Department of Economics and Finance
Chair of Introduction to Business

Outcomes of the Digital Era: A Case Study on IoT and Tech-Tourism Startups.

SUPERVISOR
Prof.ssa Federica Ceci

CANDIDATE
Virginia Bosi

Mat.214381

Academic Year
2018-2019

INDEX

INTRODUCTION

"The Web as I envisaged it, we have not seen it yet. The future is still so much bigger than the past." Tim Berners-Lee, Inventor of WWW

The following dissertation will initially provide a historical overview of past events that have induced the recent economic and social revolution characterized by the presence of technology. The exhaustive examination of the circumstances that have led to the incredible contemporary evolution will serve for a better understanding of how the present generation ended up with the creation of startups and their related features.
This work, as a matter of fact, will describe the enhancement and application of modern technologies employed to re-design and simplify our everyday life, while it will also envision the future outcomes prompted by the present social and environmental demands.

Human beings have always had extraordinary intelligence surpluses that made it possible for our ancestors to evolve successfully and rapidly throughout centuries.
What in fact, makes mankind so special, it's its ability to create and develop such creations implied into facilitating their everyday lives and actions. Nonetheless, with this curious behaviour and creative attitude, human inventions escalated quickly and evolved dramatically culminating to today's situation of a digitalized existence. The last century has seen a revolutionary technological change characterized by an overwhelming development speed and a consequential disruptive change in habits and behaviors of the latest generations caused by the advent of digital devices and social networks that destroyed geographic and social barriers throughout the globe. It is hence fundamental to thoroughly understand the reasons and facts that brought to today's situation and most of all, to be aware of the forthcoming powerful metamorphose that economies and environments are going to face.

Technology is indeed the genesis of the drastic changes that altered the last century, but, as the first chapter of this thesis suggests, the social and economic revolutions that redesigned our life can be divided into different eras. The present time is known to be

part of the Digital Era, which is just started and goes far beyond the first technological revolutions. This brand-new revolutionary era is characterized by the presence of artificial intelligence, the massive use of the internet and social networks and most of all by the advent of startups and "intelligent objects" that influence our everyday life while also impact whole worldwide economies and societies.

The following chapters will, in fact, focus on Startups, providing an overall explanation of what these new businesses are and how to profitably make them work. Once understood the concept, the thesis will move on in describing the technologies used and implemented that will presumably further affect habits and impact economies, more precisely: on IoT devices. The ability of the "Internet of Things" of connecting people to objects, or objects to other objects through AI, is expected to contribute to the making of smart cities, which are supposed to be digitalized towns secured and controlled by artificial intelligence systems with the aim of guaranteeing better services, and an easier living along with a better coexistence with inhabitants and tourists. Technological developments have lowered traveling costs and enforced the phenomenon of globalization ending up with a sharp increase in tourism and its related profits among different countries. For this reason, travel-tech is a fundamental tool for creating accessible and proficient means to enhance the market of tourism.

The overall material will be provided with a case study on Dogghis, an IoT and Travel-tech startup, which perfectly provides all of the fundamental features that represent our future. The real-life example will enable a better understanding of the functioning of the innovative technological systems mentioned above along with their substantial objective. The case is studied upon existing problems that will be solved through the use of digital devices with the aim of automatizing existing human behaviours hence providing a technological solution and eliminating the traditional gesture in a disruptive manner. Dogghis digitalized the last physical gestures left in the process of touristic accommodation eliminating the need of physical keys and persons where human contribution was necessary. With digital keys and biometric secured recognition, it is possible to obtain the same (or better) result without the need of a physical presence.

This simple example stands for an overall wide process of disruptive innovation, which is the core of the digital era we are living in, and most of all, the mean of an unpredictable future.

CHAPTER 1:

The rise of the Digital Era: From the first Industrial Revolution to Startups.

Human beings have been gifted with overwhelming intelligence and rational capacity that stimulates an inclination for continuous evolution. This unique feature, that distinguishes men from animals, brought our species to settle throughout the globe and exploit the benefits it offers.

