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***Manufacturing 4.0,
the case study of Gaya Gelatolab***

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ABSTRACT

The main objective of this dissertation is to describe and analyse the phenomenon of smart manufacturing, at international and national level. The expression Industry 4.0 and Smart Manufacturing are closely related due to the technologies and actors involved: smart manufacturing involves manufacturer and SME, while Industry 4.0 might involve a wider range of industries. The expression Industry 4.0 belongs to a project in the industrial high-tech development of the German government that promoted the computerization of traditional industries. Its technological foundation consists of cyber-physical systems and the Internet of Things.

This revolution is made possible by the availability of sensors and low-cost wireless connections, associated with an increasingly pervasive use of data and information, computational technologies and data analysis, new materials, components and systems connected and totally digitalized.

Industry 4.0 provides technological solutions for: optimize production processes, support of industrial automation processes, promote economic cooperation between businesses through advanced techniques of distributed planning, integrated management of logistics network and interoperability of information systems.

We will comment the international trends of digitalization through the datas provided by the Global Informational Technology Report, the most significant annual report regarding worldwide digital industry growth. Then there will be a focus on the main case studies located in Italy, describing how and who is carrying out the Digital Manufacturing revolution in our country. Furthermore we will highlight the aspects that make smart manufacturing a significant resource for the Italian economy, thanks to the ability of digital technology to enhance the driver of the SME.

Afterwards we will introduce our main case study, Gaya Gelatolab Srl, an Italian company founded in Italy in 2016 but present in the Asian market since 2008, working in the field of Gastronomy of the Natural Gelato from

Italian tradition. The main technology innovation of Gaya lies in its production system at the center of which there is an exclusive batch freezer: "Principessa", in honor of the Sicilian plateau where the Italian gelato was born. Another innovative point of the "Gaya Gelatolab System" is balancing software recipes that can manage precisely the quantities of the ingredients and the maintenance of the machine. The whole technology of Gaya is online.

We also want to demonstrate how the case study of Gaya Gelatolab is an impressive business model with international purpose in the food franchising sector.

The sources of this dissertation have generally two origins: Firstly, for what concern the case study, the company has provided data and documents regarding company profile, mission and values, governance structure, technical description of "Principessa", sales revenue, employment data. Furthermore, I personally carried out several interviews with Umberto Bastianello, CEO of Gaya Gelatolab and Carlo Catani, Sustainability Expert of the company.

Regarding the theories that introduce the case study, the main sources belong to international reports provided by international consulting companies like Boston Consulting Group, McKinsey Company and two blogs carried out by professional ice cream artisans, Ice Rock Blog and Gelatieri per il Gelato. Then the use of reports has been very important, for what concerns the Italian market I reported the "Italian Culture and Image of Italian Crafts" provided by Confartigianato, and the book "Fare è innovare, il nuovo lavoro artigiano" written by Stefano Micelli. The Global Information Technology Report 2016 and the A.T. Kearney's Global Services Location Index are the main reports I used in chapters 2 and 4, since they provide a survey about where the digital manufacturing is developing mostly. Eventually, I will underline and comment the main data and information collected, in order to explain the innovative business of Gaya Gelatolab Srl.

CHAPTER 1: The fourth manufacturing revolution

1.1 Defining Manufacturing 4.0

We define Manufacturing 4.0 (or Smart Manufacturing) as the next phase in the digitization of the manufacturing sector, driven by four disruptions: the rise in data volumes, computational power, connectivity, especially new low-power wide-area networks; the emergence of analytics and business-intelligence capabilities; new forms of human-machine interaction, such as touch interfaces and augmented-reality systems; improvements in transferring digital instructions to the physical world, such as advanced robotics and 3-D printing. These are the four major disruptive innovations in modern manufacturing, following the lean revolution of the 1970s, the outsourcing phenomenon of the 1990s, and the automation that took off in the 2000s.

Nine drivers are transforming manufacturing production¹:

- **Advanced Manufacturing Solutions:** Autonomous, cooperating industrial robots, Numerous integrated sensors and standardized interfaces.
- **Additive Manufacturing:** 3D printing, particularly for spare parts and prototypes. Decentralized 3D facilities to reduce transport distances and inventory. Production can be tweaked and calibrated in any ways without hurting efficiency. It has already made headlines in plastic manufacturing, especially in the fields of aviation and Medtech.
- **Augmented Reality:** Augmented reality for maintenance, logistics, and all kinds of SOP. Display of supporting information, e.g., through glasses. By displaying supporting information, this technology allows to perform highly complex tasks. More generally, it can be used for training purposes.
- **Simulation:** Simulation of value networks. Optimization based on real-time data from intelligent systems. Simulation is already a widely used for testing and optimization, e.g. for products, materials and production

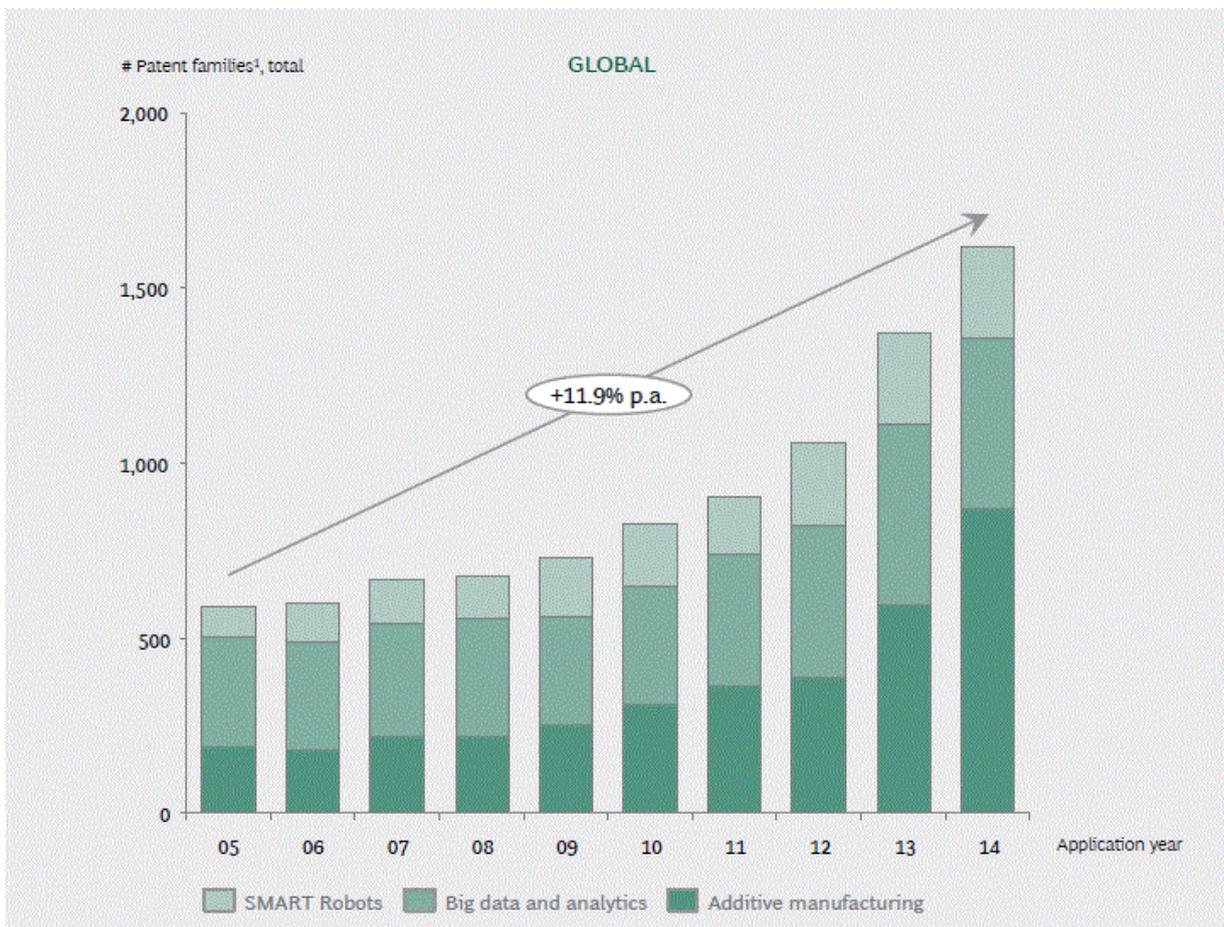
¹ Source: "Winning the Industry 4.0 Race" Report by Boston Consulting Group

processes. It is also used for advanced real time simulation of the physical world in a virtual model. This allows firm to test work processes, e.g. by training maintenance staff through various training simulations.

- **Horizontal/Vertical Integration:** Cross-company data integration based on data transfer standards. Precondition for a fully automated value chain (from supplier to customer, from management to shop floor). Horizontal and vertical integration of the supply chain brings cross company, universal data integration. This is a prerequisite for a fully automatic value chain that extends from suppliers to customers.
- **Industrial Internet:** Network of machines and products. Multidirectional communication between networked objects. The Industrial Internet of Things embodies the spirit of Industry 4.0. This breed of technology is developed in order to link machines, products, processes, and systems together in real time. More devices will be embedded with sensors and computing. This helps to decentralize analytics and decision making, enabling real time responses.
- **Cloud:** Management of huge data volumes in open systems. Real-time communication for production systems. Cloud systems will manage huge volumes of data in open systems, allowing instantaneous communication with production systems. Software can be hosted in the cloud, rather than locally, for easy continuous upgrading and backup.
- **Cyber Security:** Operation in networks and open systems. High level of networking between intelligent machines, products, and systems. Open and integrated networks are vulnerable to malicious attacks. As a result, factories will have to emphasize cyber security in order to protect industrial systems and manufacturing lines.
- **Big data and Analytics:** Full evaluation of available data (e.g., from ERP, SCM, MES, CRM, and machine data). Real-time decision-making support and optimization. Analytics powered by "Big Data" deliver comprehensive evaluations of many available data sources, such as ERP, SCM and CRM systems. This will provide fresh insights and real time decision making support.

Many of these technologies are already in use, therefore research organizations and universities are collecting intellectual property rights in these areas. Regarding this topic the Boston Consulting Group, a US multinational corporation of management consultancy, monitored the worldwide flow over of patent applications for robotics, additive manufacturing, and big data analytics. The result is that all three showed a strong growth, particularly with additive manufacturing.

Patents for industry 4.0 technologies since 2005



Source: Thomson Innovation, BCG Center for Innovation Analytics.

A patent family is a group of related patents. E.g if the inventor files for protection in several countries or if a single invention has multiple patents.

When we talk about 4.0 industry, one of the key features is the shift of the production method, which affects on human resource competencies. The

technologies and robotics replace human labor, with all the consequences that this may entail in terms of employment levels, and changing professional demands. Interest in Industry 4.0 is rising exponentially, for instance the share of Google searches for "Industry 4.0" relative to total searches have shot up in recent years. The benefits expected from this phenomenon are the following:

- **Higher flexibility** given by small batches production, with the economies of scale of mass production.
- **Higher speed** from prototyping to mass production, using innovative technologies.
- **Increased productivity** thanks to lower set-up time and reduced downtimes.
- **Improved quality** and scrap reduction thanks to real time production monitoring through advanced sensors.
- **Higher competitiveness** of products thanks to additional functionalities enabled by Internet Of Things.

In the manufacturing sector there might be a biased perception that technology could change products and their traditional single value. For instance, is there a risk that 3D printing might be a threat comparable to that robotics is for the industry? Here the answers are unambiguous: 3D printing, however, used already for years by manufacturing firms, is more an opportunity than a risk.

Actually it might be a tool that enhances the creativity and entrepreneurship allows to find new business opportunities. For example: thanks to 3D printers, goldsmiths like Bijouets are able to perfect their art and to forge inimitable works or the shoe craftsmen, without moving from their laboratory in Italy, or shoes producers that customize each product for customers thousands of kilometers away, thanks to the foot scanner, which positioned at any store in the world, take the exact measurements of the prospect's foot and transmits, via the internet, to the artisans in Italy who

are so able to realize remote the perfect shoe desired by the customer, tailored as only the artisans know how to do.

The new value chain processes of digital manufacturing, and the digitization of processes, are also a direct reference to the small size, artisan or small industry. Take the case of a trial for a client: you must design, build a mold that has a cost, print, deliver, check with the customer if they achieve the final mold or going to produce. All this process has a certain development time and high costs. With the additive printing, you can make a prototype without going through the intermediate mold, with much shortened time. If you like the product, it sends into series production with the additive printing. This results a great opportunity, which leads to reduce time and costs.

What is for sure to interest manufacturers is process effectiveness. Industry 4.0 offers new tools for smarter energy consumption, greater information storage in products and pallets (so-called intelligent lots), and real-time optimization. For instance Swiss giant ABB, a pioneering technology leader that works closely with utility, industry, transportation and infrastructure, use a computer-based system that mimics the actions of an "ideal" operator, using real-time metrics to adjust kiln feed, fuel flow, and fan-damper position. The company found that the new tools boosted throughput by up to 5 percent.²

² <http://www.abb.com/cawp>

1.2 Craftsmanship today and common biases.

When we think of a craftsman - a carpenter, a potter, a tailor, a goldsmith - our thoughts turn immediately to the hands work, namely manual skill which is the result of a long and constant apprenticeship. The artisan used to work in an intimate space and almost domestic, as a shop that overlooked the town, which usually was a laboratory as well, from stock and store. Inside these laboratories few people used to work with a variety of materials - from wood to metal, from the stone to the wicker, from fabrics to paper mache - performing original or functional objects, often ordered directly by the client based on his specific needs and personal tastes³.

The manual work instead of machines, the workshop or the laboratory instead of the factory and especially the skill, even when it comes to using tools or technologies: all this distinguishes the artisan production from the industrial and confers its characteristic qualities (the creative originality) as well as its inevitable defects (long production times and high costs).

Nowadays next to the traditional figure of the craftsmans, it emerges a new one that uses digital technologies and new tools, and to offer services and visibility to the traditional artisan class that create physical design and craftsmanship. A new production, made by digital craftsmen: the "crafters", the "makers", the "wwworkers", which seems to have finally won the centrality of this world know-how, re-evaluating history, culture and traditions.

These new figures are spreading increasingly in Italy. With more than one million corporations, the craft sector in Italy represents approximately 30% of the national total, with a prevalence of micro enterprises: more than 95% of small businesses employing less than 10 workers, while just under 80% of employees in the industry, working at companies with fewer than 10 employees. The higher concentration of the sector is located in Lombardia,

³ Italian Culture and Image of Italian Crafts, ISPES and Confartigianato, 1986

Veneto and Emilia Romagna, although many regions of southern Italy showed significant growth rates.

The Italian law states specifically the definition of artisan corporation. The main features are: the sector of activities of the company and the number of employees which, in any case, may not exceed 32 units share. This means that when referring to handcraft businesses we always talk about business realities of SME or even individual companies⁴.

In order to understand the phenomenon of digital manufacturing applied to craftsmanship, we have to prove the falsity of several common biases about craftsmanship sector: An imperfect job is considered "craftsmanship", therefore not "industrial" and the craftsman is often considered (and often defines himself) as the guarantor of the tradition, of the static time, of the old and therefore obsolete knowledge⁵.

An other common bias is: craftsman must necessarily be a small business. This statement is not always true: Hermes, born in 1837 in Paris as a manufacture of saddles and saddlery, has sold - in 2016 - 2.84 billion and has 6,000 employees worldwide, including 1,500 craftsmen. Leather craftsmen attend 10 years of apprenticeship. Each purse is made entirely by a craftsman who chooses the cut of the skin to work, prepares all the items that are needed for the package and then proceeds to the assembly - cared in every detail and guaranteed by a personal stamp that is a trademark of liability. The Birkin bag, for instance, requires 18 to 25 working hours.⁶

An other common bias is that the craftsman is a laborious and underpaid job. It is forgotten that the apprenticeship has a paid contract (difficult to find in other areas) and that in 70% of cases it becomes an employment contract for an indefinite period. A report made by UnionCamere and the

⁴ <http://www.mi.camcom.it/imprese-artigiane>

⁵ Italian Culture and Image of Italian Crafts, ISPES and Confartigianato, 1986

⁶ Hearts and Crafts, the people that make Hermès, film directed by Frederic Laffont, produced by Hermès International

Ministry of Labor (since May 2010) states that the craft industry, despite the crisis, continues to generate jobs; And partly remains vacant.⁷

At academic level, the artisan phenomenon is still studied from a partial and often erroneous perspective. In fact, still today, artisan sector is still viewed in this perspective: craftsmen survive but any possibilities either new opportunities are expected for this sector⁸. The university analyses mostly the traditional techniques, but often ignore thinking that handicrafts can also be the center of innovation; It has been studied the cultural models of craftsmanship, but do not engage them in the overall model of industry 4.0.

In this context, the territory can play an extraordinary role, as well as structured exchange of skills and practices with other areas such as digital design or marketing. However, it is necessary to build a new vision of the profession, indeed a true imaginary of the artisan culture, which is based on two main points:

- Respect and enhance diversity (constitutive and non-self-satisfied) and the small dimension as a conscious choice (and not because of a "want but not" or a laziness towards growth) to point to: Financial products, IT applications and design methodologies are generally tools designed for large companies and then simplified and "discounted" to make them accessible to small businesses;
- Innovate not only tools but also design methods, product / service concepts, use of new materials, interfaces to new robotized machine tools, smart use of digital technologies (CRM, eCommerce, embedded sensor, Etc) in organizational mechanisms in the way of financing and protecting the growth.

⁷ <http://www.quaderniartigianato.com>, Quaderni di Ricerca sull'artigianato.

⁸ Italian Culture and Image of Italian Crafts, ISPES and Confartigianato, 1986

1.3 The protagonists of Digital Manufacturing (Gershenfeld Analysis)⁹

Neil Gershenfeld was among those who first identified the subversive power of the technology we now call digital manufacturing. As a professor at MIT and director of the Center for Bits and Atoms, became famous for a series of theses and proposals that have marked the international debate. "The digital revolution that we are experiencing - says prof. Gershenfeld - is not essentially linked to radical innovations. Not even 3d printers today considered the leading technologies in this revolution, can be considered a novelty: In different variants were invented and developed in the 80s of the twentieth century and have been for many years an important part of the innovation processes product, although little known to consumers, namely rapid prototyping.

The real innovation is that nowadays these technologies are particularly available and easy to access. While In the 80's the machines produced by 3d Systems or Stratasys, the first producers of 3d printers, were available only to a limited group of medium or big corporations who could afford the cost and develop the proper competencies to make the work efficiently, today the new machines for digital manufacturing are affordable for private users as well."¹⁰ In addition the competencies to make these machines work are attainable for who is willing to spend time and energy to study these technologies. Similarly with what happened in the computer industry, the change becomes radical innovation when technology becomes available for almost any laboratory or family.

What will we do with all this widespread technology? Gershenfeld has no doubts: "The killer app in the digital manufacturing is the personalization, namely the customization for each user." Thanks to the new digital manufacturing technologies, each object can be developed and

⁹ *"Fare è innovare, il nuovo lavoro artigiano"*, Stefano Micelli, 2016

¹⁰ Neil Gershenfeld, *FAB: The Coming Revolution on Your Desktop—from Personal Computers to Personal Fabrication*, Basic Books, 2005

implemented for a specific person considering that customization work entails costs accessible to most users.

The protagonists of this new season will not necessarily custom manufacturing business as well as we now know them. Gershenfeld himself initiated the first laboratory for digital production putting together a minimum set of machines (a machine for laser cutting, a printer and a 3D CNC milling machine), which formed the nucleus of the first Fab Lab active in the United US.

These Fab labs, which are spreading increasingly worldwide, are considered by Gershenfeld *"part of a broader movement makers who are democratizing the production access to modern means"*¹¹. In this new scenario manufacturing system is local, while the ideas and the projects are flowing.

These tools may seem rudimentary compared to today's machines at the disposal of large manufacturing companies. In fact, the parallel with personal computing history suggests that often true innovation will find space particularly due to dynamic technologies of domestic use, changing in a relatively short time the economic system in which we lived.

Fab Labs have an essential role in this process. Firstly because they allow access to informally technology creating real community around projects and training initiatives. When you enter a Fab Lab, or other areas that perform similar functions, people can ask questions, build relationships and establish contacts with people involved in other initiatives. It becomes part of a shared space where access to technology is no longer a privilege for the few. According Gershenfeld the Fab Lab are essential, Also it is important that triggers an accumulation circuit in the processes of learning. If a maker group develops successful a project in Asia it is conceivable that the lessons learned can be useful in Europe and the United States. Share

¹¹ Neil Gershenfeld, FAB: The Coming Revolution on Your Desktop—from Personal Computers to Personal Fabrication, Basic Books, 2005

and sediment become critical to avoid the phenomenon of technological repetition.

