



Leading Digital Transformation in Schools

“Knowledge wakes the desire to learn, to know more and more, because knowledge seduces, captivates, inspires...”

This is what guides and motivates us”

EXECUTIVE SUMMARY

In recent decades, the efforts of educational policies in different countries have had results, particularly in regard to growth of population access to education. The student experience was drastically reshaped by technology in the past forty years. Students moved from learning basic computer skills in a dedicated laboratory to having one computer per classroom, to one computer per student, to owning five or more devices — some personal and some provided by schools and universities.

Recognizing that Education is a critical factor for the development of these economies, the business model developed by jp.ik, a company evolved from its identity as an original equipment manufacturer (OEM) to become Europe's first original design manufacturer (ODM) - included the development of educational programs, together with local governmental entities, that enable people's access to personal devices with Internet connection, contributing to the reduction of the "digital breach". Since 2008, jp.ik has been responsible for 20 educational projects worldwide, including some that are regarded as large-scale Intel Education Solutions deployments at national level:

- [2007-2011]: Portugal – e-escolinhas/Magellan Project: Deployment of 753.000 student devices and 16.000 teacher devices; 160.000 classroom and 3.400 schools impacted.
- [2009-now]: Venezuela – Canaima Project: Deployment of 4 million student devices.
- [2011-now]: Uruguay – Ceibal Plan: jp.ik was responsible for the first deployment of CMPCs in the country. Near 300.000 devices deployed to date.
- [2009-now]: Argentina – Conectar Igualdad: More than 1 million devices delivered through international partners and for different projects inside the Conectar Igualdad Program.
- [2012-now]: Panama – Balboa: Over 300.000 student devices deployed.
- [2013-now] Bolivia – Quipus: Turnkey Project, including the refurbishment of an old factory, the construction of a new one, technical training and consultancy, among other services. 600.000 student devices have deployed to date.
- [2014-now] Angola – Meu Kamba: 150 digital classroom equipped with 10.000 student laptops. Large-scale pedagogic and technical training programme addressed to local teachers. 102 education agents were already trained and until the end of 2016, the programme will reach a total of 600 educators.
- [2015] Mexico – SEP: Within its joint-venture with the Mexican group IUSA, jp.ik has won a governmental tender for the deployment of 960.000 student tablets.
- [2015] Uruguay – Plan Ibirapitá: 15.000 tablets with dedicated software delivered to elderly people, under a Government's plan to promote digital access across advanced age groups. In 2020, this number may reach 400,000.
- [2016] El Salvador – Una niña, Un niño, Una Computadora: Turnkey Project, including the implementation of the first IT assembly line in the country, purpose-built for the national Education programme.

Presently, jp.ik employs nearly 250 people who work on the development of Education solutions that deliver social, cultural and economic value. Key statistics of their achievements include the following:

- Fifteen million student devices distributed worldwide.
- More than fifteen million students with access to educational netbooks.
- 300.000 educators trained to teach with information and communication technologies.
- 20 large scale education projects implemented worldwide.

In IDC's vision, 3rd Platform technologies — such as cloud computing, social media, mobile, and Big Data — are offering more mature countries the opportunity to become more effective and efficient in teaching, school administration and academic research. 3rd Platform technologies are also offering emerging countries the opportunity to leap forward.

IDC believes that students have the ability to access content while on the move, using devices provided by schools and universities or their own. They can collaborate with peers and teachers by leveraging collaboration tools provided by educational institutions, as well as consumer social media. Schools, universities and colleges can also personalize curricula by applying advanced analytics to identify students' strengths and weaknesses. Educational institutions can provide more flexible and scalable access to content and administrative resources through cloud computing.

jp.ik believes that the strategy and the business model created allow the leadership of the digital transformation in schools worldwide.

SITUATION OVERVIEW

A new educational paradigm

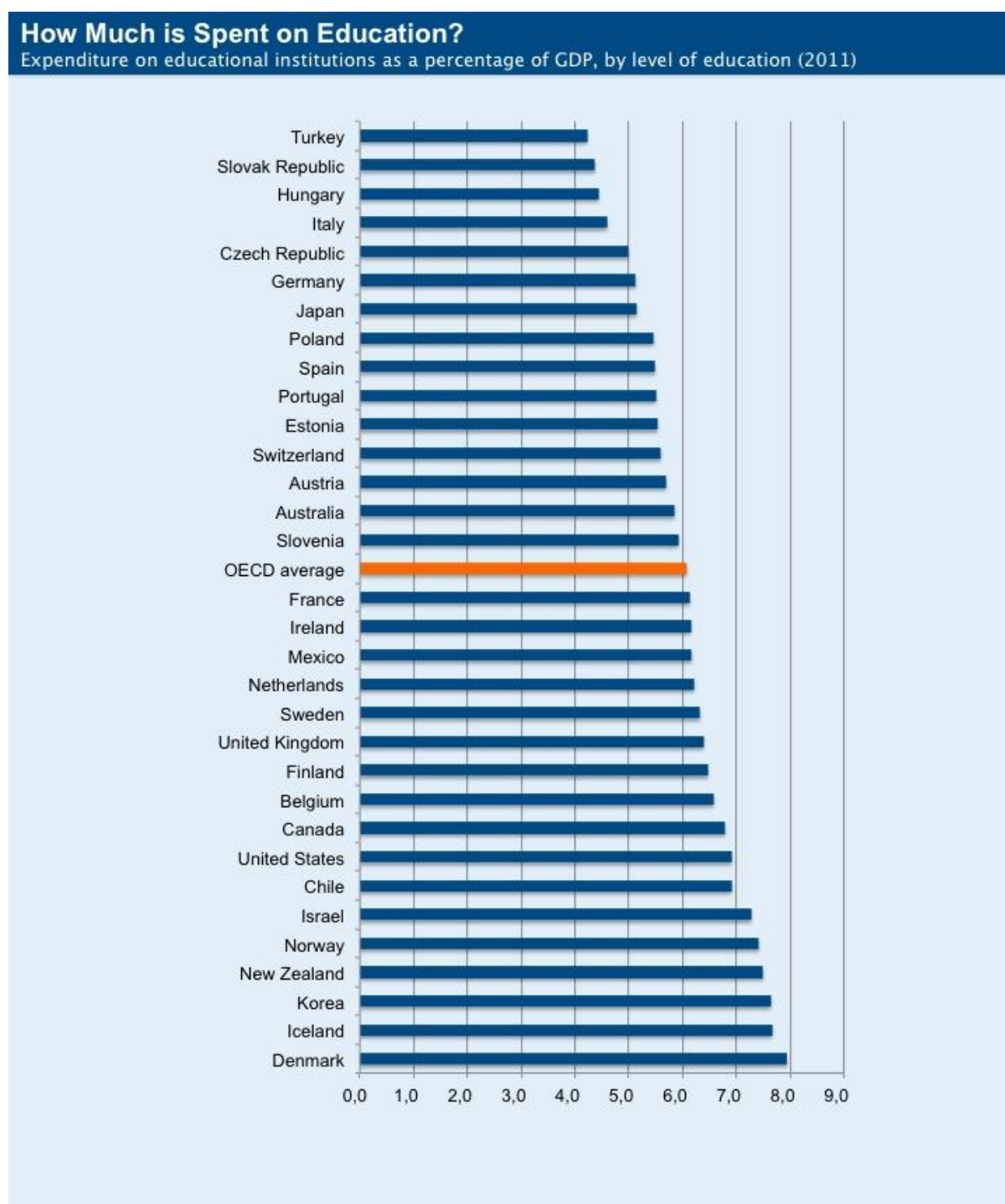
Despite the existing asymmetries in access to education worldwide, the efforts of educational policies in different countries in recent decades has had results, particularly in regard to growth of population access to education.

