

Sailing the winds of “creative destruction”: Educational technology during economic downturns

By

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The world of business is hunkering down under the assault of a global economic downturn of historic proportions.

Companies large and small are engaging in frantic cost-cutting campaigns, freezing budgets, cancelling expansion plans, closing stores and plants, postponing long-term decisions and trimming payrolls.

Under these scenarios, investment in training and education might seem counter-intuitive to conventional business logic and, more often than not, is usually one of the first items to be eliminated.

However, a closer look at the practices of emerging economies and the handful of companies that not only survive but thrive during massive downturns reveals a contradiction in this conventional wisdom.

Organizations such as *Amazon*, *Zipcar*, *University of Phoenix*, *Coffee Geek* and those in emerging markets as *Wipro* or *MIT's One Laptop per Child project (OLPC)* seem to follow a very different pattern. They actually cut physical and financial capital expenditures *by increasing* their focus on smart uses of intangible assets such as intellectual, human and social capital, and among them, innovative and extensive applications of educational technology.

Educational technology for “external use”

Exceptional challenges require innovative approaches. Companies that thrive during downturns turn educational technology outward not only to educate and develop skills and specific behaviors in their workforces, but also for “external use” for their clients’ benefit.

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In order to be able to contribute to a lasting recovery, however, educational technology must move beyond the business-as-usual emphasis on developing “competencies” –that is, potential - towards improving individual and organizational performance – or, on the job results.

Educational technology applications during hard times must be laser-focused on producing *results* that add measurable value to *external clients* (Kaufman, 1972) (Kaufman, 2006) and evaluated according their long-term, sustainable return-on-investment (ROI) to the organization, its clients and community.

A good understanding of the external requirements and challenges of reinventing markets, such as responding or anticipating critical changes in clients’ behavior and priorities, is essential in order to identify and prioritize the individual and organizational competences to be developed.

Educational technology can also improve its impact on performance and its cost-effectiveness – thus reducing workforce’s training and downtime costs, increasing speed and productivity- by moving from the classroom to the workplace in the form of “embedded learning” and support tools.

Applying the concept of e-performance, defined as “*the capacity of an organization, teams and individuals to generate measurable performance improvement through the integrated usage of online practices and technologies*” (Bernardez, From E-Training to E-Performance: using online technology to work, 2003, p. 8), smart companies integrate learning and work concepts that help their clients as well as their employees to obtain superior performance.

E-Performance systems create a continuum between learning and performance by using educational technology called *Electronic Performance Support Systems (EPSS)* that integrates intelligent job aids and tutor training embedded in the online *graphic user interface (GUI)*. Originally designed “*to provide whatever is necessary to generate performance or learning at the moment of need*” (Gery, 1992, p. 34) to front-line employees in the banking and retail industries and to drastically reduce the costs, speed and

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risk of massive instructor-led training, EPSS systems can be turned outward to directly assist clients and end users, reducing their waiting time and travel and costs and increasing their productivity.

Amazon uses *EPSS* to help its small business clients learn how to use *Amazon* to sell and distribute their own products and services globally, thus increasing their own revenue and consequently, *Amazon's*.

Adding EPSS, intelligent and interactive job aids and a user-friendly interface to its e-commerce and logistics platform helped *Amazon* grow a 500,000-member small business community of practice and virtual business ecosystem that helped both to increase revenue counter cyclically during the 2001, 2003 and 2008-9 recessions. (Fowler, 2009 January 31, p. C3)

Another important e-performance and educational technology concept that helps both smart companies and their clients increase productivity during downturns is *Web usability* defined by expert Jakob Nielsen as “*embedding learning processes and psychological principles in interfaces and applications that become intuitive and friendly to the user*”. (Nielsen, 2000, p. 11) Specialists in software psychology and Web usability as well as instructional designers are key players on *Microsoft*, *Amazon* and *Zipcar* client service teams.