Reporting Gershenfeld thoughts during TED2006: "There's been a sea change in aid, from top-down mega-projects to bottom-up, grassroots, micro-finance investing in the roots, so that everybody's got that that's what works. But we still look at technology as top-down mega-projects. Computing, communication, energy for the rest of the planet are these top-down mega-projects. If this room full of heroes is just clever enough, you can solve the problems. The message coming from the Fab Labs is that the other five billion people on the planet aren't just technical sinks; they're sources. The real opportunity is to harness the inventive power of the world to locally design and produce solutions to local problems. I thought that's the projection 20 years hence into the future, but it's where we are today. It breaks every organizational boundary we can think of. The hardest thing at this point is the social engineering and the organizational engineering, but it's here today."¹²

In Italy, the success of the maker movement, as well as the spread diffusion of the Fab Lab, might be surprising. In our country there are nearly a hundred Fab Labs, some of which are very active in several territories: in many cases these initiatives are still struggling to find their economic sustainability, but the spread of these workshops throughout the Italy demonstrates the vitality of an economic and social environment that reacted rapidly to the opportunities offered by new technologies. Some of these Fab Labs have been able to establish themselves in the local context, mixing new technologies and needs of traditional manufacturing companies, becoming a reference point for entrepreneurs of the territory. In other cases, the success of the Fab Lab is linked to a renewed interest in many urban contexts for the rediscovery of manufacturing, which has been excluded from the life of the city for a long time.

¹² TED2006, Unleash your creativity in a Fab Lab, Monterey, California.

In Italy the maker culture is generating interesting results among small and medium enterprises, that has allowed the country to develop and promote Made in Italy, particularly in food, fashion and design. The manufacturing and digital approaches have much in common and many differences. These similarities and differences deserve to be considered closely, not only in our country, but as a worldwide phenomenon.

1.4 The Digital Compass

Most of these digital technologies have been brewing since the early 2000's. Some are not yet ready for application at scale. But many are now at a point where their greater reliability and lower cost are starting to make sense for industrial applications. However, most manufacturing companies are not consistently aware of the emerging technologies.

Macckinsey & Company, one of the biggest worldwide consultant companies, surveyed 300 manufacturing leaders in January 2015; only 48 percent of manufacturers consider themselves ready for Industry 4.0. Seventy-eight percent of suppliers say they are prepared.

To identify the right opportunities for your industry, McKinsey developed a Digital Compass to identify most promising Industry 4.0 opportunities. Over the years, they have worked on many client projects focused on Industry 4.0 and have collected masses of relevant data for our benchmark database. Drawing on this powerful combination of experience, knowledge, and insights, they have built a Digital Compass that will help companies to identify the most promising opportunities – along all links of the supply chain – in order to make informed decisions on which tasks to prioritize.

The 'digital compass' helps companies find tools to match their needs.



¹Maintenance, repair, and operations.

McKinsey&Company

The traditional manufacturing business model is changing, and new models are emerging; incumbents has to be quick to recognize and react to these new competitive challenges. Eighty-four percent of the manufacturing suppliers Mckinsey & Company surveyed expect new competitors to enter the market soon. More specifically, executives must consider the following options, and watch for others that may be deploying them.

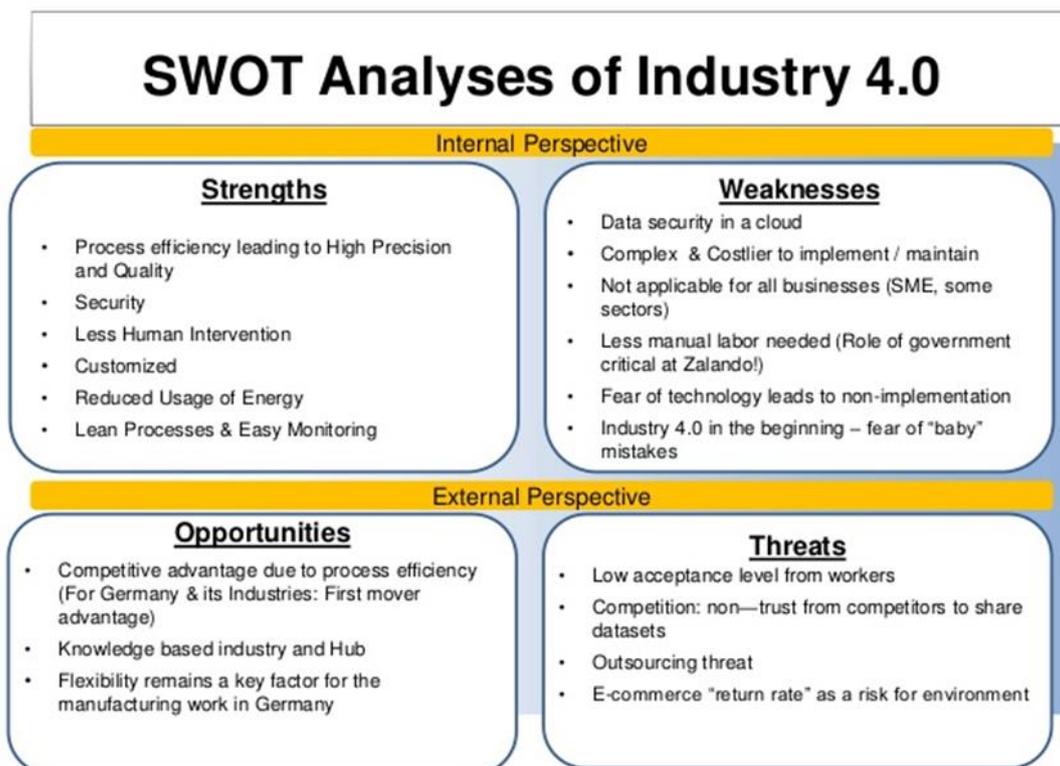
- “Platforms,” in which products, services, and information can be exchanged via predefined streams. For instance, open-source software applied to the manufacturing context. A company might provide technology to connect multiple parties and coordinate their interactions. SLM Solutions, a 3-D printer manufacturer, and Atos, an IT services company, are currently running a pilot project to develop such a marketplace. Customers can submit their orders to a virtual broker platform run by Atos. Orders are then allocated to SLM’s decentralized network of production sites, and subsequently produced and shipped to the customer. Some companies are also trying to build an “ecosystem” of their own, as Nvidia has in its graphics-processor business. It provides software developers with resources, and offers start-ups help to build companies around Nvidia technologies.
- Businesses that license intellectual property. Many manufacturing companies have deep expertise in their products and processes, but lack the expertise to generate value from their data. Manufacturers might offer consulting services or other businesses that monetize the value of their expertise.
- Businesses that monetize data. At present many third party companies provide data analysis in several areas. For instance SCiO, a Kickstarter project, is a low-cost, pocket-sized spectrometer that uses near-infrared technology to assess the composition of materials. It is expected to cost \$250, whereas traditional machines cost upward of \$10,000¹³. Every time a SCiO is used, it contributes to a large database of scanned materials, helping to make the machine more accurate. It is a consumer product, and not yet ready for industrial use. But industrial models are on the way. Kaggle, a distributed network of about 270,000 data scientists, has already helped more than 20 Fortune 500 companies solve their toughest data problems.

¹³ www.mckinsey.com

1.5 The impact on the supply chain, the SWOT analysis.

Disruptive innovations are currently changing the landscape of many industries and their business models. Because of increasingly digitalized processes and an exponential growth of sensible data, supply chains are also impacted by the fourth industrial revolution. The strategic management requires a more transparent understanding of the currently available and interrelated technologies and concepts. Since the supply chain will obviously undergo an organizational change, a theoretical framework is necessary to understand which activity is impacted from a holistic management perspective.

The SWOT analysis (also known as SWOT matrix) is a strategic planning tool used to evaluate the strengths, weaknesses, opportunities and threats of a project or in a company or in any other situation where an organization or an individual should play a decision to achieve a goal. The analysis may concern the internal environment (analysis of strengths and weaknesses) and external organization (analyzing threats and opportunities).



Source: McKinsey & Company official site

For what concerns the small-medium companies, digitalisation might lead to a better process efficiency, more security on value chain processes, less human intervention and easier monitoring.

However this perspective might be expensive, complex to manage and not applicable for all business. Furthermore, it may lead to a new human resource framework due to less manual labor needed. In this scenario might be appropriate to invest in two types of collaborative arrangements, namely Outsourcing and Collective research Organizations.

Outsourcing relationships enable company to add the resources and integrated services to your organization that will help to drive desired outcomes. Seasoned logistics experts or consultant work with SME, sharing challenges, examining processes, and configuring a comprehensive menu of logistics services into an outsource relationship that is built around key operational and financial metrics. Collaborative enhances the value of logistics drive innovation and continuous improvement throughout supply chain. The expected benefit from this type of collaboration arrangements are: gain immediate and sustained value that enables profit and longevity, reducing capital investment in equipment, technology, and human resource, increasing insight into performance metrics and drive continuous improvements, respond quickly to market changes and expansion, achieve cost avoidance and continual soft cost savings.

Collective research centres mainly operate in traditional industrial sectors and are founded on the initiative of the industry. They are part of the private sector, but they function as non-profit organisations. They can operate at the federal or regional level. Members are companies from a specific sector (and consist mainly of SMEs). The centres receive government support from either the federal government or the regions, or both. Nowadays, collective research centres enable research & development (R&D) for the benefit of companies in a specific sector through mutual collaboration. This type of collaboration is particularly called upon by SMEs that do not dispose of the necessary resources to pursue their own research activities. One of the main

activities of collective research centres is conducting technological research for an entire industry, hence the term "collective". In addition to their research activities, most collective research centres support technology transfer or dissemination of information through seminars, exhibitions, publications, manuals, etc. This dissemination is facilitated by technology advisors who are attached to collective research centres. These advisors function as a bridge between companies and collective research centres.

They act as first contact with companies in a specific industry, in order to resolve concrete technical problems. They also fulfill the role of information provider by communicating research findings, information about government mechanisms, new techniques, information about study days, etc.

On the external perspective, digitalisation lead to competitive advantage thanks to process efficiency, as we can see nowadays in the German Industry and its efficiency and flexibility in the manufacturing work. On the other hand workers may see digitalisation as a thread, due to a less human intervention they might have to adapt their work to new technologies.

CHAPTER 2: Global Trends of Digitalization

2.1 The Global Information Technology Report¹⁴

Since 2001, The Global Information Technology Report series published by the World Economic Forum in partnership with INSEAD and Cornell University has measured the drivers of the ICT revolution globally, using the Networked Readiness Index (NRI). The Index has evolved over time and currently assesses the state of networked readiness using 53 individual indicators. For each of the 139 economies covered, it allows the identification of areas of priority to more fully leverage ICTs for socioeconomic development.

Four important messages emerge from the Report this year. First, innovation is increasingly based on digital technologies and business models, which can drive economic and social gains from ICTs if channelled in a smart way. Second, the way businesses adopt ICTs is key for leveraging them for development, so encouraging businesses to fully embrace the powers of digital technologies should be a priority of governments. Third, both the private sector and governments need to step up efforts to invest in innovative digital solutions to drive social impact. Last but not least, a sustainable digital economy will depend on quickly evolving governance frameworks that allow societies to anticipate and shape the impact of emerging technologies and react quickly to changing circumstances.

Against this background, the Report is meant to be a call for action. Policymakers must work with other stakeholders to swiftly adopt holistic long-term strategies for ICT development and lead in adapting governance and leadership behaviors to ensure that ICTs deliver maximum benefits. Under the theme "Innovating in the Digital Economy," The Global Information Technology Report 2016 highlights striking innovation patterns in the NRI data that can help point the way for policy and investment priorities.

¹⁴ "The Global Information Technology Report 2016", report by World Economic Forum

2.2 NRI Definition

The main criteria to measure the IT growth of each country is the Readiness Index (NRI). Also referred to as Technology Readiness, it measures the propensity for countries to exploit the opportunities offered by information and communications technology (ICT). It is published in collaboration with INSEAD, as part of their annual Global Information Technology Report (GITR). The report is regarded as the most authoritative and comprehensive assessment of how ICT impacts the competitiveness and well-being of nations.

The index was originally developed by the Information Technology Group, which worked at Harvard University's Center for International Development until 2002. It seeks to better understand the impact of ICT on the competitiveness of nations and is a composite of three components: The environment for ICT offered by a given country or community (market, political, regulatory, and infrastructure environment) the readiness of the country's key stakeholders (individuals, businesses, and governments) to use ICT the usage of ICT among these stakeholders.

2.3 The networked readiness framework

The networked readiness framework rests on six principles: (1) a high-quality regulatory and business environment is critical in order to fully leverage ICTs and generate impact; (2) ICT readiness—as measured by ICT affordability, skills, and infrastructure—is a pre-condition to generating impact; (3) fully leveraging ICTs requires a society-wide effort: the government, the business sector, and the population at large each have a critical role to play; (4) ICT use should not be an end in itself. The impact that ICTs actually have on the economy and society is what ultimately matters; (5) the set of drivers—the environment, readiness, and usage—interact, co-evolve, and reinforce each other to form a virtuous cycle; and

(6) the networked readiness framework should provide clear policy guidance.

The framework translates into the NRI, a composite indicator made up of four main categories (subindexes), 10 subcategories (pillars), and 53 individual indicators distributed across the different pillars:

A. Environment subindex

1. Political and regulatory environment (9 indicators)
2. Business and innovation environment (9 indicators)

B. Readiness subindex

3. Infrastructure (4 indicators)
4. Affordability (3 indicators)
5. Skills (4 indicators)

C. Usage subindex

6. Individual usage (7 indicators)
7. Business usage (6 indicators)
8. Government usage (3 indicators)

D. Impact subindex

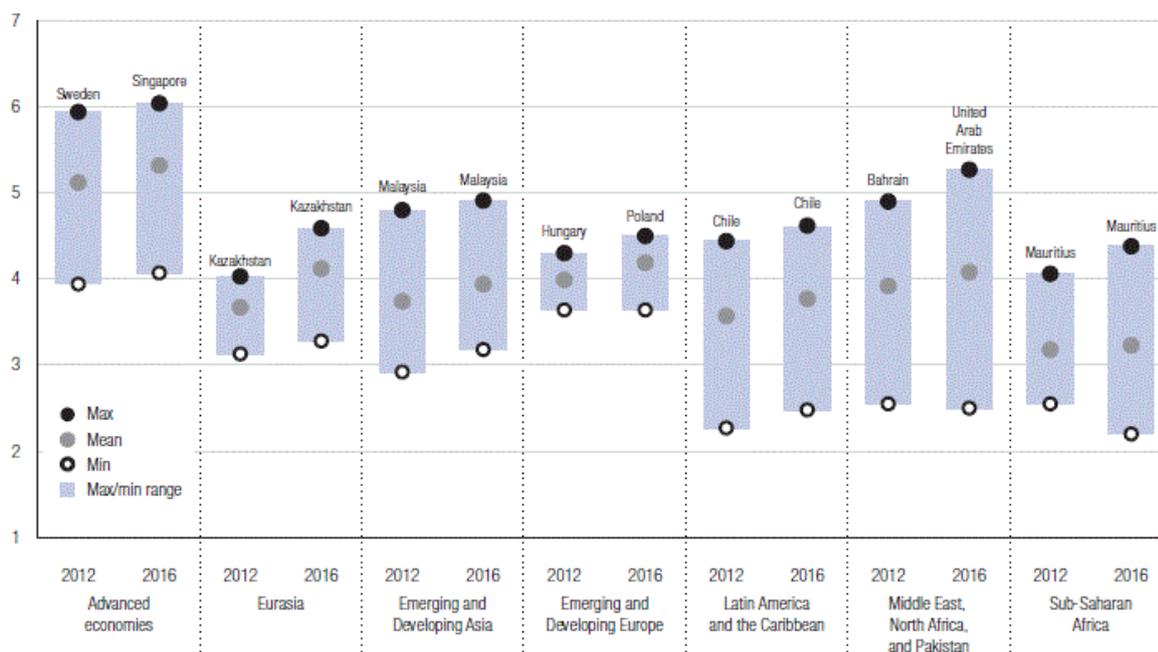
9. Economic impacts (4 indicators)
10. Social impacts (4 indicators)

The computation of the overall NRI score is based on successive aggregations of scores: individual indicators are aggregated to obtain pillar scores, which are then combined to obtain subindex scores. Subindex scores are in turn combined to produce a country's overall NRI score. The appendix of Chapter 1.1 presents the detailed methodology and composition of the NRI.

About half of the individual indicators used in the NRI are sourced from international organizations. The main providers are the International Telecommunication Union, UNESCO and other UN agencies, and the World Bank. The other half of the NRI indicators are derived from the World Economic Forum's Executive Opinion Survey (the Survey). The Survey is used to measure concepts that are qualitative in nature or for which internationally comparable statistics are not available for enough countries. The 2015 edition of the Survey was completed by over 14,000 business executives in more than 140 countries.

2.4 Top movers

Figure 10: The Networked Readiness Index by regional group, 2012 vs 2016
Score (1–7)



Source: NRI, 2012–2016 editions.

Note: Numbers are based on a constant sample of 132 economies. Groupings follow the IMF classification; IMF "CIS" = "Eurasia."

1. **Singapore** tops the Index this year, defending its number 1 position. Its outstanding performance is underlined by the fact that it ranks 1st in the world in three of the four subindexes (Environment, Usage, and Impact), driven by top spots on several pillars: political and regulatory environment (2nd), business and innovation environment (1st), skills (1st), government usage (1st), and social impact (1st). Overall, this ranking is to a large extent the result of strong government commitment to the digital agenda, including its Smart Nation program.

The drop in the Readiness subindex to 16th place is largely explained by a drop in the affordability of broadband, although the price points of broadband packages may hide quality differences (i.e., a price increase may come with a quality increase). Singapore currently has an offline population of 18 percent, potentially explained by its demographics, and the country is still out of the top 10 for individual usage (12th) and business adoption

(14th). Nevertheless, gains from ICT adoption are widely shared in Singapore, as the country tops the Social impacts pillar, making excellent use of digital technologies to provide access to basic and government services and ensuring that schools are connected.

2. **Finland** stays in 2nd place with an unchanged overall score, but sees some slight rank drops for the Environment, Usage, and Impact subindexes. The country tops the rankings in the Readiness subindex. This is the result of high scores in particular in the infrastructure (3rd) and skills pillars (2nd); in addition, affordability is very good (13th), although Finland is one of several countries that sees broadband prices increase significantly this year (51st, down from 39th in 2015). There is currently room for improvement in particular in the business and innovation environment, where Finland ranks 9th. With 14 days to start a business, the country comes in only at a low 81st place in this particular indicator; as pressure for firms to bring products to market quickly is increasing, these types of framework conditions matter more than ever. That said, Finland has extremely good access to the latest technologies (1st) as well as venture capital (6th), and its businesses are highly connected (5th on business usage).

These factors are all important in helping Finland achieve its top global rank in economic impacts. The government is currently perceived as playing a less proactive role in promoting ICTs than in the past (21st place, down from 10th in 2013): indicators are dropping for government procurement of advanced technologies, importance of ICTs to government vision, government success in ICT promotion, and ICT use to boost government efficiency.

3. **Sweden** keeps its 3rd position in the NRI as scores in all four subindexes remain almost unchanged. Overall, it ranks best in Usage (4th), which derives from very high scores in individual (4th) and business usage (2nd),

and notably does very well in Impact (3rd). Businesses are taking advantage of the fact that their consumer base is highly connected, which is reflected in one of the highest rates of B2C interaction globally (4th). Government, on the other hand, is not yet connecting with citizens online to the same extent as business, with a 45th rank for the government E-Participation Index.

In general, the Swedish government is perceived as less proactive than other advanced economies in their use of digital technologies (23rd for government usage); in particular, business executives feel that it has somewhat been losing sight of the digital agenda (20th for government ICT vision, down from 11th in 2014). Yet the government has been taking steps to improve the overall framework conditions for business: there is visible progress in several areas of the political and regulatory environment and the business and innovation environment pillars.

In particular, Sweden slashes the number of days it takes to start a business from 16 to 7, moving it up 45 places in the ranking in this indicator to 42nd place. Driven to an important extent by the business sector, digital technologies are making themselves felt in terms of economic impact (3rd) and an improvement by four places in social impact to 12th.

4. **Norway** moves up one rank to 4th place, with small but positive score changes in all four subindexes. The country seems to have reached a plateau, with little movement in its total NRI score in recent years. Its digital economy is built on the very solid basis of top regulatory and innovation environments (6th and 7th, respectively) as well as the world's best ICT infrastructure. Although fixed broadband prices are relatively high (71st) there has not been a further increase this year, and with 96.3 percent of the population online (2nd for individuals using the Internet), the high prices do not seem to act as an access barrier.

Similar to the situation in Sweden, Norwegian firms are capitalizing on the high ICT literacy among the general population and workforce by using digital technologies heavily in their interactions with consumers as well as among each other (8th and 7th, respectively). There has also been a visible positive move in government usage (importance in vision, success in ICT promotion, and government efficiency), moving the country up six places to the 18th rank in the government usage pillar. Unsurprisingly, these strong digital foundations are reflected in two 8th ranks for the two Impact pillars.