Human beings are not born to adapt to situations, they are born to shape situations and make them adaptable to men. To be adaptable, means to be easy and controllable. Their evolution kept going vertically instead of horizontally, by taking drastic advantage from what the Earth offered in order to survive and continuously improve living standards. Horizontal evolution is the refining of features making them perfectly adaptable and efficiently working in order to blend without fault to the surrounding environment. Vertical evolution is about modelling the environment and creating tools and measures to overcome nature's challenges. As a result of this formidable and distinctive attitude, the *Homo Sapiens* began its journey into changing the world it lived in, through its creations and discoveries.

From the creation of the wheel to the First Industrial Revolution, mankind has always challenged itself into making possible the impossible. From the desire to fly, to the desire to submerge into the darkness of the ocean or to travel to space, men never had boundaries.

During the last centuries, there have been four main technological revolutions that have gradually shaped the world we now live in, changing social, environmental and economic structures in an always more limited time.

The First Technological Revolution (1866-1900) had been shaped under the light of the discovery of steam engine, in the creation of new means of transportation and consequently into a reshaping of social boundaries, shortening distances and enhancing trading opportunities; It was the first enormous step to globalization. The innovation in transportation industry played a fundamental role into changing the world we live in and

keeps influencing the present times supporting the circulation of information as it did in the past. You shall note that, starting from those days, information has been the leading protagonist of change. New technologies and Social Networks are all about this topic, and globalization is in fact the consequence of the birth of new opportunities to share ideas and thoughts without geographical and cultural limits, creating a unifying bond throughout the globe and right sets of circumstances to join forces into generating life changing inventions.

The Second Revolution (1901-1959) reinforced the propensity for social change especially with the creation of electricity. Little did our ancestors know that such a discovery would have led our world to dramatically change into an always more disruptive technological innovation. In the following decades, the use of electric power spread into many different uses, from Edison's light bulb to Meucci's telephone to Tesla's first induction motor. Electric power brought to a fast, unstoppable and ongoing change, that unequivocally appeared to be the perfect tool into making anything easier, accessible and efficient. Its versatility had been exploited during the Third Technological Revolution (1960-2010) also known as the Computer based revolution or Multimedia Revolution. Technology, during those years, started to refine and become more and more efficient and powerful, and it spread to many fields, from communication and transportations to medicine and biology. Computers and telephones are the main responsible for globalization and the evolution of communication. These objects not only gave the possibility to overcome distance and connect people, facilitating trade and boosting up economic opportunities, but also, with the advent of Internet, they created a unified Globe, with a convergence in trends, ideologies and prices.

The new era we now live in, called Digital Era, is quickly evolving in the ongoing Fourth Technological Revolution (2011-Today) where politics and economics of information have progressively but radically transformed civilization along with computer sciences progresses.

The internet is now a radical source of knowledge and technology innovations are beyond innovative. The new tools we are now developing concern Artificial Intelligence, and things have never been easier than nowadays. The development of such technologies and the advent of Cyber Tech, Smart Factories and Sustainable Development is fundamental to keep the world we live in suitable for the always growing population and the multitude

of resources demanded. The new technologies offered nowadays help men to hack the digital code of the real world in order to create a fourth digital dimension where you can make happen what reality cannot afford. Biotechnology for example, is using these tools to overcome natural boundaries by modelling, fixing and creating what couldn't be offered before.

So, concerning the present years, we can notice a boom of innovation technology along its related economy. With the awareness of men's power in creating and making the impossible available, people started to foresee the near future, and since we now live in an extremely easy and accessible era, they started to make their ideas happen, in the creation of a new market: Startups.

As Radovan Richta states in his book Civilization and the Crossroads: "The progress of civilization today consists of various intersecting, merging or compensatory currents; what is more, it is subjected to disparities between the levels of science and technology and the nature of the social systems. From this, too, stems its obscurity. Under these circumstances it appears that the only way to gain any comprehension of the transformations in the basis of civilization is to work out theoretical models representing pure type of the structure and dynamics of the productive forces and to examine the specific social and human linkages in each separately. It is evidently just this inability to disentangle and grasp the two basic processes that has given rise to a measure of uncertainty and in exactitude with which the social sciences face contemporary civilization and its prospects.