Putting educational technology to the task

Let's explore six lessons coming from those who thrive under “bust” conditions. We will try to show how smart and innovative educational technology can help organizations, individuals and even communities to:

1. Tame business cycles
2. Make their case as a business case for your *external* clients.
3. Reinvent the workforce
4. Reinvent markets and business models
5. Graduate organizations, not just individuals
6. Develop business ecosystems

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Taming “business cycles”

“The same process of industrial mutation –if I may use the biological term– that incessantly revolutionizes the economic infrastructure from within, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism. It is what capitalism consists in and what every capitalist concern has to live in”

(Schumpeter, Business Cycles: A theoretical, historical and statistical analysis of the Capitalist process, Vol. 2, 1939, pág. 1033)

Back in 1939, after extensive study of European and American recessions and recoveries, Austrian-American economist Joseph Schumpeter concluded that business cycles were an integral and positive force for capitalistic economies.

The “gales of creative destruction” – as Schumpeter called economic downturns - are part of the constant renovation and reinvention of industries and the correction of bouts of what John Kenneth Galbraith¹ called “financial euphoria.” As difficult as they can be, economic downturns create many opportunities to put into practice innovative and breakthrough concepts - usually postponed to the indefinite future during “easy money” times - while wiping out obsolete industries, dysfunctional companies and self-destructive financial practices.

As a matter of fact, it often takes a downturn gale to force companies to move innovation from the lab to the street.

It was not until the 1873-1896 recession² in the United States - when the rising costs of commodities hit U.S. companies hard - that electricity’s superior efficiency in converting oil and coal into energy earned Thomas Edison³ Wall Street’s “green light” for electrification.

Even once the “irrational exuberance” of overinvesting in technological infrastructure during boom periods goes bust, companies with better business models and smarter use of technology apply this underutilized and less expensive capacity, thus starting the next cycle of growth. *Amazon, FedEx*, the higher education industry and *Wal-Mart* benefitted from the

¹ (Galbraith J. K., 1990) (Galbraith J. , 1954)

² See URL: http://en.wikipedia.org/wiki/List_of_recessions

³ (Millard, 1990)

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digital overcapacity left by the dotcom bust and transformed e-commerce from a technophile pastime into a 200 billion dollar a year mass-market and logistics industry.

Educational technology *tools* such as *EPSS*, *communities of practice* and *e-performance*, combined with educational technology *architecture* such as *performance-centered university incubation programs* spinning off new organizations, helped once-small tech startups such as *Wipro* capture global markets during the 2000 downturn and open new plants in Michigan and Iowa during the current 2008-2009 recession to serve IBM's demand for cost-efficiency. (Hamm, 2009)

Innovative combinations of educational technology methodologies and software applications developed to serve *Bottom-of-Pyramid (BOP)*⁴ markets in the developing world may help increase access to education in developed countries during hard economic times. One example is MIT's *One Laptop per Child (OLPC)* \$100, solar-powered laptop designed for use in Third World rural schools.

These lower cost educational laptops with their user-friendly, Linux-based educational programs based on Seymour Papert's collaborative learning methodology have been particularly successful in U.S. and EU schools serving low income communities.

According to C.K. Prahalad, because of its requirements of exceptional price-performance and flexibility, "*the BOP can be a source of innovations for not only products and processes, but business models as well*" (Prahalad C. K., 2005, p. 49) and are particularly suited for the conditions of sharp economic downturns in developed markets.

Companies such as Microsoft, Hewlett-Packard and Intel, and their competitors in India and China, launched new free or low-cost Web services, hardware, software and educational programs to serve the new educational market created by OLPC and the new priorities created by the 2008-2009 economic emergency.

Grameen Bank was created by Mohammed Yunus - an economics professor and 2006 Peace Nobel Price laureate - to "bank to the poor" through under \$20 micro lending and

⁴ Term coined by management guru C.K. Prahalad to refer to the segment of the global market formed by 4 billion consumers living on 2 dollars a day –under 1,500 dollars annually- (Prahalad & Hammond, 2002) (Prahalad C. K., 2005)

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entrepreneurial education to groups of women in Bangladesh, Pakistan, India, Africa and Latin America. It has been successful in taking low income families in the United States and Europe off of welfare rolls and is also poised for rapid growth under massive, bottom-up, small business-focused economic recovery plans such as those announced by U.Ss and EU governments to fight the 2009 downturn.

As in other examples, *Grameen* bases its success on organizing and educating borrowers – primarily self-employed women - to succeed in growing their micro-businesses and forming self-directed micro-credit groups.