5. The United States moves up two ranks overall, continuing a positive trend from 2013 (from 9th place in 2013 to 7th in both 2014 and 2015 to 5th place this year). This is based on improvements in all four subindexes.²⁴ The United States stands out in terms of its extremely favorable business and innovation environment (3rd), which has given rise to one of the most agile and digitized business sectors globally. The public sector is also using digital technologies effectively to deliver services to citizens (4th on the Government Online Service index) and to facilitate participation (9th on the E-Participation Index). All stakeholders can take advantage of very low broadband prices (ranked 17th), with the cheapest package at US\$16 per month, compared to a global average of US\$52 and an average of US\$26 in high-income countries;²⁵ however, although international Internet bandwidth per user has been growing steadily in recent years, the race has accelerated such that the United States is slipping from 34rd in 2013 to 42nd this year.

The overall impact of digital technologies in the United States is strong (it ranks 7th for both economic and social impacts) and growing, in particular in the social dimension: this year, the United States moves up 15 places to rank 15th in the perceived impact of ICTs on access to basic services.

6. **The Netherlands** drops by two spots in the overall rankings, but remains one of the countries that makes the best use of digital technologies to achieve both economic and, in particular, social impacts (it ranks 6th and 3rd, respectively, in the two pillars and 2nd in the Impact subindex). This is despite high mobile tariffs (105th) and high and rising broadband prices (85th, down from 68th). Other drops at the indicator level can largely be attributed to the fact that, although conditions are stable or even improving slightly in absolute terms, other countries are moving ahead faster. This is true in particular for the business and innovation environment as well as ICT infrastructure. The Dutch population is one of the most technology savvy and connected in the world (8th for individual usage), an asset that both the government and the business sector are making good use of (3rd for B2C Internet use, 8th for the Government Online Service index, and 1st for the E-Participation index). Businesses are extensively deploying digital technologies to reshape their business and organizational models (4th in both indicators) and basic service providers, whether they are public or private, are working hand-in-hand with the population to facilitate access via their platforms (2nd).

7. **Switzerland** slips by one spot overall to 7th, placing in the top 10 for the Environment, Readiness, and Impact and 12th for Usage subindexes. The country moves up by two places in the innovation environment assessment, largely driven by a jump in perceived availability of venture capital as well as continued high levels of government procurement of advanced technologies; this is against an overall global trend of falling government demand for the latest technologies. However, in general the government has so far been a less avid adopter and promoter of digitization, as reflected in a 43rd place for government usage. Although it is strong in the high-tech procurement market, it seems to be using digital technologies relatively less to interact with citizens. On the other hand, the country remarkably places 1st for business usage, driven by high business

technology absorption and innovation capacity and high levels of digital B2B interaction (interestingly, more than with consumers). This in turn has been generating strong economic impact (2nd rank), as reflected also in a steady upward trend in the share of knowledge-intensive jobs (3rd).

8. The United Kingdom remains in 8th position, improving slightly in absolute scores on all four subindexes. Improvements at the indicator level are particularly concentrated in the business and innovation environment: perceived venture capital availability, the quality of management schools, and government procurement of advanced technologies have all increased compared to last year, while the number of days and procedures to start a business was reduced. Although infrastructure and individual usage are moving in the right direction, they are not moving fast enough to result in gains in the rankings. Business adoption is high and UK businesses are top in the world in making use of the Internet to interact with their consumers as well as with their production network (1st in B2C, 2nd in B2B). They are also pushing the boundaries in terms of using ICTs to reshape their business and organizational models (ranking 2nd and 1st, respectively). The government is also moving closer to the global frontier in terms of technology use, jumping six places into the top 10 of the government usage pillar.

9. Luxembourg's NRI rank stays the same as last year at 9th place, with its overall score continuing its steady upward trend. Improvements at the pillar level come in three areas: political and regulatory environment and individual usage, moving Luxembourg to 1st and 2nd place in these categories, respectively, and in the area where the country is most behind, affordability: here in particular, a large drop in mobile cellular tariffs moves the country up 14 places in the affordability pillar. Although performance in terms of innovation environment is mixed, good availability of venture capital (8th) and a strong government commitment to procuring advanced technologies (5th) bode well for the commercialization of new ideas. In

general government is perceived to play an important role in supporting Luxembourg's digital economy, with business executives attesting to a high importance of ICTs in the government's vision (5th) and its success in ICT promotion (6th). Furthermore, strong framework conditions have been put in place, reflected in the top rank regarding the level of sophistication for ICT related laws (e.g., for e-commerce, digital signatures, and consumer protection). The country also boasts a top infrastructure with top ranks for international bandwidth (1st) and the number of secure servers per capita (3rd).

10. **Japan** remains in 10th place overall, as in 2015, and is able to climb two places to 2nd in the Usage subindex; with business and government usage already among the highest globally (3rd and 7th, respectively), the country moves up two places in individual usage to 11th place. The business and innovation environment is improving visibly with progress in the perceived availability of venture capital, the quality of management schools, and government procurement of advanced technologies; this is the continuation of a strong positive trend, moving the country from 40th place in 2014 to 33rd in 2016 in this particular pillar. Japan also keeps building out its infrastructure, in particular international Internet bandwidth and the number of secure servers. In terms of impact, the country is slightly losing ground, mainly because its peers are moving ahead faster.

2.5 The Small Business Act for Europe

The Small Business Act (SBA) was created by UE in support of SMEs and the craft/handmade sector. It is a tool that defines the lines of action that the European Union intends to take in favor of SMEs. Between 2008 and 2010, the Commission and the Member States have, in the framework of the SBA, implemented initiatives aimed at reducing administrative burdens,

facilitating the financing of SMEs and facilitating their access to new markets¹⁵.

The main objective of the Small Business Act is to improve the political approach Global business spirit. The decision making process – starting from the the Public service standards - must therefore incorporate this principle, in order to promote the growth of SMEs and to help them dealing with the problems that limit their evelopment. At the center of the SBA for Europe, there is the conviction that a truly favorable environment for SMEs depends first on the recognition of entrepreneurs by the company. The general climate in society has to lead individuals to consider attracting the opportunity to start their own business to recognize that SMEs make a substantial contribution to employment growth and economic prosperity.

The Small Business Act puts forward simplification, reduction of administrative burdens, market opening and support for SME development potential, which are reflected in ten key points:

- Entrepreneurship - facilitating a gratifying context for the operators;
- Second chance - for honest entrepreneurs who have experienced insolvency;
- Think first of all - make rules that conform to this principle;
- Advisory Administration - to make Public Administrations permeable to the needs of SMEs;
- Public procurement and aid - facilitating the participation of SMEs in public procurement and improving the possibilities for State aid for SMEs;
- Finance - facilitating access to SME credit and punctuality of payments in commercial transactions;
- Single Market - to help SMEs benefit from the opportunities offered by the Single Market;

¹⁵ Source: L'attualità dell'artigianato e la sua anima digitale, Andrea Granelli

- Skills and Innovation - update and implement skills in SMEs and all forms of innovation;
- Environment - transforming environmental challenges into opportunities for SMEs;
- Internationalization - Encourage and support SMEs to benefit from market growth.

CHAPTER 3: The Italian Digital Renaissance

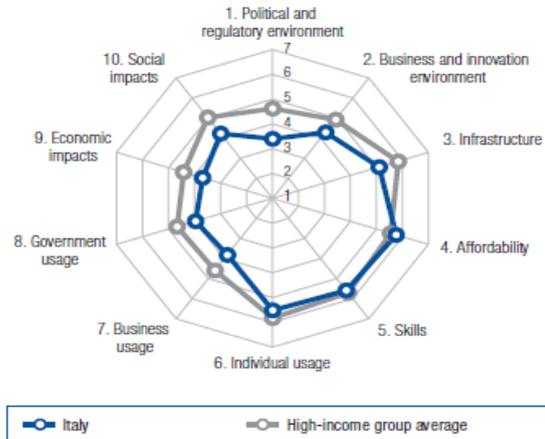
3.1 The growth of Italy

Italy is among the group of top movers this year, climbing up by 10 places to an overall NRI rank of 45. The most significant driver is a large improvement in terms of both economic and social impacts, putting Italy 18 places ahead in the Impact rankings to 48th.

Over the past years, the Italian government has launched several policies aiming at improving the provision of online services to its citizens and creating a better environment for start-ups and innovative companies. However, key constraints remain, including the lack of venture capital and the overall political and business environment. Here the country seems to be moving in the right direction, gaining in almost every aspect of the regulatory environment pillar, but it remains far below the global average.

Italy is currently doing best in individual usage (37th), followed by business (52nd) and government use (62nd). Yet only a small portion of Italians are connected to fixed broadband: the number has been historically low but the gap with other advanced economies has only increased in recent years, when subscriptions per 100 people increased by less than 10 percent from 21.9 (28th highest, in 2010) to 23.5 (36th, in 2014). With the private sector currently reorganizing itself and the launch of the 2015 national Digital Agenda, which will unfold in the coming years, the country has an opportunity to close this gap. Going forward, it will be important to capitalize on this positive momentum.

| | Rank (out of 139) | Value (1-7) |
|---|----------------------|----------------|
| Networked Readiness Index..... | 45.. | 4.4 |
| Networked Readiness Index 2015 (out of 143)..... | 55..... | 4.3 |
| Networked Readiness Index 2014 (out of 148)..... | 58..... | 4.2 |
| Networked Readiness Index 2013 (out of 144)..... | 50..... | 4.2 |
| A. Environment subindex..... | 85..... | 3.8 |
| 1st pillar: Political and regulatory environment..... | 96..... | 3.4 |
| 2nd pillar: Business and innovation environment..... | 68..... | 4.3 |
| B. Readiness subindex..... | 41..... | 5.5 |
| 3rd pillar: Infrastructure..... | 39..... | 5.1 |
| 4th pillar: Affordability..... | 52..... | 5.7 |
| 5th pillar: Skills..... | 37..... | 5.6 |
| C. Usage subindex..... | 43..... | 4.4 |
| 6th pillar: Individual usage..... | 37..... | 5.5 |
| 7th pillar: Business usage..... | 52..... | 3.8 |
| 8th pillar: Government usage..... | 62..... | 4.0 |
| D. Impact subindex..... | 48..... | 4.0 |
| 9th pillar: Economic impacts..... | 39..... | 3.7 |
| 10th pillar: Social impacts..... | 62..... | 4.2 |



The Networked Readiness Index in detail

| INDICATOR | RANK/139 | VALUE |
|---|----------|--------|
| 1st pillar: Political and regulatory environment | | |
| 1.01 Effectiveness of law-making bodies*..... | 128..... | 2.5 |
| 1.02 Laws relating to ICTs*..... | 71..... | 3.9 |
| 1.03 Judicial independence*..... | 81..... | 3.6 |
| 1.04 Efficiency of legal system in settling disputes*.. | 138..... | 2.1 |
| 1.05 Efficiency of legal system in challenging regs*.. | 129..... | 2.4 |
| 1.06 Intellectual property protection*..... | 58..... | 4.1 |
| 1.07 Software piracy rate, % software installed..... | 33..... | 4.7 |
| 1.08 No. procedures to enforce a contract..... | 69..... | 3.7 |
| 1.09 No. days to enforce a contract..... | 129..... | 1120 |
| 2nd pillar: Business and innovation environment | | |
| 2.01 Availability of latest technologies*..... | 49..... | 5.1 |
| 2.02 Venture capital availability*..... | 124..... | 2.1 |
| 2.03 Total tax rate, % profits..... | 129..... | 64.8 |
| 2.04 No. days to start a business..... | 28..... | 6 |
| 2.05 No. procedures to start a business..... | 41..... | 5 |
| 2.06 Intensity of local competition*..... | 53..... | 5.3 |
| 2.07 Tertiary education gross enrollment rate, %..... | 35..... | 63.5 |
| 2.08 Quality of management schools*..... | 28..... | 5.1 |
| 2.09 Gov't procurement of advanced tech*..... | 113..... | 2.8 |
| 3rd pillar: Infrastructure | | |
| 3.01 Electricity production, kWh/capita..... | 46..... | 4779.8 |
| 3.02 Mobile network coverage, % pop..... | 1..... | 100.0 |
| 3.03 Int'l Internet bandwidth, kb/s per user..... | 32..... | 92.5 |
| 3.04 Secure Internet servers/million pop..... | 38..... | 249.2 |
| 4th pillar: Affordability | | |
| 4.01 Prepaid mobile cellular tariffs, PPP \$/min..... | 73..... | 0.26 |
| 4.02 Fixed broadband Internet tariffs, PPP \$/month.. | 52..... | 28.88 |
| 4.03 Internet & telephony competition, 0-2 (best)..... | 69..... | 1.90 |
| 5th pillar: Skills | | |
| 5.01 Quality of education system*..... | 65..... | 3.7 |
| 5.02 Quality of math & science education*..... | 41..... | 4.6 |
| 5.03 Secondary education gross enrollment rate, %.. | 35..... | 102.4 |
| 5.04 Adult literacy rate, %..... | 17..... | 99.2 |

| INDICATOR | RANK/139 | VALUE |
|--|----------|-------|
| 6th pillar: Individual usage | | |
| 6.01 Mobile phone subscriptions/100 pop..... | 17..... | 154.2 |
| 6.02 Individuals using Internet, %..... | 52..... | 62.0 |
| 6.03 Households w/ personal computer, %..... | 40..... | 74.0 |
| 6.04 Households w/ Internet access, %..... | 39..... | 72.6 |
| 6.05 Fixed broadband Internet subs/100 pop..... | 36..... | 23.5 |
| 6.06 Mobile broadband subs/100 pop..... | 28..... | 70.9 |
| 6.07 Use of virtual social networks*..... | 35..... | 6.0 |
| 7th pillar: Business usage | | |
| 7.01 Firm-level technology absorption*..... | 106..... | 4.2 |
| 7.02 Capacity for innovation*..... | 37..... | 4.5 |
| 7.03 PCT patents, applications/million pop..... | 24..... | 55.4 |
| 7.04 ICT use for business-to-business transactions*.. | 80..... | 4.5 |
| 7.05 Business-to-consumer Internet use*..... | 59..... | 4.7 |
| 7.06 Extent of staff training*..... | 131..... | 3.2 |
| 8th pillar: Government usage | | |
| 8.01 Importance of ICTs to gov't vision*..... | 108..... | 3.3 |
| 8.02 Government Online Service Index, 0-1 (best)..... | 23..... | 0.75 |
| 8.03 Gov't success in ICT promotion*..... | 126..... | 3.1 |
| 9th pillar: Economic impacts | | |
| 9.01 Impact of ICTs on business models*..... | 72..... | 4.4 |
| 9.02 ICT PCT patents, applications/million pop..... | 27..... | 9.4 |
| 9.03 Impact of ICTs on organizational models*..... | 84..... | 3.8 |
| 9.04 Knowledge-intensive jobs, % workforce..... | 35..... | 35.6 |
| 10th pillar: Social impacts | | |
| 10.01 Impact of ICTs on access to basic services*..... | 89..... | 3.9 |
| 10.02 Internet access in schools*..... | 88..... | 3.9 |
| 10.03 ICT use & gov't efficiency*..... | 107..... | 3.4 |
| 10.04 E-Participation Index, 0-1 (best)..... | 19..... | 0.78 |

Note: Indicators followed by an asterisk (*) are measured on a 1-to-7 (best) scale. For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" on page 53.

Source: The Global Information Technology report

3.2 The Italian "makers"

The artisan work, which many considered a niche business due to mass production and the tendency of corporations to transfer production abroad to save on labor, has been reinvented thanks to digitalization. Manufacturing in Italy is re-entering the market completely with a new approach, and made stronger by new technologies. New artisans have a computer, a 3D printer and a set of precision instruments. They use to realize prototypes do-it-yourself of any type of object. At present they are called "*makers*", the digital artisans. Those who like to design their own objects on their own and then build them by controlling the entire production process.

According to Andrea Granelli (president of the Olivetti Historical Archive Association, creator and co-author of recent studies in the Italian artisanal sector), author of the book "Digital Craftsmen". The digital maker "is nothing but a computer programmer: a developer of algorithms, source codes, software, app. Apparently there is nothing far from the craftsman's work, but actually the concepts of "craftsmanship" and "digital" are much closer than we think. The "IT method" - that is to create software, apps, digital interfaces, 3D models - is not at all an industrial process, but it is deeply crafted because it cannot be standardized or automated in any way and because it requires high personalization and customization"¹⁶.

Like artisan work, digital solutions created by the maker for a company cannot have standard methods / behaviors to take away the uniqueness, diversity and competitiveness of that enterprise. Digital solutions require the continuous adaptation of the "toolbox" to new, specific and unique contexts. Another important analogy between artisan and computer culture, continues Granelli, is the concept of "repair / maintenance". Producing and maintaining / repairing an object or software is the same and only the one who manages them has a vision that goes beyond the individual

¹⁶ Artigiani del digitale. Come creare valore con le nuove tecnologie, Andrea Granelli, Luca Sossella Editore, 2010

components and which captures the overall purpose of the object or the software: it is only by repairing things that you understand Really how they

The explosion of digital technologies, open source, standardization of interfaces, reusable software routines and 3D models of printable objects allow the craftsman to have in his hands a formidable "digital raw material" made of high cost performance content that can be re-tailored to your specific needs. For the industrial sector, digital means mere automation of production processes (ie having robots in place of employees), while for artisan means improving the product, doing things better and better. The Italian craftsman has always made innovations (for example by creating tools and machines alone, experimenting with new techniques and new materials) and that is why our companies make extraordinary products and Italy remains a country with strong creativity. But digital gears more to the Italian economy, as long as our small and medium-sized businesses can renew themselves, reorganize their resources and, above all, know how to work in network.

A great exemple is the venetian shoemaker Simone Segalin, son of art. Unlike his father and grandfather, though, he is a digital craftsman. He has a laser scanner which can be achieved in an instant the exact measurements of the customer's foot, obtaining a three-dimensional model to be printed in 3D and have a form on which to build a shoe that fits like a glove. The advantages include the ability to shorten the distances: if a Los Angeles attorney wants the Segalin shoes, can go in the American store reference and, with the laser, the Italian shoemaker send the data to have them made to measure without having to face a transatlantic flight¹⁷.

Sandro Tiberi, known as "the digital master dealer" of Fabriano, in Marche. Today, using the water-repellent nanotechnology and applies them to the paper surface that, in this way, becomes resistant to water and oil. Not only it produces, for example, the anti-counterfeiting paper with a chip inside. "I

¹⁷ <http://www.mastrosegalin.it/the-company>

create the highest quality products using high quality raw materials, focusing on innovation, design and projecting this profession in the future."¹⁸ Because that's what the makers do, the digital artisans, as is well described in "The Maker's Manual" by Andrea and Paul Maietta Aliverti: "The maker is a person who takes pleasure in building objects with their own hands, with their inventiveness, their techniques and their skills. the maker does what the craftsmen have done for centuries, with the love for their work and for their art, with the support of new technologies it is a digital craftsman, who uses new tools to reinvent a profession that is disappearing."

In this field Cisco, a worldwide leader in the ICT sector, has chosen to focus in the near future, investing a total of \$ 100 million to stimulate the process of digitization in Italy with Digitaliani project. One of the pillars main goals is developing manufacturing sector with particular emphasis on promoting the Made in Italy. In Friuli Venezia Giulia, a region in which the American company has recently signed a memorandum of understanding, in order to give impetus to several areas of technological innovation, create a network of collaboration with the academic and business world focused just on training and research to the application of digital technologies interconnected with the manufacturing sector. The main task is to accelerate the adoption of technological solutions to strengthen the competitiveness of companies and the excellence of Italian products. Similarly, Cisco collaborates with Italtel Cefriel, founded with the aim of providing support to companies and enable projects in industry 4.0, the new way of doing business wherein the supply chain production has increasingly weight digital technologies, the tool for data and analysis tools.

Whereas - according to the Observatory on Smart Manufacturing of Politecnico di Milano - 80% of Italian companies are aware of the importance of implementing a concrete digitization process, only 20% of these has prepared a real its internal digital piano. The intent of the

¹⁸ <http://www.confartigianato.it/sandro-tiberi/>

Digitaliani project is to make the digitizing an integral part of the manufacturing process through preventive maintenance systems, or by means of devices for energy optimization and useful to guarantee the safety standard throughout the productive activity. Exploiting, essentially, what digital can give to make more effective and efficient production flow.

3.3 "Industria 4.0" national plan¹⁹

The major industrialized countries have already taken action in support of national industries in order to fully grasp this opportunity. Italy has developed a "National Plan 2017-2020 4.0 Industry", launched by the Italian government in September 2016, and then entered the Stability Law, which provides for concrete measures based on Strategic and Complementary measures.

Firstly, as reported on "*Italy's plan Industria 4.0*" provided by the Ministry of Economic Development, the government has identified our main industrial sector peculiarities, including merits and limits:

- Industrial sector deeply based on SME enterprises.
- Few large industrial and ICT private players able to lead Italian manufacturing transformation.
- Limited number of industry champions able to coordinate the evolution process of value chains.
- Key role of illustrious universities and research centers in development and innovation.
- Strong cultural traits of finished products.

