for developing nations, which face considerable resource limitations but which potentially also can benefit greatly from educating their vast population through highly scalable education solutions (Charmonman et al. 2014). India, for instance, with its 1.2 billion population and role as “largest contributor to the global workforce” of over 950 million people (Ernst & Young

LLP, 2013, p.7) would seem to be an ideal candidate. Traditional classroom environments in India “can’t keep up with the masses” (Pushkar 2014). Therefore, the prospect of MOOCs has become real to India as it identified “of the 2.9 million registered users of Coursera in March, 2014 more than 250,000 were from India, second only to those from the United States (Agarwal 2013).

The question of sustainability is particularly important for developing nations such as India, as the sustainability drivers for developed economies may not apply in less developed regions, thus requiring different models for the creation, distribution, and maintenance of MOOCs, so as to sustain their broader success. For example, a MOOC student in North America may be happy to enroll in a course for self development or personal enjoyment, given the only incremental cost being time spent to participate. In contrast, a MOOC student in India without prior access to a well developed online infrastructure, may choose to take a MOOC only if it provides employment-related rewards, given the potentially significant costs to obtain the needed computing device and Internet access. India is furthermore interesting as a comparison case because it has (unlike China) a large English speaking population, so MOOCs developed in North America could potentially be successful in India, if similar sustainability drivers existed in both regions. In order to be sustainable, MOOCs are expected to meet a set of success criteria, the determination of which is the subject of this article.

Consequently, this study aims to answer the following research question: What are the factors contributing to the success of MOOCs in a developing region, here India, and how do they differ from success factors in the United States?”

The article addresses this question in relationship to MOOC development in India, but with the expectation that findings are applicable to a larger group of developing nations. The research, being early stage, is exploratory in nature, and will draw on expert

opinions to preliminarily answer the above question.

## II. BACKGROUND

### A. *Determinants of MOOC Success*

E-learning services usually attribute their levels of success to two main factors: content and delivery (Romiszowsky, 2004). Although content and delivery are highly important, by themselves they cannot assure long term success (McGraw, 2001). Whereas short term success for the “product” MOOC can possibly be measured meaningfully in terms of these two factors, MOOCs as a sustainable education system require a broader set of success criteria. For long term (product) sustainability, the literature (Cooper & Kleinschmidt, 2000), (Janelle & Hodge, 2000) and (McNally et al., 2010) identifies the following key areas, Stakeholders and Supply, Product Distribution, Predicted Customer Intentions, and Product Demand.

**Stakeholders and Supply** - Cooper & Kleinschmidt (2000) stress the impact of support or lack thereof, from top management (Cooper & Kleinschmidt, 2000). Other well-known studies, Rothwell (1972) and Maidique & Zirger (1984), have also stressed the significant role which the buy-in of stakeholders and other “top management support” plays on the success or failure of new and developing products (Cooper & Kleinschmidt, 2000, p.21). The buy-in of stakeholders, however, should not be limited to financial resources (Johansson, 2002). Truly successful products require stakeholders which examine the external environment in which the product is launched, and thus, must provide both “financial and political resources” which are “critical for product development success” (Johansson, 2002, p.100). For MOOCs, stakeholders and supply identify the key elements in the supply chain of MOOCs.

**Distribution** - The continual expansion of “information societies” or plugged-in societies, has led the technological impact on products to become a core component which

may lead to their success (Janelle & Hodge, 2000, p.211). Studies have identified factors insuring product success as not only technological continuity and stability, but also the level of “technological discontinuity” that is required for the product (McNally et al., 2010, p.992), referring to whether a product fits within the demands of the technological infrastructure of its contextual market environment, or if new technological processes and infrastructures are required (Ibid). The reverse concept of examining discontinuity contributes as a success factor, as it enable the identification of required acquisitions, product adaptations and managing skills best suited to the context of the target market to emerge (Silva et al., 2007, p.741). This is an essential aspect of online or e-products. For MOOCs, distribution defines the distribution channel, by which online courses are delivered to learners.