Crossing the divide of modern civilization which is coming to be our daily lot, makes exceptional demands on our ability to apply new methods and approaches, without which we would fail to understand the dimensions, laws and forms assumed by the movement of events accompanying the advance of the scientific and technological revolution."

These sudden modern changes that our contemporary civilization is facing are so rapid that might become unrestrained and above all not suitable for the present society not so easily adaptable and comfortable with it. The tools and knowledge available nowadays could create mind-blowing and life changing innovative technologies in many different fields, but would a cyber world be suitable for a century that still hosts generations that

had been growing up without smartphones, computers or social networks? Would they ever trust such technologies?

This is the first time in human history that comparable power and capacity to self-create and dominate nature has been achieved by men. But as history has demonstrated, too much power in people's hand can be devastating. It is scientists and creators' responsibility to reduce risks and increase benefits led by new technologies in order to be socially acceptable.

1.1 Startups

"A Startup is a temporary organization used to search for a repeatable and scalable business model" Steve Blank

Blank, who is one of the greatest influential exponents of the startup ecosystem, has given the most accurate and complete definition of what is this new business that has been rising during the last decades. According to the serial entrepreneur, a startup is a temporary organization which goal is to be designed in order to search, and not execute. It searches, instead of executing, because, as he suggests: "*Startups don't know what they're doing".* Hence it is not sure what their products, clients and profits will be. For this particular reason, a true startup searches, with multiple attempts if necessary, for repeatable and scalable business models to get to the point of executing properly and become profitable. And finally, when over time the entity will be able to define its products, its clients and obviously its business model, it will then become a corporation.

From this definition, we can clearly understand that a startup differs from other entrepreneurial businesses not only for its dynamic and flexible nature, but for its capacity and necessity to become repeatable and scalable, which simply means, achieving the ability of repeating sales from its customers as well as to serve many of them *profitably*.

1.2 Startup requirements "Declaration of possession of requisites for an innovative startup company"

I will now elucidate in legal terms, the necessary Italian requirements that a business must have in order to be defined "startup".

To be declared an “Innovative startup” the company must possess the following requisites:

A) It is established and carries out business activities from not more than sixty months;

B) It is resident in Italy pursuant to Article 73 of the Presidential Decree of 22 December 1986, n. 917, or in one of the Member States of the European Union or in States adhering to the Agreement on the European Economic Area, provided it has a production site or a branch in Italy;

C) The total annual production value, as resulting from the last balance sheet approved within six months of the end of the financial year, does not exceed 5 million euros (the requirement is requested and is intended as self-certified starting from the second year of activities);

D) Does not distribute, and has not distributed, profits;

E) Has, as the exclusive or prevalent corporate object, the development, production and marketing of innovative products or services with high technological value;

F) It was not constituted by a merger, corporate demerger or following the sale of a company or business unit.

G) It possesses *at least one* of the following requirements:

- Research and development costs are equal to or greater than 15 percent of the greater value between cost and total value of the innovative startup's production. Costs for the purchase and rental of real estate are excluded from the calculation for research and development costs. For the purposes of this provision, in addition to the provisions of the accounting standards, they are also to be included among the expenses in research and development: the expenses related to precompetitive and competitive development, such as experimentation, prototyping and development of the business plan, expenses related to incubation services provided by certified incubators, the gross costs of internal staff and external consultants employed in research and development activities, including shareholders and administrators, legal fees for the registration and protection of intellectual property, terms and user licenses. Expenses are shown in the latest approved financial statements and are described in the explanatory notes. In the absence of financial statements in the first year of life, their execution is assumed through a declaration signed by the legal representative of the innovative startup.