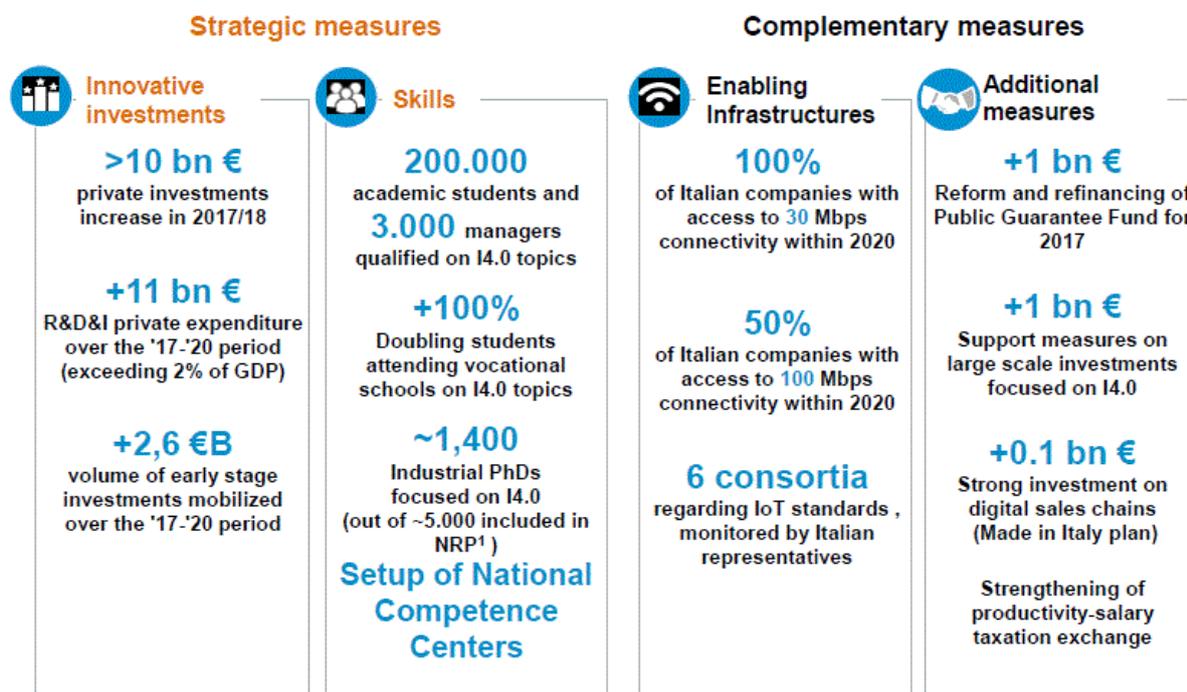
Strategic Measures consist of three main points for what concerns innovative investments: Stimulate private investments in Industry 4.0 technology drivers, Increase private expenditure in research & development & innovation, expand open innovation relationships between mature

¹⁹ "*Italy's Plan Industria 4.0*", report by Ministry of Economic Development

companies and high-tech startups. Regarding the promotion of skills and competencies development there are four main guidelines: Spread the Industry 4.0 culture through "*Scuola Digitale*"¹ and "*Alternanza Scuola Lavoro*"² programs, Develop Industry 4.0 skills through vocational training, strengthening "*Istituti Tecnici Superiori*", finance the Technological Clusters and Industrial PhDs, create Competence Centers and Digital Innovation Hubs.

The complementary measures consist in enabling infrastructures as ensuring proper network infrastructure like Ultra Broadband Plan, and also cooperating in the definition of IoT (Internet of Things) open standards and interoperability criteria. There are also several additional measures that the Government planned: provide a channel finance to support the I4.0 transformation (Private Debt/Equity, VC), support Public Guarantee scheme on investments, reinforce internationalization of Italian companies and strengthen the productivity-salary taxation exchange and decentralized negotiation. Furthermore one of the main tasks is generating interest on I4.0 opportunities and create a shared public-private governance.

Industria 4.0 national plan, 2017-2020 targets:



1. National Research Plan.

Source: Steering Committee Industria 4.0

Furthermore the government provided the digital craftsmanship rules, governing the sustainable and digital craft manufacture introduced by the law of stability for 2014 (L. 147/2013). More specifically was established in the state budget of the Ministry of economic development a fund, with a budget of 5 million euro for 2014 and 10 million euro for the '2015 in order to support the companies with common program in the development of innovative activities to operate on sustainable manufacturing and digital craftsmanship, promotion, research and development of software and hardware and the conception of the sales business models do not conventional and forms of collaboration between these realities.

Businesses that want to make use of the facilities must unite, in numbers at least equal to five, in a temporary association of companies (ATI) or temporary joint venture (RTI) or enterprise networks. The resources of the Fund, which currently amounts to 9.06 million euro were distributed through selective procedures announced by the Ministry of Economic

Development also able to enhance the involvement of public research institutions, universities, autonomous schools and autonomous entities with functions of representation in the realization of the proposed programs, or in the use of its results. With the Ministerial Decree of February 17th 2015, the Minister of Economic Development has regulated the terms, conditions and procedures for granting and payment of benefits in favor of contractors who met aggregations in order to promote innovative activities in digital and crafts sustainable manufacturing.

On 18 May 2016 the Government in Parliament showed that in 2015 there has been a number of particularly significant questions - despite the interest expressed by potential recipients of the intervention. In particular, 6 applications were filed, of which 5 are admitted to the facilities, for a total value of committed resources amounting to 2.4 million Euros.

3.4 Finance in support of I4.0, VC and startups

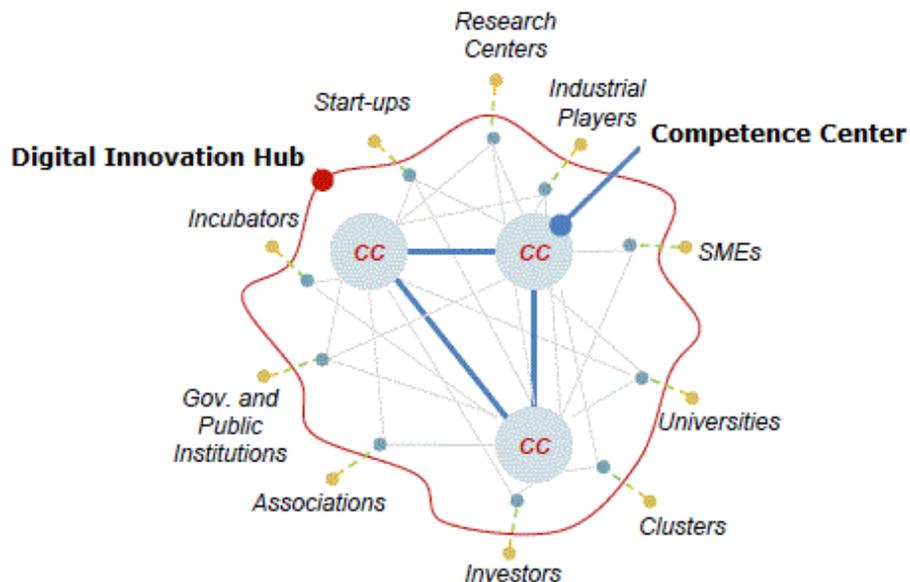
For what concerns financial facilitation for SME that are willing to invest in Digital technologies, Not only manufacturing, but also in agrifood, bio-based economy and energy efficiency. There are several initiatives carried out by the government:

- 30% tax deduction for investments up to 1 M€ in innovative startups and SMEs.
- Enablement of "sponsor" companies to buy fiscal losses of participated startups.
- "PIR" – Reduction of capital gain taxes in case of medium/long term investments on listed and unlisted SMEs.
- "*Acceleratori di impresa*" program, financing the establishment and the growth of new companies focused on I4.0 technologies ("*CDP*").
- Establishment of dedicated investment funds for the industrialization of high-tech ideas and patents ("*CDP*").

- Hyper-Depreciation: Increase of amortization rate for investments in I4.0 technologies (from 140% to 250%).

3.5 Digital Innovation Hub and I4.0 Competence Center

The involvement of small and medium-sized enterprises throughout the country and intensification of their relationship with universities and research are the two main goals of Industria 4.0 national plan. The law offers tax incentives, but also focuses on training and the promotion of excellence. In order to support the diffusion and take up of the "culture of Industry 4.0" that Calenda plan established two new entities: the Digital Innovation Hub, centers that will be on the field, with the collaboration of Confindustria and R.ETE. Companies Italy to help Italian SMEs in the transformation to the 4.0 Industry; and the Competence Center, which actually refers to some Italian universities with the aim of strengthening relations between research and industry. The government plans to invest 270 million euro for the activation and implementation of these initiatives.



Source: "Italy's Plan Industria 4.0", report by Ministry of Economic Development

The Digital Hub technology clusters are defined by the government, "*a bridge between business, research and finance*²⁰". Confindustria and the Association R.ETE. will be in charge of this project, in collaboration with Casartigiani, CNA, Confartigianato, Confcommercio and Confesercenti. The idea came from the European program "Digital european industry" of April 2016, which has provided € 500 million for Europe.

As we can see the figure above, Digital Innovation Hub might represent a slim model and concrete innovative business support with a bottom-up involvement of the territories, universities and research centers of excellence and might be a strategic asset for growth and economic and industrial development of our country. "*The main objective is to ensure that manufacturing, point of excellence of our economic system, steps from the current 15% contribution to GDP to at least 20%*" as reported by Confindustria²¹. The points of the mission of DIH Calenda indicated in the Plan are: awareness among businesses of existing opportunities in the field of Industry 4.0; Support in planning of innovative investments; Addressing to Competence Center Industry 4.0; support for access to public and private funding instruments; mentoring business services; interaction with European DIH.

It has recently been appointed the new manager of the national project Digital Innovation Hub of Confindustria Digitale: Fabrizio Gea. At present the hub led by him aims to create a network able to develop guidance services, support, feasibility studies and pre-analysis to enable enterprises to choose innovation and apply it in the time and manner that allow the highest evaluation on the technological and economic level.

The Competence centers enhance the relationship between universities and companies. They are a select group and act nationally, through university

²⁰ www.sviluppoeconomico.gov.it

²¹ www.confindustria.it

centers of excellence and large private players, with the contribution of key stakeholders (eg research institutes, startup etc., Etc.). While the Digital Innovation Hub spread across the country, the government will manage internally the Competence Centers. *"We decided to start investing in Polytechnics of Milan, Turin and Bari, SSSA, University of Bologna, Federico II University of Naples and Universities from Veneto²²"* said the minister Carlo Calenda.

The missions of the competence centers are: training and awareness on the industry 4.0; live demo on new technologies and access to best practices again as part of the fourth industrial revolution; technological advisory for small and medium-sized enterprises of Industry 4.0; launch and acceleration of innovative projects and technological development; Support for experimentation and production I4.0 of new technologies; coordination with European competence centers. The Competence Center will benefit from 100 million euro investment.

In addition to the Competence Center and the National Digital Innovation Hub, are provided by consortia Calenda Piano six deputies to the discussion on the IoT standards and an awareness roadshow throughout the peninsula, will be attended by associations, universities, companies and the highest testimonial institutional positions. All this will be managed from the control room consists of the Presidency of the Council of Ministers, the Ministries of Economy, Development, Labour, Education, Environment and a representative of the technical universities, research centers, business and trade unions.

²² www.mise.gov.it

CHAPTER 4: Global Service Location Index

4.1 The GSLI Report, assessment criterias

While the Italian digital manufacturing is still building its basis, many top worldwide corporations are investing in digital technologies, side by side offshoring investments. A.T. Kearney's Global Services Location Index™ (GSLI) provides a scenario for corporations (particularly the ones involved in robotics and automation) interested in outsourcing and offshoring. This choice involves a crescent number of offshore locations, in which the governments provide convenient labour costs in order to look attractive towards worldwide corporations. Established in 2004, the GSLI analyzes and ranks the top 50 nations as the most profitable locations for moving outsourcing productions, including IT services and support, contact centers and back-office support.

A.T. Kearney shows the results of the GSLI 2016, the main goal of the report is to provide an overall scenario of the most attractive locations where to locate offshore activities. The index, at its 7th edition, indicates the profiles of 55 countries valued on three main assessments: financial attractiveness, people skills and availability, and business environment. The most significant characteristics of these countries are measured with a framework of 38 categories, in order to identify the best countries to locate information technology (IT), business process outsourcing (BPO) and voice service.

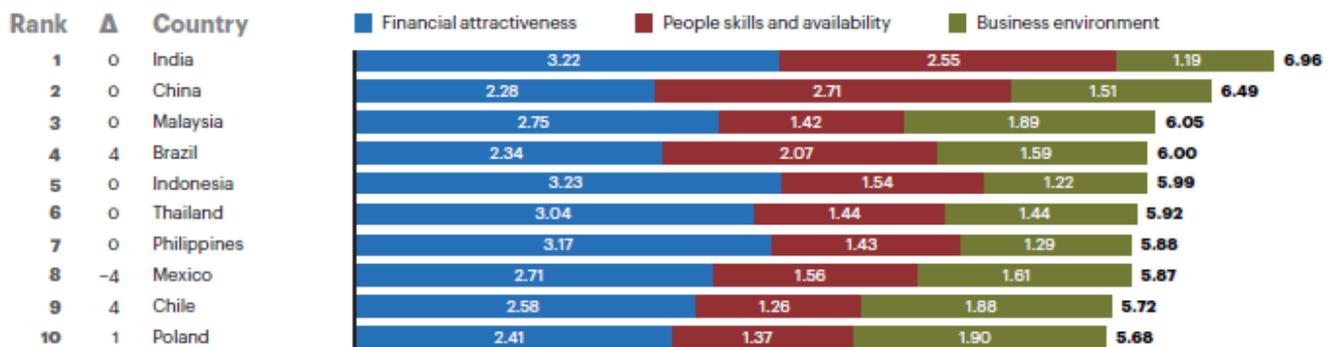
The criterias provided to evaluate location attractiveness were analysed through A.T. Kearney surveys, industry interviews and informations gained in client relationships. The relative weights of are calculated on the weight to the offshore country, from costumer knowledge and industry research. Because financial convenience is often the main reason to locate in a foreign country, financial attractiveness constitute the 40% of the weight in the location decisions report. The two categories left, people skills and availability and Business environment, worths both the 30% on the overall decision.

GSLI Assessment criterias

| Category | Dimensions | Metrics used |
|---|--|---|
| Financial attractiveness (40%) | Compensation costs | <ul style="list-style-type: none"> Average annual wages Average compensation costs for relevant positions (BPO analyst, IT programmer, contact center representative) |
| | Infrastructure costs | <ul style="list-style-type: none"> Average cost of infrastructure (occupancy, electricity, telecommunications) Blended travel cost to major customer destinations (New York, London, Tokyo) |
| | Tax and regulatory costs | <ul style="list-style-type: none"> Relative tax burden, costs of corruption, and exchange rate movements |
| People skills and availability (30%) | Cumulative services experience and skills | <ul style="list-style-type: none"> Estimated size of IT and BPO sectors Quality and skill ratings for relevant positions (quality of management school, college education quality, relevant industry certifications for IT, BPO, and contact centers) |
| | Labor force availability | <ul style="list-style-type: none"> Population ages 15 to 39 Total tertiary enrollment |
| | Educational skills | <ul style="list-style-type: none"> Scores on standardized tests to assess student performance |
| | Language skills | <ul style="list-style-type: none"> Scores on standardized education and language tests |
| Business environment (30%) | Country risk (economic and political) | <ul style="list-style-type: none"> Economic risk (overall business environment; foreign direct investment confidence levels from A.T. Kearney's Foreign Direct Investment Confidence Index™, a survey of global investment outlook of executives from the world's largest corporations) Political risk (political stability, terrorism risk, regulatory burden) |
| | Cultural adaptability | <ul style="list-style-type: none"> A.T. Kearney Globalization Index personal contact rank |
| | Country Infrastructure | <ul style="list-style-type: none"> Blended metric of country infrastructure quality (telecom, electricity) Overall local infrastructure quality |
| | Security of Intellectual property (IP) | <ul style="list-style-type: none"> Ratings of intellectual property protection ISO information security certifications Software piracy rates |

Source: 2016 A.T. Kearney Global Service Location Index

A.T. Kearney's Global Services Location Index (top 10 countries)



Source: 2016 A.T. Kearney Global Service Location Index

India is still on the run to lead the Index. Offshoring to this country is still a highly attractive perspective for many corporations, and it is the undisputed industry leader. Consider, for instance, that no fewer than five Chinese telephone corporations have declared plans to offshore R&D centers in India, which is going to become the second largest buyer of handsets telephones. These enterprises expect to hire the talent of India's engineers to develop their commodities. Huawei, the fourth largest smartphone supplier, created its first overseas R&D center in Bangalore in 1999, where at present works 2,700 engineers. In February, the company stated it will invest \$170 million in a new, eight-hectare (20-acre) campus that can host almost 5,000 engineers.

China, at the second place, is close to India in the chart, thanks to major gains in educational skills and cultural. Additionally, the renminbi's recent drop in value against the U.S. dollar should increase the country's financial attractiveness. Furthermore, China is making progress in improving governance and liberalizing financial markets. However, the U.S.-China Business Council's 2014 China Business Environment Survey found that nearly half of companies expressed reluctance to invest in R&D in China because of weak enforcement of intellectual property (IP) rights. And 40 percent say air pollution makes it difficult to attract expatriate staff to work in China, while also increasing the amount of sick leave. In any event, given the country's size and the growing number of major multinational players, China is much more likely to become significant in the BPO market as a customer rather than a provider. International companies wishing to compete for their business will need to hire staff proficient in Chinese language skills—an area where regional players such as Indonesia, with a significant ethnic Chinese minority, might have an advantage.

Malaysia (3) holds steady in the ranking, thanks to minor improvements in IP security and compensation costs that give the country a leg up over Brazil. Not leading in any category, Malaysia turns in a solid performance across the board, and that has ensured third place in the Index since its

inception. In addition to Kuala Lumpur, where Tech Mahindra is launching a center of excellence for Google Technologies, Malaysia has developed a major offshoring hub just 160 kilometers (100 miles) south of the border with Thailand in Penang, where a new IT and BPO park is being built to house as many as 21,000 new jobs by 2020.

The Philippines (7) is second only to India as a player in the global outsourcing industry, where it began in contact centers and gradually climbed the value chain to now incorporate most functions in BPO and IT. Since the 2014 GSLI, the Philippines has registered gains in its scores in infrastructure, environment, and tax and regulatory costs. Significant recent offshoring activity includes the opening of Accenture's third delivery center in the country in Ilocos to complement its operations in Manila and Cebu City. Both Convergys and Sutherland are expanding their contact centers in Davao City, which will create as many as 4,000 new positions. Davao City is just one of several tier 2 and tier 3 cities targeted under the Philippines' Next Wave Cities Program, a public-private partnership developed between the Information Technology and Business Process Association of the Philippines and the Department of Trade and Industry (see sidebar: Tier 3 Cities). This program offers the country's 100 million inhabitants new opportunities that may alleviate the need for many to migrate in search of work abroad.

CHAPTER 5: Italian Ice Cream Industry

5.1 Italian food industry 4.0

Today the food economy sector is one of the most important industries in the world in terms of turnover, (it is estimated to represent about 40% of world GDP) and in terms of labor force is estimated at around 35 % of overall workers. Currently the food system economy is going through a period of profound transformation, innovation, which will have a profound impact on the economy of the planet either directly, or indirectly through other words, the effects that food has on important areas such as health and environment.

Last two years can be considered without doubts as the years of the startup of food, the Internet of food, or food Innovation. It was, especially for Italy through Expo Milano 2015, a period with exponential increase in new projects, but it has been a year of global innovation and transformation, just consider the volume of venture capital investments reached this year with a record of 6 billion \$.

The success in the food economy depends on a complex set of factors ranging from the guarantee of the authenticity of the product, the ability to communicate, to innovate and transform production systems, which over the years become obsolete. Building a brand identity through new technologies both on the supply chain than on traditional communication skills.

5.2 Sustainability, the short supply chain.

The growth of Italian handicraft production has contributed strongly to various sectors which, although less known, have been the engine through which the ice cream business, for instance, has attained higher levels of quality and consumption.

Over the last twenty years, the compound ingredient sector - or semi-finished products - has progressively consolidated its structure, which currently consists of about 80 companies employing 1,500 employees and a turnover of over 250 million euros, Both in Italy (+ 2/4% a year) and above all abroad (+ 10% a year). For the most part, these are production companies, which sometimes also operate on behalf of third parties. Few of those who have only a distribution activity.

The technological tools are shaping a new system of production and consumption, in which consumers and producers face with change of their habits. That is why the digital revolution weights heavily on many aspects of the production chain, if you do not want to lose significant market share to "accommodate" the consumer needs through product selection, reward companies that meet their demands.

The products of this industry are many, such as fresh and exotic fresh fruit concentrates, oilseed paste (eg hazelnut, pistachios), flavor characteristics, thickeners, stabilizers, uprights and gaskets. These are products that allow ice cream makers to provide a considerable range of consumer benefits: among them, the ability to offer novelties and a wide variety of tastes, a constant quality over time, increased seasonal availability and a safe product in all Its organoleptic properties, controlled and totally absent of preservatives.

Returning to the numbers, the European Union, with Germany in the lead, is the main export market, although there is growing demand from the United States, Eastern European countries, the Far East and Australia. In general, however, both export and demand, especially in terms of new tastes, are growing, although the bulk of consumption still focuses on traditional tastes such as lemon, strawberry, chocolate, hazel and cream.