Currently, more than 3/4 of the world population has at least Secondary Education and more than 40% of the population between 25 and 34 years old reached the Tertiary Education level. According to data from the Organization for Economic Cooperation and Development (OECD), in most developing countries schooling levels continue to grow at a faster rate than the industrialized countries.

Also according to data from OECD, on average, countries that are part of this organization dedicate about 6% of GDP to Education, whereas the average annual expenditure per student rises to 10 220 dollars. However, the international financial crisis and the consequent recession of economic activity worldwide have placed severe restrictions on Education public spending in most countries. Available data (OECD, 2015) allow us to note that in over a third of the member states of this organization the investment in Education has fallen as a result of the international financial crisis, and that in some countries most affected by budget cuts this fall exceeds in 5 percentage points.

FIGURE 1

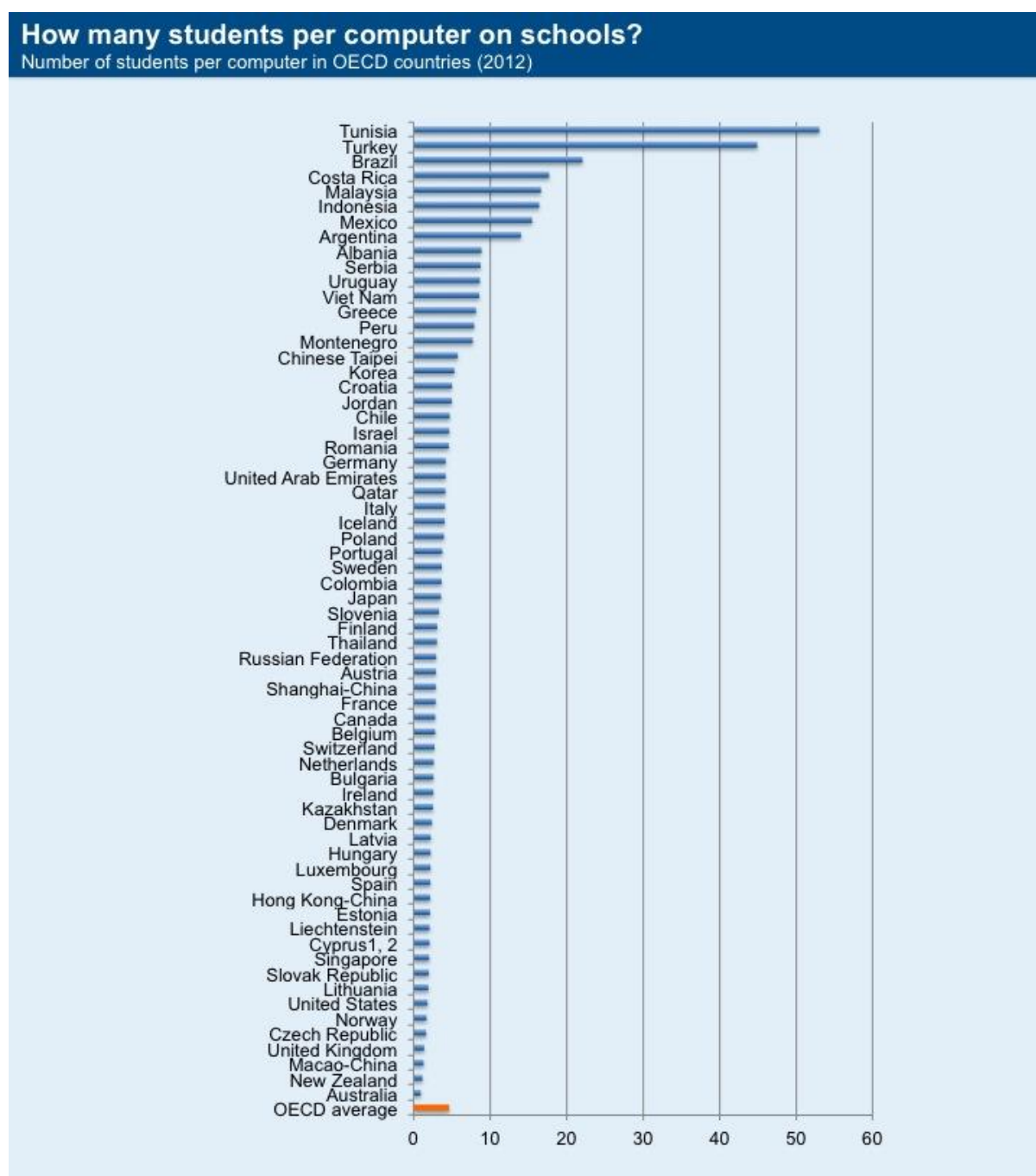
Expenditure on educational institutions as a percentage of GDP



Moreover, and despite the differences between countries, in recent years we've witnessed the gradual ICT spread in educational institutions worldwide. Data from OECD show that on average, more than 72% of students use computers in classrooms. Simultaneously, with the widespread use of personal computer in classrooms, around 42% of students use the Internet to complete their schoolwork.

FIGURE 2

Students per computer on schools



The student experience was drastically reshaped by technology in the past forty years. Students moved from learning basic computer skills in a dedicated laboratory to having one computer per classroom, to one computer per student, to owning five or more devices — some personal and some provided by schools and universities. With multiple devices, students interact with peers and teachers while in the classroom, at home, or sitting at the campus' coffee working on a group project. They have access to digital content provided by teachers and schools, as well as content available on social media platforms.

Schools and universities are moving on to adapt to change and offer an improved learning experience. They have understood that they can use technology to personalize their curriculum and offer a more blended learning style to take advantage of those personalized curricula.

Education IT and non-IT executives will be looking for student analytics suppliers that can help them understand the business value as well as the regulatory compliance and privacy risks of more granular personalization curricula, and for learning management system providers that can help teachers use the new style of learning while they coach students to experiment, criticize, filter, organize, reuse, produce knowledge and solve problems.

Educational institutions in Europe are continuing their journey toward blended learning environments, where technology can help mix traditional ways of delivering content with far more interactive styles.

One example is the flipped classroom. In this model, students learn about the most important theoretical concepts through multimedia, with teachers guiding them through practical activities in the classroom. Developing countries, such as the Gulf States, are demonstrating a greater craving to experiment with new models compared to Europe, where more ingrained practices are making cultural change difficult. For instance, Sultan Qaboos University, in Oman, piloted flipped classrooms by enabling students to access the institution's learning management system through mobile devices. Primary and secondary schools are also moving along a similar path due to the strong penetration of mobile devices among younger pupils, although teachers still have a strong-active role.

Data about students, classrooms, courses, teachers, and so forth will increasingly be centre stage to make student recruitment more effective and ensure learning paths customized with higher retention and success. To support the transformation of learning and student administration processes, schools and universities in Western Europe are investing in several solution areas.