Grameen groups strengthen their repayment capacity above conventional banking standards by employing and recruiting new members, thus increasing disposable income for further investment and expanding an economic “virtuous circle”. (Yunus, 2003)

The *Grameen* model was first applied in the United States in 1985, when then governor of Arkansas Bill Clinton invited Yunus to start the program in his state as the Good Faith Fund. *Grameen* groups in South Dakota and Chicago soon followed and gradually extended to several other states.

Although entrepreneurial-focused *Grameen* grew at a slower pace during the nineties economic boom and the 2001-2005 recovery, when the Clinton Foundation supported its worldwide application, its innovative combination of microfinance, entrepreneurial spirit and education is now likely to spread faster and serve as a model for other initiatives as the 2008-2011 US economic recovery plan rolls out.

Following Schumpeter’s predictions, even when the 2008-9 recession hits Starbucks high-end business model, forcing it to cut back its workforce and many of its 16,000 stores in 50 countries, the “latte culture” and industry developed by Schultz and other pioneers through consumer education survives, fueling lower-cost versions of the same business model.

Coffee lovers on a budget have scaled back from Starbucks to lower-cost *McDonald’s lattes* (Riley, 2008). They even make coffee at home,, helping sustain the coffee bean business and cranking up the sales of new online startups such as *Coffee Geek* – which provides interactive Websites, users communities, instructional DVDs, and items such as

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the \$79 "*Latte Art Beginner's Pack*" that contains a frothing pitcher and milk thermometer, sending their sales up 65% as *Starbucks*' went down. (Tuna, August 14, 2008)

Making your case as a business case for your external clients

In the rush to respond to a downturn, we must keep in mind that all actions and technologies are *means* towards social, organizational or individual ends. If we hurry to fight fire without paying due attention to its actual causes, we might end up discovering that trying to extinguish a cooking oil fire with water will just make it flare and spread.

Before selecting our technology of choice – be this reengineering, downsizing or retraining - we must make sure we identify those technologies that will improve results *for our external clients*.

In a downturn, most organizations and individuals focus on cutting their internal costs without considering whether they are actually passing or increasing these costs along to their clients. The usual consequence of such a shortsighted approach to cost-cutting can be setting up the organization's revenue stream for an even sharper nose dive.

Educational technology contributions under "bust" conditions must target improving both the "*bottom line*" – costs, efficiency, resource utilization - that is mostly within the organization, **and** the "*top line*" – revenue, business opportunities - that operates in the real, external world of market, clients and community.

Companies such as *Amazon* and *Zipcar* applied embedded *EPSS*, *job aids* and other educational technology tools to help their clients learn to use *Amazon's* online technology to buy and sell products online and *Zipcar's* Web tools to help small business and universities to optimize their use of rental cars and transportation logistics.

Zipcar online communities also help clients – individuals, businesses or universities - organize and share their experiences in improving their environmental performance and "*reach out into the community and make a difference*" (*Zipcar*, 2009) by helping local communities reduce their CO² output and improve energy standards.

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By helping their clients improve their top and bottom lines, increase their revenue and reduce their costs during downturn cycles, *Amazon* and *Zipcar* experienced *counter-cyclical revenue growth* during the 2000, 2001 and 2009 recessions.

Facing large and potentially prolonged economic downturns such as those in 1929-1937 or the current 2008-2009 crisis, governments and organizations are hard-pressed to determine the effectiveness and social impact – as measured in economic recovery and sustainable jobs creation - of large educational programs focused on massive workforce retraining and industrial or business reconversion. The return on such an investment is critical not only in terms of the scale, but also in terms of the speed of the return, which involves substantial social and human distress.

Methodologies such as the *double-bottom line business case*, which measures both Mega-level results such as societal value-added –s ocietal bottom line- and Macro-level benefits for the organization - conventional bottom line, used at the Sonora Institute of Technology (ITSON) programs might prove critical to measuring educational success in helping economic recovery. (ITSON - Sonora Institute of Technology, 2007)

Table 1: Double bottom-line business case

*This double-bottom line of an ITSON graduate program –Business Intelligence Center- designed to help small companies to export to overseas markets (Asian Pacific basin) shows how the educational products and services delivered at the **Micro-level top line** (research, business plans, students projects) produce measurable benefits to ITSON at the **Macro-level top line** (revenue from educational programs, research and consulting services) and also produce benefits to the small companies assisted by the program, their employees and the community at the **Mega-level top line** (increased exports revenues, direct and indirect jobs and increased revenue for clients, community and government derived from those products and services)*