For sure the costumer perception about health and sustainability has changed radically. The striking example is offered by the food of big business based on palm oil. The massive campaign conducted via internet

by associations respectful of the environment and by associations for ethical and responsible consumption has shown the serious damage that this substance produces not only for the human being (in fact, is suspected to be carcinogenic), but also for the ecosystem and the sustainability of life of other species.

As a result of this slow but inexorable and increasingly pervasive information campaign, more conscious consumers are concerned by the use of this substance, so many industries known large retailers are protecting their image, as it happened to the first companies that stated they would not introduce more palm oil in its products, like Colussi, then a part of the Mulino Bianco, the Barilla group; other companies such as Lindt hastened to clarify that the use of palm oil comes from environmentally sustainable plantations.

One thing is certainly clear, for the first time the spread of mainstream informations has produced a change upstream in the production process by changing the inputs. large companies have been forced to choose between a more ethical ingredient and one less expensive, and they had to opt for the first choice against any criterion of cost-effectiveness; the reputational damage would be incalculable in this case, thanks to digital technology the consumer is actually reclaiming its sovereignty.

The purpose of this chapter is therefore to analyze the processes of change that are sweeping the downstream production chain, proving that this is not an isolated event, but rather a complex phenomenon that since the last part of the supply chain chain goes back up upstream, influencing the dynamics and resulting in a sort of virtual circuit in which the production processes, distribution as well as technological interacting mutually contaminate, giving rise to a system that if it is properly directed it might turn into a virtuous system.

Quality, profitability, balance between price-quantity and market niche requirements are variable rarely considered by agro-industrial companies.

Even the choices for longer period are consistent with this entrepreneurial scheme. Most of the share of investments are focused on materials and mechanization, less product innovations, a few intangible investments that are intended to create trademarks or manage the marketing and distribution. In a global competition these elements can play a key role in business success and the whole country system.

In the agricultural and food sector, the result of the long process of transformation has been the progressive depletion of the most upstream stages, that has affected the global productive chain. There are important links between manufacturing and agriculture, each provide valuable inputs (in particular on market destination).

The agriculture has a pulling function for the industry and the trade, otherwise it could be considered a marginal sector with limited bargaining power. The quality and competitiveness of the final product is intimately linked to the variety and quality, typical of the primary product.

The power of knowledge affects not only on economic decision-making processes but also particularly food policy favoring measures that new and innovative production techniques, which in the case of the supply chain means a return to the past through the rediscovery of the short chain. Short food chain is an expression that define a large field of food production-distribution-consumption configurations, such as farmers' markets, farm shops, collective farmers' shops, community-supported agriculture, solidarity purchase groups.

The short supply chain is a production process characterized by a limited number of production steps and circumscribed, and in particular for commercial brokerage, which can also lead to direct contact between the producer and the consumer. The main purpose of such a chain is to contain and reduce costs to the consumption of the products. The short chain is also the model that inspired the fair trade groups in order to recognize a fair price to producers. It is most prevalent in agriculture, especially for those

products that do not require conversion processes, such as rice or almost all fresh fruit and vegetables.

Generally, a food supply chain can be defined as "short" when it is characterized by short distance or few intermediaries between producers and consumers.

Several are the objectives pursued by the short chain, the most important are:

- Avoid the commercial mediation directly connecting the consumer with the producer.
- Reduce the geographical distance from the product to reach the consumer to encourage production and consumption at 0 km.

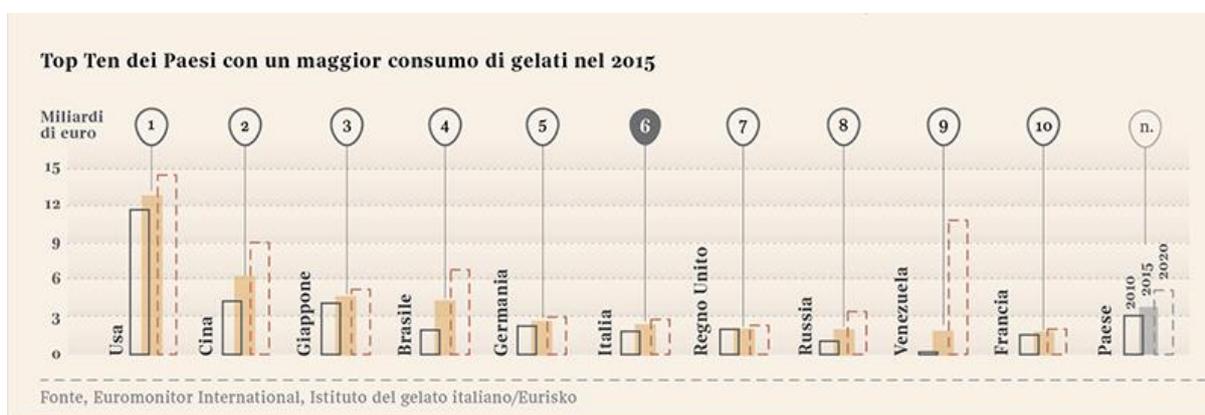
The short chain is an innovation in the agri-food distribution system. Clearly its existence did not lack of traditional redistributive function, mostly carried out by the supermarkets.

5.3 Italian Gelato business

Since 2013, Italian households' annual spending to buy ice cream cones, cups and bowls stood at 2,026 million euros, up 1% on the previous year. 2% increase also in commercial establishments: ice cream shops (including ice cream parlors, but also other ice cream shops such as pastry shops, bars, restaurants) are 38,892 with 90,565 employees. In Italy, the share of handicraft gelatoers on the population is 62 companies per 100,000 inhabitants. More than 150,000 ice cream makers are estimated. Much negligible is the value of purchases by the producers of the artisan gelatoindustry for the agri-food industry: in 2013, 220,000 tons of milk,

64,000 sugars, 21,000 fresh fruits and 29,000 raw materials were purchased.²³

The artisan ice cream is gaining a prominent role in the main streets of international capitals. With interesting growth prospects across the border not only for artisans of the icicle (150,000 people in Italy generating a business of 2.5 billion), but for the whole chain behind us, by our specialized machine manufacturers (beyond 300 million turnover) to those of semi-finished products (another 450 million revenues).



Source: Eurmonitor International, Istituto del gelato italiano/Eurisko

The national market is now saturated: there are almost 30,000 artisan ice cream parlors in the country (summing up all the ice-cream shops around the world is getting the same figure) and consumption has stabilized around 6 kilograms per capita, about 380 thousand tons year. While exports are still largely to be explored, with good prospects not only in the European, but also in the US and the Far East.

The ice cream industry's machines and ingredients are one of the most outstanding points in Made in Italy. The brands of producers are 15, with a total turnover of about 300 million euros (80% of which is export), but if furniture and equipment are also considered, turnover reaches 800 million

²³ <http://www.ilsole24ore.com/art/impresa-e-territori/2017-01-21/dolci-e-gelati-italiani-confermano-leadership-mondiale->

euros. The major export markets are in the European Union, but the demand for the US and part of emerging emerging markets grows, especially in the Far East. The ingredients and semi-finished products range from about 80 companies to 1,600 employees with a turnover of more than 450 million euros, which has grown in recent years both in Italy and abroad. The European Union, with Germany in the lead, is the main export market, although a growing demand comes from the US, Eastern Europe, Far East and Australia.

5.4 The Internationalization process of Italian Gelato.

Italy is the homeland of artisan ice cream, and this is confirmed by data on ice-cream parlors, which vary, recognizing the existence of more than 29,000 shops, of which about 8,000 can be considered "pure" ice cream, a typical national phenomenon.

Considering these numbers and comparing them with those relating to the Italian population, it is understood that the territory is well covered, with some areas, such as those with high density tourist, "sature" of exercises and proposals. This scenario does not detract from the fact that proposing new ideas in the ice cream market can still have interesting growth areas.

It has always been physiological for companies in the sector (ingredients, equipment and machinery in the first place) to look abroad as a source of development. The form of Italian artisan gelato, thanks to the existence of these "actors" in the chain, is easily exportable, engaging in the agro-food production realities of almost all countries around the world. For this reason, in the case of ingredient producers, about 50% of the turnover is export oriented, while in the case of machines and equipment, given the saturation of the domestic market, the export data is even higher.

At present it is estimated that the number of ice cream parlors outside our borders is equivalent to half those, with a total number of about 70,000 exercises, interesting quantity and enormous growth potential especially in developing countries.

For example, in the case of equipment operating in China or in Italy it does not change much, in the case of ingredients the local tastes must be well-considered. Keeping China as a reference, we must, in fact, consider a millennial education based on a completely different diet from ours, with a different perception of sweetness (both palate and sometimes "psychological") of creaminess and taste. The process of exporting ingredients can not therefore be ignored by a process of customer information and education.

While many products are customized for export, it is also true that the identity of Italian gelato does not have to be distorted to suit local tastes. When this happens, the product has suffered a rapid decline and has not had the expansion that could be expected and this should be an example for all the operators (from craftsmen to companies) who are preparing to bring their expertise outside of national borders.

5.5 Franchising practice related to Ice Cream business

Franchising is an organizational form in which a franchisor allows a second franchisee to sell goods or services with the franchisor's brand and to use its commercial practices²⁴.

This is a contractual relationship between two companies: the first one that has had a good commercial success and intends to develop on the national or overseas market, creating a distribution network across the country and imposing its brand image; The second one that seeks out the name, reputation and experience of the first company.

The franchise can therefore also be seen as a concession of the brand, products and services, means and methods created by the franchisor's experience with the franchisee, subject to payment of an appropriate fee.

²⁴ Combs, Ketchen 2006

The franchisor allows the franchisee to use his own commercial formula, which includes the right to exploit its know-how and distinctive signs (name and brand) so that the franchisee can handle their business with the same image as the franchisor. For its part, the franchisee undertakes to use and to reproduce the franchisor's trade policy and image, in the mutual interest of the parties and the final consumer.

The know-how it is referred to as "a complex technical and specialist knowledge that they favor the attainment of economic objectives [...] and which represent an economic value and as such is susceptible to transfer from one legal entity to another. Secrecy is an essential element of know-how, both before and after the contract. However, franchisees can not be forced to use the know-how directly, since they will be a well-acquired asset"²⁵.

A significant element of this type of contract, which makes it different from all others, is the independence of the two parties: the two entrepreneurs cooperate but remain autonomous, even if bound by mutually binding contractual obligations. A contractual constraint is the layout and design of the point of sale, because each store is structured as the main one and can be run by both a parent company manager and an independent entrepreneur, as if it were a property store franchisee. The latter are legally and economically independent entrepreneurs one by one. The shops use to be open far from the headquarters and close to the customers.

So when companies expand geographically, the need arises to know the local market to identify the appropriate positions and evaluate their conditions. By using franchises in non-family locations, the firm has to rely on market research and franchisee experience as they know better about the specific needs of the site. Because a single company enters a franchise system, it must find this new type of contract convenient, and it becomes only if the expense, constituted by the right of entry and the fee, is lower

²⁵ FIPE, 1995

than the net additional revenue that results from the participation in all Initiative.

The franchise can also be effectively used in the pastry-ice cream industry, and the general characteristics take on more specific features. The most important aspects are the simplicity and replicability of the products. These two characteristics are interconnected and refer to the preparation of products that must be identical in all chain stores. The first aspect puts emphasis on preparation while the second on the quality of products distributed to customers. The products must meet the following criteria to be recognized by the customer as characteristic of the chain: readiness, quality, availability of ingredients, food characteristics, nutritional quality, packaging and delivery.

The first feature relates to the fact that the product must be served in a short time and therefore the preparation procedures must be simple and easy to understand by each employee. Product quality (perceptive, nutritional and hygienic) must be uniform throughout the year and not be affected by procedures, seasonal variations or location of the point of sale. However, product quality must remain high, whatever the production and service conditions.

Availability of the ingredients refer to the variety that must be standard and have specific peculiarities. Product performance depends to a large extent on the precise use of the ingredients in the predetermined quantities. The characteristics of food must be the same in all chain stores and cater to consumers. The most significant characteristics of food are the color, texture and shape, consistency, flavor, preparation methods, temperature and presentation.

Another feature that the product has to meet is the nutritional quality that must always be placed in the forefront of consumer choice. The last three important things to consider, around which the entire chain activity is

based, are customer preferences, packaging and delivery, and ultimately cost, because they point directly to customer satisfaction.

After analyzing the entire franchise system, however, it is appropriate to consider some of its limitations. These are mainly found in the internal environment and are the weaknesses on which the two professional figures need to pay attention. They derive from an erroneous interpretation of the formula by the two actors and are: opportunism, lack of professionalism and lack of innovative and lasting ideas. An effective franchise network must create a good or innovative service that is easily replicable by franchisees, but it is difficult for non-members of the network to do so. It must require forecasting and organizational skills and, being composed of several participants, must aim at mutually beneficial returns for everyone over the long term, given the duration of the franchise contract. A short-term return can be a sign of opportunistic behavior by one or both of the actors, and this can undermine the stability of the entire chain and does not allow for a lasting economic-financial balance.

The franchisor must opt for incentives or other methods that make goals meet, while the franchisee must behave ethically correct. On the economic level, however, a difference of intent is obvious, but problematic: each of the two parties would like to increase profits often at the expense of the other. For example, the franchisor might want to increase sales outlets and thus expand sales by maximizing the franchisee's production level by limiting their fixed costs or management costs; The franchisee might want to reduce the costs associated with day-to-day management or modify the directives given by the head office or may want to limit its costs by reducing some of the ancillary services.

Both objectives can lead to excellent results in the immediate aftermath, but create long-term damage both at the point of sale and the entire system. The most serious damage that compromise the life of the chain are the alteration of the image built over time and the betrayal of customer expectations. The severity of these shortcomings lies in the fact that a

mechanism is triggered that, once lost loyal customers, it will be very difficult to retrieve their trust and interest in the chain.

The opportunistic behaviors mentioned above often accompany the non-existent professionalism. An example can be found in a disastrous sales point management, or in management practices that are more related to immediate results than long-lasting results. It should not be forgotten that the franchise contract is of "idiosyncratic" type: it is a mix of ideas, people and goals and for this reason the parties are obliged to act strongly interdependent. To carry out such a complex project, though the shades of simple collaboration require long-term investments in specialized resources for all stakeholders.

So the basis for success in this type of contract lies in the great professionalism and lack of opportunism of partnership, from the top to the foundation of the organization. Last but not least, the innovation is a value added: the franchisor should be able to concretize and then convey an innovative know-how, enabling customers to recognize it among all other business activities.

A danger that always underestimates this type of activity is the alteration and possible exasperation of the same positive features, such as the franchisor-franchisee trust relationship and the excessive prevalence of the external aspects of the business, such as the image and the brand, compared with management.

This contract can lead to excellent economic results and visibility, but at the same time, if managed badly, it may lead to high risks. It is therefore essential to balance the objectives of the franchisor and the franchisee and mutual trust among the players of this type of contract.

5.6 Italian trends and mainstream brands

In the ice cream world there are chains that can not be defined as handicrafts although they adopt innovative formulas. The most famous is Grom, a company that produces industrial ice cream using handmade

ingredients. The chain was purchased by the Unilever multinational. In Italy there are other popular franchisings such as: La Romana, Crema & Chocolate as well as minorities with few stores. Grom is the most prestigious and famous name in the industry and also the one that has conveyed the Italian ice cream in the world, opening dozens of venues in Italy besides those in New York, Paris and Tokyo. The Italian business ice cream shop has been particularly developed in Asia over the past few years. For example the Mec3 business case, which has established a non-equity joint venture with the Chinese partner Bright Food, for the opening of a Iceason brand ice cream franchise, the case of Creme Milano, which has implemented a Direct investment by opening an ice cream parlor and then developing a licensing, and finally the case of Grom, which is considering entering the Chinese market, in the form already started of the international franchise.

Grom ice cream parlors are 56 in Italy and a dozen abroad, those under the sign of La Romana are 35, of which 1 abroad. Grom manages them directly, La Romana, save the historical flagstores, in franchises. So while offering the same kind of good, it is run with two different business models.

Grom's operational management produces 606 thousand euros of profit, compared with 24 million euros, while La Romana produces 542 thousand, compared with a turnover of just over 5 million. Grom manages its stores directly. Which means that it has to afford all the costs: raw materials, personnel, rentals, equipment, etc.

Romana, except the historical flagstores, developed its stores through the franchise. The outlets open to other entrepreneurs that bear the costs. As a result La Romana managers are only concerned with verifying the quality of the product and whether the service is in line with their standards.

5.7 Handcrafted Italian Gelato and semifinished ice cream production, differences and issues.

For a few decades, market policies for artisan ice cream have shifted from the hands of ice-cream makers to those of the industry that supplies them, inevitably leading to a standardization of the product.

Following the artisan vision, ice cream maker should not be only an "assembler" of ingredients but must return to be the carrier of a food culture that must be of excellence in its content and must do it in the best way, with regard to the new market needs and aimed at the welfare of customers and themselves, as an entrepreneur.

Following the information provided by the association "Gelatieri per il Gelato", a cultural movement created by the professionals in the field of gelato, we may define the Italian handcrafted Gelato:

"The Artisan Gelato Food of Italian Tradition is the optimal result of freezing and contemporaneous stirring a mixture of genuine, natural, preferably fresh ingredients and high quality food ingredients. These elements are chosen, balanced and expertly mixed by the artisan ice-cream maker in his laboratory Production according to its originality and creativity. The Gelatiere Artigiano is the skilled professional who knows the technical details to balance the ingredients for the production of an optimal product, knows the organoleptic and functional properties of both the basic ingredients and the ones reserved to characterize the ice cream. The artisan is aware of the thermal fragility of its products and embraces the necessary skills in the management of production processes using machines and equipment available for production, storage and sale in the best ways by treating the quality of their products up to their consumption. Any product that preserves the structure and texture of the ice cream at a temperature higher than zero degrees Celsius cannot be considered as Artisanal Ice Cream Italian Tradition."²⁶

²⁶ Definizione di Gelato Artigianale e di Gelatiere Artigianle, <https://gelatieriperilgelato.com>

“Only by cold pressing through mixing and simultaneous freezing of the mixture, the characteristic consistency and softness of the product are achieved. In that stage the product is intended for sale and consumption. The Artisan Gelato of Italian Tradition has in our country the land of choice where the Artisan Gelatiere finds its ideal realization, especially in the use of typical ingredients of the territory.”²⁷

For artisan ice cream of Italian tradition is a food preparation brought to the solid and pasty state by mixing and contemporary freezing of all ingredients used with genuine, natural, preferably fresh ingredients and high quality selected, balanced, blended ingredients Knowingly from the artisan gelato maker in the production workshop.

The blend of handmade Italian ice-cream ice cream is produced with certified ingredients and traces including fatty matter mainly from fresh milk, fresh or pasteurized eggs from ground or organic and sugar-based breeding. It may not contain added flavorings (except those obtained naturally by infusion or maceration of natural products), dyes, GMOs, hydrogenated vegetable fats or additives, excluding food additives of natural origin, which are not chemically processed and considered safe by EFSA in quantities Indicated by law. The use of powdered milk is only allowed for protein supplementation of fresh milk and not in its substitution. The use of unhydrogenated vegetable fats such as cocoa butter or cold squeezing oils, such as olive oil (EVO), hazelnut, walnut, almond and coconut oil are permitted if used Such as, less than 50% of total fat.

The family of the semifinished ice cream compounds can be divided in the following areas:

High-weight semi-finished compound. Those powdery, liquid or liquid products made up of several elements that are suggested by the manufacturing industries for their use in addition to 7% of the ice cream recipe and which also contain natural flavorings or not. This category

²⁷ <https://gelatieriperilgelato.com>

includes bases 100 (that is, used at 10% per liter of recipe (or water) of the recipe, and higher, liquid frozen ice cream mixtures and complex flavoring pasta.

Low-weight compound semi-finished products. Those powder products made up of different elements that are indicated by the industry for use between 0.6 and 7% of the recipe. This category includes bases 50, powdered concentrates of yogurt, cheeses or other similar products, and so-called supplements (of proteins, fibers or emulsifiers).

Concentrated semi-finished products. They are lyophilized liquids or industrial concentrate powders that are recommended for use in a range of 1 to 5% of the recipe and are used to flavor ice creams (eg mint, licorice, coffee, biscuit, but also pasta Lyophilized, concentrated and pasteurized fruit, etc.).

Semi-finished products in purity. These are mainly industrial pastes made from roasting and milling of dried fruits, to which no other ingredients (no flavors, no sugars, no coloring or additives) are added. Powdered milk and sugar can also be included in this family.

Pastry semi-finished products. This family includes those handicrafts or industrial products that can be marketed to be consumed as such but which can also be used as ingredients in the aroma of ice cream. Some examples are: candied fruit (citrus, chestnuts, etc ...), nougat, biscuits, chocolate. Notwithstanding their intrinsic characteristics of salubility, organoleptic quality and traceability (no GMOs, hydrogenated fats, dyes, aromas and intensive cultivation oils).