**Predicted Customer Intentions** - Similar to technological discontinuity, product success is also associated with “customer discontinuity” (McNally et al., 2010, p.992). This examines the possible intentions of customers and the likelihood to which they will be willing and able to change their known behaviour patterns to what is required for the adoption of a new product (Ibid). In a learning environment, customer intentions translate into intended learning outcomes.

**Demand** - Predicted demand for a product, that is identifying potential customer attitudes and awareness or “customer meaningfulness”, runs parallel to the concept of identifying customer discontinuity (McNally et al., 2010, p.991). This focuses on the significance which the customer may place on a product. For MOOCs, this describes the demand for open online learning.

### III. METHODOLOGY AND DESIGN

Fig. 1 depicts a model for MOOC sustainability with 4 independent variables, each of which together with corresponding propositions will be described below.

#### A. MOOC Supply Chain (Academic and Platform Stakeholders)

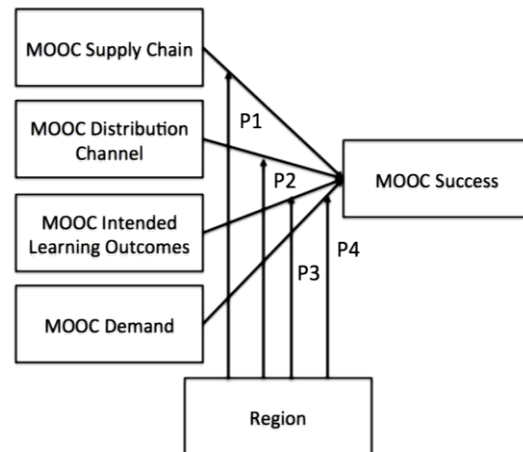


Fig 1. Model of MOOC Success

MOOC Supply Chain is our construct to describe the delivery capability for MOOCs in the region. The delivery capability of the supply chain refers to the region’s ability to create and maintain a set of MOOCs. This delivery capability may be defined by available funding, presence of content providers, such as universities, and expertise in MOOC creation (Liyana-gunawardena et al., 2013). The assumption is that a stronger delivery capability will lead to greater MOOC success (P1). The stakeholders in the supply chain for MOOCs are likely to be different according to the region in which the MOOC is developed (Winkler 2014). Based on past research we conjecture that:

(Proposition 1) MOOC success in the US will be based on a supply chain dominated by platform stakeholders (Liyana-gunawardena et al., 2013) whereas in developing nations (here India), success will be based on a supply chain that is built around academic and local support institutions (Jain et al., 2014).

#### B. MOOC Distribution Channel

Studies have identified contextual environmental conditions play a role in the development of networks (Li & Atuahene-Gima, 2001). As a predominantly virtual product online, MOOCs will rely on a transmission and delivery infrastructure to be

successful. The better this infrastructure, the more successful the MOOC is expected to be. The infrastructure will incorporate a range of factors at the technology level and also with portable technology devices. Thus it will include bandwidth and availability of reception devices (Ratwatte 2013). Furthermore, the network will also include intermediaries, such as the large MOOC “integrators” we see emerging through Coursera, Futurelearn and other platforms (Wintrup et al., 2015). Once again, we expect differences between developing regions and developed ones, namely the high importance of the technical network as the possible Achilles’ heel in developing regions, such as in parts of India and the importance of intermediaries to organize the vast supply of MOOCs in more developed regions. We thus state:

(Proposition 2) MOOC success in developing nations (here India) will depend on a working IT infrastructure, whereas MOOC success in developed nations will depend on a well-developed intermediary network.

### ***C. MOOC Intended Learning Outcomes***

MOOCs are by definition open and usually delivered on a no-fee basis. Nevertheless, for most viewers they incur costs, both in terms of time spent (opportunity cost) and resources required to watch (e.g., computing and communication costs) (Masters 2009). From a viewer’s perspective, their sustained investment, beyond early curiosity, should therefore only make sense if the MOOC achieves the desired learning outcome. It is therefore through reaching greater achievements with the intended learning outcomes, that a greater level of sustained MOOC success is possible. We expect intended outcomes to differ between a developed region and a less developed region. Studies have indicated that for developing regions course content needs to be geared around skills based training, along with language also playing a key role (Boga & Mcgreal, 2014), and that courses will have “distinguishable features compared to MOOCs

popularised in North America” and these features are essential for their success (Perris 2014). Whereas MOOCs course design in India would be “based on application (rather than personal interest)” (Perris, 2014), MOOCs in the US would be geared towards further personal development (Palin 2014). We thus expect:

(Proposition 3) MOOCs in developing nations to target skills and application based learning outcomes, whereas US MOOCs will target personal interest and developmental achievements.