BUSINESS INTELLIGENCE CENTER (TRANS PACIFIC)						
US Dollars						
MEGA 'TOP LINE'	2007-2011	2007	2008	2009	2010	2011
Direct jobs	90	10	15	20	20	25
Ratio Indirect jobs/Direct Jobs		0.5	0.5	0.5	0.4	0.4
Indirect jobs	200	20	30	40	50	60
Annual average income Direct Jobs	5,362	5,365	5,368	5,371	5,374	5,377
Annual average income Indirect Jobs	5,362	5,365	5,368	5,371	5,374	5,377
Direct Jobs "ripple effect" revenue	483,495	53,650	80,520	107,420	107,480	134,425
Indirect Jobs "ripple effect" revenue	1,074,500	107,300	161,040	214,840	268,700	322,620
Tax revenue for State and Community	303	9,090	13,635	18,180	21,210	25,755
Exports revenue	47,019		10,909	11,454	12,027	12,629
MEGA RESULTS	1,605,014	170,040	266,104	351,894	409,417	495,429

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MACRO "TOP LINE"	2007-2011	2007	2008	2009	2010	2011
Products & services revenue						
Research		3,600	4,200	4,800	5,400	6,000
Business plans		3,000	3,500	4,000	4,500	5,000
Special projects		2,500	3,750	3,750	6,250	7,500
Stages & exchange						
Other ITSON services (non BIC programs)		10,022	13,559	21,232	29,850	30,669
MACRO RESULTS	173,082	19,122	25,009	33,782	46,000	49,169
DOUBLE TOP LINE (MEGA+MACRO)	1,778,096	189,162	291,113	385,676	455,417	544,598
MICRO	2007-2011	2007	2008	2009	2010	2011
Products & services delivered						
Research	80	12	14	16	18	20
Business plans	80	12	14	16	18	20
Special projects	95	10	15	15	25	30
Stages & exchange	10	2	2	2	2	2
Other ITSON products & services	300	40	50	60	70	80
TOTAL MICRO OUTPUT	565	76	95	109	133	152

The *conventional bottom line* below shows the conventional ROI for the company and the *double bottom line* shows the societal ROI for the community (Bernardez, Minding the business of business: tools and models to design and measure wealth creation, 2008)

COST	2007-2011	2007	2008	2009	2010	2011
Initial investment	45,454	45,454				
Non-ITSON financial support	1,500	1,500	1,500	1,500	1,500	1,500
Licenses	1,000	1,000				
IT equipment	2,000	2,000				
Operational costs		3,600	3,602	3,604	3,606	3,608
Stages & exchanges	2,250	4,500	4,500	4,500	4,500	4,500
TOTAL COST	90,474	58,054	8,102	8,104	8,106	8,108
CONVENTIONAL BOTTOM LINE		-58,054	-41,147	-32,376	-20,160	-16,993
DOUBLE BOTTOM LINE		131,108	181,060	283,009	377,570	447,309
CONVENTIONAL ROI (MACRO/COST)		-1.28	-0.91	-0.71	-0.44	-0.37
SOCIAL ROI (MEGA+MACRO/COST)		2.88	3.98	6.23	8.31	9.84

Consider these two questions when selecting value-adding educational technology applications during a recession:

1. *How can we help our clients (and our clients' clients) reduce costs (thus increasing their purchasing power)?* By creating online user communities, *Zipcar* provides its clients with a car they can use for as little as one hour (cars just-in-time and just-enough). By reducing the rental process to just four clicks, *Zipcar* dramatically cuts its own operational costs *and* saves its clients' time and their pick up and drop off costs.
2. *How can we help our clients (and our clients' clients) increase their revenue, profitability or quality?* *UPS* and *Amazon* provide sharable, just-in-time logistics and e-commerce capabilities to small business and entrepreneurs that enable them to

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increase their revenue by having access to global markets. Educational technology-embedded applications such as *EPSS* to help small business optimize routes and logistic costs and *CRM* to track customers' preferences and behavior are a key part of both *UPS* and *Amazon's* value proposition⁵ to their clients.