A new technological paradigm

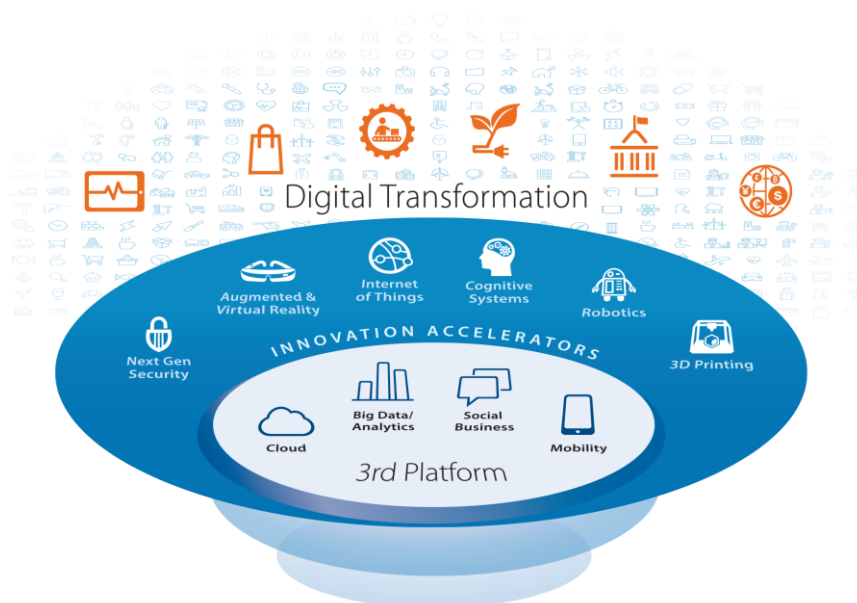
The Information Technology industry has faced a paradigm shift at intervals of 20 years. In the first phase of IT industry development - centralized systems based on mainframe systems and terminals - these technologies supported only a few million users and were only available to a few thousand applications. In a second phase of development of IT industry - with the emergence of personal computers, local area networks and client/server architectures - these technologies have come to support hundreds of millions of users and witnessed the proliferation of tens of thousands of applications worldwide.

Actually, the emergence of the 3rd Platform IT - supported by mobile technologies, social applications, Big Data and business analytics solutions, and by cloud computing services - will be the engine of growth and innovation of the IT industry in the next 20 years and will significantly change the way organizations worldwide provide IT services to their users. In this new context, IT must be able to support billions of users, as well as supporting the emergence of millions of available applications.

To this new reality we can still add billions of other intelligent systems (IoT - Internet of Things) connected to this new infrastructure for communication and information sharing. As result of this new reality, IDC has seen the rapid development of various technologies related to the IoT, such as wearable computing, drones, robotics, 3D printing, cognitive systems, natural interface, etc., that surely will be responsible for transformation opportunities for organizations worldwide. IDC calls that new paradigm Smart Economics and it will have a profound impact on most industries. Figure 3 summarizes this new reality.

FIGURE 3

Emergence of a new technological paradigm



Source: IDC 2016

To be able to seize the opportunities of change and create a sustainable innovation environment, it's necessary that organizations proceed to the transformation of IT activities and processes. While technologies related to the 2nd Platform - personal computers, servers, networks - enabled the automation of business processes, streamlined operations and boosted employees productivity, 3rd Platform value proposition will enable the creation of new products and services and customer experiences.

IDC predicts that by 2020 most of economic sectors will be led by organizations with a strong presence in digital economy. Presently, we see organizations from different sectors initiate transformation processes that incorporate digital strategies in order to:

- Create a better consumer experience for their customers.
- Increase operational efficiency.
- Innovate their business models.

From IDC's perspective, in addition to growing competition from organizations leading the digital transformation, they face the following global challenges:

- Gather and analyse more information for customers.
- Increase employee productivity.
- Develop better forecasts in various business areas in order to reduce the decision making cycle and make more assertive decisions.
- Increase the efficiency of internal and external business processes.
- Identify and exploit new business models.

Leading digital transformation in schools

Inspired by the *e-escolinhas* project's success in Portugal, jp.ik strategy focused on emerging economies where the lack of educational and technological resources is much higher. For this purpose and recognizing that Education is a critical factor for the development of these economies, the business model developed by jp.ik included the development of educational programs, together with local governmental entities, that enable people's access to personal computers with Internet connection, contributing to the reduction of the "digital breach".

In many cases, the business model includes the creation of value through the development of educational equipment production units or the creation of services that could assist in transforming the role of teachers in the educational process (see case studies chapter).

Gradually, and with the growth of business globally, jp.ik's strategy begins to reflect the importance of IT in the transformation of the educational process, including the introduction of new learning models, based on the greater autonomy of students, the teacher's role transformation and the creation of a faster learning model. To this end, the dematerialization of educational contents is crucial, both in terms of educational textbooks, as at the level of school support.

In that context, the current strategy of jp.ik is focused on developing a set of support services for governments in the transformation of the educational process, as well as the development of innovative solutions - such as the recent announcement of "Popup" schools - which can be assembled in just four days and fully equipped with student and teacher devices, projectors and web connection - enabling them to maintain their leadership in the Education sector.

jp.ik's strategy also includes a differentiated approach to emerging countries and developed economies. While in the first case, jp.ik's strategy includes the development of educational solutions that can be applied in different countries, in more developed economies the strategy favours the development of educational products adapted to these markets and the creation of a network of local partners with expertise in this area. Presently, jp.ik develops educational projects in over 130 countries, with an active presence in more than 50 of them.

COMPANY OVERVIEW

JP Sá Couto and the spark of opportunity

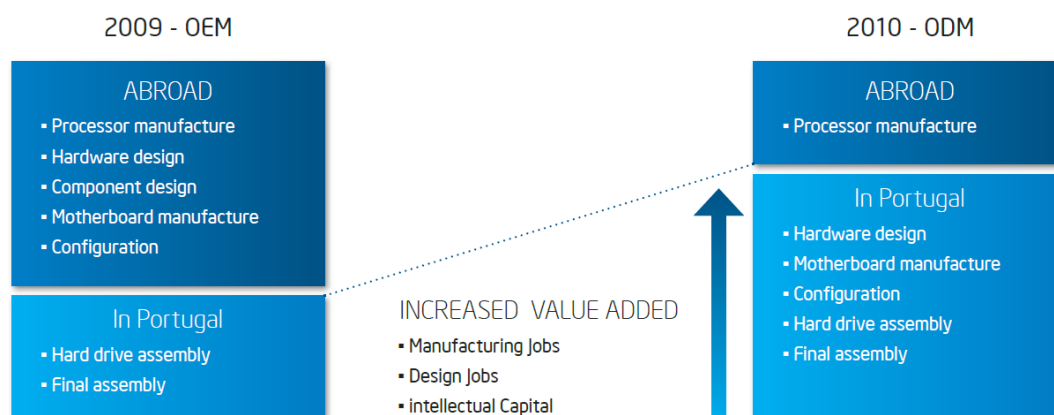
Long before the company took on its international presence as jp.ik, JP Sá Couto was a small PC manufacturer and Intel reseller located in Matosinhos (Oporto), Portugal. Established in 1989 with a focus on technical support services, the company launched its TSUNAMI brand of desktop computers in 1994, and that brand released laptops in 2002. While those product lines were recognized for innovation and quality, their reach was mostly limited to domestic distribution in Portugal. All that changed in 2008, when the Portuguese government's Ministries of Education and Technology began working with Intel on what would become the *e-escolinhas* project (best known by "Magalhães" project - see case studies for further information about this initiative).

Portugal's project for deploying technology in schools had an enormous scope. In addition to including every primary-school student in the country, the project met challenges that range from modernizing national communications infrastructures to providing locally relevant digital Education content. In keeping up with Intel's general philosophy for educational projects such as this one, the content, software and services associated with Magalhães computer were sourced through local Portuguese companies.

The architects of the Education modernization plan in Portugal selected JP Sá Couto as the project's PC provider. The truly transformative aspect of grabbing this opportunity was that the company evolved from its identity as an original equipment manufacturer (OEM) to become Europe's first original design manufacturer (ODM), as depicted in Figure 4.

FIGURE 4

The transition from original equipment manufacturer (OEM) to original design manufacturer (ODM)



The company's transition to become an ODM increased its share of the overall profit associated with each system by bringing the following sets of tasks into JP Sá Couto's sphere of operations:

- Hardware and component design.
- Motherboard manufacture.
- Configuration.

The increased value controlled by the company as a result of this transition expanded operations to include manufacturing and design roles. This expanded identity set the stage for the global growth that followed.

