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Lucubrate

Magazine

Technology Generates Jobs

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"I believe that the school must represent present life – life as real and vital to the child as that which he carries on in the home, in the neighborhood, or on the playground." *John Dewey*

LUCUBRATE MAGAZINE

The world is changing all around us. A skilled population is the key to a country's sustainable development and stability. We know that obtaining a quality education is the foundation to improving people's lives and sustainable development. To contribute to skill people over the next ten years and beyond, we must look ahead, understand the trends and forces that will shape our business in the future and move swiftly to prepare for what has to come. We must get ready for tomorrow today. We will make it possible for youth and young adults all over the world to gain skills they can use in the labour marked or to create their own jobs. We will make it possible for every person to have lifelong learning opportunities to acquire the knowledge and skills they need to fulfil their aspirations and contribute to their societies.

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We recognize the creative power that comes from encouraging collaboration and innovation among a team of knowledgeable experts. This unique energy is our greatest competitive advantage in the world marketplace.

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- Our mission is to support education for building skills to all kind of businesses to create possibilities for jobs and make a lasting difference to people's lives. Globally. 24/7.
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Find out more

Technology Generates Jobs

They're always polite, they always upsell, they never take a vacation, they never show up late, there's never a slip-and-fall, or an age, sex, or race discrimination case," said Andrew Puzder, then chief executive of Hardee's Food Systems Inc., a restaurant chain headquartered in Tennessee. He was talking about swapping employees for machines.

Photo:Kzenon

Statements like these give workers reason to worry*. The advent of a jobless economy raises concern because tasks traditionally performed by humans are being—or are at risk of being—taken over by robots, especially those enabled with artificial intelligence. The number of robots operating worldwide is rising quickly. By 2019, 1.4 million new industrial robots will be in operation, raising the total to 2.6 million worldwide. Robot density per worker in 2018 is the highest in Germany, Korea, and Singapore. Yet in all of these countries, despite the high prevalence of robots, the employment rate remains high.

The Robot Takes the Job from the Young Worker

Young workers may be more affected by automation than older workers. Although the adoption of robots did not have any substantial net effect on employment in Germany, it reduced the hiring of young entrants. For this reason, the effects of automation can be different in countries that are aging compared with those that have young populations and anticipate large numbers of new labor market entrants.

Yes, robots are replacing workers, but it is far from clear to what extent. Overall, technological change that replaces routine work is estimated to have created more than 23 million jobs across Europe from 1999 to 2016, or almost half of the total increase in employment over the same period. Recent evidence for European countries suggests that although technology may be replacing workers in some jobs, overall it raises the demand for labor. For example, instead of hiring traditional loan officers, JD Finance, a leading fintech platform in China, created more than 3,000 risk management or data analysis jobs to sharpen algorithms for digitized lending. Technological progress leads to the direct creation of jobs in the technology sector. People are increasingly using smartphones, tablets, and other portable electronic devices to work, organize their finances, secure and heat their homes, and have fun. Workers create the online interfaces that drive this growth. With consumer interests changing fast, there are more opportunities for people to pursue careers in mobile app development and virtual reality design.

Technology Creates Jobs

Technology has also facilitated the creation of jobs through working online or joining the so-called gig economy. Andela, a U.S. company that specializes in training software developers, has built its business model on the digitization of Africa. It has trained 20,000 software programmers across Africa using free online learning tools. Once qualified, programmers work with Andela directly or join other Andela clients across the world. The company aims to train 100,000 African software developers by 2024. Ninety percent of its workers are in Lagos, Nigeria, with other sites in Nairobi, Kenya, as well as Kampala, Uganda.

Technology increases proximity to markets, facilitating the creation of new, efficient value chains. In Ghana, Farmerline is an online platform that communicates with a network of more than 200,000 farmers in their native languages via mobile phone. It provides information on the weather and market prices, while collecting data for buyers, governments, and development partners. The company is expanding to include credit services.

A chinese worker assembling production at line conveyor in china factory. Picture Kadmy.

During this process of technology adoption some workers will be replaced by technology. Workers involved in routine tasks that are "codifiable" are the most vulnerable. The examples are numerous. More than two-thirds of robots are employed in the automotive, electrical/electronics, and metal and machinery industries. Based in China, Foxconn Technology Group, the world's largest electronics assembler, cut its workforce by 30 percent when it introduced robots into the production process. When robots are cheaper than the existing manufacturing processes, firms become more amenable to relocating production closer to consumer markets. In 2017 3-D printing technologies enabled the German company Adidas to establish two "speed factories" for shoe production: one in Ansbach, Germany, and the other in Atlanta in the United States, eliminating more than 1,000 jobs in Vietnam. In 2012 the Dutch multinational technology company Philips Electronics shifted production from China back to the Netherlands.

Many Service Jobs Will be Automatized

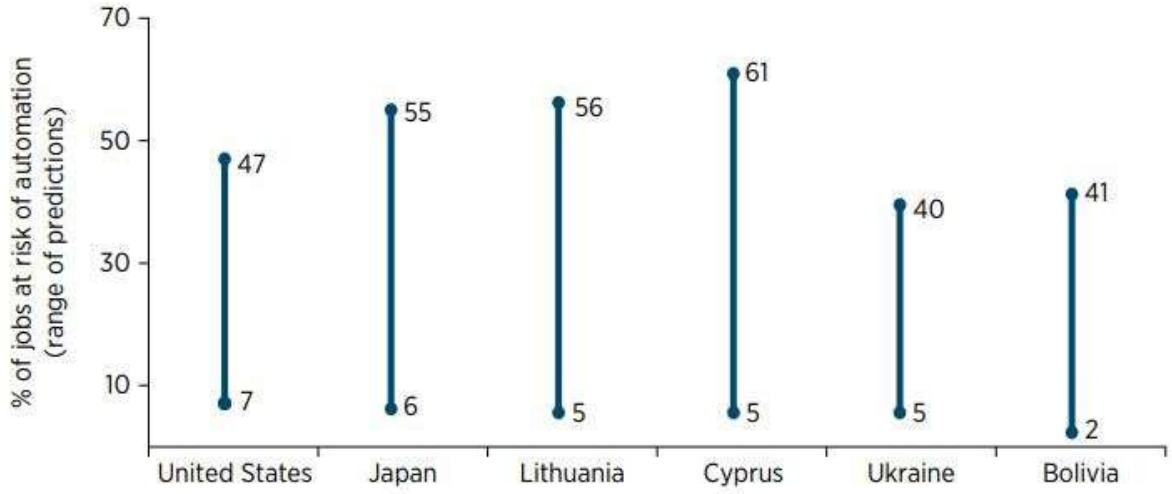
Some service jobs are also vulnerable to automation. Mobileye of Israel is developing driverless vehicle navigation units. Baidu, the Chinese technology giant, is working with King Long Motor Group, China, to introduce autonomous buses in industrial parks. Financial analysts, who spend much of their time conducting formula-based research, are also experiencing job cuts: Sberbank, the largest bank in the Russian Federation, relies on artificial intelligence to make 35 percent of its loan decisions, and it anticipates raising that rate to 70 percent in less than five years. "Robot lawyers" have already replaced 3,000 human employees in Sberbank's legal department. The number of back-office employees will shrink to 1,000 by 2021, down from 59,000 in 2011. Ant Financial, a fintech firm in China, uses big data to assess loan agreements instead of hiring thousands of loan officers or lawyers.