Table 2 shows an example of how to calculate the value added to a client using a prepared meals business model focused on providing a combination of healthy meals at low costs, dietary menus, consumer nutritional guides and cooking education.

Table 2: Business case for healthy prepared meals

Client	Current situation	Desired situation	Gap (causes)	Mega: value for the client	Micro: Products or services to close gap	Macro:
Women, professional, 20-45 years with children N=12,000 Target= 50% 6,000	Poor diet, lack of time, "microwave diet", adverse health effects in client (women) and client's "clients" (children) Overweight High blood pressure Loss of bone density Dental problems	Balanced diet, more time for at home meals, enjoy preparation Avoid adverse health effects: Normal weight, blood pressure Normal bone density Good dental health	Lack of time Waste of costly ingredients "Fast food" Fast eating (stress) Bad eating habits Lack of nutritious ingredients Lack of cooking skills Stressful cooking experiences	(Cost of the problem) Food waste: \$ 5,000 year Dental care: \$ 1,500 / year Healthcare woman: \$ 600 Healthcare year 2 children : \$ 1,200 Bone density-related incidents (fractures) over 5 years: \$ 1,000 Total= \$ 9,300 year	Consists of: Organic, scientific diet prepared food Health menus online Cooking 101 and cooking workshops Additional cost (products, services + "premium" price) = \$ 7,000 Client savings = \$ 2,300 a year	Margin= 15% 1,050 x client x year x target (6,000)= \$ 630,000 net revenue

*By monetizing the cost of the target clients' needs – defined as gaps between desired and actual health and cost levels -, the business case rationale in Table 2 shows how an investment in educational technology applied to developing **Cooking 101 job aids** and **cooking workshops** can self-finance by saving clients \$2,300 per year while helping the new company command added revenue from a "premium price" of \$7,000 per client per year.*

⁵ (Anderson, Narus, & van Rossum, March 2006)

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Reinventing the workforce

History shows that large economic downturns provoke significant increases in educational investment and force the adoption of innovative educational technology. New Deal programs such as Public Works Administration (PWA) and Works Progress Administration (WPA) required massive investment in retraining and as a result developed new methodologies to improve on-the-job training turnout such as *Training within Industry* (TWI).

If anything can be learned from downturns it is that the best way to save for a rainy day is to invest in our own personal *employability* or “*capacity to renew our competencies to get into the new jobs of the future during economic downturns*”. (Bernardez, 2008, p. 126).

The experience of the WPA during the New deal era shows that jobs cannot be created in a vacuum nor based solely on applying preexisting skills. Sustainable jobs require creating viable organizations and reinventing industries and workforce skills.

As the WPA and PWA experience shows, producing more graduates with current academically-defined competencies or “improving” training for “make-work” jobs not only does not help individuals or organizations to recover, but actually worsens their situation.

Retraining and workforce development programs are a substantial part of the trillion-dollar economic recovery plans announced both by U. S. and EU governments for 2008-2010 and will play a critical role not only in fighting unemployment, but in reactivating the economy through the development of new, more competitive industries.

The key concept of the so called “*Nordic Flexicurity*” is that “*whenever a firm cannot keep workers productive in their current job, the government should take responsibility and retrain workers*”. (Erikson & Westergaard-Nielsen, 2006, p. 7)

Denmark and the Nordic countries lowered their unemployment rates during the 2000-2001 economic downturns thanks to their high investment in workforce development and creative retraining programs. (Guerra, Bernardez, Jones, & Zidan, 2005)

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Recovering and transforming economies might require that meat packers become math teachers or health care workers through specialized, in-company retraining program, which, for example, allows a third of Denmark's entire workforce to switch jobs every year.

Innovative applications of educational technology such as fast "just-in-time" *Performance-Centered Design* (Gery, 2005) might help workforce development partnerships among colleges, unions and companies' HR and training departments develop highly customized retraining programs that focus applicants on meeting the requirements of specific new jobs.

Educational technology starts with us.