- Employment as employees or collaborators in any qualification, in a percentage equal to or greater than the third of the total workforce, of staff holding a research doctorate degree or who is carrying out a research doctorate at an Italian or foreign university, or in holding a degree and having carried out, for at least three years, certified research activity in public or private research institutes, in Italy or abroad, or, in a percentage equal to or greater than two thirds of the total workforce, of personnel in possession of a master's degree pursuant to article 3 of the regulation referred to in the decree of the Minister of Education, University and Research 22 October 2004, n. 270.
- Both the owner or depositary or licensee of at least one industrial sole right relating to an industrial, biotechnological invention, a topography of a semiconductor product or a new plant variety or is the owner of the rights relating to an original computer program registered with the special public register for computer programs, provided that such rights are directly related to the corporate purpose and business activity.

1.3 Principles to create an efficient Startup

Entrepreneurs have been investing on a broad range of startups starting from the "dot-com mania" which escalated quickly after the advent of the Internet in 1993. The first browser that made it possible for ordinary people to go online was called Mosaic, which shortly after will be called Netscape, and it can be defined as the spark that started the stock market boom in the Silicon Valley from September 1998 to March 2000 where the startup bubble burst. After that short span of time characterized by euphoria, enormous investments and disastrous losses, entrepreneurs started to digest how that fresh new and innovative business worked.

Peter Thiel, cofounder of PayPal, has experienced the "dot-com mania" fist hand. In his book "From Zero to One" (Pp. 18-19) he describes what entrepreneurs have taught after the crash of the dot.com market:

1. Make progresses one step at a time: Grand visions contributed in enlarging the bubble, so it is better to not indulge. Whoever claims to be capable of doing something great is suspicious, and whoever wants to change the world should be humbler. The only way to take a safe path is to proceed with short incremental steps.

2. Remain simple and flexible: Every business should be “simple”, which means “not strictly planned”. You shall not know what your business will be capable of; planning is something arrogant and rigid. You may instead experiment, “iterate” and treat entrepreneurship as an agonistic field testing.
3. Flourish on competition: Do not try to create a new market prematurely. The right way to know you have a true business in your hands is to start from an already existing client, so that you can build your enterprise improving products that are already recognised and offered by successful competitors.
4. Concentrate on the product and not on sales: If your product needs sales personnel or marketing, it means it is not good enough. Technology primarily concerns the development of a product and not its distribution.

These four fundamental lessons have become tenets in the startup environment, and perfectly explain how to face the creation and development of one. They also highlight the differences in the approach that has to be undertaken with respect to other traditional businesses.

The contrast intensifies if we consider that startups are entities that, through the use and implementation of innovation technology, compromise and question the current businesses due to their disruptive nature. Therefore, the reason why the Digital Era is so unpredictable and sometimes alarming, is because the advent of this new business, based on disruptive innovation, is generating profits by destroying conventional and traditional businesses.

“Today’s technology is not just more powerful than the past one: it is different”

Mind the Change

Have you ever noticed that when handling new technologies, old people find it difficult to use it while children seem to be learning immediately? Above the many scientific reasons concerning brain reception through different ages, an additional simpler explanation is due to the fact that technologies have changed, and they’ve changed to become easier and immediate. While the majority of old technologies were conceived as something complicated that required a manual or some explanations, we can actually perceive that a great amount of new the technologies offered are replacing, in terms of simplicity, the previous ones: requiring people to unlearn in order to learn.

1.4 Digitalization and Social Changes

Technologies provided and implemented by startups are said to be *digital* and are distinguished by the ability of collecting and using information in the form of data. This process of collecting, transmitting and elaborating data is led by a software that has the extraordinary power of taking decisions and eventually operate.

A product is said to be digital if a software is leading its functions. Some products are born as digital products: A computer, a smartphone, a television. Other become digital because a software controls the functions that were before directed by analogue mechanisms: for example, cars and other transportations or appliances.