JP Sá Couto becomes an international player and evolves into JP – Inspiring Knowledge (currently jp.ik)

In the four short years from 2008 to 2012, JP Sá Couto has grown its small manufacturing operation to ship a total of more than four million educational devices globally, with presence in five continents. jp.ik's success has benefited Portugal's economy, expanding its operations since beginning its involvement with the *e-escolinhas* project. The company nearly doubled its staff from 2008 to 2012 and modernized its facilities.

A force for positive change in the Portuguese economy

Presently, jp.ik employs 225 people who work on the development of Education solutions that deliver social, cultural and economic value. The company designs its own systems (in keeping with Intel reference design guidelines), takes delivery of components from its suppliers and then builds the end product according to branding requirements that originate from its customers all over the world.

Key statistics of their achievements include the following:

- Nine million student devices distributed worldwide.
- More than nine million students with access to educational netbooks.
- 10 000 educators trained to teach with information and communication technologies.
- 10 000 schools working with educational projects.

In addition, jp.ik has streamlined the supply chain even further through contracts with downstream OEMs throughout the world. In these scenarios, jp.ik designs systems for end-customers, and the components may ship directly from the suppliers to local OEMs anywhere in the world before final delivery, where they will be distributed for use in Education projects. jp.ik's relationship with Intel continues to be immensely valuable, as Intel conducts matchmaking between global and local partners to build these worldwide relationships.

jp.ik has become a worldwide provider for ICT in Education

Since 2008, jp.ik has been responsible for 20 educational projects worldwide, including some that are regarded as large-scale Intel Education Solutions deployments at national level:

- [2007-2011]: Portugal - e-escolinhas/Magellan Project: Deployment of 753.000 student devices and 16.000 teacher devices; 160.000 classroom and 3.400 schools impacted.
- [2009-now]: Venezuela - Canaima Project: Deployment of 3 million student devices.
- [2011-now]: Uruguay - Ceibal Plan: jp.ik was responsible for the first deployment of CMPCs in the country. Near 2010 devices deployed to date.
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- [2009-now]: Argentina - Conectar Igualdad: More than 1.348.000 devices delivered through international partners and for different projects inside the Conectar Igualdad Program.

To expand its total addressable market segment, jp.ik has grown into additional product areas, including devices specifically designed for teachers. In addition to increasing sales volume, Intel has pre-validated these products, built to meet the specific needs of teachers and align with the student systems, to be used with best-in-class educational software. Access to the same alliance ecosystem as the rest of the interactive learning solution and content adds to this additional product line's value to jp.ik, its OEM partners, and its end customers.

"Today, jp.ik is recognized worldwide as an undeniable reference in the field of information technologies dedicated to education, not only for its innovating products, but also for its creativity in searching for new educational solutions that meet the needs of each country."

Jorge Sá Couto, Chairman of jp.ik

jp.ik PRODUCTS

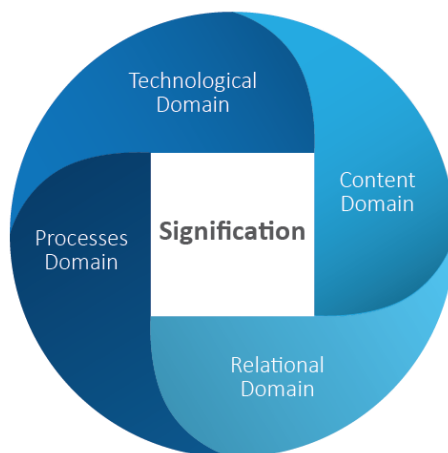
The offer for the educational market presents a new structure oriented to the market and to a certain customer typology. The three business lines - Original Equipment Manufacturer (OEM), Small and Medium Business (SMB) and Public Sector - provide differentiated offerings to the level of equipment, engineering and software services as well as the renewed Teacher Training Services.

The OEM business line will rely mainly on the supply of differentiating devices to the context of the digital classroom, as well as "tailor-made" offers of software image development. The focus on SMB channel will be supported by exclusive partners in distribution and technical assistance, to ensure a high level of services to our customer integrators of technology solutions. They will have a closed devices offer to students and teachers as well as training opportunities for teachers and educators.

The level of supply to the Public Sector - intended for central governments and large educational projects integrators - will feature a wide range of devices for the classroom, allowing the creation of specific offers for each project and / or client.

Pedagogical Training Services (Professional Development Services) will have a broader range of formations (from technological emersion to pedagogic innovation and transformation) following the IK-model framework for meaningful use of Education technology in the classroom, in face-to-face blended learning and e-learning formats, complete with consulting services to governments and ministries (figure 5). To support major projects and equip countries and regions in response to sustainability in medium term, we've revamped the offering of industrial engineering for the construction of industrial device assembly plants, service centres and on-going site support.

FIGURE 5



jp.ik model framework

Finally, and available in all three business lines, we have a renewed offer of Popup School, appearing now as a turnkey solution, with technology and furnishings designed specifically for the school.

jp.ik also transitioned the branding of its ICT devices to new products for educational projects and SMB business (as shown in figure 6) with different form factors (e.g., clamshell, 2-in-1, tablet, convertible), sizes (e.g., 7", 8", 10", etc.), operating systems (e.g., Windows, Android, Chrome OS, Linux), to fit different school levels and project's maturity. The success of these devices in their market segment draws from jp.ik's continuing affiliation with Intel and are all based on reference designs developed by Intel.

Nowadays, jp.ik offers comprehensive solutions for classrooms, schools and ministries, including hardware, software, content, classroom tools, infrastructure, network and security products, as well as integrated solutions like Popup Classroom, Popup School and Professional Development Services (e.g., IK-Learning Program).

jp.ik has a Research and Development Department skilled in product development, product management and pedagogy, responsible for the definition of best products, solutions and project architectures that fit educational and socio-politic needs.

This department is responsible for engineering research, design and development activities related with product development and also with active procurement of new products available in the market that could be incorporated in jp.ik products' portfolio after a process of evaluation.

The capacity of jp.ik product design for Education devices is recognized internationally, enabling the use of adequate ICT devices for students' class work or projects, which promote the skills that students need for academic success and also on the job market.

In product development workflow, pedagogical factors are very relevant and the pedagogy specialists that are part of the Product and Solutions Department participate in product evaluation, projects design, proof-of-concept projects and teacher training, in order to adopt the best practices for ICT usage in Education.

The goal to empower people through learning is carried out with jp.ik's Pedagogical expertise, extensive research and development of innovative pedagogical strategies that benefit from the use of digital learning tools. In order to reach that goal the Pedagogical Team has the main responsibility to:

- Study and develop methodologies for a meaningful ICT integration in educational systems
- Foster ICT use in several educational ecosystems through:
 - Real context assessments that enable the production of evidences on gains.
 - Meaningful projects planning that cover clients' needs.
 - Devoted and systematic jp.ik pedagogical presentations to strategic stakeholders.
- Test and evaluate the accuracy of several educational tools that may integrate jp.ik stack considering the paramount importance of an educational vision.
- Conceive, prepare and implement training courses aligned with the particular learning challenges that stakeholders and beneficiaries are facing.
- Ensure technological innovation by challenging pedagogy in critical contexts of decision.

FIGURE 6

jp.ik inspiring products



Source: jp.ik, 2016

Industrial engineering Services

Industrial solutions geared towards Education and communities' development

jp.ik's Engineering Services encompass various areas of action, striving for a holistic approach to projects and aiming for the creation of an industrial technological cluster. Our final goal is to settle the stepping stone towards an initiative that will lead to job creation opportunities and bring social development and economic growth to a community and, ultimately, to a whole nation.

Specialized and experienced teams are equipped to implement a wide variety of Industrial Projects, ranging from the adaptation of an assembly line to full Industrial Units and After Sales Centres, providing several professional services that can be adapted according to the customer needs.