Nevertheless, it is impossible to put a figure on the level of job displacement that will take place overall. Even the most well-known economists have experienced little success with this exercise. In 1930 John Maynard Keynes declared that technology would usher in an age of leisure and abundance within a hundred years. He mused that everyone would have to do some work if they were to be content, but that three hours a day would be quite enough. The world in 2018 is far from this kind of reality.

How Many Jobs are Affected?

Although quantifying the impact of technological progress on job losses continues to challenge economists, estimates abound. Those estimates vary widely (see figure). For Bolivia, job automation estimates range from 2 to 41 percent. In other words, anywhere from 100,000 to 2 million Bolivian jobs may be automated in 2018. The range is even wider for advanced economies. In Lithuania, from 5 to 56 percent of jobs are at risk of being automated. In Japan, from 6 to 55 percent of jobs are thought to be at risk.

FIGURE Estimates of the percentage of jobs at risk from automation vary widely



Sources: WDR 2019 team, based on World Bank (2016)

Note: The figures represent the highest and lowest estimates of the percentage of jobs at risk of automation in economies for which more than one estimate has been produced by different studies. A job is at risk if its probability of being automated is greater than 0.7.

The wide range of predictions illustrates the difficulty of estimating technology's impact on jobs. Most estimates rely on automation probabilities developed by machine learning experts at the University of Oxford. The experts were asked to categorize a sample of 70 occupations taken from the O*NET online job database used by the U.S. Department of Labor as either strictly automatable or not (1–0). Relying on these probabilities, initial estimates placed 47 percent of U.S. occupations at risk of automation. Basing probabilities on the opinion of experts is instructive but not definitive. Moreover, using one country's occupational categories to estimate possible job losses from automation elsewhere is problematic.

Will We See the Same Development in All Countries?

Job loss predictions do not accurately incorporate technology absorption rates, which are often painstakingly slow and differ not only between countries but also across firms within countries. The absorption rate therefore affects the potential for technology to destroy jobs. The use of mobile telephony, for example, spread faster than earlier technologies, but the Internet has been comparatively slow to take hold in many cases, particularly among firms in the informal sector.

The uptake of mechanization in agriculture presents a similar picture. Persistent trade barriers, the relatively low cost of labor compared with that of agricultural machinery, and poor information all contribute to the low rates of mechanization in low-income and some middle-income countries. Even for the textile industry's spinning jenny, the relatively low cost of labor delayed its introduction in France and India in 1790 France had only 900 spinning jennies compared with 20,000 in Great Britain. The prevalence of automation versus labor continues to vary across and within countries, depending on the context.

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**The article is from Chapter 1: THE CHANGING NATURE OF WORK. WORLD DEVELOPMENT REPORT 2019. The World Bank 2019.*

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Multimedia-based electronic learning has become a tool used to provide access to education for multiple segments of the population, which otherwise would have little to no access to it. While eLearning is integrated into curricula early in the digital revolution, in many countries, it is just beginning to address the opportunities and challenges web-based learning may bring.

Lucubrate Magazine

Intellect Asset Bank

By Peter Welch, Georgia, CEO GlobalCfo.LLC

As we proved in the last articles on intellectual capital accounting for IC follows the same conceptual framework and double-entry bookkeeping as required for financial reporting under IFRS. We will from time to time introduce more articles such as the one below that continues the discussion on IC and knowledge management. As we referenced before, IC will not necessarily be readily accepted and will take a leap of faith by management to even discuss let alone entertain implementation. The biggest issues are not necessarily in identifying what constitutes IC but in the issue of determining a valuation i.e. assets and liabilities. It certainly goes without saying that any management would like to increase its assets, i.e. is ba-

Intellectual Assets Bank

INTRODUCTION

The change of the industry in knowledge-based capital (KBC) has been rising significantly in the past decades. Empirical research has shown that investments in knowledge-based capital, i.e. intangible assets, have become key drivers of economic growth across Western economies [1]. The need for creating a good financial foundation for all innovative knowledge companies becomes imperative.

Accounting Series – article No: 34

Accounting Theory – Advanced Part 24

The crucial actors in this process are the small and medium-sized enterprises (SMEs), especially start-ups and small innovative companies, who develop knowledge assets and exploit their increasing returns to scale. Nonetheless, young SMEs may face a number of difficulties in raising the capital or loans, necessary to grow, essentially because they are subject to high risks of failure and they have a very small or not existing amount on tangible assets.

Objective

The objective of IAB is to establish a real (intermediate) bank in Europe and by extension worldwide, for giving guarantees on loans for innovative, technology-driven start-ups and SMEs. This target group will be supported with extra services in the field of managing their Intangible assets or finding Equity or blended solutions (mix of loans, equity and grants) or dedicated services in the area of intellectual property rights likle licensing and infringement research in order to develop and increase their intellectual assets.

In this context, intellectual assets (IA) have two attractive features that may help firms to unlock new investment or obtain more favourable financing conditions. Because of this challenge, the Intellectual Assets Bank [IAB] intend to provide commercial financial institutions (such as commercial banks, credit unions, VC's, crowd lending companies etc.) a concept of guarantee based on the companies actual and future intangible assets.

The IA bank developed a series of audit and management methods in order to disrupt the concept of guarantee and increase the not only the financial basis of the SME's but also their ability to manage their intangible assets in the future and create multiple money streams from these assets. The IA bank will help the innovative SME's , to reveal to financiers, the quality of the firm's management and of its technological capabilities Notwithstanding these view on the intangible assets of an organization, IA-based finance is actual under-exploited across Western economies, especially with respect to those young SMEs who need to open new financing channels. To create more efficient use of IA-based finance, the most experienced organizations in auditing and managing the intangible assets are creating a consortium that is capable of creating an **I**ntellectual **A**ssets **B**ank [IAB].

BUSINESS PROCESS

It is planned that JRC Capital will give to IAB the legal base for all operations. During the operations of IAB JRC will be responsible for all regulations, compliance, reporting etc.

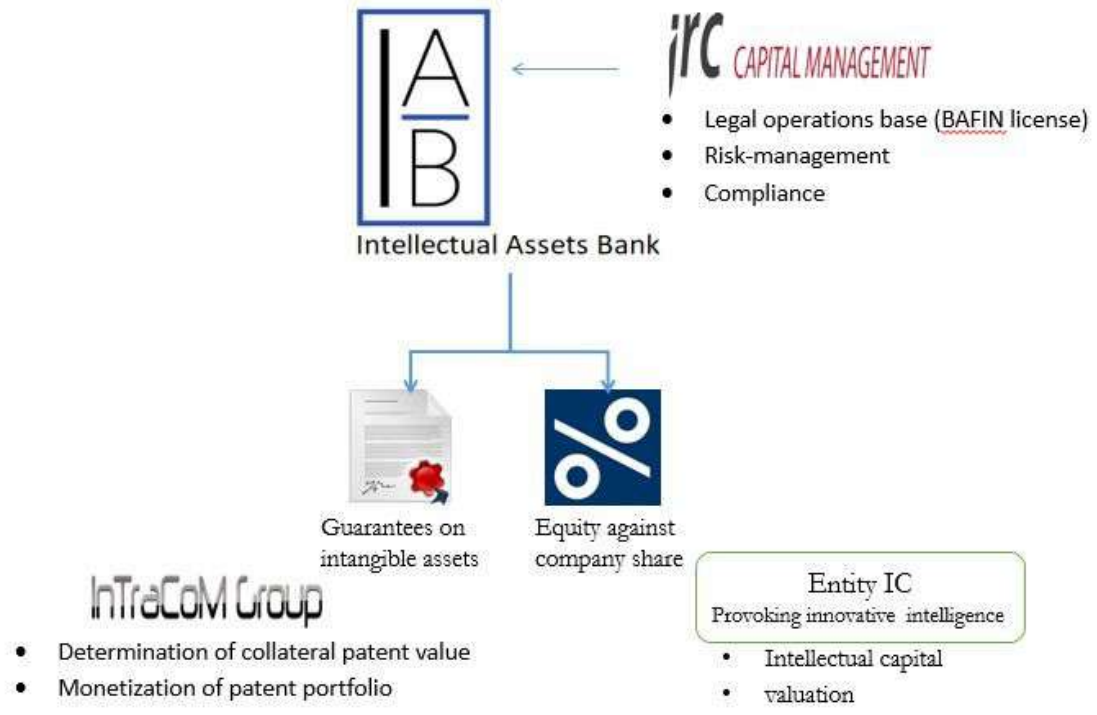
InTraCoM will be responsible for the intellectual property valuation and securitization as collateral. Parallel to this InTraCoM will support the patent-giving clients in infringement research and licensing activities. Both services will be agreed with the client.