Now think about how many facilities have been digitalized in the last decade. Entrepreneurs and engineers have been working hard into exploiting social demands for a much effortless and reachable technology, seeking the connection between objects and people and creating intelligent devices in order to digitalize our everyday life. This is the work of a *"startupper".*

In the attempt to design the possible outcomes of a foreseeable future, Vittorio Veltroni, a Philosopher and Entrepreneur who is currently dealing with consultancy in digital survival, outlined what he perceives will happen in the upcoming time.

Veltroni supposes that in the upcoming fifty years, machine learning (ML) developments and artificial intelligence (AI) will allow devices to carry out many tasks better than humans do, such as concerning data cataloguing and executing plans of action resulting from it. In the implementation of these digital systems, there is also the possibility of creating machines with remote brains and constructing always more functional and powerful robots able to interact with complex physical environments. So, the extraordinary and revolutionary fact that marks the XXI century is that humans will shift from using mechanical tools to substitute or implement manual labour into designing new high-tech systems to substitute or integrate human's cognitive ability. Many activities will be automatized in the upcoming years while AI and ML will be implemented and broadened to different fields.

Obviously, this great change will have social consequences, not only in our everyday habits and customs, but in the whole economic perspective mostly affecting unemployment in many sectors. Machine will shortly substitute men's work not only in the production sector but especially in the one of services. As we could notice first hand,

in the last few years there has been a boom of startups delivering services that have been entering the market. From food services to transportation and tourism, many people easily adapted and enjoyed the new automatized businesses that have been created inevitably causing a reallocation of human capital.
These disruptive innovations do not allow economic and cultural surviving opportunities to those segments of society with a lack of education and psychological tools that would enable them to embrace such paradigm. "It's about an ongoing chase, and thus irregular, of creative intuition and of a syncretic capacity to find links and connections that could not be previously extrapolated." *(Veltroni, V. (2017), Creativi per Forza in A. Baban, A. Cirrincione and A. Mattiello, Mind the Change, pp.19)*

Considering the realistic point of view of Veltroni and analysing the upcoming factors that have been modelling and influencing social changes, it is clear that the latest transformations involve the consequences brought up by products incorporating digital technology. (Such consequences concern the impact on companies' business models and business processes as well as the scale of sectors affected by transformation.)
"Any product has digital power: it has the possibility to become digital, or at least, to actively take part to systems that are based on digital reasoning.".

CHAPTER 2:

Technologies available in the implementation of startups and expected outcomes.

Once comprehended the nature and the future of startups, it is necessary and inevitable to better understand in which direction the new innovative business is oriented in terms of production and outcome. In the many technological and innovative outcomes that can produced by startups, a large and influent branch regards IOT.

The term Internet of Things was first conceived by Kevin Ashton, a researcher at MIT, when he found the standard for the RFID (Radio Frequency Identification) and other sensors.

The new term is now used for those real objects that are connected to the internet. Thanks to their remote connection to the web, these objects have the power to connect the real world to the virtual one, operating on a new dimension. More specifically, Intent of Things stand for a set of technologies able to connect any device to the internet. The aim is to monitor, control and transfer information to consequently carry out different actions.

"Imagine everything was linked. Let's say a professor at the university is not feeling well and calls in sick. An automatic system at the school could send an alarm to all the students that the class was cancelled. Furthermore, this information is passed through a system that adapts my agenda, it calculates the new time to my next class two hours later, taking into account public transport time table. And could also reset my alarm clock to wake me up a bit later, and it could adjust the central heating system and the coffee machine. Imagine we had an Internet of Things, wouldn't that be awesome?"
Internet of Things Europe, Digital Single Market.

IOT is having a big success because its technology not only fascinate its users but most of all, it makes anything much simpler. The majority of people are supporting the change and are eager to expand this technology to many other devices. Especially in Italy, there is great confidence on the country's smart minds and capabilities employed in the research of new devices and connections.

2.1 Development of IOT

The first devices that preceded Internet of Things were initially involving detectors, which were able to precisely collect data for specific applications such as the detection of temperature, movements and sound. These sensors were used for many different causes, but the aim was parallel: to detect information and transform it to digital data, but the connection to the internet was still missing.