Neutral pure compounds. Powder blends of different types of stabilizers that may or may not contain emulsifiers. These products are typically used in a range of less than 0.5% on the recipe. They do not contain aromas but only a balanced stabilizing nucleus to give structure to ice cream or sorbet.²⁸

²⁸ <https://gelatieriperilgelato.com>

The mix of artisanal ice cream based on Italian water-based (or sorbet), in addition to containing drinking water and sugars, is prepared with certified ingredients and traces including fresh fruit, preferably seasonal, preferring local produce. In the preparation of Italian-based water-based ice cream (or sorbet), the use of semi-finished products is regulated in accordance with the following provisions: High and low-weight semi-finished products (excluding natural fiber mixes) and semi-finished concentrates. Neutral compounds are permitted, provided they do not contain chemically processed additives or derived from hydrogenated or animal fats. It is allowed to use frozen fruit in purity or in puree without additives. In addition, colorants and aromas are prohibited, with the exception of natural flavors.

CHAPTER 6: The case study of Gaya Gelato Lab



6.1 Company history.

At the end of the 1990s, Stefano Grandi was a successful entrepreneur. CEO of Motor Power Company, an international company specialized in industrial engines production, has always had a particular attention to artists and craftsmen: "I have always been concerned about art and artists, I have always financed many of their creations without asking for anything

in return [...] However, I understood that the artistic sector is also victim of ruthless market laws that lead to penalizing artists and creating vicious circles, just as it does in many industrial sectors in Western countries. I decided to look for place in the world that could welcome artists wishing to experiment, and creating all the infrastructures for this to happen. The choice was the island of Bali, where was born Gaya Fusion, a creative incubator supported by values such as respect for human beings, Craftsmanship, sustainability, harmony with the environment. "²⁹

Among the various creations developed, it is worth mentioning the ceramic production of all kinds, a production based exclusively on manuality, without any automatic process.

"We cannot produce with industrial processes," says Stefano Grandi, "because it would be the destruction of creativity. For example, we rediscovered and protected ancient Japanese processes, from which we understood how to produce by allowing nature to make its course with its time and wait. Today, this project provides internationally renowned clients such as Aman Resorts, Cheval Blanc (Vuitton Group), Armani House, Bulgari Hotels and Resorts, Four Seasons, Ritz Carlton, Donna Karan - Urban Zen. For our clients we provide emotional products for their environments, communicating culture, tradition, territory"³⁰.

The vision of Stefano Grandi's ice cream is due to the profound awareness and the central role of the artisanal dimension for the revival of sustainable development of the territories. However, the craftsman's role is jeopardized by multinational business dynamics that go in the opposite direction. In addition, often the initiatives of green marketing are often superficial operations, so that nothing really changes in that sector.

"So when I started looking at the world of artisan ice cream - says Stefano Grandi - I was disappointed by what I was seeing [...] the current industry

²⁹ ³⁰Rino Panetti, Theory U. La magia dell'innovazione profonda per competere nel futuro, 2015

imposed the sale of ice cream as an emotional sale, damaging the ice cream itself. To be clear, two of the most dangerous things for ice cream are light exposition and temperature fluctuations. Now, I will tell you what happens usually in an ordinary ice cream store: Once the ice cream is made, it is brought to a showcase, causing continuous heat exchanges. When it is opened, the fridge compressor starts to work, which increases and decreases the temperature, leading to high energy consumption, fluctuations temperature that damage the environment, use of high power air conditioners in order to expel the hot air produced by the compressor of the fridge.”

After the showcase, the ice cream is moved to an additional freezer, while the other one has to be meticulously cleaned, washed and disinfected with chemical products.

All these processes have been influenced by the common bias of the ice cream business which suggests that ice cream has to be exposed, in order to look attractive to the clients. On the other hand, the result is that light exposition causes the surface oxidation of the ice cream, and temperature fluctuations damage ice cream in its heart.

A clear example of how the sense of craftsmanship is lost concerns the confusion, created by the sector, between the true artisan gelato and the ice cream produced with powders and semi-finished products. These powders are a mixture of powdered milk, stabilizers, thickeners and dextrose, to which the ingredients and flavours are added. 90% of the “Geletarie” acquires these powders already worked by industrial suppliers³¹.

Roberto Lobrano, Training Courses Manager of Gaya Gelatolab, long and widely experienced consultant in ice cream business, states that "the problem is not related to the use of powders, but to the correct balance of sugars, milk proteins, cocoa powder and possibly stabilizing flours. The truth is that 90% of operators today rely on semi-finished companies to

³¹ Rino Panetti, Theory U. La magia dell'innovazione profonda per competere nel futuro, 2015

delegate a major part of their work: the choice and balance of ingredients that characterize their own recipes. This decision is not even economically convenient, since it is more expensive to use industry-based bases rather than assemble recipes for themselves, but it is the result of some sort of professional laziness or lack of professional expertise. Over the years, the artisan craftsmanship has been transformed from research and taste to a mere assembly process of simplified industrial flavorings, according to manufacturers of machinery and furnishings, with the clear aim of simplifying the processes to provide the largest number of business activities, fueling an increasingly standardized supply market and low professional profile. We almost came to the extinction of the category holding the "craftsman" knowledge.

Today, we are at the stage where the awareness of some ice cream-makers about the product culture and the respect for the territory is being reborn. These ice-cream makers are aware that their work is a service related to respect for the nature, seasonality, health and taste of its customer. The ice cream created by industry is at the brink of collapse caused by its own indiscriminate development."³²

However, we must clarify one important thing before proceeding: Gaya Gelato is not a company that produces ice cream equipment or an ordinary ice cream franchising, but the expression of a new 360 degree business model aimed to anyone who wants to enter this industry and share the same company values. "In our project, we are the ice cream makers!" Stefano highlights. In fact, Gaya Gelato proposes itself as a partner, providing part of the financial resources, all the technology needed, patented and customized by the company (we will look at that later) and all the know-how (training, image, communication, strategies, processes). A sustainable partnership whose goal is to spread the craftsmanship and natural ice cream of Italian tradition.

³² Rino Panetti, Theory U. La magia dell'innovazione profonda per competere nel futuro, 2015

6.2 Company Profile

Gaya Gelatolab is an Italian company with an international attitude, which operates in the Natural Ice Cream Italian tradition. Born into a culinary experiment started in the island of Bali in 2008, Gaya Gelatolab Srl officially opened in 2016. Currently the company has opened 10 stores in the Indonesian island and 3 in Jakarta, laying the foundations of a franchise network, supported by a laboratory Centralized for the production of ice cream.

For what concerns the business administration structure, management board is composed by 5 members: Umberto Bastianello (CEO), Stefano Grandi (CEO of Motorpower Company), Roberto Lobrano (Training Courses Manager), Carlo Catani (Sustainability Expert), Rita Chiericati (Product Manager & Business Development). The company has one collaborator in Italy for what concern the IT, Alberto Cavazzoni, then there is an operational office in Bali, headed by the General Manager Giorgia Oronte, 4 employees in the administration office and 1 Purchase Manager that coordinate the employees within the stores. Regarding the R&D, Gaya collaborates actively since its born with Motor Power Company (Stefano Grandi is the CEO), the result of this partnerships is "Principessa", an innovative ice cream batch freezer on which we will focus on.

Gaya Gelatolab's preparations have first-class quality features, mainly because the raw materials are selected from the best local, national and international producers, with particular attention to organic and fair-trade farming and the leaders of the Slow Food circuit excellences.

The company launches in every area of intervention a search for excellence providers with whom it establishes trade agreements, so as to ensure quality, consistency and appropriate economies.

The fruit is purchased from well-chosen direct and local producers. Milk and dairy products are provided by quality reference dairies and direct product control. The dried fruit is purchased from the producers and processed on

site whenever possible, thanks to modern and compact machinery. Fresh eggs from organic farms are used. Semi-finished products that can not be produced directly are chosen among the market's excellence. Selling media are eco-compatible or biodegradable.

Gaya is a dynamic business model, open to many types of partnerships and collaborations, offering human resource training, outlet setting up and furniture, recipes that belongs to the Italian Gelato culture, analysing and selecting local suppliers, managing storage. All fo these services are concistent with the idea of producing and promoting the culture of the handcrafted Italian Gelato. Fresh ice cream is daily transported in every Gaya Gelatolab store, strategically integrated with local business.

Increasing the value of the territories, new approaches to the artisanship of Italian ice cream, innovation and technological and distribution optimization are our drivers for generating balanced and sustainable food models. Through direct contact with the consumer, the company wants to revive and convey the ancient values of a genuine ice cream that has become time-consuming. Infact Gaya gelato makes use of high quality organic ingredients, mostly offered by the territory in which they operate, with the aim of transforming them into natural handicraft products, characterized by the Italian know how of ice cream making.

Paraphrasing the slogan "Earth, Heart, Art" the principles on which the project was founded Gaya Gelatolab are: quality, equity and innovation.

For what concerns the training of employees and spreading Gaya know how, beyond the use of local and organic ingredients as we said, there is a strong culture and experience of Italian Gelato makers represented by Roberto Lobrano, Training courses Manager of Gaya Gelato.

Roberto Lobrano is a freelance and marketing lecturer at the retail store in various schools in Italy and abroad and has been consulting since 2001 at an international level. He was one of the senior lecturers of the Carpigiani Gelato University in Bologna, collaborating with the University of Perugia

flavors and with the Gelateria Italian School. In 2010 he was the director of Gelateneo, the classical ice cream school in Icemteam group 1927.

Since 2001 he has been co-operating internationally with craftsmen and industry professionals in the opening up of new business and in developing business strategies for improvement and success. Furthermore, he is a member of the Masters of Italian Ice Cream Association and is among the founding members of Gelatoires for Ice Cream with Luca Caviezel, Carlo Pozzi and other illustrious Italian ice-cream makers.

The experience of Roberto Lobrano with tropical ingredients, tipycal of the Indonesian agriculture, is the prove that the real value of the Italian ice cream is not necessarily in the ingredient of Italian origin, but in the "Italian" technique of knowing how to transform a good local ingredient into an excellent Italian "ice cream".

Thinking that Italian ice cream abroad is only representative of import products might be limiting. As Lobrano states "It is right to support our quality productions in Italy, but it is equally good to value the territories that host us and integrate ourselves with local culture"³³.

For this purpose, Gaya Gelatolab seeks to stand out from the ice cream industry prepared with industrial semi-products, using the human resources and natural raw materials of the territory. Through our choices we will participate in the implementation of a food and one consumption model healthy lifestyle.

Regarding the innovative and technological side of the company, the technical team has designed during the last 6 years, in collaboration with Motor Power Company and BRX, the mantecatrice "Principessa" characterized by a Direct Drive technology, useful in the phase determinant of preparation of ice cream, which has brought with it an advantage competitive strategy and new business opportunities:

³³ Source: <http://www.foodmakers.it/intervista-al-dott-lobrano/>

- A central laboratory, highly productive and able to provide at least three outlets, in order to multiply penetration potential of product, enlarging the geographical area of interest.
- Recipes tested and original, provided through a software connected to the balance of laboratory. A collection of carefully selected recipes balanced, putting together the culture of Italian gastronomy and organic products of the local area.
- Use machinery with technology Direct Drive that allow drastic reduction in energy and water, without the need for water for cooling.
- Realization of a layout productive ergonomic and efficient, for a capacity production of at least 200 kg per day.
- No need to use blast chilling because the ice cream is whipped in cylindrical bucket and transferred directly in the sales counter without undergoing thermal shock.
- Use display counters in showcase cockpit with original design, in order to achieve high efficiency and stability of temperatures.
- Network of suppliers selected for the characteristics of quality, vocation to organic, ethics and proximity to the territory, benefiting from a high capacity contractual and a provenance guaranteed commodity. Particularly with this aspect, the role of Carlo Catani, director of the first University of Gastronomic Science, is essential regarding the selection of suppliers.

Gaya wants to communicate a lifestyle rather than a simple commodity, like the need to adopt sustainable and healthy diet, respecting the environment and well-being. In this perspective, Gaya Gelatolab wants to stand out in a particularly positive way the ice cream industry made with industrial semi-finished products, using the human resources and materials raw natural

territory. Through conscious choices Gaya Gelatolab participates in the implementation of a food consumption pattern and style healthy life. A company that wants to be on the consumer side, offering natural preparations and giving the possibility to choose the products that best adapt to their diet, whether they are allergic, intolerant, vegans, or admirers of a balanced and healthy diet.

The Representative Office has recently opened in Bali (Indonesia) that will follow existing relationships with P.T. Gaya Gelato, distribution companies in Bali (Indonesia) and P.T. Gaya Gelato Indonesia, distribution companies in the Jabodetabek (Jakarta, Bogor, Depok, Tangerang and Bekasi), which, with its 30 ml of inhabitants (2014 census), is today the most populous metropolitan area in Indonesia and second in the world.

The decision to locate in Indonesia is the result of a series of logical consequences, intuitive and strategic. Firstly, the territory was well known by the founders, then it was considered a virgin place for ice cream business (when they were thinking about Gaya Gelato, it did not exist any gelato parlours), rich in raw material (tropical country), of great culture, where you can experience the real flavors. "Today paradoxically – states Umberto Bastianello, CEO of Gaya Gelatolab - the taste of natural ice cream is hard to be appreciated by the market in Italy, for standardization imposed by industry"³⁴.

Gaya organizational structure is, today, elementary but mentally set to growth. It is characterized by:

- A division of the horizontal work with a concept of Job enlargement extremely stressed out.
- A use of the grouping in all its phases (according eith input business process) highly variable, with the election of different project managers as needed (thus reinforcing the horizontal relationships)

³⁴ Interview with Umberto Bastianello, CEO Gaya Gelatolab

- A hierarchy with a span of control as wide as possible, even in the presence of a company newly formed.
- A centralized coordination in the figure of the CEO

The project was launched in 2008 as a classic production system and evolved, giving life to an innovative and unique business delivery model that provides a central laboratory in delocalized controlled areas. The mixtures of ice cream or the whipped cream are delivered in the corresponding outlets, using their own logistics system and ensuring the classical genuineness of a fresh product.

The company offers modular sales systems. A point of sale could be connected and unplugged to the production lab and could have one of the following layouts:

- Flag store: Store with large yards, located in the old town or in high passage areas. It offers ice cream served in cup, cone, bowl or dish, granite, biscuit and merchandising items labeled Gaya Gelatolab. To complete the customer shop experience, the company makes available the Wifi service and any reading corner, event space and tastings.
- Productive Flag store: Similar to the flag store and equipped with a backpack with shrink pads that allow the production of liquid blends instead.
- Corner: Minimal structure with a service desk for ice cream and biscuit for emotional shop. Ideal for shopping centers or restaurants and accommodation facilities.
- Productive Corner: Minimal structure similar to Simple Corner. Equipped with a service desk and a backpack with dryers for the production on the spot of liquid blends.
- Catering: Mobile structure for ice cream distribution during special events, such as parties or business events. This is a battery-powered unit.
- Horeca: Gourmet ice cream, vegan and biscuit delivery service for hotels, restaurants and other facilities.

- Temporary Store: Pop-up sales point created for certain periods of the year. Layout designed according to seasonality and precise circumstances.
- Emotional shop: Shop with special design to be placed in valuable landscaping areas, fully energetic self-sufficient and capable of providing gelato and other Gaya Gelatolab products.

The entrepreneurial purpose of Gaya is to open a new, sizeable gap in the world of ice cream: no longer a market divided and controlled between on the one hand, manufacturers of technology and other, industries preparations but growth and achieving an extremely important position in the frozen landscape, craftsmanship. "The handicraft product must once again be the leader in this market" as the CEO Umberto Bastianello states. This evolution might be possible only in a completely revisited key, with a technical and commercial organization in production and marketing, a vision in national development and that can not compete with the capabilities of a multinational. For this reason was born Gaya Gelatolab, to bring into the world a handmade product and the Italian culture of know how in the ice cream business.

The Gaya Gelatolab preparations and recipes have high qualitative characteristics, mainly because the raw materials are selected from the best local producers, national and international, with a focus on organic agriculture and fair trade and the deans of the circuit par excellence Slow food. The company started in each area of intervention a looking for excellent suppliers with which establishes the trade agreements, so as to ensure quality, consistency and adequate economies.

The fruit is purchased from direct and local producers, carefully selected. Milk and dairy products are provided by dairies choices of reference for the quality and for the control Product direct. Dried fruits are purchased from producers and processed locally when possible, thanks to modern and compact equipment. They use fresh eggs organic farms. The semi-finished

products that can not be produced directly are chosen from among the excellence of market. The sales supports are eco-friendly or biodegradable.

6.2.1 Indonesia: country overview.

For what concern the territory, data confirms Indonesia as the main Southeast Asian economy, with GDP growth of 4.8%, which - albeit slightly down on 2014 - identifies the country as one of the most promising in the area. This success contributes to a population of 255 million people and a stable democratic order that contributes to maintaining the confidence of international markets towards a harmonious development of the country in the medium to long term³⁵.

The Indonesian economy enjoys good solidarity thanks to the breadth of its domestic market, characterized by growing private consumption and increasing investment. Generally, the economy of the country is less dependent on the performance of the international economy rather than other countries in the area, distinguishing itself from relative resistance to any downturn in international demand.

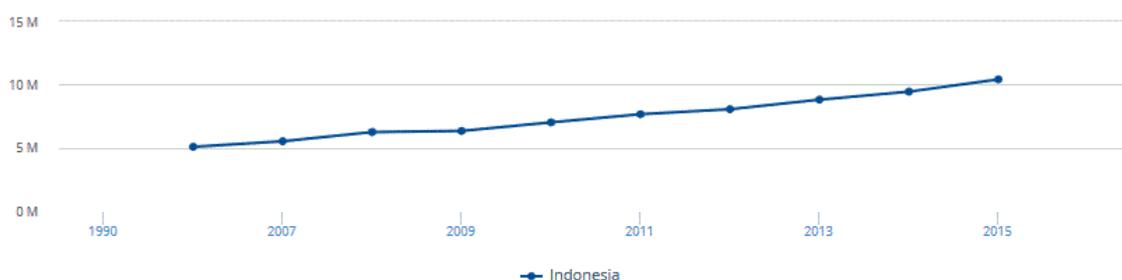
Below we can notice the main economic indicators related to Indonesia: We may underline a sensible growth of PIL and trade balance (namely Bilancia commerciale) which is, in national accounting, the amount of imports and exports of goods recorded in a country. The balance of trade balance corresponds to the difference between the value of exports and imports of goods.

³⁵ <http://www.infomercatiesteri.it/public/images/paesi/129/files/INDONESIA>

| (In dollari) | 2014 | 2015 | 2016* | 2017* |
|--|---------|--------|--------|--------|
| PIL | 888,5 | 861,8 | 940,9 | 1.076 |
| PIL pro-capite | 3.533 | 3.362 | 3.620 | 3.905 |
| Crescita del PIL reale (var %) | 5,2 | 4,8 | 5,3 | 5,2 |
| Consumi privati (% PIL) | 5,3 | 4,8 | 5,0 | 5,5 |
| Debito pubblico (% PIL) | 25,9 | 27,8 | 28,5 | 28,9 |
| Investimenti diretti stranieri | 39,7 | n.d | n.d | n.d |
| Bilancia commerciale (milioni di dollari \$) | 6.982 | 13.281 | 12.372 | 13.088 |
| Rating OECD sul rischio Paese | 3° cat. | | | |
| Inflazione (%) | 6,4 | 6,3 | 4,3 | 4,7 |
| Disoccupazione (%) | 5,9 | 6,2 | 5,8 | 5,6 |

Source: World Bank, EIU, IMF

Indonesia International tourism, number of arrivals of non-resident tourist at national level:



Source: World Development Indicators

For what concern the WTO, Indonesia has been a member since 1995, chaired by the Group of 33 Developing Countries (G-33) - which wants to maintain adequate agricultural import tariffs and safeguard mechanisms for the production of raw materials Sensitive first - but basically has a cautious opening attitude. More generously, Indonesia does not seem to adopt protective measures unless it is in the case of international crises (1997-98 financial crisis). The 2011 turmoil has emphasized an attitude of national product protection, through some non-tariff barriers (foodstuffs) and technical and health regulations. Nevertheless, in terms of the average level of import tariffs, the country has been declining since 1998: average import tariffs fell from 9.24% in 1998 to 7.49% in 2010.

6.3 Mission and values

"It is the voice of responsibility – as Umberto Bastianello states - which has developed this idea, the knowledge that the standardization of food and taste due to the massive production, are the main causes of the destruction of our planet, its biodiversity and culture. Economic growth in itself is not enough, the development is real only if it improves the quality of life in a sustainable and fair way. The flavor of natural products, respected and processed by skilled craftsmen, changed from time to time; we must learn again to understand the differences, and appreciate them for this, and the ice cream is certainly, as a product, one of the greatest ambassadors of these concepts, because it embraces children and the elderly, and has no limits or cultural, nor religious".

Enhancement of the territories, new approaches to the craftsmanship the Italian gelato, innovation and optimization level technology and distribution are the main drivers to generate models balanced and sustainable food.