Entity IC will value the intellectual capital of the company and help to increase the value in intellectual assets against equity.

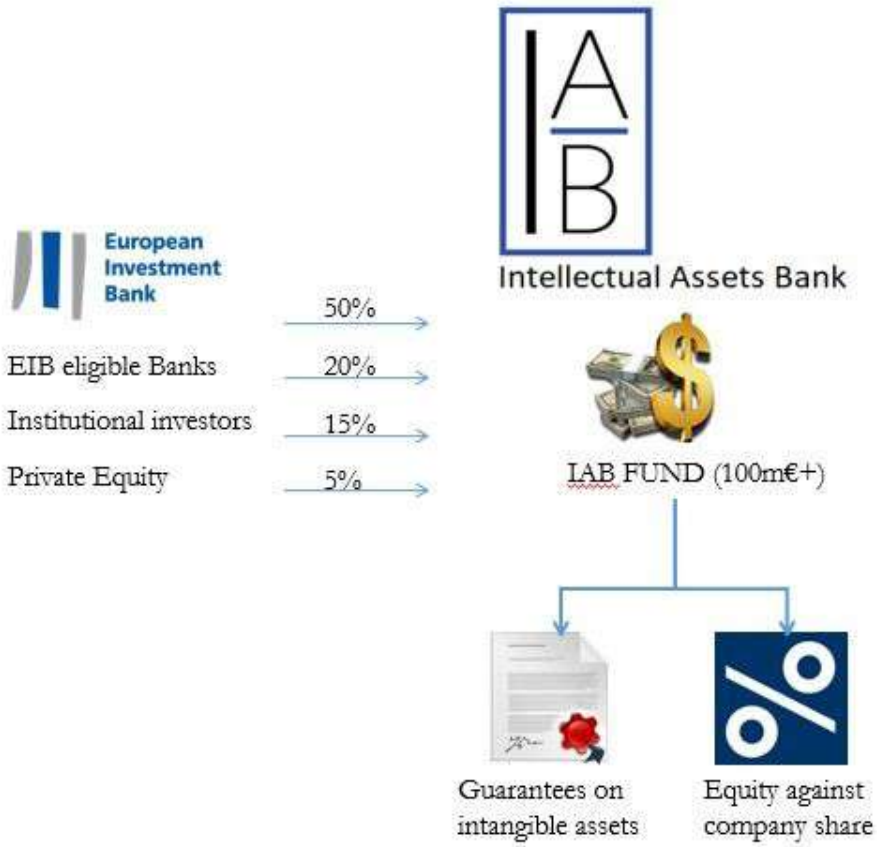
It is planned that IAB will give **only** guarantees to loan giving banks, up to max. 50% of the total loan which the bank gives to the debtor. IAB will backup the own guarantee of 50-80% by EIF or EIB.

IAB will have therefore 2 products: equity product and debt product.

The process for setting up the IAB is as follows:



The different investor types for IAB are illustrated in the following graph:



Market perspective

In the Eurozone, in the year 2017 loans volume was +/- of 560,000 b€ given to the European industry by Banks. In the Eurozone, there are +/- 59,000,000 companies (SMEs) registered [4]

Among them, total amount companies having more than 500K€ patent value are: 34,100 (=0,06 %) [1] 27% of SMEs in Europe are seeking for a loan [5] The rejection rate for SMEs is in average around 6%, but with high differences in Europe (i.e. Italy around 40%)

We assume that 9,000 of SMEs in Europe (27% of 34,000) with high IP value (>500K) with an average loan amount of 2 m€ generate the total market size for bank guarantees on collaterals to: 18.4 b€

With an average interest rate of 1.5% on guarantees and 0.5% of non-performing-loans the revenues generated out of 100m€ funds (leverage factor: 10) are 10 m€/ year. The expected R.O.I for investors is 10%/a.

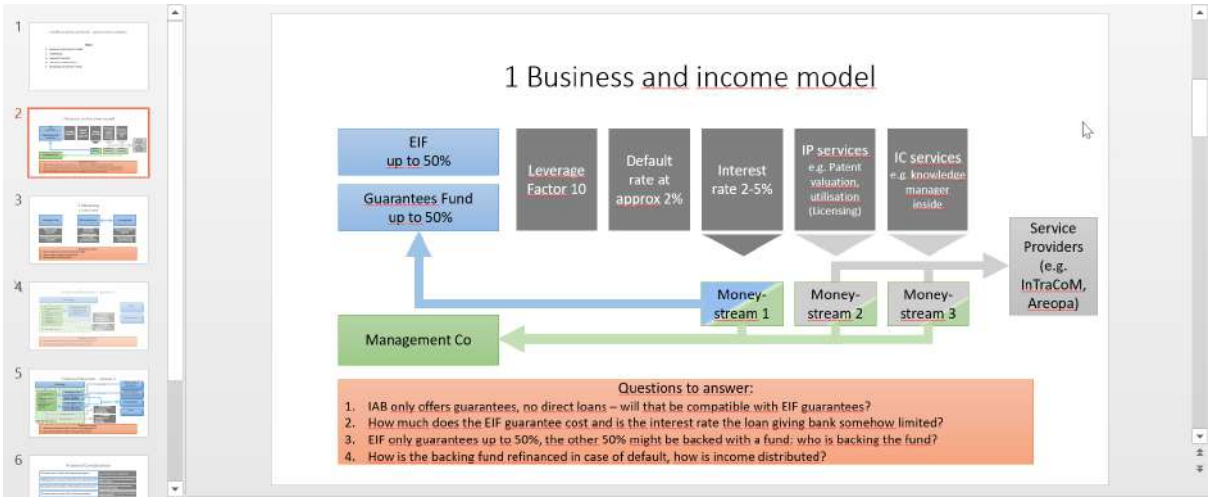
These figures don't take into account the rest of the intangible assets of the companies.