A few questions can help us and our organization refocus on increasing our human and intellectual capital before we have to send out our resumes:

1. Are my competencies adequate to the current market and my clients' needs?
2. Am I investing in my own intellectual assets, *e.g.*: second language skills, business acumen, understanding other cultures and markets?
3. Is my current job vulnerable in this crisis? In what way? Can I do something to make it safer? Does my current job have a future? Do I have a future in this position? Where are the jobs of the future? Where are the potential employers of the future? Do I have a plan to get there?
4. Do I have a plan for thriving under the current downturn? Have I defined concrete, specific steps for the coming weeks and months? For a two to three-year "L-shaped" economic recovery scenario?
5. Which are the technological competences I should strengthen or acquire to make 1-2-3-4 happen?
6. What should I do to improve my attitudes toward change? My networking? How strong and how deep is my rolodex?
7. Do I have a "Plan B"?

No matter how good our workforce development programs are, they will only work if each individual takes charge of developing one's own human capital assets and thinks about oneself as an investor.

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Reinventing markets and business models

Economic downturns play into the strengths of smart, technology-intensive business models.

The success of the *University of Phoenix*⁶ and the *Yale-Harvard-Stanford* consortium in providing online higher education to working and lower income students at a global scale after the 1999-2000 and 2008-2009 economic downturns is an example of how crises can midwife large-scale technological adoption and spawn counter-cyclical growth in the middle of a recession.

The Arizona-based Apollo Group, owner of University of Phoenix, reported an increase in first quarter 2009 revenue of 24.4 % or \$ 978 million versus \$781 million for the same period last year. (RTT News, 2009)

Recessions create opportunities for developing not just new companies, but new markets.

Indian companies such as *Tutor Vista*⁷ have thrived during the past five years by providing online tutoring to K-12 American students to meet the *No Child Left Behind* standards. Today, the Indian directory for such services includes more than 100 new companies serving the United States, the European Union and India and employing an average of 400 teachers and a new online workforce of over 20,000.

Massive applications – and thus demand - of *EPSS* and collaborative online, virtual work systems to reduce transaction costs and to increase large and small businesses and “*prosumers*”⁸ revenues at a global scale are already taking place in OECD and BRIC countries.

A sharp, prolonged “L-shaped” recession will only increase the demand for such smart applications of educational technology.

⁷ (Bernardez, Capital Intelectual: Creación de valor en la sociedad del conocimiento, 2008)

⁸ (Anderson C. , 2006)

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Graduating organizations, not just individuals

Massachusetts Institute of Technology (MIT) has pioneered new and innovative business models for universities focused on graduating organizations rather than only individuals that are likely to thrive under hard times⁹.

As a recent report from Bank Boston points out, “graduates of the MIT have founded 4000 firms, which in 1994 alone, employed at least 1.1 million people and generated \$232 billion in world sales. If the companies founded by MIT graduates and faculty formed an independent nation, the revenues produced by the companies would make that nation the 24th largest economy in the world”. (Barrow, 2001, p. 50)

India’s Institutes of Technology (IITs) and Mexico’s Sonora Institute of Technology (ITSON) are other examples of universities helping to create new companies that provide jobs for their graduates through an “organizational graduation” process that dramatically improves the rate of survival and success as well as the retention of talented human capital.

In all these cases, educational technology is applied to develop a performance and organization-centered curricula that integrates individual education with organizational incubation and acceleration.