Through the direct contact with the consumer, Gaya Gelatolab wants to revive the ancient values of a genuine ice cream that has been transformed over time. In fact, the company promotes local ingredients and high organic ingredients quality with the purpose of subsequently turn them into handmade natural products.

The mission is to offer to customers a natural product characterized by transparency. Through the use of excellent ingredients, attention to consumption, enhancement of the territory and the transmission of "Culture of food that is good, healthy and fair" in a light innovative industry.

The communication to the final consumer is a very complex part. The main goal of Gaya is to transform customers into consumers aware and sustainable but the danger is that the use of specific issues related to sustainability issues are likely to create cognitive dissonance large customers and then move them away from the product. The ideal communication is based on a few simple and clear messages, related to

artisan preparation procedures and slowness, understood as the right time, these processes require the use of the majority of local raw materials so that they do not travel and pollute less, and the use of environmentally friendly lightweight packaging.

The second level of investigation is related to the formation of the staff so that they can know in the whole Gaya ice cream and is thus able to provide customers-consumers with useful and interesting information on sustainability issues. In addition to this, the third level of detail is the organization and the proposal of real courses for customers-consumers, related to sustainability together with the tasting and evaluation, including technical, product. It is only through the consumer-customer training and their awareness on issues dear to us, you can get a real paradigm shift that can make winning our product, our ice cream.

The sustainability of Gaya ice cream goes hand in hand with the authenticity of the ingredients used. The genuineness is commonly considered a prerequisite for the homemade ice cream, but actually most of the companies in this sector uses prepared mixtures. It is a further point in our favor and our strength but on this communication impact needs to be soft. The main goal of the project is to bring the customer to know and recognize the difference between industrial products, semi-finished, and the Gaya ice cream quality. Informations are provided to customers about positive and inspiring manner, in line with an understandable philosophy.

6.4 Inside "Principessa", Direct Drive Technology.



Mantecatrice Principessa Source: Gaya Gelatolab

Along with the pasteurizer, the batch freezer is the most important machinery in a handicraft gelato because it serves to transform the fluid mixture into the final product: the ice cream. In fact, it comes from Spanish *mantra*, or butter, and is the term used in the kitchen as in gelato to indicate the process of processing the ingredients in order to form a blended and creamy compound.

Drying is done by the action of three elements: stirring the compound, cooling it from 4-6 ° C to about -15 ° C and injecting air inside it, captured by the fatty molecules and proteins.

The sudden and sharp decrease in temperature is linked to the need to avoid the formation of too large crystals to have a smoother and less lucid compound. The agitation of the mixture, on the other hand, serves to favor air intake to increase the volume of the compound (in the jargon it is referred to as "overrun") and to soften it.

There are three types of shredders available on the market:

- Vertical.
- Horizontal.
- With built-in pasteurizer.

Vertical planners are the first to enter the ice cream market and date back to 1927. With them was born the modern ice cream parlor, because first the jellyfish had to arm a long wooden spatula and patience enough to detach and spread the compound by gelation, which would otherwise be completely solid. In vertical machiners a continuous rotating blade or a helix blade, depending on the models, pulls the ice cream out of the walls of the grout and mixes it. The pot is placed vertically over the ground and the ice cream maker can observe the whole process, possibly by making modifications and additions.

Otherwise, in the most recent horizontal fillers the rotating pot is rotated 90 ° and is locked inside the machine, so it is not visible while working. In this case, the shrinkage takes place by means of blades which act from centrifugal blenders, with a higher air intake than the vertical shredders. For this reason, some ice cream makers prefer to use traditional crushers and fruit ice creams, more compact, and horizontal cream scrubbers, which, thanks to more generous amounts of fats and proteins present in the blends, can incorporate more air.

Another case where vertical sprayers are preferable is when you want to add pieces of biscuits, chocolate flakes, orange peels and anything else to the ice cream to be crushed by the high speed blades of a horizontal sprayer.

Those who need to retrieve laboratory space or initially save on machines may have a horizontal shaver with a small pasteurizer for mixing the ingredients. These are placed in the upper container that works and brings them to the pasteurization temperature; Once cooled, the mixture passes

directly into the shredding cylinder located at the bottom and turns into ice cream, however, leaving the important maturation phase of the mixture.

With a completely different approach to existing solutions, Principessa Mantecatrice proposes to the market of the machines for the production of the artisan ice cream through the application of a new technology: the Direct Drive. From organic forms, this innovative machine is born later to the need to optimize and innovate the production processes underlying the models of business of ice cream parlors. Principessa, is the result of constant research and development by a team of experienced people who have seen the potential before its creation, in collaboration with two highly specialized company: BRX S.r.l. and Motor Power Company.

BRX is an Italian company that combines professional expertise with a 20-year experience in steel and refrigeration machining. Characterized by cutting edge technology, aesthetics and functionality, the result of constant research and a dialogue and listening relationship with the sector of refrigeration, particularly in the ice cream business.

The genesis of the project is mainly due to the will of its creator Stefano Grandi, CEO of Motor Power Company, specialized in producing industrial engines, in order to find a way to produce high quality batch freezer without waste of water. The Company is specialized in the design and development of high performance solutions in the industrial handling sector. Consolidated expertise and technological know-how, acquired through a variety of application experiences and continuous, uninterrupted work on research and development, allow the company to communicate with leading international companies looking for automation and motion control. Gearboxes, gear motors, servomotors, drives and controls are the result of this production concept that is being developed and found to be realized and implemented solely in our plants, with the constant supervision of a staff from proven experience that follows every single stage of production Design.

Principessa is the first direct-acting motor-milling machine that manages directly to carapina. It is a technology and design center that promises to revolutionize the concept of shrinkage, thanks to its ability to combine tradition and technology in an unprecedented fashion. From a technical point of view the main features of *Principessa* are:

- Direct drying in carapina, which eliminates the extraction of the ice cream from a rolling cylinder and allows total freedom in choosing the production ladder, also eliminating cross-contamination from allergens.
- The use of Direct Drive technology on the agitation system that eliminates the kinematic chain results in high performance (98% efficiency), increases the versatility of movement and reduces energy consumption. Direct Drive technology is used today in various industries of industrial automation, which makes the project extraordinary, introducing this innovation in the ice cream machine industry to exploit a number of surprising advantages that result in very tangible and tangible benefits in the lab.
- Eliminating water cooling and machine washing between cycles allows 100% water saving.
- Its eye-catching design and reduced dimensions allow it to be placed at the sight of the customer and to prepare the ice cream at the point of sale.

The goal was to keep craftsmanship and respecting tradition through the use of technology that represents the excellence of automation. In one of the most traditional sectors like ice cream handcrafted production, Direct Drive technology has been introduced, characterized by a power-saving technique that reduces fuel consumption, bulk, costs and simplifies the production of ice cream.

The technology used has enabled the release of pre-defined forms and exits from the standards already on the market of ice cream makers. For the values of ethics and genuineness pursued by the concept Gaya Gelatolab, the company has been inspired by organic, natural forms, soft and light. In

this regard, to emphasize the quality and the transparency of production, we chose to work on the aesthetic value and on the recognizability of the milling machine in order to be carried out outside the laboratory. This has thus come to the idea of a totemic object with strong recognition and at the same time characterized by a simple and lightweight appearance.

A less frustrating engine has a better performance, even in terms of human effort. With Direct Drive technology, they do not need great powers to apply movement forces, as power does not dissipate in clutches and complex kinematic chains. Deleting the transmission organs also gives you more stability by undoing unwanted games and unwanted elasticity. The system performance is very high and therefore less energy is consumed. Noise is limited to cooling fans only, as the engine is practically unbreakable. Maintenance is reduced to the minimum due to the simplicity of the engine that does not have transmission parts, so there are no friction or spare parts that wear out over time.

Energy wastes and water wastes are the biggest issues in the artisan ice cream world. In addition, the shape of the machine, which in fact is very simplified in its shape, allows the use of a conventional carapin to carry out the whole process of shrinkage, thus allowing it to perform the entire production process in one container from the mixing of the ingredients , Up to storage in the counter for its distribution.

This allows many benefits including reduction of time, Cancellation of product waste during extraction, to free him from a particular sequence in the preparation of tastes, because each taste is produced and is distributed to the public by its original carapina, Eliminating washing between production cycles, Reducing the risk of contamination between incompatible ingredients.

Principessa is equipped with a remote access system (via internet) that is easy to use, allows access even if the devices are within the customer's

network via a GSM on demand connection, if the ADSL network is not available.

The shredder is also equipped with latest generation sensors, in order to monitor real-time information on the state of the device and the product. The software that manage the ingredients mixture was developed with the aim of creating support for the production and distribution process management. The system allows accurate recipe balancing and makes no mistake for the operator. The software is interfaced with the Scales and controllable via a touch screen. The ductility of engine control, another feature of direct motion technology, allows you to adjust speed, acceleration, and direction of rotation, which allows you to program recipes with different parameters, giving you exclusive freedom of management on this type of machine.

The controls are within a mobile touchscreen console, with extensive programming options for individual recipes. Lastly, the vertical shrinkage and the very large form of the inlet mouth with which the machine is conceived allows a constant visual inspection of the product and allow insertion of ingredients (grains, crispy parts or Fruit in pieces) at any time of processing.

6.5 Production Chain

Gaya's production concept is organized in Product Center (Prd C) and Profit Center (Pft C). The Prd Center is a production center that serves more Pft Centers. It can produce the overall range and quantity of products (blends and ice cream in Carapina, or other) or a narrower range of products (blends only), and then it delegates the shrinkage to Pft_C. The product Manager is in charge of choosing which model to use.

The Prd_C performs the main functions of:

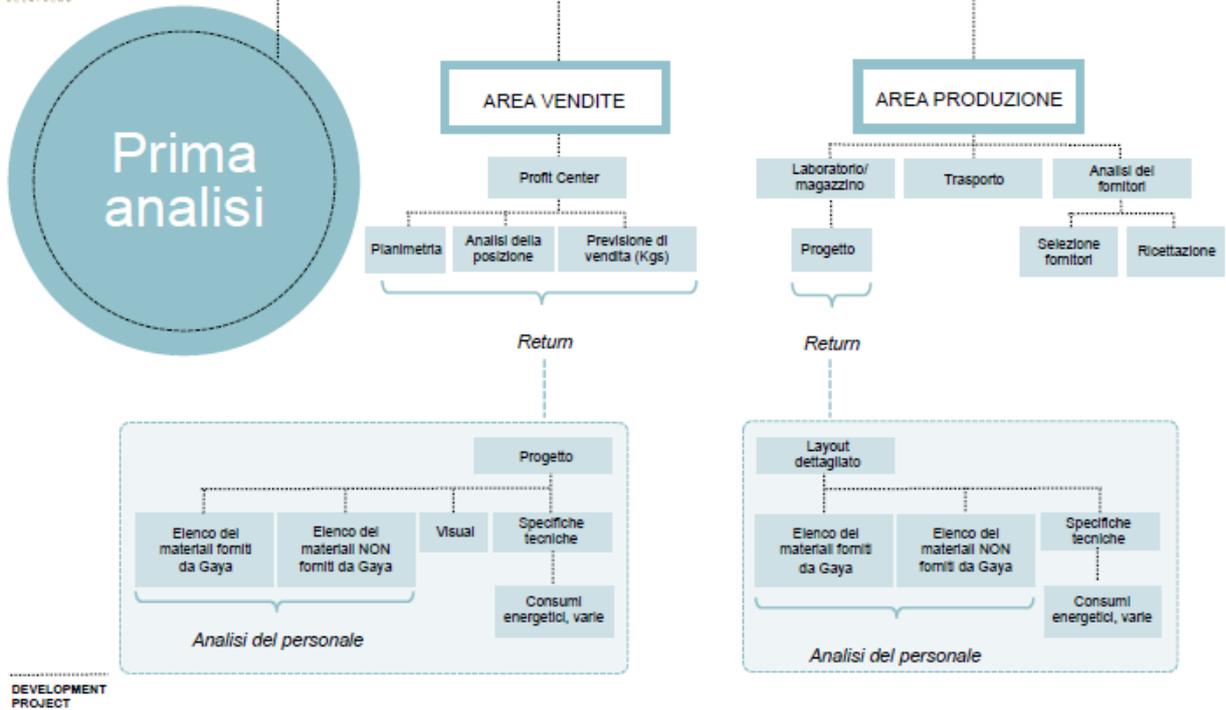
- Storage of raw materials

- Processing of raw materials
- Packaging
- Transport and distribution

Pft_C does in fact distribute products in detail (Ice cream, granite, sorbets). The Prd_C was sized according to the capacity predictions distribution of Pft_C. This activity was organized within a project with its purpose to determine sizing and equipment in detail of the Prd_C in order to meet Pft_C requests.

The main steps of the process are as follows: Defining the Logical Layout of the Production Cycle: In this schema are defined the macrofunctions that make up the production cycle. Each macro function is further detailed, defining all the specific subfunctions, for each subfunction you specify the following information: Subfunction function, required equipment, model brand, production capacity, dimensions, utilities needed.

Depending on the production request, the requirements in terms of equipment and space for each macro function are calculated. This information prepares scale layouts of the work spaces of the individual macrofunctions, set up according to the sizing made above. These blocks have determined the required surface area requirements of the Prd_C users. The adaptation of blocks to the room to be analyzed has been designed so as not to affect production flow and ergonomics. Also with this setting you can progressively detail and in depth macro information and get specific as it works and how the Product Center is composed.



Development project, general framework of the productive chain. Source: Gaya Gelatolab

The result is a physical layout of the production environment, with a detailed indication of the equipment, their position, user connections, discharges and a logical layout of the production flow with all the production information. The final configuration of the production environment is determined by the following variables, the significant modification of one or more of these variables requires a review of the results, as new production needs may have a significant impact on the layout used.

- Daily production: minimum, average and maximum
- Product type (blends, ice cream, etc.)
- Variety of tastes, number of bases, number of bases to be pasteurized
- Term of production autonomy, linked to the autonomy of storage of raw materials.
- Pasteurization time
- Drying time

- Raw material storage
- Surface and shape of the productive environment

In order to understand properly the organization of Gaya production process, we might take the study of the Product Center that was developed in Sicily. The following datas are the summary of technical specifications for the Cappadonia project based on sales forecasts, provided by 'Business plan Cappadonia srl':

- Total sales forecast: 57,293 kg
- Daily, average and maximum production: 61.2 - 202.1 - 343 kg
- Product type (blends, ice cream etc.): blend
- Variety of flavors: 37
- Number of bases to be pasteurized: 1
- Term of production autonomy, linked to storage autonomy of fresh raw materials: three days
- Raw material storage: fridge-freezer-shelf
- Surface and shape of the productive environment: 62 sqm

The analysis conducted by Gaya Innovation System have led to the following results and related needs: Average pasteurization time: 1.92 min/kg, average shrinkage time: 14 minutes, number of pasteurizers: 1 from 60l considering a use maximum of 8 hours per day on peak days, necessary number of staplers: 5 (4 in profit centers + 1 per laboratory), estimated capacity refrigerant temperature positive temperature: 1600 lt (Milk, cream, 50% fruit and pasteurized blends) estimated storage cabinet conservative negative temperature: 720 lt (50% of the fruit needs) Estimated shelf life: 310 lt

Then Gaya provide a list of necessary equipment: 1 refrigerator temperature cell positive, 1 conservative negative temperature locker, 2

scales, 1 bladder, 1 60lt pasteurizer, 5 fillers, 1 mixer, 7 counters work, 2 shelves, 1 bottle shelf, 2 wash basins, 1 lava items, 1 carapine shelf, bottle shaker, 1 labeling machine.

6.6 Financial statement and investment.

After the first years of adjustments, organizing each areas of the company, Gaya Gelato Srl started officially in 2016. and started with a turnover of 152,000 euro with an operating profit of 27,000 euro³⁶. At present the turnover is 270,000 euro with high perspective of growth due to several deals in progress with food franchising corporations at International level. The whole business is divided in two areas: the capital of Indonesia Jakarta and the island of Bali.

At present the company has in Jakarta 15 staffs for 3 profit centres: 6 staff for store arctivities, 5 staff for Marketing and 4 staff for Grand Indonesia (one of the biggest shopping centre in town), 5 staffs for the lab. in 2018 there will be 5 new profit centres with 24 staffs, with 4 more staff for the lab. With the total of 48 staffs among profit centres and Lab.

For what concerns Bali, In Sayan (the biggest outlet) Gaya has a total of 24 employees in the following areas such as production, retail sales staff and biscuit, accounting, drivers, maintanance, cleaning staff, purchasing, IT and security. In the remaining 8 outlets there is an average of 2 to 4 staffs for a total of 25 employees³⁷.

As we said, Gaya Gelato might be considered as an open business, in which the entrepreneur who invest in Gaya business becomes an effective partner. An integral part of organizational efficiency is given by training of staff following training protocols aimed at valorisation of each business area. For

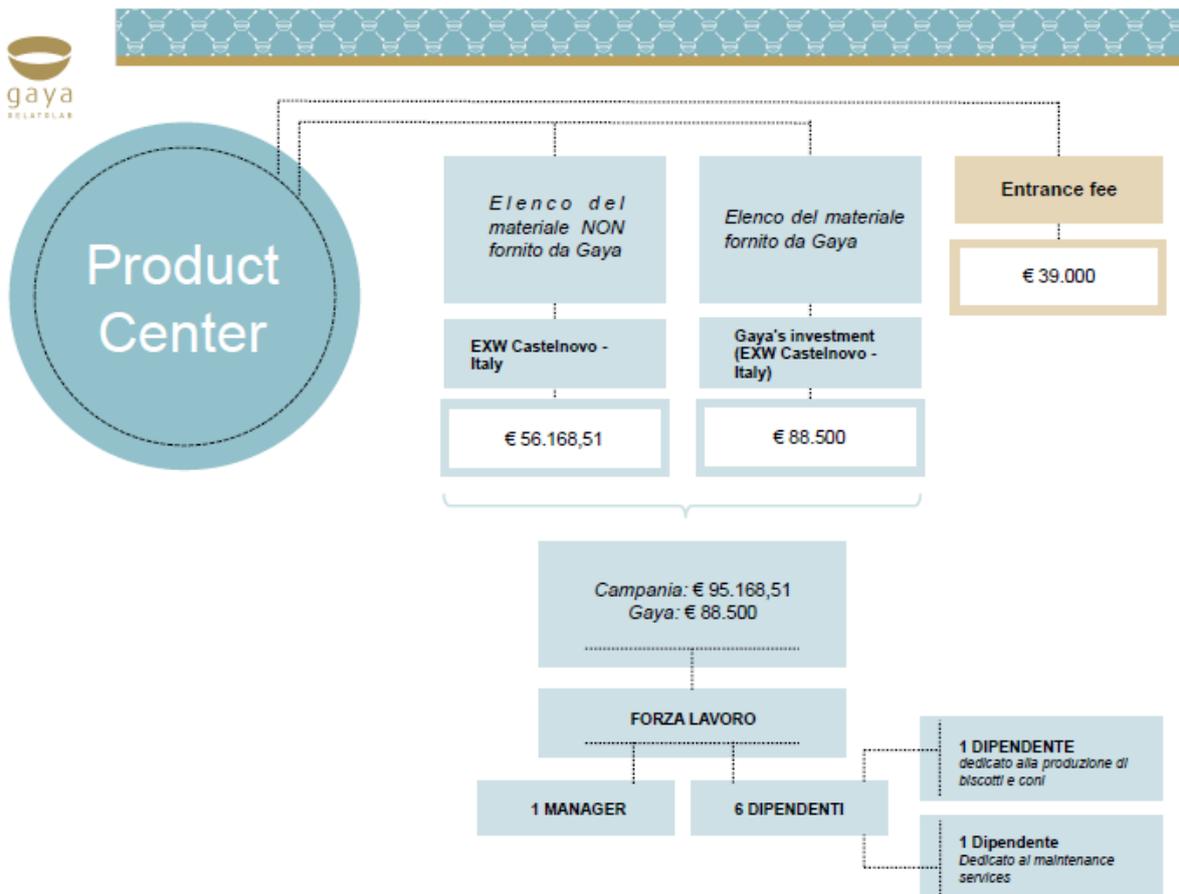
³⁶ Interview with Umberto Bastianello, CEO Gaya Gelatolab Srl

³⁷ Datas provided by Gaya Gelatolab HR department in Bali and Jakarta

what concerns the size of the investment, we might start from the costs of machinery and equipment of a Product Center.