These projects aim to cover the full cycle, reaching all the industrial processes, civil engineering, technical training and manufacturing work. Regarding After Sales Services, jp.ik can provide assistance for Repair Centers' implementation, allowing the customers to close the cycle and assuring a long-term approach according to the market's needs. For continuous assistance and knowledge transfer, Project Management, Consultancy, Training and Local Support, within the manufacturing or repair facilities are included.

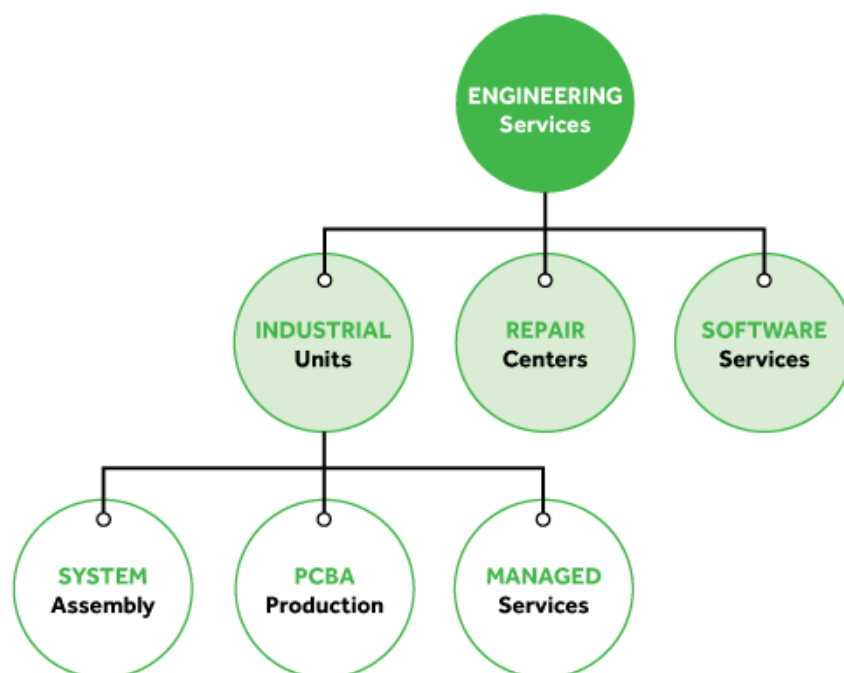
Following well-known methodologies and business practices, drawn from vast experience implementing educational projects worldwide, jp.ik's Engineering Services can be customized according to each customer's needs, while respecting local practices and culture. A long-term approach aims to prepare and empower a local working force, promoting ownership and skills' development in an Educational and ICT market context.

jp.ik's portfolio of industrial services encompasses various areas of action, striving for a holistic approach to projects that will lead to job creation opportunities. These services are segmented according to the area of action allowing a specific - and if necessary - tailored approach.

The Engineering Services include the set up and continuity of industrial type projects, ranging from the implementation of an assembly unit line to a full industrial unit. These services are segmented according to specific scopes of action, like is shown on figure 7.

FIGURE 7

jp.ik industrial services portfolio



Source: jp.ik, 2016

Industrial Units services

- **System Assembly SKD**

The first step towards the creation of an Educational IT Cluster. This refers to the transformation of an existing facility in an industrial building, in order to accommodate the assembly and manufacturing of equipment. The local people benefit from the job creation, promoting a sustainable development in the surrounding communities.

These services can be implemented in scenarios where the client already has - or wants to set up - a final assembly line (in SKD – Semi Knock Down). Targeting all manufacturing, logistic and management areas, these services assure adequacy of the entire production and maintenance process. Additionally, a technical and operational approach is also provided, ensuring that the customer will have all the required expertise in the manufacturing process.

- **PCBA Production CKD/SMT**

An integrated solution for a full industrial unit. The production line layout refers to the physical alignment of all of its components - machinery, equipment, and storage - inside the Assembly Plant to create an optimized workflow at the lowest cost possible.

These services can be implemented in scenarios where the client already has - or wants to set up - a CKD – Complete Knock Down or SMT – Surface Mounted Technology line. jp.ik helps to define all the manufacturing, logistic and maintenance processes, allowing the customer to be

autonomous in every stage of the way. A high component of local technical support is also available to ensure that the knowledge is properly applied.

- **Managed Services**

We offer continuous support during the whole process. The managed services include mainly Advisory Services, Consultancy, Training and Support at an Industrial Engineering and Technical level. This knowledge transfer is key to the success and sustainability of a project by providing local people the information and skills they need to carry on the project themselves.

These services can be executed when the client needs support managing various components related to the implementation of industrial projects.

Repair Centers services

Assure the best after-sales service to you educational projects while developing new streamlines of value to the industrial cluster. Besides creating job opportunities, repair centers contribute to prolong the lifespan of devices and promote a responsible consumption, saving money and reducing waste.

These services include local consultancy, with an initial diagnose of the current conditions and processes, subsequent advisory work and local technical support.

Software Services

Custom-built and custom-designed operative system images to add value to each device. Includes a specific set of applications and resources for Education, giving students and teachers all the tools they need for an innovative and inspiring classroom experience.

These services range from installation of Operating Systems, updates and additional software, to testing and validation of the final image that will later be applied in the manufacturing process.

BUSINESS VALUE

An Education Solution Provider (ESP) is the key for sustainable projects

A recognized Education Solution Provider (ESP) has the expertise to anticipate and solve challenges while bringing together all necessary components and core stakeholders. In order to deploy successful implementations, jp.ik provides integrated solutions for governments and Decision Makers that are willing to transform Education.

From our several projects deployed worldwide in this past 9 years, with different cultures, politics, religions and local challenges, we realized that Education transformation requires different competences like engineering, pedagogy, training, device development, manufacturing and after sales services. Only companies that understand this ecosystem are able to present impacting, transforming and sustainable projects in Education that can help governments move forward and consistently in this area. With this mix it is possible to address needs such as STEM, SDG's and other prominent trends and priorities in Education that create impact in society, economy and also politics.

With this scope and commitment in mind jp.ik presents an integrated portfolio of technology, services (both pedagogy, consultancy and training) and engineering combined that allow us to present ourselves as an Education Solution Provider, directly or working with our partner's ecosystem.

Stimulating Opportunities for Local Partners

jp.ik continues to drive advances in ICT for Education, with new large-scale projects every year. Nationwide educational projects require strong involvement from a wide variety of partners from areas such as hardware, software and services. Since the beginning, jp.ik understood that the success in Education projects depends on the commitment alongside with partners, trusting them to help the company deliver its projects - and also to support them in the future. From this line of view, jp.ik created the “glocal” approach, acting as an Education Solution Provider, counting on local partners to deliver, integrate, train and support educational projects, transferring knowledge to the ecosystem and to the countries that trust jp.ik with their projects.

That strategy creates dramatic opportunities for companies - large and small - that operate in areas such as:

- Device OEMs.
- Hardware and software resellers and distributors.
- Providers of telecommunications and networking services, equipment and infrastructure.
- Educational content providers.
- Training/professional development providers.
- IT integration and support organizations.
- Educational software and application developers.

While not every local partner can expect to achieve the scale of success reached by jp.ik, solutions forged among more than 500 member companies of the alliance deliver locally relevant and integrated solutions to classrooms worldwide.

Through this alliance, jp.ik helps partners of hardware, software and services to connect with other companies, as well as with project decision makers during the planning stages of major ICT implementations for Education.

CASE STUDIES

Bolivia: Quipus Project

A Sustainable Education Project

The refurbishment of an old factory, the construction of a new one, technical training and consultancy. 200.000 student devices have deployed to date.

“The Bolivian project constitutes a proof-of-concept of the turnkey solutions developed by jp.ik, in order to help nations invest in Education. Other countries should look at Bolivia as an example.”