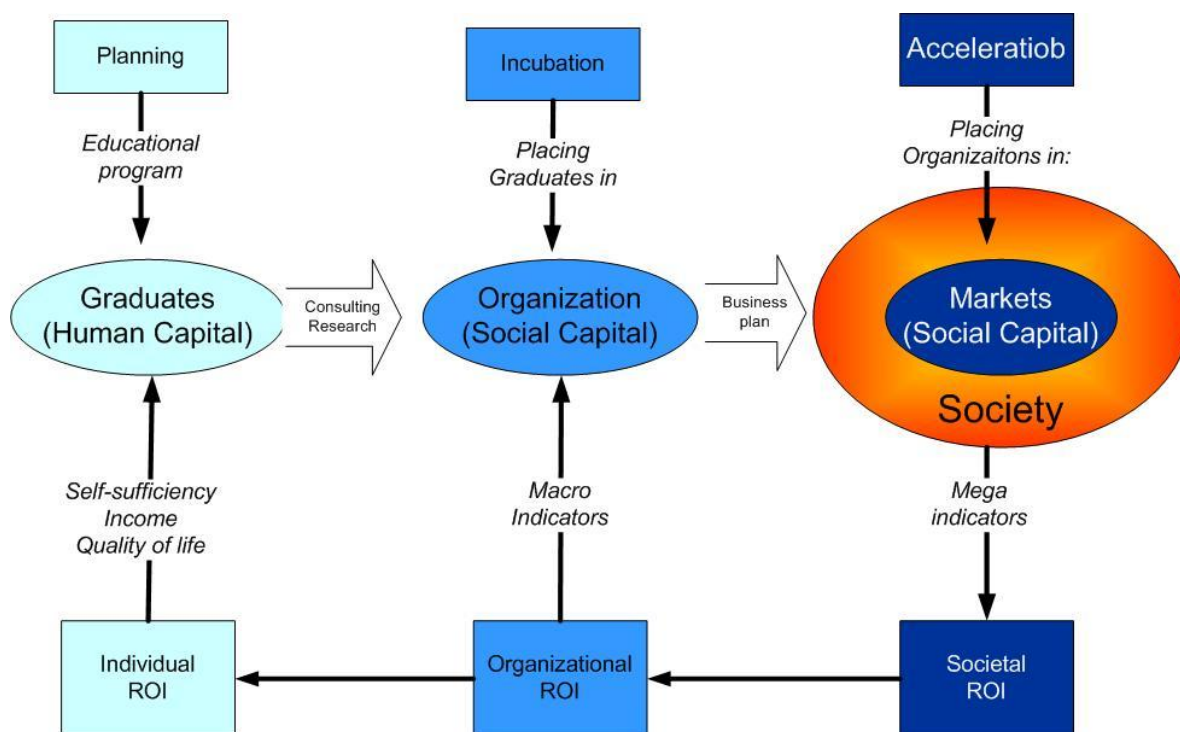
The performance-centered university curriculum puts graduate students in charge of developing new companies incubated by the university. The university not only helps design and organize the new ventures, but positions them in clusters and in global markets.

The challenge for educational designers and technologists in these new university models is to integrate disciplines traditionally separated in largely unconnected education and business departments around a shared process that goes beyond individual graduation, towards placing sustainable, economically viable organizations in the market. (see Figure 1).

Figure 1: Performance-Centered University

⁹ (Barrow, 2001), (Bernardez, Desempeño Organizacional: conceptos y herramientas para la mejora, creación e incubación de nuevas organizaciones, 2007)

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Source: (Bernardez, Desempeño Organizacional: conceptos y herramientas para la mejora, creación e incubación de nuevas organizaciones, 2007)

Following this model of educational technology “architecture”, ITSON “*has created 958 new professional jobs and 24 new companies in Mexico during 2008, in spite of economic recession, by fortifying local communities and creating clusters and business-friendly ecosystems*”. (ITSON - Sonora Institute of Technology, 2007, p. 44)

Developing business ecosystems

Reestablishing the flow of supply and demand during downturns requires going beyond the rescue of single organizations through bailouts towards improving and developing new business ecosystems that can generate the conditions for a wider and faster recovery.

China emerged from the massive famines and obsolete infrastructure left by 50 years of crippling communist centralized planning, Red Guards persecution and massive bureaucracy by establishing *Special Economic Zones (SEZ)* that operate as free market, free trade, entrepreneurial ecosystems that brought 400 million Chinese into the ranks of the middle class in one decade.

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At the center of each SEZ and business ecosystem are China's universities which, following the performance-centered model, provide not only highly educated graduates, but entire teams organized in small company "spinoffs" controlled and financed by the university.