Let's now view a graphical PowerPoint perspective:

Intellectual Asset Bank – general description

Topics

1. Business and income model
2. Marketing
3. General structure
4. General considerations
5. Roadmap for the pre-setup



2 Marketing

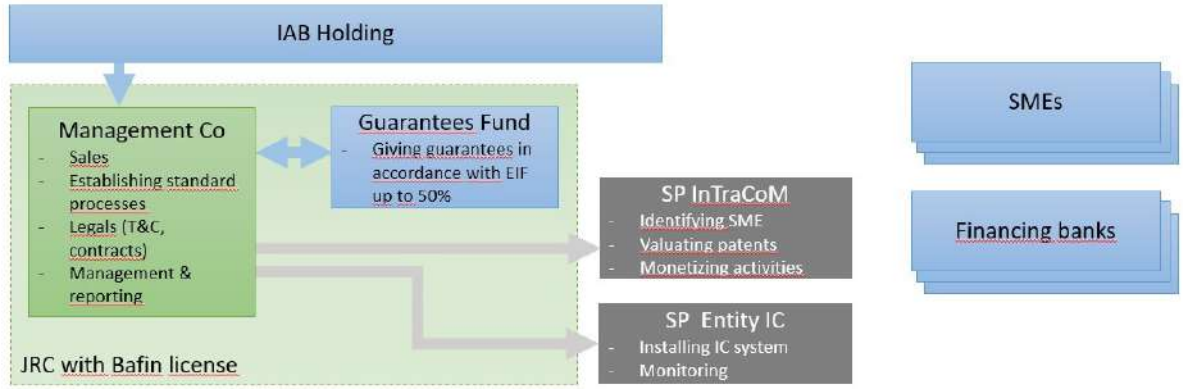
a 3 sided market

Guarantees Fund	SME seeking finance	Financing Banks
Private equity investors	Must have monetizable intellectual assets	Have access to SME (with IP)
Average return rate of at min 5%	Are ready for monetizing their IA	Have a process for „mixed" financing

Questions to answer:

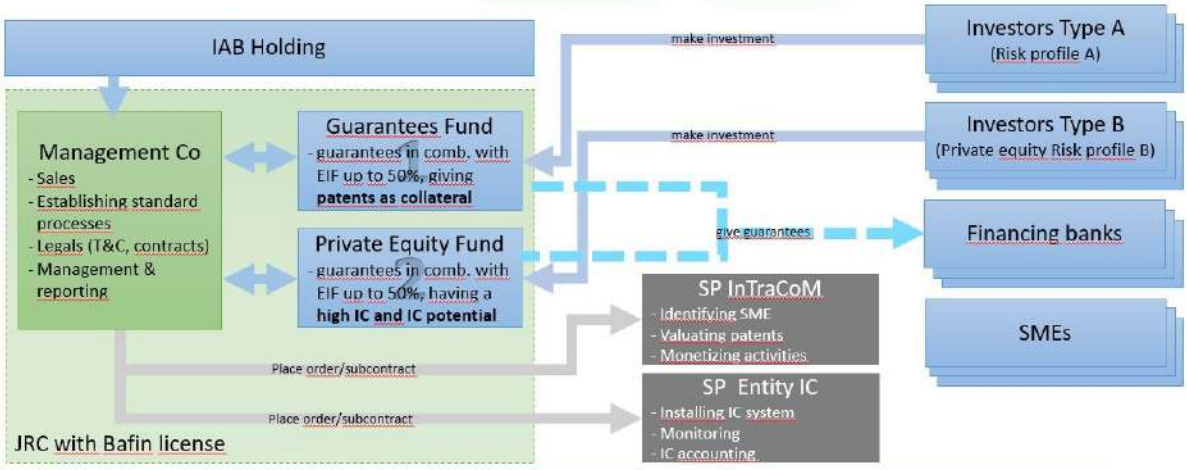
1. Do we need the Guarantees fund in first stage?
2. How to address investors for the fund?
3. How to address SME and banks?

3 General Structure – version 1



Questions to answer:
1. What kind of functional staff is needed in Management Co?
2. How much funding is needed in the guarantees fund?

3 General Structure – version 2



Questions to answer:
1. What kind of functional staff is needed in Management Co?
2. How much funding is needed in the guarantees fund?

4 General Considerations

The interest rate is linked to the total guarantee given	e.g. 1% for 50%, 3% for a 100% guarantee
100% guarantee can be given only if there are utilizable patents	Patents are in use, value covers 100%, utilisation in licenses is allowed
New patents can be added as collateral when value decreased	When the collateral-portfolio value decreases under the 100% coverage
The payment terms must be inline with patent maturity	The max credit length is shorter than the remaining term of the patents
Interest rates may vary according to changes in portfolio or organisation	When knowledge became explicit to a certain extend or patent value increased, interest rates can be decreased also

Questions to answer:

1. How to utilize IC in terms of default?

5 Roadmap pre-setup stage

1	Determine partners and roles	For each partner: what is his/her role during setup phase and what is the role during operation phase? What are e/o's contributions?
2	JRC eligibility requirements	What are the required steps, documents, general requirements for IAB in order to be able to give guarantees? Is the general business model for IAB in line with EIB/EIF?
	Milestone: there must be a model where JRC is acting as a guarantee-giving bank giving at least 50% guarantees from the EIF	
3	Draft model for the guarantees fund	Where is the funding coming from? What is the operational form of the fund? What are the general T&C?
4	Draft a general business process	What are the different steps 1. starting from assessment of a company until giving a loan 2. in case of a default
5	Draft the business model, make a business plan	Who is earning on what? How is profit distributed? What are the (fix) cost? Where is the break-even? What are the setup cost?
6	Find SME who agree with the financing concept	Are the SME ready for that kind of model? What are they ready to spend (%)
7	Find banks who agree with the financing concept	What are the requirements on bank side? What would be the interest rate for them in case of 50,80,100% guarantees? Is the business case attractive? Who is ready for an initial project?
8	Find investors for fund	What are the potential investors? Is the business model attractive? Who is ready for a seed funding?
	Milestone: there must be an appropriate co funding available for covering the other up to 50% guarantees	

OVERALL CONCEPT

Based on the existing experiences and proven methodologies from Intracom & Entity IC from the one side and the need that exist on the SME market from the other side. In order to have a clearer view of the market and in order to structure our value proposition in a better way, based on the available expertise with Intracom & Entity IC. I suggest we use the concept of the 6 stages in the life circle of an SME. In there we will use the following criteria :

1. Company growth in manpower and complexity, based on the crisis moments in the growth of an organization
2. Having a knowledge mgt strategy (explicit versus tacit)

Having an IP strategy & tactics

OVERALL CONCEPT continued next week

References

[1] OECD (2013), „knowledge-based capital, innovation and resource allocation", in Supporting Investment in Knowledge Capital, Growth and Innovation, OECD Publishing.

[2] http://www.economist.com/node/7068382

[3] Intangible Asset Market Value Study, Cate M. Elsten and Nick Hill

[4] Research at Orbis Business data [http://orbis.bvdinfo.com]

[5] http://www.ecb.europa.eu/

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Mr. Peter Welch, CEO of GlobalCfo.LLC

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Why Innovation in Education?

*Innovation in the public sector in general, and in education in particular, could be a major driver for significant welfare gains. Innovations to improve the effectiveness and efficiency of such a large area of government spending could yield important benefits.**

The picture on the top: Bruno Scramgnon

Innovation in Education

Innovation in education is a highly contentious issue. Talking to education ministers one quickly gets the impression that education systems, in general, are very reluctant to innovate, and that there is strong resistance to change among teachers. Education is sometimes perceived as one of the most conservative social systems and public policy fields. But talking to teachers gives one the opposite idea – that there are too many changes imposed on them without much consultation or the necessary preconditions for successfully implementing change. In

some countries, innovative change has been implemented without the care and diligence needed or the appropriate prior testing, experimentation and evaluation.

This controversy should not deter us from looking at the facts. And the facts clearly demonstrate that education systems are running up against very serious problems which, if left untouched, could result in serious risks not only for education itself but also for future economic growth, social progress and well-being. Since the mid-20th century, education systems have expanded enormously and human populations have never been more highly educated than today. Emerging economies and developing countries are now also relentlessly expanding their education systems, seeing education as an indispensable ingredient of modernisation and progress. Indeed, the benefits to individuals and societies of ever more education remain very impressive. Yet, although many policymakers may consider the continued expansion in numbers as the best route forward, a closer look into the data reveals that this may as well lead us into difficulties.