Jorge Sá Couto, Chairman of jp.ik

Just a few years ago, it was hard to believe that Bolivia would ever be able to build a project that would revolutionize the country's Education, Productive Development and Technological Readiness. But they made it. Bolivia is now an excellence model in the implementation of a technological project, which started with educational purposes and became a provider of wider scope solutions to the country.

jp.ik is a key stakeholder in this project. Its knowledge transfer fuels a continuous initiative that is delivering the best outcome for people, communities and Bolivia as a whole, promoting long-term competitiveness and sustainability.

In 2010, Bolivia started investing in an Education Revolution, with a set of goals that would end up fusing with an ambitious plan of the country's industrialization - released in 2012 by the Ministry of Education along with the Ministry of Productive Development and Plural Economy. One of the main purposes of this plan was the ICT integration in the Education system of a country where only 24% of households had access to a computer.

With the support of jp.ik, in 2013, the government created Quipus, a public company dedicated to the implementation of a technological education project: in Bolivia and for Bolivia. In less than one year, the very first assembly plant of the country had already produced 150 000 student devices, delivered to each high school finalist. Quipus is now diversifying its product offer, aiming to cover more school years and reaching other key sectors like Health and Telecommunications.

It all started with an Education Revolution, but now, Bolivia is living a technological revolution. A new future is about to arrive.

A success story

Envisioning Bolivia as a unique scenario, jp.ik faced this challenge, its context, the local culture and history, considering commitments and hopes at all levels, from government to educators, from students to their families and the community as a whole.

The engagement of the Bolivian people and the collaboration between the different stakeholders established the success formula for the sustainability of this project.

The refurbishment of an old textile factory gave birth to the first assembly plant in Bolivia. Texturbol was managed by Quipus with the consultancy of jp.ik, and in only a few months it produced 150 000 student devices. At full capacity, Texturbol had the ability to run three shifts of 60 people each. These shifts comprehend production but also quality control, logistics and administrative services.

Technical qualification was a key step for the implementation of Texturbol as a highly productive plant: jp.ik performed an intensive process of knowledge transfer in order to ensure effectiveness and efficiency.

The Kallutaca plant is the final assembly plant of the project, accommodating up to 800 workers in just one shift. This plant will have a more complex and diversified production process, with capability to produce Wi-Fi boards, motherboards and RAM memories.

Quipus may be a brand new company, but in a short period of time it gained ground in delivering meaningful technological solutions. The company name itself is full of meaning: "Quipus" was an ancient technology created and used by the Aymara people for accounting purposes and mnemonics records. The main goal was to bring the invaluable ancient culture to the new technologies field, reinforcing the country's attachment to its history. With support from the Ministry of Productive Development and Plural Economy, the 60 people working at Quipus have built a responsible and committed company that works proudly for the Bolivian People.

The future will bring the diversification of its product offer, not only covering more school years but also reaching the general public. These new solutions will be made available at a very affordable price, including, for example, servers and digital TV decoders.

"Technology produced in Bolivia, with our own hands"

Camilo Morales, vice Minister of Productive Development and Plural Economy

El Alto, the regional department where both plants are based, was the first to receive a massive handover ceremony of student devices, making the delight of 15 000 high school finalists. Pando was the latest regional department to receive such an event. The President Evo Morales attended all ceremonies celebrated in the nine Bolivian departments. These events marked the start of a dream come true: making education in Bolivia accessible to all.

All deadlines count

It was not an easy task, but in the first months of activity Quipus produced and delivered 150 000 student devices all over the country. Meeting the deadlines required big efforts from all the dynamic groups involved, starting with production and ending with the delivery team. Both Quipus and the Ministries consider that complying with the established production and delivery times was one of the main targets achieved by the project so far.

“The creation of Quipus proved that Bolivians are resilient people, and made them believe in the possibility to set more distant goals”

Ana Teresa Morales, Former Minister of Productive Development and Plural Economy

The introduction of technology in the classrooms of high school senior year is changing the daily life of students and teachers. The impact is even higher in regions where most people – whether youngsters or adults - have never used a computer.

And self-confidence. With a full set of new technological tools, the school community is living a double phenomenon: teachers are empowered to be more creative and go further in their classes, and students gain a new vision for their future, feeling entirely prepared to continue studies and succeed in their own country.

Quipus has been working with the Ministry of Education and software developers in order to focus more on the educational content specifically developed for each school year. At the moment, there is an eBook platform with more the 2 000 books and over 40 educational apps available that can be accessed from each student device. This investment will take the technology integration in the classroom to a whole new level.

“International entities recognize Bolivia as the state that has invested the most in Education”

Evo Morales, President of Bolivia

One of the main reasons for the success of this project was the dynamic collaboration - from the beginning - between the Ministry of Education and the Ministry of Productive Development and Plural Economy, along with the key stakeholders like jp.ik, which has always supported the process in loco.

Inspiring knowledge in Bolivia

The knowledge transfer is one of the main assets of jp.ik when helping nations like Bolivia design and implement their own technological project for Education. From Industrial Engineering to Asset Management, and from Building of Infrastructures to Pedagogic Training, jp.ik played a key role in the implementation of such a project over time, covering all stages. jp.ik's team believes in the importance of collaborative work, sharing what we know best with countries that are full of potential and willing to make a change in their people's lives.

Education is the best way.

"The Bolivian project constitutes a proof-of-concept of the turnkey solutions developed by jp.ik, in order to help nations invest in Education. Other countries should look at Bolivia as an example."

Jorge Sá Couto, Chairman of jp.ik

Angola: Meu Kamba Project

Over 100 Angolan teachers trained by jp.ik. 150 digital classroom equipped with 10.000 student laptops. Large-scale pedagogic and technical training programme addressed to local teachers. 102 education agents were already trained and until the end of 2016, the programme will reach a total of 600 educators.

"A country can only be developed following the evolution of Science and Technology. And there are many projects in the Ministry of Education involving the Information and Communication Technologies. Any educational project should always go through basic training and 'Meu Kamba' could not be otherwise" said Maria Julieta Octavio, Project Coordinator of "Meu Kamba", Head of Department of Secondary Education and Research Officer of the National Research Institute and Development of Education (INIDE) - Ministry of Education of Angola.

Under the Angolan Ministry of Education project "Meu Kamba", jp.ik just trained more than 100 teachers for technology integration in teaching practices. A total of 600 trained primary school teachers. Launched in 2014 by the Angola Education minister, Pinda Simão, "Meu Kamba" (meaning "My Friend") is the technology program that marks a turning point in the Angolan Education system. In order to promote integration and access to new technologies from primary school, the "Meu Kamba" program has teacher training as one of its main lines of action.

The teacher training promoted by jp.ik, in partnership with a team of Portuguese trainers called *Bulldog*, is designed to prepare teachers for meaningful use of technology in the classroom, promoting innovation in teaching practices, motivation and greater involvement of students.

"Preparing teachers for the significant use of new technologies and their integration into the school curriculum is the key to success of a technology-based educational project", says Jorge Sá Couto, Chairman of jp.ik. "With a Primary Education that goes from 1st to 6th grade, where each teacher has to cross different disciplines, mastering technological tools is essential as the teaching community is the innovation engine of the Angolan Education System."

In this first phase, monitored by the Ministry of Education of Angola, the training was intended for 102 teachers of Luanda province. However, and following the implementation of digital classrooms in 150 schools in 18 provinces, it is planned to train a total of 600 teaching staff.

Uruguay: Ibirapitá Plan

jp.ik provides technological project for the retired people. 15.000 tablets with dedicated software delivered to elderly people, under a Government's plan to promote digital access across advanced age groups. In 2020, this number may reach 400,000.

"Equal access to knowledge through new technologies has to be promoted beyond formal Education. We are proud to see jp.ik's solutions reach beneficiaries representing lifelong learning" says Jorge Sá Couto, Chairman of jp.ik.