| | Unit Cost | Campania Investment | Gaya Investment |
|--|-------------|---------------------|------------------|
| Entrance Fee | | | |
| Mantecatrice "Principessa" | 1 16.000,00 | 16.000,00 | 40.000,00 |
| Stazione operativa automatica con cappa aspirante, miscelatore, software | 1 13.000,00 | 13.000,00 | 32.500,00 |
| Banco refrigerato | 1 3.000,00 | 3.000,00 | 6.000,00 |
| Riempitrice semiautomatica | 1 7.000,00 | 7.000,00 | 10.000,00 |
| Total entrance fee | | 39.000,00 | 88.500,00 |
| Macchina sottovuoto | 1 3.145,00 | 3.145,00 | |
| Pastorizzatore 60l | 2 10.949,90 | 21.899,80 | |
| Blast Chiller (5 vassoi) | 1 1.920,00 | 1.920,00 | |
| Cella frigorifera positiva 700 l | 2 1.440,00 | 2.880,00 | |
| Cella frigorifera negativa 700 l | 1 1.680,00 | 1.680,00 | |
| Scaffalatura (inox a 4 scaffali mm 1200x500x1550h) | 3 312,00 | 936,00 | |
| Sink "Ilsa" (inox armadiato, 1 tub with dripstone cm 120x70) | 1 1.080,00 | 1.080,00 | |
| Sink "Ilsa" (inox a giorno 1 tub with dripstone cm 120x70) | 1 708,00 | 300,00 | |
| Hob Counter induction (3500 watt) | 1 288,00 | 288,00 | |
| Forno a microonde (Samsung 1100 w) | 1 468,00 | 468,00 | |
| Dry Fruit Cutter/Slicer (Italservice 4 lt with dimmer) | 1 636,00 | 636,00 | |
| Bilancia (20kg/1 g.) | 1 156,00 | 156,00 | |
| Worktop inox (armadiato with shelve cm 200x70) | 1 1.260,00 | 1.260,00 | |
| Worktop inox a giorno (con ripiano di fondo, shelve cm 200x70) | 1 652,80 | 652,80 | |
| Forno ventilato "pastry-making" "Rational Master" | 1 9.000,00 | 9.000,00 | |
| Macchina lavaggio | 1 5.850,00 | 5.850,00 | |
| Cone Making Set | 3 345,00 | 1.035,00 | |
| Spremi agrumi | 1 300,00 | 300,00 | |
| Estrattore | 1 300,00 | 300,00 | |
| Carrello Ingredients Transportation 3 scaffali | 1 132,00 | 132,00 | |
| Planetaria Mixer (Italservice 6/7 litri) | 1 480,00 | 480,00 | |
| Frullatori Big Stix 650w | 2 351,00 | 702,00 | |
| Minor Equipmet Set | 1 987,91 | 987,91 | |
| Recycling Bins | 4 20,00 | 80,00 | |
| Total Cost Other Equipment | | 56.168,51 | |
| Total Market Value | | 144.668,51 | |

Development project Campania, cost of the Prd_C. Source: Gaya Gelatolab



Development project Campania, cost of the Prd_C. Source: Gaya Gelatolab

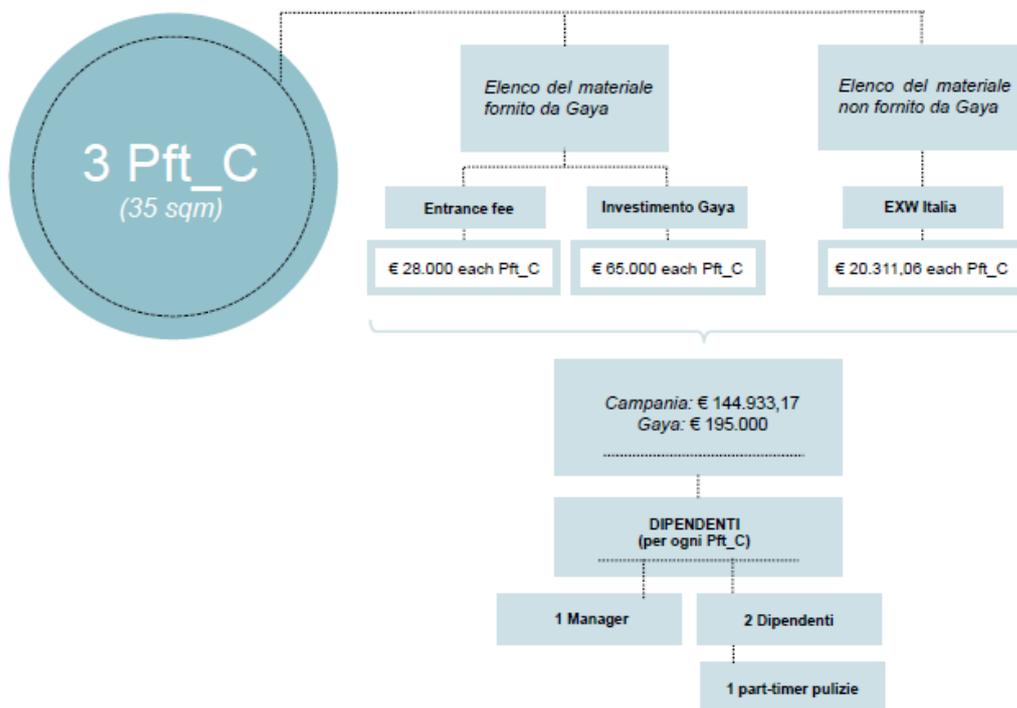
As we said, one of the main features of Gaya production is the capability of the laboratory to provide 3 profit centres (flag stores and parlors), so we will consider the cost of 3 profit centres in once in the business plan provided by the company.

The main difference with competitors is not a matter of price, the competitive advantage is the technology implemented in the laboratory: Thanks to Principessa, one laboratory can provide fresh ice cream every day for three stores, while the traditional technology (with the same price) is able to provide commodities for only one store. In other words, for about the same costs Gaya is able to manage three stores (whatever the kind of parlours we decide to open), with a gross profit of almost two times the overall cost, as we can see in the table related to financial statement (look up figure pg.93). As a result of 3 profit centres activity, the break even

point is expected to be achieved within the first year. From the point of view of the entrepreneur that invests in Gaya, with an overall investment of 288,101 euro, there is an expected gross profit, after deduction of Gaya's royalties, of 957,274 euro.

By January 15th of each year, each partner will pay: 50% of the royalties planned, considered contractually as "guaranteed minimum", 100% of royalties related to "Branding & Advertising".

3 Profit Centers cost, Gaya investment, entrance fees, investor costs and fees.



Development project Campania, cost of the Pft_C. Source: Gaya Gelatolab

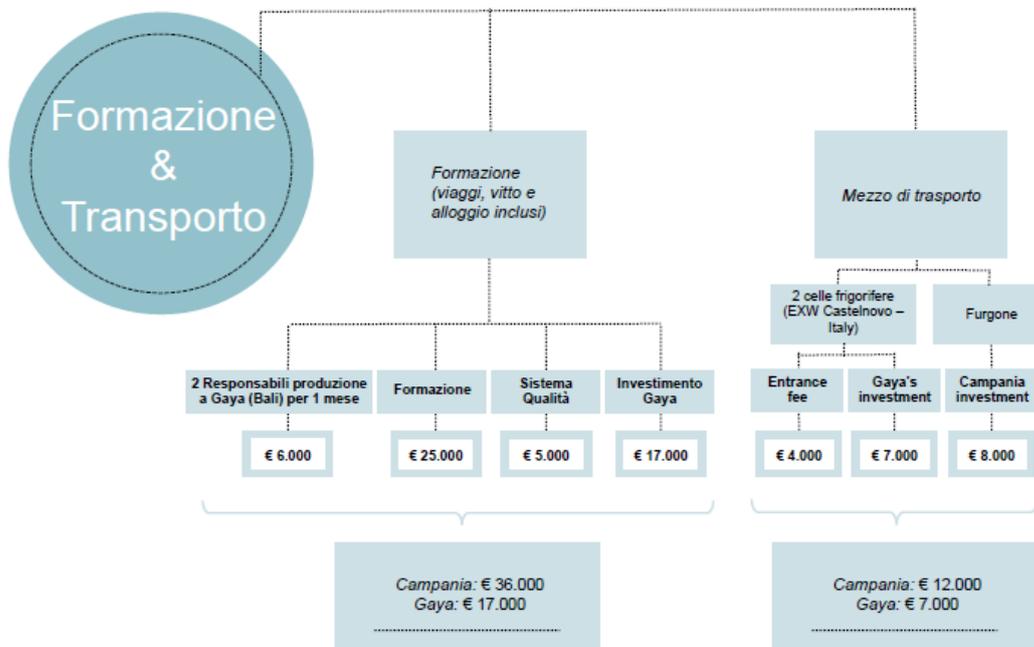
Transport and training costs:

| | Campania | Gaya |
|--|-------------|-------------|
| Mezzo di trasporto | 8.000,00 € | |
| Celle frigorifere da trasporto (2) - Entrance Fee | 4.000,00 € | 7.000,00 € |
| | 12.000,00 € | 7.000,00 € |
| Formazione | 25.000,00 € | 17.000,00 € |
| Sistema Qualità (annuale) | 5.000,00 € | |
| 2 Resp. Produzione a Bali Bali | 6.000,00 € | |
| | 36.000,00 € | 17.000,00 € |
| Totale | 48.000,00 € | 24.000,00 € |

Development project Campania, cost of the Prf_C. Source: Gaya Gelatolab

| Description | Cost | Pcs | Campania Inv. | Gaya Inv. |
|---|------------|-----|---------------|-------------|
| Fee Showcase | | | 6.000,00 € | |
| Banco vendita a pozzetti = Entrance fee | 6.000,00 | 2 | 12.000,00 € | 25.000,00 € |
| Mantecatrice "Principessa" = Entrance fee | 16.000,00 | 1 | 16.000,00 € | 40.000,00 € |
| Total Cost Entrance Fee | | | 28.000,00 | 65.000,00 |
| Banco vendita in vetro e ripiano in marino di Carrara | € 2.231,21 | 1 | 2.231,21 € | |
| Carta da Parati | € 72,82 | 30 | 2.184,54 € | |
| Gaya Iron Logo | € 196,65 | 1 | 196,65 € | |
| Shop Window/Display Case Logo | € 146,05 | 1 | 146,05 € | |
| Sgabelli with Shiny Stainless Steel Footrest | € 117,05 | 2 | 234,11 € | |
| Sgabelli rialzati with Shiny Stainless Steel Footrest | € 143,75 | 3 | 431,25 € | |
| Divano inner QDF and seat cushion Sunbrella cover | € 349,11 | 2 | 698,21 € | |
| T BACK CHAIR No seat cushion | € 217,68 | 4 | 870,71 € | |
| Panca | € 199,20 | 4 | 796,79 € | |
| Pouf | € 189,96 | 2 | 379,91 € | |
| Sedute in ceramica | € 90,85 | 5 | 454,25 € | |
| Bar Table with White Lacquered Steel Stand | € 130,40 | 2 | 260,80 € | |
| Coffee Table | € 239,24 | 1 | 239,24 € | |
| High Bar Table with White Lacquered Steel Stand | € 121,16 | 1 | 121,16 € | |
| Tavolino in ceramica | € 116,15 | 2 | 232,30 € | |
| Advertising Poster | € 2,30 | 3 | 6,90 € | |
| Wooden Poster Frames | € 8,05 | 3 | 24,15 € | |
| SHOWCASE with White Lacquered Steel Shelves | € 535,98 | 1 | 535,98 € | |
| Corpi illuminanti in ceramica | € 9,09 | 4 | 36,34 € | |
| Macchina per lavaggio | € 5.850,00 | 1 | 5.850,00 € | |
| Sink | € 150,00 | 1 | 150,00 € | |
| Steel ice cream spatula "Gaya" | € 5,75 | 20 | 115,00 € | |
| Banco refrigerato positivo 700 l (with Positive Cooling Unit) | € 1.440,00 | 1 | 1.440,00 € | |
| Back Shelving (inox a 4 ripiani mm 1200x500x1550h) | € 312,00 | 1 | 312,00 € | |
| Frullatore Big Stix 650w | € 351,00 | 1 | 351,00 € | |
| Studio architettura (30 Sq m) | € 2.012,50 | 1 | 2.012,50 € | |
| Total Expenditures for Miscellaneous Furnishings | | | 20.311,06 € | |
| Campania Investment | | | 48.311,06 € | |
| Total market value each Pft C | | | 85.311,06 € | |

Development project Campania, cost of the Prf_C. Source: Gaya Gelatolab

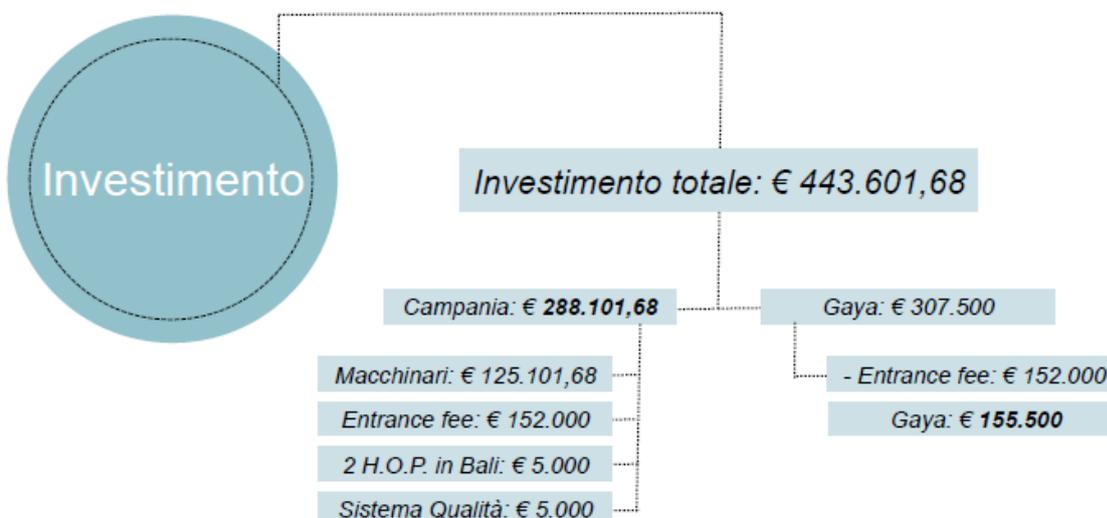


Development project Campania, cost of the Prf_C. Source: Gaya Gelatolab

Overall Investment:

| Totale | | 443.601,68 | |
|-----------------------------|--------------|-------------------|-------------------|
| | | Campania | Gaya |
| Product Center | E. Fees | 39.000,00 | 88.500,00 |
| | Altre | 56.168,51 | |
| Profit Center 1 | E. Fees | 28.000,00 | 65.000,00 |
| | Altre | 20.311,06 | |
| Profit Center 2 | E. Fees | 28.000,00 | 65.000,00 |
| | Altre | 20.311,06 | |
| Profit Center 3 | E. Fees | 28.000,00 | 65.000,00 |
| | Altre | 20.311,06 | |
| Formazione | E. Fees | 25.000,00 | 17.000,00 |
| | S. Qualità | 5.000,00 | |
| | Resp. a Bali | 6.000,00 | |
| Furgone | E. Fees | 4.000,00 | 7.000,00 |
| | Furgone | 8.000,00 | |
| | | 288.101,68 | 307.500,00 |
| Attrezzature (di proprietà) | | 125.101,68 | |
| Entrance Fee | | 152.000,00 | |
| Resp. a Bali | | 6.000,00 | |
| Sistema Qualità | | 5.000,00 | |

Development project Campania, cost of the Prf_C. Source: Gaya Gelatolab



Development project Campania, overall investment. Source: Gaya Gelatolab

Financial statement:

| Campania (Dettaglio) | | | | |
|-------------------------------------|---|--------------|----------|-----------------------|
| Ice cream | | | Each | Kgs |
| | 3 | Pft_C retail | 20.000 | Total |
| | | | | 60.000 |
| Total Kgs al dettaglio | | | | 60.000 |
| Biscotti | | | Each | Bags |
| | 3 | Pft_C retail | 17.000 | Total |
| | | | | 51.000 |
| Total Sacchetti al dettaglio | | | | 51.000 |
| Gelato - Totali | | | | |
| Prezzo di listino | | | 18,50 € | 1.110.000,00 € |
| | | | | 1.110.000,00 € |
| COGS | | | 3,00 € - | 180.000,00 € |
| Royalties | | | 7% - | 77.700,00 € |
| Branding & Adv | | | 1% - | 11.100,00 € |
| Sistema Qualità | | | - | 5.000,00 € |
| | | | - | 273.800,00 € |
| Gross Profit - Gelato | | | | 836.200,00 € |
| Biscotti - Totali | | | | |
| Retail price | | | 3,20 € | 163.200,00 € |
| | | | | 163.200,00 € |
| COGS | | | 0,57 € - | 29.070,00 € |
| Royalties | | | 7% - | 11.424,00 € |
| Branding & Adv | | | 1% - | 1.632,00 € |
| | | | - | 42.126,00 € |
| Gross Profit Biscotti | | | | 121.074,00 € |
| Gross Profit Totale | | | | 957.274,00 € |

Development project Campania, Gross profit. Source: Gaya Gelatolab

6.7 Future perspectives and challenges.

As we saw, the main idea of this project contemplates the territorial development of Gaya Gelatolab through a high-level franchise network to promote the culture of real artisan ice cream between consumers and operators on the market. The core business is reflected on various levels of development, starting with the supply of healthy products and continuing to refine and innovate the machinery needed to prepare the ice cream currently available on the market.

Gaya is currently working on a new collaboration with Desita, an Italian company that provides franchising systems, from brand identity definition to the organization of replicable operating models looking at brands for internationalization, especially in Europe and the MENA region: from investors to turnkey project. Thanks to this collaboration and agreements with other partners involved in food franchising in the middle east, Gaya is planning to expand in India, Saudi Arabia, Kuwait, Qatar, Israel, Egypt, Marocco and other countries in that area. Furthermore, Gaya is still considering the opportunity to open in Italy, it is a matter of time and choosing the right chances: "The world has about 70,000 ice cream parlours, half of them are placed in Italy, so the possibilities of bringing the artisan gelato abroad are huge. However we are still waiting to open in Italy, it is worth to operate in our country only in a big market, we need to give the best visibility to our project."³⁸

We might ask ourselves, where is the made in Italy in this project since Gaya does not use Italian products in their recipes? The answer is in the know-how, namely the team of experts in the Italian handcrafted Gelato, that creates the the recipes and trains the employees in each area of the business. Know how and experience are essential in this business, and in Gaya Gelato is the value added. The taste of the product has to be consistent with our Italian sensibility, then it has to balance the proper

³⁸ Interview with Umberto Bastianello, CEO of Gaya Gelatolab Srl

amount of sugar and softness. The recipe is one of the key of Gaya success, and the idea of bringing a healthy and natural approach to the product is the mission. However the artisan approach has to be implemented with a structured governance, open minded to new markets, new technologies in production, supply chain, ecommerce and digital marketing.

Eventually, Gaya's entrepreneurial goal is to open a new, significant step in the ice cream world: no longer a market divided and controlled between, on the one hand, technology makers and, on the other hand, the preparation industries but development and achieving an extremely important position in the ice cream landscape. The handicraft product has to become a leader in this market. It can only do this in a completely revised, technical and commercial preparation, an organization in production and marketing, a vision in national development and not that it can compete with the capabilities of a multinational.

Gaya Gelatolab expects to offer its customers a natural product with transparency. Through the use of excellent ingredients, respect for ethics, consumer attention, territorial enhancement, and the transmission of a healthy, healthy and fair food culture in an innovative handicraft environment. That's why Gaya Gelatolab was born to bring a handicraft and Italian culture to the world.

Conclusions

As we said, Manufacturing 4.0 (or Smart Manufacturing) is defined the next phase in the digitization of the manufacturing sector, driven by four disruptive innovations: the rise in data volumes, computational power, connectivity, especially new low-power wide-area networks; the emergence of analytics and business-intelligence capabilities; new forms of human-machine interaction, such as touch interfaces and augmented-reality systems; improvements in transferring digital instructions to the physical world, such as advanced robotics and 3-D printing.

As we observed, it emerged a new professional that uses digital technologies and new media, and offer services and visibility to the traditional artisan class that create physical design and craftsmanship. A new production, made by digital craftsmen: the "crafters", the "makers", the "wworkers", which seems to have finally won the centrality of this world know-how, re-evaluating history, culture and Italian traditions. An open behaviour to new market might be one of the turning point in this scenario, so the informations provided by GSLI Report suggest us that Asia is the most attractive continent to develop Digital IT related businesses (among the first five positions, four countries are in Asia).

In this new scenario, Gaya Gelatolab offers one of the several ways in which craftsmanship can develop, in order to keep alive the know how of our culture in the food industry. The experience that belongs to tradition, if implemented with a proper governance, might be the value added of an international company. For sure the mission of Gaya is challenging for many reasons, as the diversification of the product due to the use of regional raw materials. It is necessary indeed that the costumer has to be conscious of the philosophy behind Gaya's production, at least generally.

As nowadays Gaya Gelatolab is carrying out, Italian craftsmanship can be exported as a specific competence, and the artisan experience might be the value added at international level in the food industry as in many other

sectors. The key point to understand Gaya's business, is that they are selling structured competences rather than a product, implemented by a copyrighted technology.

The result of this analysis shows one of the way artisanship can be reinterpreted: Artisanship of SME has to be integrated properly in a corporate governance and implemented with digital manufacturing processes, starting from the digital technologies that nowadays characterized the Industry 4.0 to an open structure that could embrace new markets, new cultures and new opportunities.

Digitalization might transform the craftmade sector in an exportable business, and these disruptive innovations might open up great opportunities enhancing the creation of a network of entrepreneurs and their success in developing markets.

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