The problem education is facing is mainly one of productivity and efficiency. Here, efficiency means the balance between resources invested and the outcomes in terms of students' performance and equity. Over the past decades, ever more resources have been invested in education.

The problem of productivity and efficiency in education is even more striking when education is compared with other public policy sectors, which have realised enormous productivity gains in the past decades. In sectors such as health, technology has been a major driver of increased productivity and efficiency with much improved outcomes even if the cost has also gone up. Many observers wonder why enormous advances in technology has not yet led to similar improvements in education. Governments have invested a lot in bringing technology, mainly information and communications technology (ICT), to schools.

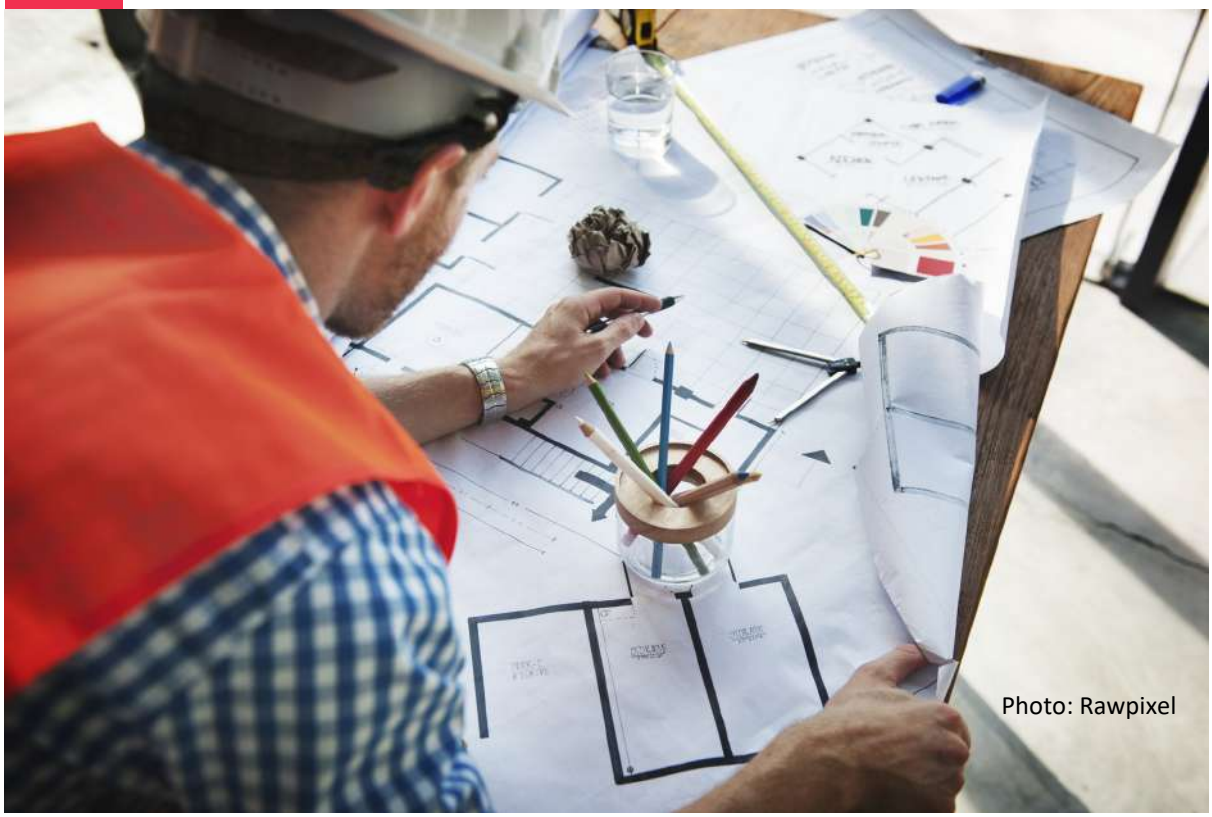


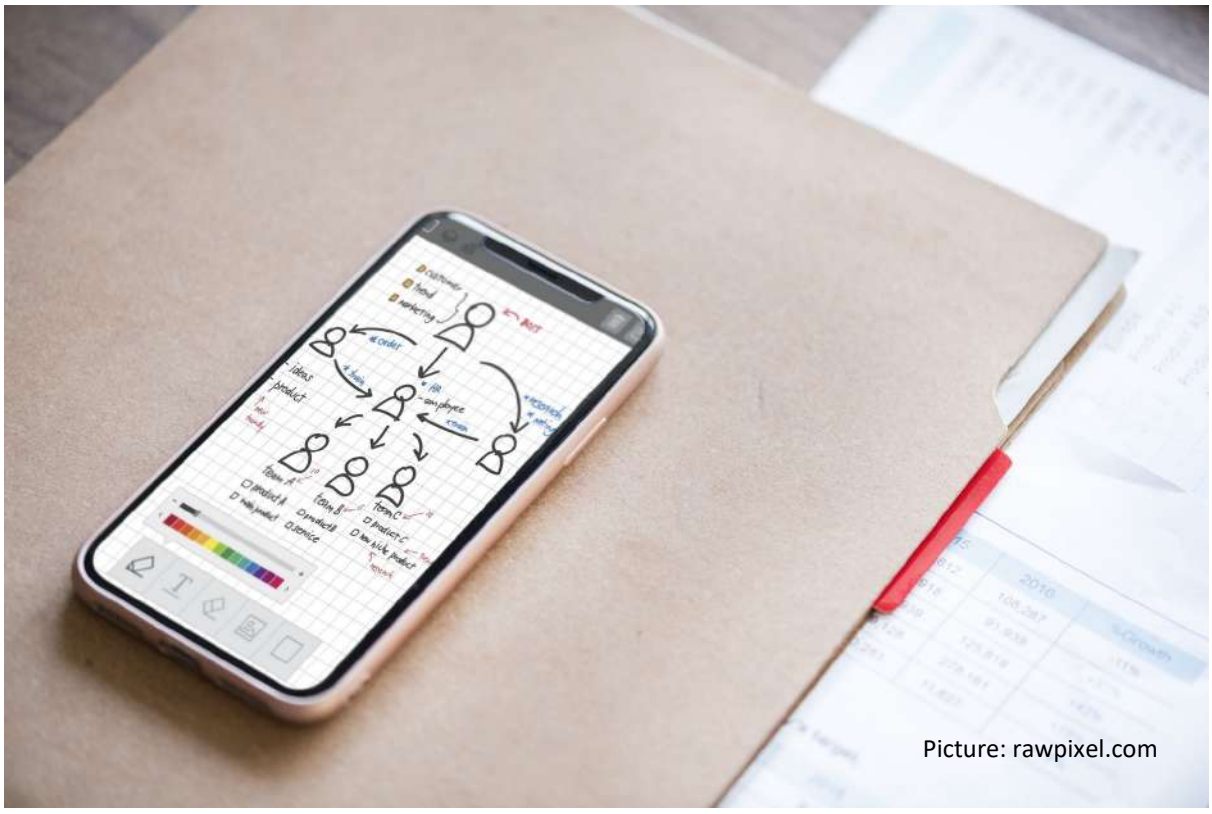
Photo: Rawpixel

Innovation in Education as Part of Innovation in Economies and Societies.