Defined as a primary project by the Executive Branch of Uruguay, the Ibirapitá Plan aims to promote digital inclusion, providing seniors with the opportunity to enjoy the benefits arising from the use of ICT. Over the next five years, the Ibirapitá Plan will deliver 350 000 tablets to Uruguayan pensioners with low incomes, in order to promote social inclusion and equal access to knowledge through new technologies. jp.ik is the major technology provider of this governmental project.

After the proven success of Ceibal Plan (Uruguay's nationwide Education program), the Government of Uruguay is now investing in its extension to retired citizens with the Ibirapitá Plan.

This technological program aims to deliver tablets produced by jp.ik, with a specially developed interface for the elderly population, also including preloaded content from various fields of interest. In addition to device, the Ibirapitá Plan offers its recipients the Internet connection in their homes and a technologic training course, totally free of charge.

"This plan is a new experience for the country, being part of the National Care System. We want Uruguay to continue its development, and that all Uruguayans can access technology" says Ernesto Murro, Minister of Labour and Social Security.

The start of the project was marked by the delivery of the 1 000 tablets. This first group was a pilot for testing and monitoring the various steps and services envisioned by the program. During 2015, it provided the delivery of 30 000 tablets; a number that may grow to 350 000 in 2020. At an early stage and via registration, only pensioners with a monthly income lower than 24 400 pesos are covered by the program. However, the Uruguayan Government aims to extend the scope of the project with the inclusion of new forms of access. In Uruguay, in 2007, only one in ten households had access to a computer. Today, as the result of government technology initiatives like the educational project Ceibal Plan, eight out of ten Uruguayans households gained access to IT platforms.

Portugal: e-escolinhas Project

Deployment of 753.000 student devices and 16.000 teacher devices, 160.000 classrooms and 3.400 schools impacted.

When Portugal's *e-escolinhas* project (also known as "Magalhães" project) deployed more than 700 000 laptops to students all over the country, jp.ik grew from its roots as a small local reseller to become a global technology provider.

Supported by Portuguese mobile telecom operators, the Portuguese Government launched its National Technology Plan for Education in 2007, with the overarching goal to build a knowledge-based society and modernize education by increasing the use of computers and access to the internet, and thus help Portugal become one of the five most advanced European countries.

The "Magalhães" project was part of this governmental initiative focused on developing a global technology plan to capacitate the country in terms of broadband connectivity, access to basic IT literacy to all population, and access to computers regarding different layers of needs: small businesses, business workers, teachers and university students. Modernizing governmental institutions through dematerialization and e-government services implementation was also of the main goals of this Technology Plan.

Through the *e-escolinhas* initiative, jp.ik produced more than 700 000 educational devices and delivered them to primary school students (ages 6–11) all over the country. With a particular challenge of handling high volume deliveries, with different packaging components, different ordering and fulfilment handling, this was a unique experience for large-project rollout deployments.

In addition to including every primary-school student in the country, the project has met challenges that ranged from modernizing the national communications infrastructure to providing locally relevant digital education content.

Thanks to the transforming National Technology Plan for Education, which has given students the access to modern technology, as well as the training and support they needed to acquire 21st century skills, a sustainable business model has arised, creating jobs and improving the country's competitiveness.

CHALLENGES AND OPPORTUNITIES

jp.ik's strategy for the next years is based on winning new business in emerging and promising markets like Africa and Middle East, sustained by the extensive experience in implementing educational projects of technological base.

In well-known markets such as Latin America, the focus will be on creating new business channels to support the growing demand for solutions to the private sector, *After School* and local government. This same strategy will also be applied in the Middle East, while jp.ik builds a solid presence in that market looking for large-scale educational projects.

Europe, for its maturity in the use of technologies merit a more structured approach focusing on channel supply and retail of branded devices to the Western countries and on the demand for larger projects in the north, east and Russia CIS.

On supply, emphasize the strong investment in engineering, software and teacher training - as a result of several years of international experience.

In order to present a consistent answer to the pressing challenge of continuity in educational projects, jp.ik has now a consistent portfolio in the design and construction of CKD and SKD industrial assembly units. jp.ik also has the ability to implement Service Support Centres, enabling to maintain high levels of customer satisfaction with effective after-sales services. With this offer - enhanced with complementary engineering, consulting and advisory services - the company targets countries that understand the value of a mid/ long-term sustainable projects and want to grasp the creation of Educational IT clusters in their countries, which also work as hubs for training and knowledge sharing between schools, academy and communities, while allowing the stimulation and creation of technology cluster with qualified human capital.

The investment in developing software platforms and applications for Education, either at the level of classroom dynamics and interactive educational applications, is also a key strategy. jp.ik highlights the focus on short-term applications for management and decision support to the school management, exploring the valuable data produced by the use of classroom applications and marking a first step in the field of analytical tools and decision support.

jp.ik's Teacher Training services have been also reviewed into a modular offer designed for gradual and multidisciplinary training of teachers as key elements in the successful implementation of educational projects of technological base. The IK-model, designed by jp.ik and inspired by the United Nations' models allows customers to have a though and work basis to define their Education plans, keeping their roots and cultural identities. Presenting the value of a qualified teacher working class will represent one of our biggest challenges in developing countries, trusting decision makers will understand its value when looking at experiences in other countries.

All dynamics line up towards a global growth strategy, with an offer of strong social, educational and economic impacts for communities and regions in which it operates.

FUTURE OUTLOOK

3rd Platform Transformation in Education

As we have seen, 3rd Platform technologies — such as cloud computing, social media, mobile, and Big Data — are offering more mature countries the opportunity to become more effective and efficient in teaching, school administration and academic research. 3rd Platform technologies are also offering emerging countries the opportunity to leap forward. For example, mobile learning is opening up new opportunities to close the literacy gap and offering specialized vocational training courses in some rural areas.

These technologies are changing how students go through their educational paths — from Primary school to Tertiary Education. Students have the ability to access content while on the move, using devices provided by schools and universities or their own devices. They can collaborate with peers and teachers by leveraging collaboration tools provided by educational institutions, as well as consumer social media. Schools, universities and colleges can also personalize curricula by applying advanced analytics to identify students' strengths and weaknesses. Educational institutions can provide more flexible and scalable access to content and administrative resources through cloud computing.





- **3rd Platform (Cloud, Big Data/Analytics, Mobile, Social) shifts:** drive transformation and change in Education as it happens with other industries. It is not just a single technology that is driving change but rather a matrix.
 - Smart campus, smart buildings, smart cities, student welfare and transportation all use sensors and connected things.
 - How schools engage with students such as personalized learning, anywhere/anytime, location, etc.
 - The speed by which services are delivered: immediate access to information rather than using libraries and textbooks. Finding information is much easier and immediate and is changing how educators respond to enquiries.
 - Schools' resiliency to change and adapt academic study to suit specific needs while maintaining core specific purpose.
 - Reliability of school operations: the need to be up and running, and security now underpin everything we do.
- **The ubiquity of technology and enabling new teaching models:** the education ICT strategies are not about how many devices will be in this year's budget. Instead, the focus needs to be on enabling collaboration, engagement, pedagogy and increasing stakeholder accessibility/transparency. Good teaching is still about pedagogy, not tools, and as such educators should lead with pedagogy and accelerate with technology. Teachers themselves need to learn how to fill the knowledge gaps. Often this will involve flipping the learning model and learning from the students. *"Kids teach me stuff all the time"* was a common theme throughout the roundtable.
- **Personalized/blended learning:** information communication technologies are not only supporting seamless access to content for students and teachers, but they are also triggering a new model of learning that is more personalized and less tied to supervised classroom-based courses in schools and universities. The combination of Big Data - which will enable to better predict and adapt learning paths to student requirements - and blended learning environments - which offer a more seamless learning experience to students - are opening up new learning scenarios. Teachers and students will be less tied to one physical location and even one institution, and they will be able to pick the best resources for their needs. At the same time, teachers morph from knowledge kings to coaches capable of helping students navigate through content from different sources and in different formats, as well as helping students contribute to the creation of new content through individual and group projects. The focus is now on the needs of each student, which is possible with today's technologies

and achieved through leveraging the vast amount of data in student management, course scheduling, assessment and learning management systems. The blended learning environment also offers seamless access to mobile, virtual, and digital classroom resources but educators need to adjust to the pace and mode of learning for individual students.