Figure 2: China and India education-centered ecosystems



Shenzhen's SEZ is organized around the university campus in multiple clusters of incubated companies that export through Hong Kong

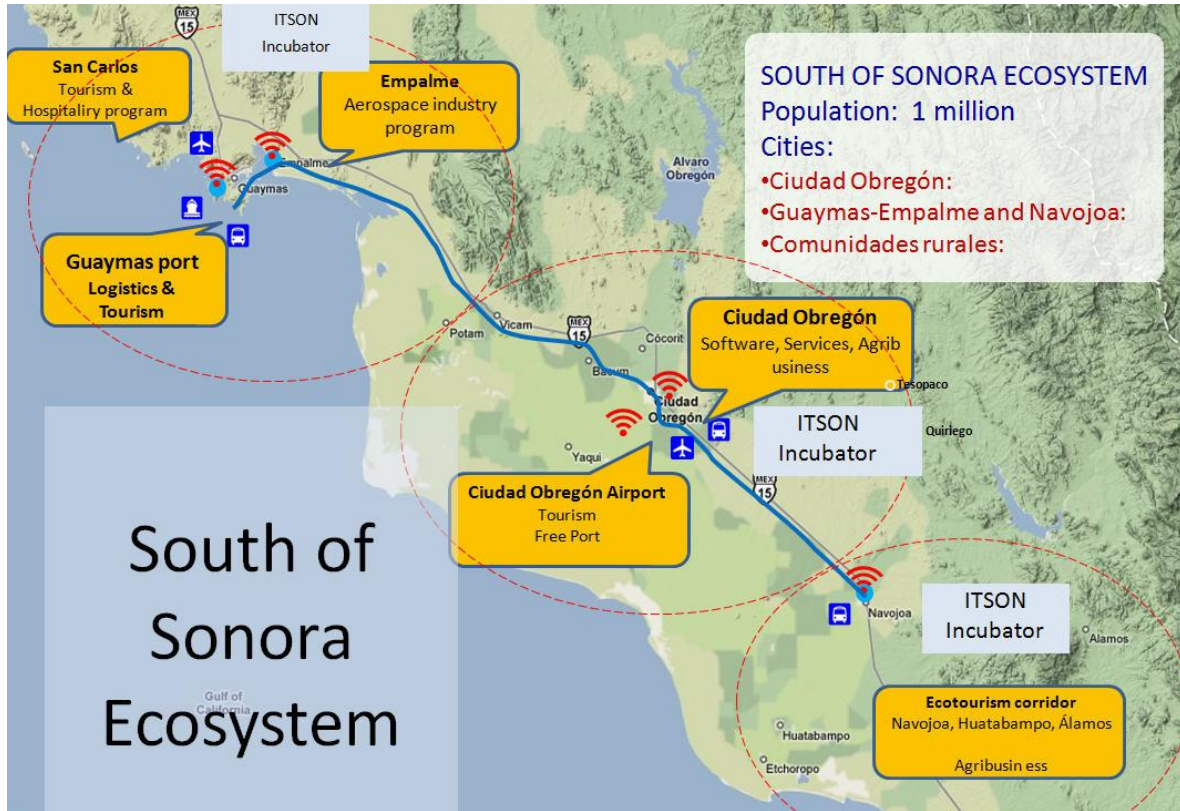
Created by Jawaharlal Nehru in the 60s, Indian Institutes of Technology became the center of business clusters such as Mumbai (Bombay) that produced the record economic growth during the nineties.

Each cluster of university-companies use massive educational technology applications such as e-learning, EPSS and virtual teamwork to both serve overseas clients and to undertake the challenge of quickly retraining a rural workforce into new urban jobs to serve overseas markets.

In Mexico, the ITSON *PhD program of Social and Organizational Performance Improvement (PII)* combines learning, applied research and consulting to develop companies from the planning stage until their positioning in their target market with the design and organization of regional ecosystems that combine and leverage their organizational competencies.

Figure 3: Performance-Centered Ecosystem: South of Sonora – Sonora Institute of Technology (ITSON)

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ITSON/PII organized the South of Sonora corridor connecting five key cities –Obregon, Guaymas, Empalme and Navojoa- by organizing a “logistics’ backbone” with railroad and Wi-Max broadband coverage and developing agribusiness, technology and ecotourism clusters that help the university “incubate” the new organizations, connect them to the markets and attract consumers and investors to the region. The program created 34 new organizations and 960 new sustainable jobs in the region during 2006-2008 and has a goal of 14,000 new jobs by 2014.

Educational technology can provide not only the tools for collaboration and communication among entrepreneurs but also new educational models focused on developing and improving business ecosystems.

Instead of hunkering down and waiting for the next nuclear attack of economic recessions, smart uses of educational technology can help individuals, organizations and communities reinvent themselves and more quickly return to even better businesses than those they left behind.

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