At the time that devices were actually connected to the web, they became the so-called Internet of Things, fulfilling the connection between objects and internet so that the sensor, could express the information acquired and subsequently share it online.

You can find a precise list of the many phases made by IoT and its different relations to data.

1. Devices - connected to the internet- able to detect data and communicate data
2. Devices - connected to the internet - able to detect more types of data and transfer them
3. Devices - connected to the internet - able to carry out a very first level of data processing (selection) at the local level to transfer only the data that correspond to specific requirements
4. Devices - connected to the internet - capable of collecting data, making a first level selection and performing actions based on information received
5. Devices - connected to the internet - capable of collecting data, selecting them, transmitting only those necessary for the projects in which they are involved, carrying out actions based on the information received and carrying out actions based on local processing capacity

2.1.1 How does IoT work?

In order to work, IoT needs to collect and archive a huge amount of data, and additionally, to be efficiently functioning and exploited, it needs to process and gather a huge amount of data in *real time*. For this reason, bug data systems, nosql databases and IoT data a primary necessity

So how exactly do all these devices share such large quantities of data? And how do we put that information to work?

It’s the common internet of things platform that brings us diverse information together and provides the common language for the devices and apps to communicate with each other. The process starts with the devices themselves which securely communicate with an Internet of Things platform, this platform integrates the data from many devices and applies analytics to share the most valuable data with applications that address industry specific needs.

The platform is constantly gathering and sorting thousands of bits of information building an historical record and secure database.

Here is a list of the multitude of parameters and related objects that can be measured by data analysis thanks to their web connection.

Parameters

- Air temperature
- Space pressure
- Movement (motion sensors)
- Thermostats
- Cameras
- Brightness detectors
- Humidity detectors
- Watches
- Wearable (wearable items, such as connected bracelets and watches);
- Environmental and territorial sensors.
- Orientation in space
- Proximity (proximity sensors)
- Images (video cameras)
- Detection of electromagnetic waves
- Radio frequencies
- Electricity, voltage, current
- Sounds

Related Objects

- Home, smart home, home automation
- Smart buildings, smart building, building automation
- Industrial monitoring, Robotics, Collaborative Robotics

- Automotive industry, automotive, self-driving car
- Smart health, healthcare, the biomedical world
- All areas of telemetry
- All areas of surveillance and security
- Smart city, smart mobility
- New forms of digital payment through objects
- Smart agri-food, precision farming, field sensors
- Animal husbandry, wearable for animals

All of the following can be defined as "intelligent objects" and they can cleverly dialogue, through sensors and web connection, with people. The capability to dialogue is being implemented day by day and is quickly and surprisingly improving while reaching overwhelming and advanced levels of innovation. Keep in mind that such a congregation of linked objects does not only bring to a one-to-one connection, but they are also able to establish multilateral associations, creating a net of related devices, materials and machineries that cooperate together into the making of a unique "anything intelligence" capable of generating new forms of knowledge.

All of the intelligent objects listed above can be defined as IoT and are responsible for the new wave of the so called "Industrial Internet". *"*So, what is this industrial Internet? Industrial machines are being equipped with a growing number of electronic sensors that allow them to see, hear, feel a lot more than ever before, generating prodigious amounts of data. Increasingly sophisticated analytics then sift through the data, providing insights that allow us to operate the machines in entirely new ways, a lot more efficiently. And not just individual machines, but fleets of locomotives, airplanes, entire systems like power grids, hospitals. It is asset optimization and system optimization. Of course, electronic sensors have been around for some time, but something has changed: a sharp decline in the cost of sensors and, thanks to advances in cloud computing, a rapid decrease in the cost of storing and processing data." -*M. Annunziata. "Welcome to the Age of the Industrial Internet". TED 2013.*

2.1.2. Biometric Recognition

The automated method of biometrics is based on the advanced technological recognition of singular and personal physiological or behavioural features by identifying and memorizing the patterns of ridges and valleys of the detected image (or sound) and matching them with a previously scanned image (or sound). This new form of technology has been implemented to many features to be recognised which can be listed among face, fingerprints, handwriting, iris, retinal, vein and voice.