- **Immersive Learning:** the Internet, along with learning management systems, social media and mobile has been stepping-stones toward more participatory learning. They drove the student experience toward more collaboration with their peers and teachers and away from the one-dimensional classroom experience where they would just sit and listen. There is now a new wave of technology that promises to make learning even more immersive and enable students to experiment with taking an active role in creating content. Examples of pilots are already emerging where 3D printing, artificial intelligence and virtual reality demonstrate the potential to make an impact on the student (and teacher) experience.
- **New delivery models and the "flipped classroom":** increasingly educators are looking at what has been termed the "flipped classroom" delivery model, which relies heavily on the accessibility of the Internet and the adoption of BYOD (bring-your-own-device) policies. The flipped classroom model involves students accessing external content, often video, outside the classroom to enable richer interaction during the lesson, with the students at the centre of the lesson rather than the teacher.
- **Collaborative Education:** collaboration is an overused word and it does not mean doing more for free. There is a need to be able to share and personalize areas that students want to focus on. Collaboration is now possible across multiple classrooms beyond cultures, institutions and countries. Access to fast Internet enables insight and connection — "always on and connected" is becoming the norm and collaboration will drive the demand for scalable communication infrastructure and solutions, but at the same time it will increase security risks.
- **Efficient delivery:** delivery of education will dissolve previous barriers enabling Education anywhere, anytime, using any device. The challenge now is how to deliver in a cost-effective manner. New Zealand schools are starting to benefit by creating space and time to free up resources for new areas and more time for enriching pedagogy. It is not about parachuting devices into schools - although it can empower change - if the devices are not used, the benefits and opportunity to enrich education processes will be missed.

FIGURE 8

3rd Platform Impact on Education

Drivers of Innovation	 Mobility	 Cloud	 Big Data/ Analytics	 Social Business
Efficient Delivery	Near real-time information gathering	Capex vs Opex: Cost considerations	Faster decision-making	Communities for Collaboration
Personalized Learning	Learning Apps	Longitudinal History	Real-time Assessment	Student Feedback
Collaborative World	All of institution Communication	Anywhere Access	Student Lifecycle Management	Marketing and Promotion

Source: IDC, 2016

Information and Communication Technologies are triggering a new model of learning that is more personalized and less tied to supervised, classroom-based courses in schools and universities. To harness the full power of this new model, IT executives should:

- Take special care of data integration across siloed applications to harness the full power of a 360-degree view of students.
- Collaborate with teachers, legal departments, administrators, commercial providers of learning content and social services. This will be necessary to understand the business value, the regulatory compliance and privacy risks of more granular personalization curricula.
- Empower teachers to leverage new learning styles and collaborate across institutions. Also, help administrators understand the complexity of enrolling, keeping track of students' attendance and achievement, as well as teaching quality across multiple styles and channels of learning.

Information sharing among academic researchers and the demand for constant Internet connectivity on campus for a variety of use cases that span across administration, teaching, learning and recreational are driving educational institutions to modernize and upgrade their communication, collaboration and cooperation capabilities. To cope with those demands, education IT executives should:

- Understand how new communication solutions will require federated identity provisioning, security policy management and remote maintenance across a variety of connections, where IT executives do not directly control the networking equipment.
- Develop their organization competencies as the frontier of ICT management in Education continues to move from "doing IT" to orchestrating and aggregating external providers.
- Understand the continually changing nature of threats. Educate teachers and students to help them comply with simple guidelines.

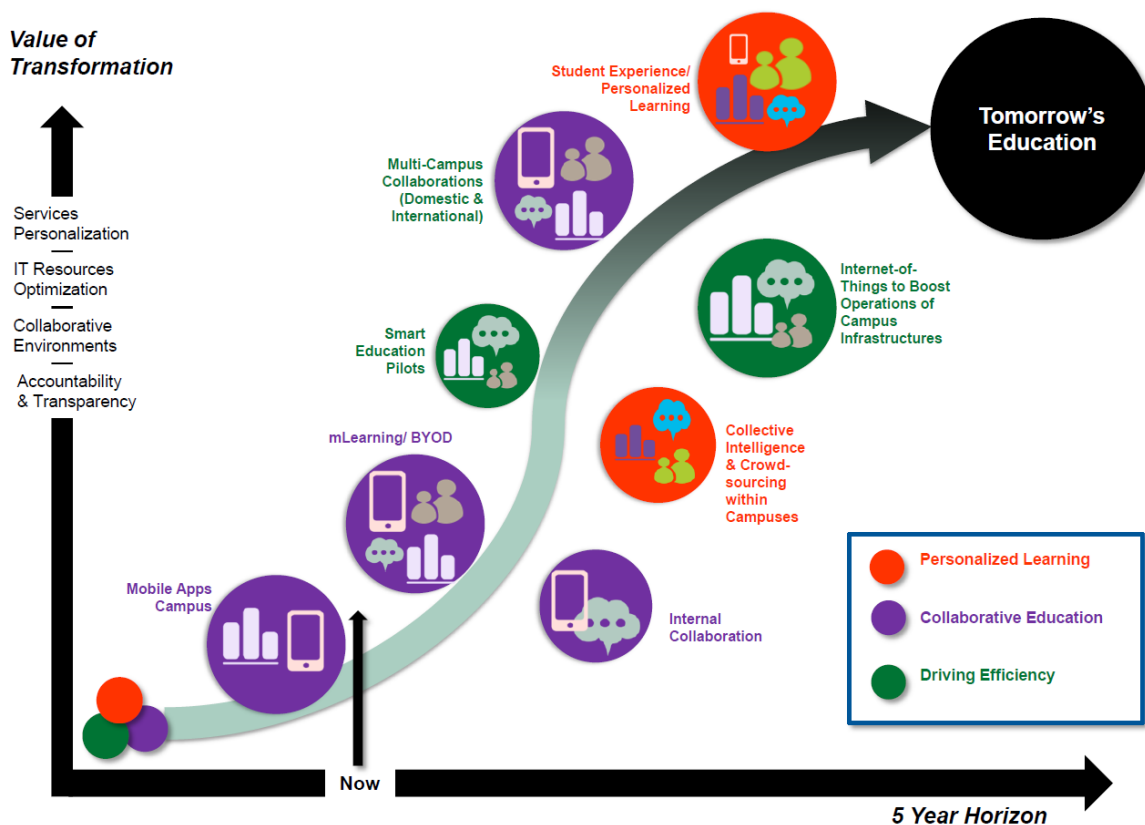
In an environment increasingly characterized by a fragmented architecture and fast-growing demand for IT service, delivery performance and security - driven by students, administrators and teachers

bringing their own devices, apps, and public cloud services to achieve efficiency, performance, agility, and security - IT executives will have to:

- Work with teachers, nonteaching staff and students to understand the priority use cases where the proliferation of mobile devices can be seamlessly and securely integrated with the legacy architecture.
- Build and execute a road map for IT skill development that matches the emerging requirements of hybrid ICT environments.
- Start small with well-identified categories and business solutions to test the benefits of centralized purchasing in terms of cost savings, IT executives' ability to redeploy savings to more innovative IT projects and sustainability of cross-school/university governance arrangements.
- Understand the operating-level agreements among providers to ensure hybrid solutions satisfy their business requirements while retaining flexibility, agility and responsiveness to changing business demands.

FIGURE 9

Tomorrow Education



Source: IDC, 2016