In the last few decades, innovation, in general, has been increasingly regarded as a crucial factor in maintaining competitiveness in a globalised economy. Innovation can breathe new life into slowing stagnant markets, and act as a mechanism to enhance an organisation's ability to adapt to changing environments. Both policies and theories on innovation have mainly focused on the business sector. Businesses need to innovate in order to keep up with their competition by introducing new products or services, improving the efficiency of their production processes and organisational arrangements, or enhancing the marketing of their activities in order to guarantee their survival.

Much more recently, policy interest has extended this "innovation imperative" from private organisations to the provision of public services. Although public services, including education, tend neither to operate within competitive markets

nor have the same incentives to innovate as businesses do, there are important arguments to push for innovation in education to maximise the value of public investment. Several recent national innovation strategies include provisions for more innovation in the public sector (such as Australia, Finland, the Netherlands, Norway and the United Kingdom). Demographic pressures, burgeoning demand for government services, higher public expectations and ever-tighter fiscal constraints mean that the public sector needs innovative solutions to enhance productivity, contain costs and boost public satisfaction.



Picture: rawpixel.com

Why Innovation in Education Matters

How could innovation add value in the case of education? First of all, educational innovations can improve learning outcomes and the quality of education provision. For example, changes in the educational system or in teaching methods can help customise the educational process. New trends in personalised learning rely heavily on new ways of organising schools and the use of ICT.

Second, education is perceived in most countries as a means of enhancing equity and equality. Innovations could help enhance equity in the access to and use of education, as well as equality in learning outcomes.

Third, public organisations are often under as much pressure as businesses to improve efficiency, minimise costs and maximise the "bang for the buck". There has been a tendency for costs in all public services to rise faster than those in the rest of the economy, and education is no exception. While this could be attributed to a "cost disease, inherent to any public-service provision which faces ever-rising labour costs and limited scope for transformative productivity gains, this may also be due to a lack of innovation. Innovation, then, could stimulate the more efficient provision of these services.

Finally, education should remain relevant in the face of rapid changes to society and the national economy. The education sector should, therefore, introduce the changes it needs to adapt to societal needs. For example, education systems need to adopt teaching, learning or organisational practices that have been identified as helping to foster "skills for innovation".

Improvements in education can be perceived differently depending on which objective is examined or on the point of view of the observer. Moreover, cultural values, social policies and political goals can mean countries prioritise these objectives differently. Priorities can also change over time as circumstances and citizens' expectations change.

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* The article is a part of the document: OECD (2016), Innovating Education and Educating for Innovation: The Power of Digital Technologies and Skills, OECD Publishing, Paris. (pp 12-17) http://dx.doi.org/10.1787/9789264265097-en

The Demand for Advanced Cognitive Skills and Sociobehavioral Skills is Increasing

The article is from Chapter 4 in the report: THE CHANGING NATURE OF WORK. WORLD DEVELOPMENT REPORT 2019. The World Bank 2019

Nelson Mandela, the first president of postapartheid South Africa, once said,

"Education is the great engine of personal development. It is through education that the daughter of a peasant can become a doctor, that the son of a mineworker can become the head of the mine, that the child of a farmworker can become the president of a great nation. It is what we make out of what we have, not what we are given, that separates one person from another."

Automation is reshaping work and the skills demanded for work. The demand for advanced cognitive skills and sociobehavioral skills is increasing, whereas the demand for narrow job-specific skills is waning. Meanwhile, the skills associated with "adaptability" are increasingly in demand. This combination of specific cognitive skills (critical thinking and problem-solving) and sociobehavioral skills (creativity and curiosity) is transferable across jobs.

How well countries cope with the demand for changing job skills depends on how quickly the supply of skills shifts. Education systems, however, tend to resist change. A signi-

ficant part of the readjustment in the supply of skills is happening outside of compulsory education and formal jobs. Early childhood learning, tertiary education, and adult learning sought outside the workplace are increasingly important in meeting the skills that will be sought by future labor markets. This article shows how.

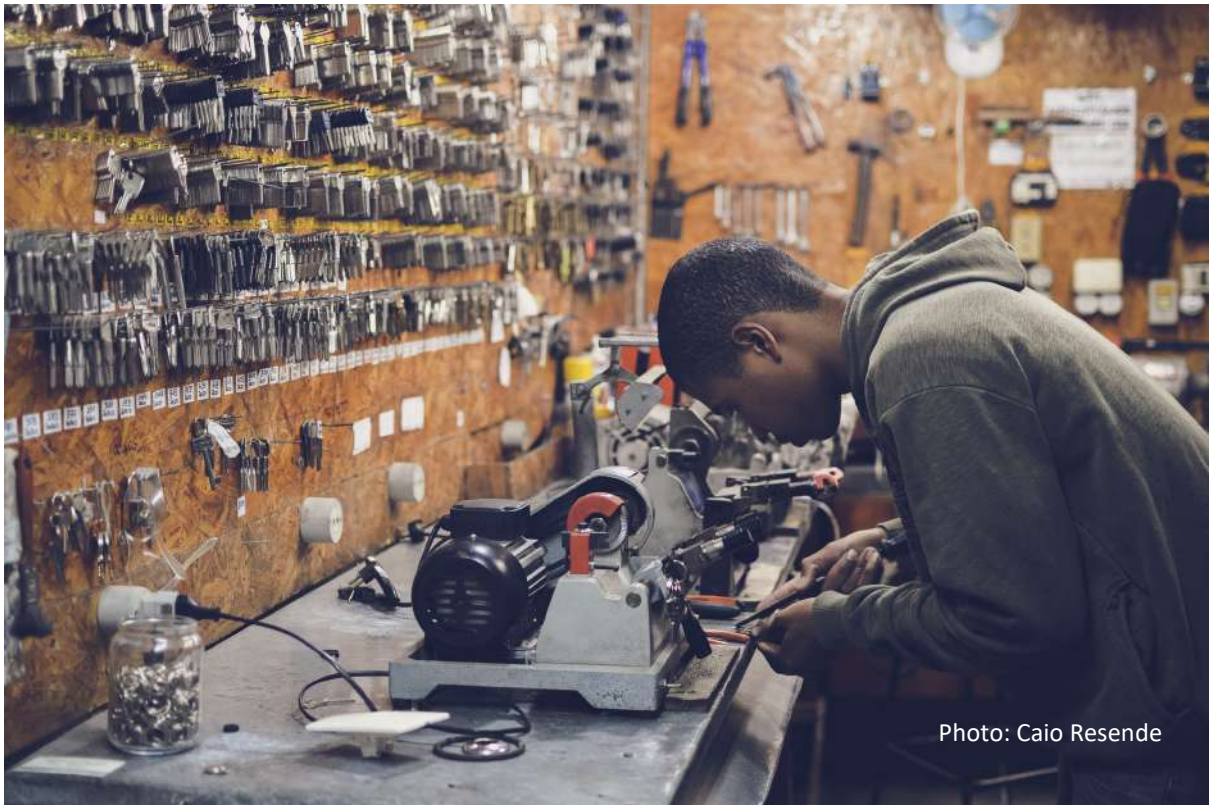


Photo: Caio Resende

A Large Share of Children Entering Primary School Today Will Work in Occupations that Do Not Yet Exist.

