



# To MOOC or not to MOOC: decision-making strategies in contemporary universities.

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- What is a MOOC?
- The business model
- Knowledge as a network market
- The decisional model
- Conclusions and limitations



# MOOCs platforms



Scholars looking at innovation in HE nowadays mainly refer to MOOCs:

"A MOOC is an **online course** with **free** registration and **open**-ended outcomes.

MOOCs integrate **social networking** and **accessible** online resources.

MOOCs relies on the **engagement of learners** who self-organize their participation according to learning goals, prior knowledge and skills, and common interests"

(McAuley et al., 2010)

# Why should an institution decide to invest in a MOOC?

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1. extend the reach of the institution and access of their teaching activities;
2. build and maintain a strong brand;
3. increase revenues and/or reduce costs;
4. improve learning outcomes;
5. experiment new model of teaching and learning;
6. improve research on teaching and learning.

(Hollands et al., 2014)

- institutions can set up new departments with different resources and processes to **explore new educational approaches**, or can **open their market target** to students who are not able to go universities.

(Yuan & Powell, 2013)

- despite the **high rivalry** within the higher education market, many institutions have joined together to establish MOOC initiatives. This indicates a certain **degree of collaborations**.

(Marshall, 2013)

Ways to monetize the MOOC business:

1. certification model;
2. **freemium model**;
3. advertising model;
4. job matching model;
5. subcontractor model.

(Belleflamme & Jacmin, 2014)

- Some universities are actively developing MOOCs (**producers**) some are using MOOCs developed by other institutions (**consumers**) and a few are doing both. Others are adopting a “**wait-and-see**” approach, and some have considered MOOCs and have either decided against any form of official engagement, or have not met with interest from faculty members to pursue them.  
(Hollands & Tirthali, 2014)
- Freemium model: **1) free MOOCs** and **2) traditional university**. What differentiates this two methods is a set of support services that will be divided in N and nonN, hence those that are influenced by the volume of the network of users and those independent.



# The information market: a network market

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MOOCs are part of the information market, which is defined as a network market; here are its main features:

- **Information and knowledge are public goods** whose consumption by one agent does not preclude the use of other agents (Stiglitz, 1999).
- **Knowledge is replicable, it can't be excluded nor divisible** (Rullani, 2004) and therefore can spread uncontrollably (Boisot, 1998; Grant, 1996; Rullani, 2004).
- **MOOCs are part of network markets** because the owner of the know-how can copy it cheaply and distribute it to other consumers;
- The **reproduction of know-how**, under certain conditions, **can be a phenomenon that allows an extension of the network** and consequently a widening of the profitable market.

- Most MOOC start-ups do not appear to have clear business models and are following the common approach of Silicon Valley start-ups by **building fast and worrying about revenue streams later.**

(Young, 2012)

- Universities are looking for models to help decisions in MOOCs.
- **The goal of this paper is to model such decision in a network framework.**



- We can consider an heterogeneous population where there are two types of consumers:
  - **Support-oriented (n):** Consumers interested in having support services.  
*Segment: high school students, undergraduates.*
  - **Support-independent (m):** consumers indifferent to support services.  
*Segment: graduates, professionals who want to improve and / or update their knowledge.*
- Support-independent consumers have differential benefits from the opportunity to take courses at a distance as they do not lose hours of work;
- Support-oriented consumers do not benefit from the differential ability to take courses at a distance because they do not work;
- The university structure provides learning support services that can only be achieved through the registration.
- Consumers of this model seeking the know-how. **“Know-how” in this model means the set of basic skills needed to understand and communicate in a particular work environment** (Becker, 2007).

**NETWORK FACTOR [q]:** The value of know-how **increases with the number of users:** the more people with whom to interface through these skills on the job, the greater the value of the skills learned.

- $q = n + m$

## CONSUMERS:

- **Support-oriented [n]:** consumers **interested** in having support services.  
Segment: *high school students, undergraduates.*
- **Support-independent [m]:** consumers **indifferent** to support services.  
Segment: *graduates, professionals.*

## SUPPORT SERVICES:

- **N:** Support services that **benefit** from the volume of the network.  
(*traditional lectures, formative experiences*)
- **nonN:** Support services **independent** from the volume of the network.  
(*channels for finding a job*)

$$U_o \left\{ \begin{array}{ll} q(1+N) + \text{non}N - p & \text{for university enrolment} \\ q & \text{if } \mathbf{n}_i \text{ takes MOOCs} \\ 0 & \text{if } \mathbf{n}_i \text{ gives up} \end{array} \right.$$

ORIENTED

$$U_i \left\{ \begin{array}{ll} q-p & \text{for university enrolment} \\ q+b & \text{if } \mathbf{m}_i \text{ takes MOOCs} \\ 0 & \text{if } \mathbf{m}_i \text{ gives up} \end{array} \right.$$

INDEPENDENT

Network factor:  $q = n + m$

$n_i \rightarrow$  support oriented consumer

$m_i \rightarrow$  independent consumer

- **Protectionism (P):** the university doesn't build a MOOCs platform, and sets the **price** of registration **according to the possibilities of support-oriented consumers**;
- **MOOCs (M):** the university **builds a MOOCs platform** trusting in the network effects and in the value of its additional support services;
- **Inclusive policy (IP):** the university sets the price of registration according to the possibilities of support-independent consumers. In this way, **it involves both categories of consumers**.
- We assume a market logic where a university chooses its position by maximizing its own profit ( $\pi = n \cdot p$ )