Biometrics undoubtedly have numerous advantages and can be used for infinite different occasions, but the brand-new technology has been used mostly for security reasons. Indeed, its capacity to recognize such peculiar characteristics makes up a perfect tool for the use of authentication given its capacity to make verification completely personalized. Web's accessibility unfortunately entailed billions of stolen accounts in the world and violated domains producing a general scepticism and distrust on digital devices that collect and use personal data, most of all, on IoT devices. Biometrics, additional IoT systems, have offered a solution to the problem, offering greater security with the use of algorithms and their collection of physical and audible attributes. Integrating this technology to already existing ones will enable an increase in its users' trust and hence an increase in its effectiveness.

Considering its usability and efficiency, biometrics have been used for a multitude of services and mostly along other IoT devices to enrich and protect their performance. The market of biometric is nowadays led by smartphones, but is quickly increasing in other many fields, from smart home to automotive, from healthcare to financial services, and most of all to digital payments. The demand for this kind of service is sharply growing and expanding to a multitude of markets.

Figure 2.1: Annual Biometrics Revenue by Selected Use Cases, World Markets: 2016-2025

Source: Tractica

Tractica, an American analysis company, estimates that the companies involved in this business will reach $69.8 billion in 2025 with annual growth rate of 22.9%.

2.2. The Future of IoT and its impact on Society.

Until now, researchers say, there are 5 billion connected objects. Expectations count 25 billion before 2020 accounting industrial data for over 50 percent of all digital information.

The internet of things is said to have a substantial and primary role in a new form of revolution called "Industrial Internet", that brings together intelligent machines, advanced analytics and the creativity of people at work.

"It is the marriage of minds and machines, and our life will never be the same"
Marco Annunziata

The expanding network of digital devices will allow to the real time optimization of production processes and economic activities resulting in a substantial reduction of pollution and resource consumption. We are well aware of the alarming situation on Earth concerning severe global warming, air and water pollution and plastic scums. We also know that it is fundamental, to survive and guarantee healthy living standards to

upcoming generations, to contribute and commit first hand to *change*. Such change consists in a modification of old habits, mentality and social behavior. It is clear that rousing and sensitizing masses takes a long time and it is not always successful, but with the help and integration of smart objects there could be a quick switch to a greener world. IoT could guide people into making the right and sustainable decisions or automatically execute sustainable actions in order to optimize operations and reduce both waste and energy consumption.

And what about the effects that these intelligent devices may have on employment? Won't they destroy working sectors and substitute human work? Marco Annunziata, the Chief Economist at General Electric and Technology enthusiast, cleverly answers the question:

"This new wave of innovation is fundamentally changing the way we work. And I know that many of you will be concerned about the impact that innovation might have on jobs. Unemployment is already high, and there is always a fear that innovation will destroy jobs. And innovation is disruptive. But let me stress two things here. First, we've already lived through mechanization of agriculture, automation of industry, and employment has gone up, because innovation is fundamentally about growth. It makes products more affordable. It creates new demand, new jobs. Second, there is a concern that in the future, there will only be room for engineers, data scientists, and other highly-specialized workers. And believe me, as an economist, I am also scared. But think about it: Just as a child can easily figure out how to operate an iPad, so a new generation of mobile and intuitive industrial applications will make life easier for workers of all skill levels. The worker of the future will be more like Iron Man than the Charlie Chaplin of "Modern Times." And to be sure, new high-skilled jobs will be created: mechanical digital engineers who understand both the machines and the data; managers who understand their industry and the analytics and can reorganize the business to take full advantage of the technology."

Therefore, knowing that our future is in the hands of cyber technologies and almost animated objects is worrying many people, but we cannot do anything but trust the smart minds that our working for us, into making this world safer, healthier and simply better.