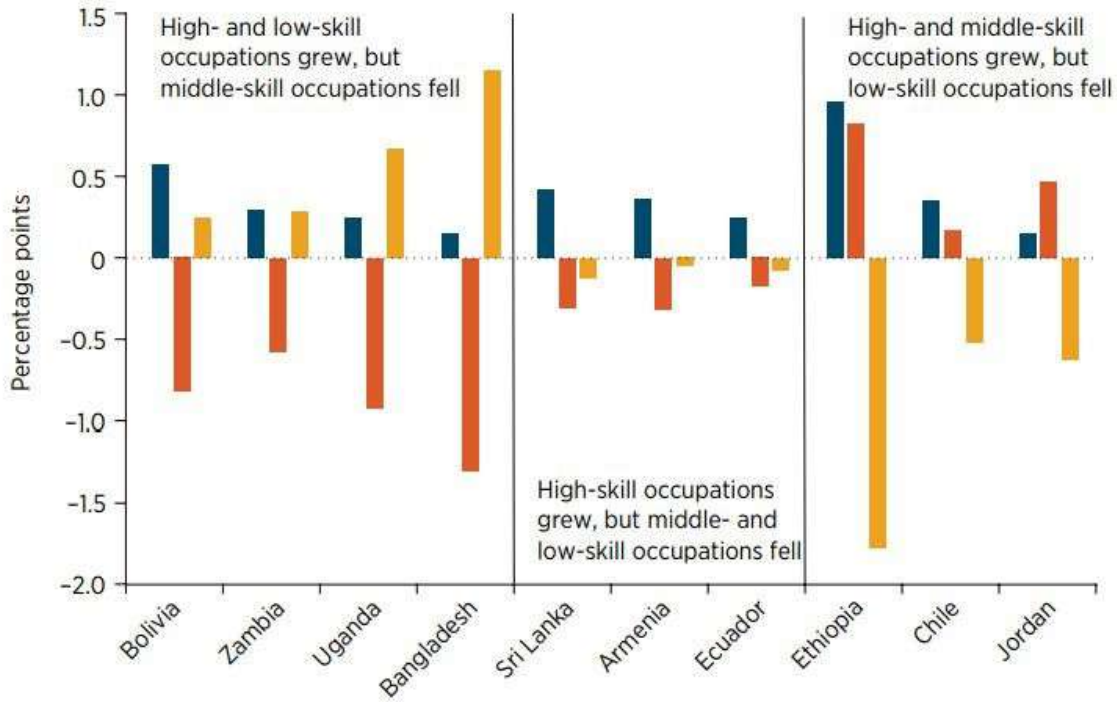
Automation—and the adoption of technology more generally—makes some jobs obsolete. The demand for skills linked to home appliance repair, for example, is shrinking quickly because technology is driving down the price of appliances and improving reliability. At the same time, innovation is creating new types of jobs. In fact, a large share of children entering primary school in 2018 will work in occupations that do not yet exist. Even in low- and middle-income countries,

many people are employed in jobs that did not exist three decades ago. India has nearly 4 million app developers; Uganda has over 400,000 internationally certified organic farmers; and China has 100,000 data labelers.

Meanwhile, many current jobs are being retooled into new forms, resulting in new and sometimes unexpected skill combinations. In 2018 a marketing professional might well be asked to write algorithms. A physics graduate may land a job as a quantitative trader in the finance industry. Workers who bring emerging skills into relevant technical fields of expertise—such as teachers who are good at web design and actuaries who are proficient in big data analytics—are likely to be in high demand.

Which skills are in less demand in 2018? Evidence from developed countries points to job polarization—the expansion of high- and low-skill jobs coupled with the decline of middle-skill jobs. The demand for workers who can undertake nonroutine cognitive tasks, such as high-skilled research, is increasing. So is the relative demand for workers able to handle nonroutine tasks that cannot be automated easily, such as food preparation. Conversely, the demand for workers for procedural routine tasks, which are often performed in middle-skill jobs such as data entry, is declining because of automation.

FIGURE: *In many developing countries, the share of employment in high-skill occupations has increased Annual average change in employment share, by occupation skill level, circa 2000–circa 2015*



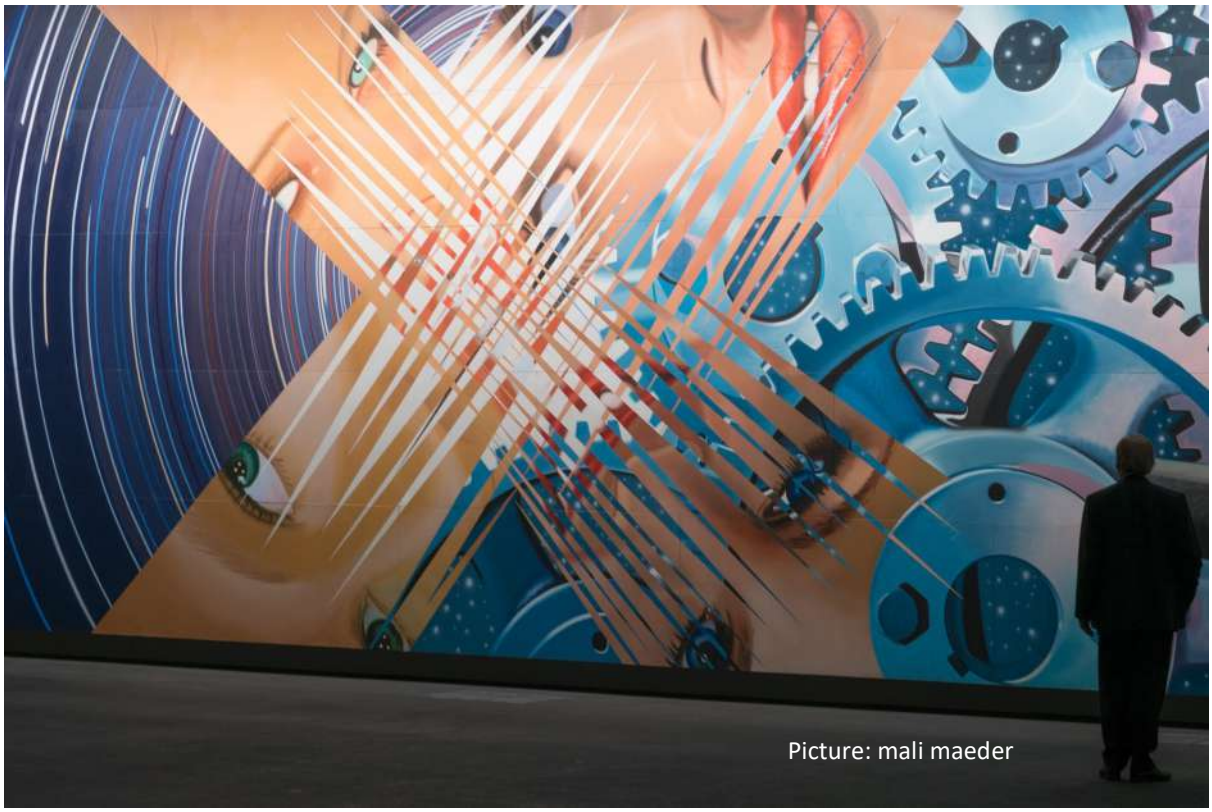
Source: WDR 2019 team, based on World Bank's International Income Distribution Data Set.

Note: High-skill occupations: managers, professionals, technicians, and associate professionals. Middle-skill occupations: clerical support workers; sales and services workers; craft and related trades workers; skilled agricultural, forestry, and fishery workers; plant and machine operators and assemblers. Low-skill occupations: elementary occupations such as cleaners and helpers; laborers in agriculture, forestry, and fisheries; laborers in mining, construction, manufacturing, and transport; food preparation assistants; street and related sales and services workersthan 0.7.