### ***D. Demand (Learning Perspectives)***

Through examining previous studies, “demand” is based on “Learning Perspectives” which are either norms based or needs based (P4). It is anticipated if users identify MOOCs to be out of their reach, their demand and attitudes towards them will be negative and thus effect MOOCs success and sustainability. Studies have identified norms based learning perspectives generate a demand for MOOCs in circumstances where the learners are “knowledgeable”, “are capable of paying for education”, and do not necessarily identify MOOCs as a means through which employability is acquired (Palin 2014). Such learners are on a career track and also have access to MOOCs in an understood language (Kop 2011). The ‘needs based’ learning perspective is likely to be based around the learners contextual circumstances and ‘need’ to expand their knowledge base if they were otherwise “left out of the higher education system” (P4) (Ernst & Young LLP, 2011, p.11). This is considered a “critical starting point” affecting the demand for MOOCs if students believe such online learning may harness for them a sense of upward mobility and greater opportunities for employment (Nath et al., 2014, p.156). Based on these recognized perspectives, we formulate:

(Proposition 4) MOOC demand in developing nations, here India, will be predominantly need based, whereas MOOC demand in the US will be predominantly interest based.

#### IV. INFORMANTS AND DATA COLLECTION

This study gathered data from three India MOOC experts. All three are professors with more than 17 years education-related experience in India, and strategic involvement with MOOCs, with respect to development, distribution and maintenance of MOOCs in India. All are also keenly aware of the nature of MOOCs in the US. They were chosen according to what Groenewald (2004) has expressed as “purposive sampling” (Groenewald, 2004, p.8). Therefore, they were selected based on the purpose and requirements for this study, that is, the experts were identified as a more neutral sounding board. As this study is exploratory the differentiating factors for the development and sustainability of MOOCs, the MOOC experts were identified as the most relevant participants for this study (Suri 2011). Three experts was considered a reasonable number along with being a pragmatic method through which to collect and manage data for this exploratory study (Suri 2011) (Forker & Mendez 2001). Semi-structured interviews of 45-75 minutes, conducted via Skype, were used to capture the experts’ knowledge following Lester’s (1999) pragmatic design of “minimum structure maximum depth” (Lester, 1999, p.2).

#### V. FINDINGS

##### ***A. Supply (Academic and Platform Stakeholders) (P1)***

It was examined here if there was a contextualized differentiation in the requirements of the “Supply” of MOOCs with key providers or “Academic and Platform Stakeholders”. Through the perspectives of the experts it has been both identified and agreed upon, that the key providers of MOOCs are subject to the environment for which the MOOCs are developed. All experts stated this divide due to India’s contextual environment and they advocated the need for government stakeholders and town mayors.

**Expert 2:** “Government would be the central agency and stakeholder for this because universities will have limited resources and limited reach. It has to be localized. So the change agents will have to be the district agents (town Mayors) of the local government offices in each district.”

**Expert 1:** “MOOCs are looked at as part of an investment in education by the government of India.”

**Expert 3:** “MOOCs will not be sustainable as a business but MOOCs will be sustainable as a social obligation, so government is important. The Ministry of Education in India is taking a very serious interest in this, because for them it is part of party politics.”

##### ***B. Distribution Channel Conditions (P2)***

The necessity for technological infrastructure along with identifying the learner markets reliance and prevalent use of the type of technology was essential to examine here. All experts confirmed the differentiation between the US and Indian context with access to technology and bandwidth speeds to support the Indian MOOCs. They also highlighted MOOC success in an Indian context may require distribution through mobile devices.

**Expert 3:** “You need to have access to technology...MOOCs which run on mobiles and use a lot of voice...with technology speed or lack of, we many need to use mobiles like this more creatively.”