Scenario	Condition	Profits
<b>Protectionism</b>	$U_{\text{enroled}} = U_{\text{giveup}}$	$\pi_p = n^2 (1 + N) + nonN n$
<b>MOOCs</b>	$U_{\text{enroled}} = U_{\text{mooc}}$	$\pi_m = n[(n + m)N + nonN] - C$
<b>Inclusive policy</b>	$U_{\text{Ienroled}} = U_{\text{Igiveup}}$	$\pi_{IP} = (n + m)^2$

# Comparison and Outcomes

Comparison

Condition

Outcome

MOOCs  
vs  
Protectionism

$$\pi_M > \pi_P$$

$$m > \frac{n}{N}$$

Inclusive policy  
vs  
MOOCs

$$\pi_{IP} > \pi_M$$

$$m > nN - n$$



Threshold	Decision
$m < \frac{n}{N}$	Protectionism
$\frac{n}{N} < m < nN - n$	MOOCs
$m > nN - n$	Inclusive policy

- Support-independent consumers are not enough to change the university strategies.

**Protectionism**

**MOOCs**

- Support-independent consumers in the system are significant, activate a platform MOOCs is the best way to involve them.

- MOOCs platform has increased support-independent consumers. Now it is appropriate to set a price tailored to their availability.

**Inclusive policy**

# Conclusions and limitations

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- First decisional model to understand the variables and their role in MOOCs strategies;
- The aging society gives a push towards MOOCs;
- Universities with high support services are more interested in providing MOOCs; (e.g. US driven phenomenon)
- MOOCs will not harm traditional universities, but their integration could be useful to implement a new way of teaching;
- Support services:

The “N” and “nonN” variables represent the additional services offered by the university to every enrolled member, they deserve a separate discussion because they involve other factors that would divert from the primary objectives of the model.

- Kinds of knowledge

In this model, firms are interpreted as Knowledge Company (Mintzberg, 1983; Peteraf, 1993; Schön, 1993), i.e. as a "system that knows" (Spender, 1996).

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$$Uo_{\text{enroled}} = Uo_{\text{give up}}$$

$$q(1 + N) + nonN - p = 0$$

$$p = q(1 + N) + nonN$$

$$q = n$$

$$p = n(1 + N) + nonN$$

$$\pi_p = np$$

$$\pi_p = n[n(1 + N) + nonN]$$

$$\pi_p = n^2(1 + N) + n * nonN$$

$$Uo_{\text{enroled}} = Uo_{\text{mooc}}$$

$$q(1 + N) + nonN - p = q$$

$$q + qN + nonN - p = q$$

$$p = qN + nonN$$

$$q = n + m$$

$$p = (n + m)N + nonN$$

$$\pi_M = pn - C$$

$$\pi_M = n[(n + m)N + nonN] - C$$

# Appendix - Inclusive policy

$$U_{\text{I enrolled}} = U_{\text{I give up}}$$

$$q - p = 0$$

$$p = q$$

$$q = n + m$$

$$\mathbf{p} = \mathbf{n} + \mathbf{m}$$

$$\pi_{IP} = (n + m)p$$

$$\pi_{IP} = (\mathbf{n} + \mathbf{m})^2$$



# Appendix - MOOCs vs Protectionism

$$\pi_M > \pi_P$$

$$[(n + m)N + nonN]n - C > n^2(1 + N) + nonN n$$

$$n^2R + mnR + nN - C > n^2 + n^2R + nonN n$$

$$1 - kN - \frac{C}{n^2} < 0$$

$$n^2 - nmN + C < 0$$

$$1 - \frac{m}{n}N - \frac{C}{n^2} < 0$$

$$k > \frac{1}{N} - \frac{C}{Nn^2}$$

$$k = \frac{m}{n}$$

$$Hp: Nn^2 \gg C \text{ therefore } \frac{C}{Nn^2} \rightarrow 0$$

$$k > \frac{1}{N}$$

$$m > \frac{n}{N}$$

# Appendix - Inclusive policy vs MOOCs (1/2)

$$\pi_{IP} > \pi_M$$

$$(n + m)^2 > n[(n + m)N + nonN] - C$$

$$n^2 + m^2 + 2nm > n^2N + nmN + nonN n - C$$

$$m^2 + nm(2 - N) + (n^2 - n^2N - nonN n + C) > 0$$

$$\frac{m^2}{n^2} + \frac{m}{n}(2 - N) + \frac{n^2 - n^2N - nonN n + C}{n^2} > 0$$

$$k^2 + k(2 - N) + \left(1 - N - \frac{nonN}{n} + \frac{C}{n^2}\right) > 0$$

# Appendix - Inclusive policy vs MOOCs (2/2)

$$Hp: n \gg nonN \quad \text{therefore} \quad \frac{nonN}{n} \rightarrow 0$$

$$Hp: n^2 \gg C \quad \text{therefore} \quad \frac{C}{n^2} \rightarrow 0$$

$$k^2 + k(2 - N) + (1 - N) > 0$$

$$k_{1,2} = \frac{N - 2 \pm \sqrt{4 + N^2 - 4N - 4 + 4N}}{2} = \frac{N - 2 \pm N}{2}$$

$$k < -1 \quad \vee \quad k > N - 1$$

*k is a relationship between two positive quantities, therefore  $k > 0$*

$$k > N - 1$$

$$m > nN - n$$