Is the same pattern beginning to emerge in low- and middle-income countries? Not quite. In many developing countries, the demand for highskill workers is increasing (figure 1). The share of workers in high-skill occupations increased by 8 percentage points or more in Bolivia, Ethiopia, and South Africa from 2000 to 2014. But the change in demand for lowand middle-skill jobs is more heterogeneous across countries. In Jordan, the share of employment in middle-skill jobs increased by 7.5 percentage points between 2000 and 2016. In Bangladesh, this share fell by almost 20 percentage points during the same period.

A Change in the Demand for Workers All Over the World.

This change in the demand for workers for low- and middle-skill jobs in developing countries is not surprising. What happens at this end of the skills spectrum is likely to be driven by the competing forces of automation and globalization. The rate of technology adoption tends to vary considerably across developing countries. In Europe and Central Asia, 26 percent of the population had fixed broadband subscriptions in 2016, compared with just 2 percent in South Asia. Globalization is bringing the low- and medium-skill jobs of developed countries to some—but not all—developing countries. Depending on the relative speed of these forces, some developing countries are seeing an increase in middle-skill jobs; others are seeing a decline.



Picture: mali maeder

Creating a skilled workforce for the future of work rests on the growing demand for advanced cognitive skills, sociobehavioral skills, and adaptability. Evidence across low- to high-income countries suggests that in recent decades jobs are

being defined by more cognitive, analytical tasks. In Bolivia and Kenya, more than 40 percent of workers using computers perform complex tasks that require advanced programming. Indeed, the demand is growing for transferable higher-order cognitive skills such as logic, critical thinking, complex problem-solving, and reasoning. In all regions of the world, these skills are consistently ranked among those most valued by employers. Analysis of the job markets in Denmark, France, Germany, the Slovak Republic, South Africa, Spain, and Switzerland reveals that a one standard deviation increase in complex problem-solving skills is associated with a 10–20 percent higher wage. In Armenia and Georgia, the ability to solve problems and learn new skills yields a wage premium of nearly 20 percent.

The demand for sociobehavioral skills is also increasing in developing countries. In Latin America and the Caribbean, the adoption of digital technology has placed more importance on general cognitive skills and raised the demand for workers with interpersonal skills. In Cambodia, El Salvador, Honduras, the Lao People's Democratic Republic, Malaysia, the Philippines, and Vietnam, more than half of firms report shortages of workers with specific sociobehavioral skills, such as commitment to work.

The Ability to Adapt Quickly to Changes is Increasingly Valued By the Labor Market.

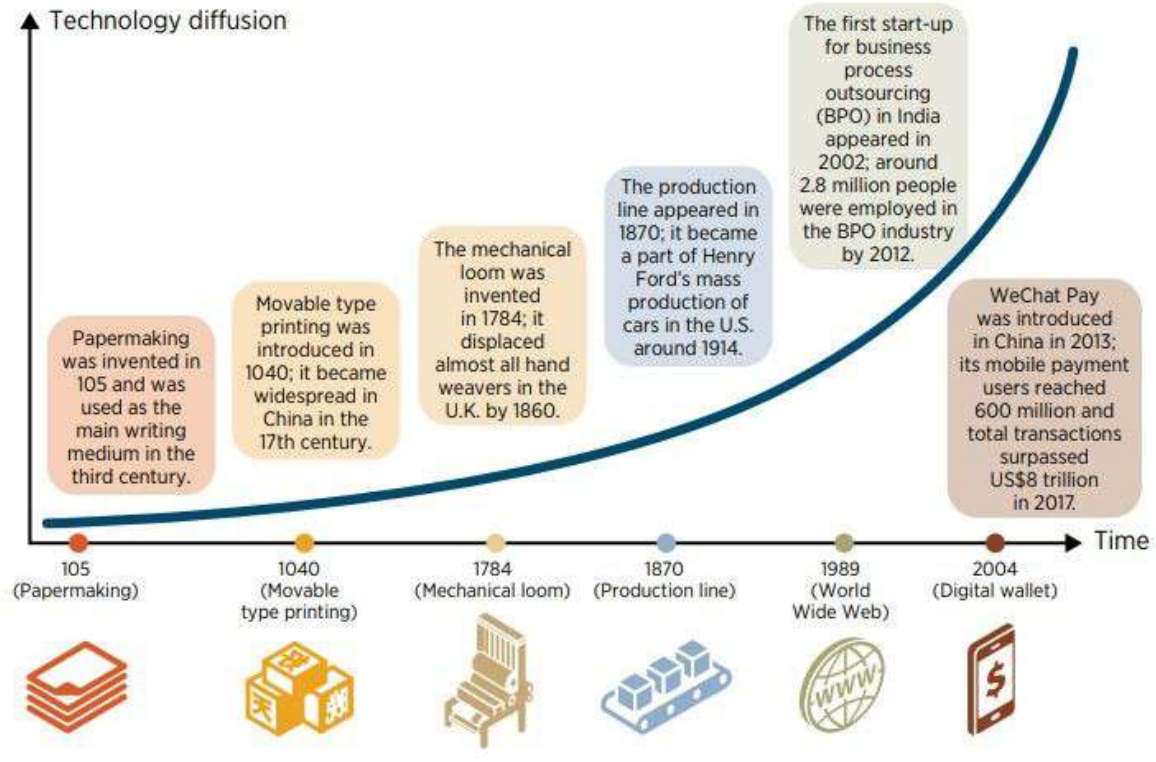
Technological change makes it harder to anticipate which job-specific skills will thrive and which will become obsolete in the near future. In the past, shifts in skill requirements prompted by technological progress took centuries to manifest themselves (figure 2). In the digital era, advances in technology call for new skills seemingly overnight. The ability to adapt quickly to changes is increasingly valued by the labor market. The sought-after trait is adaptability—the ability to respond to unexpected circumstances and to unlearn and relearn quickly. This trait requires a combination of certain cognitive skills (critical thinking, problem-

solving) and sociobehavioral skills (curiosity, creativity). A study of technical and vocational students in Nigeria showed that the sociobehavioral skill of self-efficacy was positively and significantly predictive of career adaptability.

Strong skill foundations are important for developing advanced cognitive skills, sociobehavioral skills, and skills predictive of adaptability. For most children, these skill foundations are formed through primary and secondary education. Yet, according to the World Development Report 2018, the acquisition of foundational skills that one would expect to happen in schools is not occurring in many low- and middle-income countries.

Important skills readjustments are happening increasingly outside of compulsory education and formal jobs. Skills development for the changing nature of work is a matter of lifelong learning. This kind of learning is especially germane to skills readjustment amid demographic change—be it the aging populations of East Asia and Eastern Europe or the large youth populations of Sub-Saharan Africa and South Asia.

FIGURE 2 *The rate of technology diffusion is increasing*

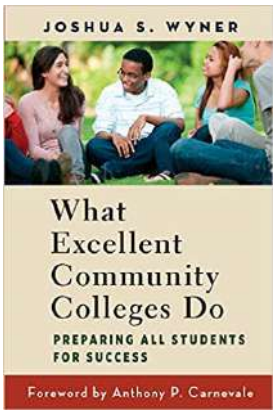


Source: WDR 2019 team

Book

What Excellent Community Colleges Do

By Joshua S. Wyner



What Excellent Community Colleges Do: Preparing All Students for Success

What Excellent Community Colleges Do, Joshua S. Wyner draws on the insights and evidence gained in administering the inaugural Aspen Prize for Community College Excellence.

This book identifies four domains of excellence—degree completion, equity, student learning, and labor market success—and describes in rich detail the policies and practices that have allowed some community colleges to succeed in these domains.

By starting with a holistic definition of excellence, measuring success against that definition, and then identifying practices and policies that align with high levels of student success, the author seeks to contribute to the growing body of knowledge about improving student success in community colleges.

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