**Expert 1:** “Technology is a problem if you want to reach people. Internet access is not widely available in India, even if they use phones, 3G doesn’t work that well...we need a new architecture for this.”

**Expert 2:** “Smartphones and tablets are very cheap; the cost of 3G data is expensive but this is not necessarily limiting.”

##### ***C. Intended Learning Outcomes (P3)***

All experts agreed about the importance of localization and saw unique outcomes needed in a market such as India as depicted through

P3. All experts identified “skills” as a differentiating factor for the Intended Learning Outcomes of MOOCs in an Indian context as opposed to the US context of learning for personal development.

**Expert 2:** “In terms of content, what is the unique skill set that the course is providing, this is of particular interest for India... we require relevant programs for relevant skills, we do not have the leisure for other things... This could be to spread awareness of health and sanitation, farming etc., here it may need professionals teaching rather than professors teaching. 80 % of MOOCs in the US are not relevant courses I think, there are good things about it, but they are not necessarily taken seriously.”

**Expert 1:** “MOOCs here have a different mentality and are not the same that Coursera is running, there is an entirely different scenario that we are facing. MOOCs designs are for skills for development to empower the people who take it in their situations.”

**Expert 3:** “We have lots of young people unemployed, there is such a big gap in skills learning and application, so MOOCs design would be to support very large scale skills building. Whether its carpentry or agriculture skills, there are about 100 or 200 million people which need to be skilled in less than a few years’ time.”

#### ***D. Demand (Learning Perspectives Attitudes towards MOOCs) (P4)***

The focus here was to identify if there is a differentiation for the demand and thus a difference in the “learning perspective” for MOOCs, based on specific contextualized environments. When examining the “needs based” learning perspective, it was confirmed by all three experts that the traditional US model of MOOCs may be elitist and therefore not cater to the needs of its learner market. All experts also indicated that the “norms based” learning perspective is relevant as they suggested MOOCs in India should be developed with more than the “privileged class” or knowledgeable learners in mind.

**Expert 3:** “India, with this scale, the reality is there are those unreached people... Initially MOOCs look a bit farfetched and a bit elitist, but this in the years to come will change.”

**Expert 2:** “The lead has to be taken by the top notch universities to begin with, and they have to make it much more inclusive rather than exclusive. If they really want to reach out on a mass scale, they have to create an ecosystem which supports it.”

**Expert 1:** “Here MOOCs are about outreach for learners to pull themselves up, if we can impart skills, then we can move beyond the privileged class.”

## **VI. DISCUSSION**

The conversation with the three experts validated all the expectations of our model. In describing the uniqueness of MOOCs in India, the experts drew attention to and made clear the contextual differences which exist with MOOCs in the US and India. Therefore, while there appears to be a general model of MOOCs which consists of prominent factors such as stakeholders, distribution channels, intended learning outcomes and demand, the contextual factors impacting these are very strong which differentiates the model into factors that are required for sustainability in the US vs the factors that are required for MOOC sustainability in developing nations such as India. Although the requirements and process for MOOCs appear similar on a global scale, there is in fact a disconnect, which impacts on educational needs (Santandreu Calonge, 2015). A similar view is represented in the literature by Fasihuddin et al. (2013), who also suggests the clarity of an existing MOOC model in the West is shaken when examined in further detail through the lens of various contextual environments, such as through the context of developing nations like India.

In addition to these four factors, the experts specifically identified language as a key success factor of MOOCs for developing countries. India was discussed as being a country which is composed of several

languages which vary within each of its unique regions. This uniqueness and diversity of languages used in India, was discussed as being overlooked by existing MOOCs and could hamper the success of this form of online learning for developing nations.

## VII. CONCLUSIONS

Examining the research of this study, the greater perspective on MOOCs illustrates India is different from the US in its requirements for MOOC success despite in the similarity of the underlying success model, as shown in Fig. 1. Details of the contextual environment define unique success characteristics and drive MOOC demand. This insight clearly needs to become more widespread, as India's population of 1.2 billion will require education at some point in the future, whereas 250,000 Coursera registered students from India appear to fall very short of the need and potential of MOOCs to educate millions.

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**(Arranged in the order of citation in the same fashion as the case of Footnotes.)**

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