2.3. Smart Cities

Smart cities refer to urban planning strategies aimed to improve the quality of life in the city, while trying to meet the needs and demands of its citizens. The means to achieve such goal are indeed technological, with the main feature of allowing infrastructures to relate with the city's inhabitants.

Making a city "smart" is an additional strategy to reduce problems of urban population growth and rapid urbanization thanks to the contribution of Information and Communication Technologies (ICTs). Examples of smart objects can be intelligent traffic lights (turning green when there are no cars running in the opposite direction) or innovative systems of waste management and disposal, or even other innovations concerning energy, mobility, communication and urban planning. It would be a synergic interconnection of industries and sectors such as Smart Governance, Smart Mobility, Smart Utilities, Smart Buildings and Smart Environment.

ICT would use a broad range of information coming from diverse settings in real time and would exploit both tangible and intangible resources. These technologies, in doing so, would be able to adapt to users' needs promoting their own sustainable development.

"For much of the 20th century, the idea that a city could be smart was a science fiction that was pictured in the popular media but quite suddenly with the massive proliferation of computable devices across many scales and with a modicum of intelligence being embedded into such devices, the prospect that a city might become smart, sentient even, is fast becoming the new reality. The convergence of information and communication technologies is producing urban environments that are quite different from anything that we have experienced hitherto. Cities are becoming smart not only in terms of the way we can automate routine functions serving individual persons, buildings, traffic systems but in ways that enable us to monitor, understand, analyze and plan the city to improve the efficiency, equity and quality of life for its citizens in real time. This is changing the way we are able to plan across multiple time scales, raising the prospect that cities can be made smarter in the long term by continuous reflection in the short term." *Batty M. - Smart Cities of the Future*

Undeniably, there would be a profusion of sectors and fields that would benefit from such a "smart" evolution, but these changes could also affect and transform the role of the

citizen. People would have the possibility to be individually involved into the city's plans and decisions, having a social and political role. It could be the start of a new form of democracy. ICTs would in fact be able, through citizens' feedbacks, to adjust according to the majority's needs or to calibrate on individual preferences.

Further benefits would be obtained by the ability of technologies to save energy as well as time. Time, in fact, is a precious resource that now, more than ever, can be optimized. Smart cities, thanks to their wide web of connections and connected services would provide a high level of security, contributing in the reduction of criminality and accidents. Nonetheless, one of its main features and goals would be to assure an improvement in environmental quality, which directly impacts citizens' lives and health.

Is investing in Smart Cities too expensive? Actually, no: according to the estimate of the Smart City Observatory of the Politecnico di Milano, in a city like Milan, it takes just 1-2 years to repay the investments of a parking management project (sensors to monitor the availability of parking spaces and apps to book and pay via smartphone). A little more (2-4 years) to set up a "smart" waste collection, with baskets equipped with filling sensors to optimize collection. A reasonably short time (3-5 years) is also required for the adoption of solutions for intelligent lighting, such as street lamps that adapt intensity to the brightness of the environment, systems of predictive and optimal maintenance of street lamps. Longer times (6-9 years), instead, are expected for the implementation of Smart Building solutions in public buildings (management of heating, air conditioning and lighting). In terms of livability for citizens, the estimate is that thanks to smart building solutions, intelligent lighting and parking management, the Milan area could reduce its carbon dioxide emissions by more than 60,000 tons of CO2 per year.

These benefits and advantages are sufficient to explain why, despite various kinds of resistance and non-optimal availability of funds, the Smart city is increasingly taking hold in Italy: according to the Observatory Data, 48% of Italian municipalities have already started at least one Smart City project in the last three years, although most initiatives - 63% of the total - are still in the experimental phase. Smart City initiatives focused mainly on intelligent lighting (in 52% of municipalities), tourism services (43%), waste collection (41%), mobility (traffic management 40%, parking management 33%) and security (39%).

2.4. IoT for Smart Cities

In the implementation and development of smart cities, Internet of Things obviously plays a huge role in connecting the objects and services present in a city to other objects and services or directly to citizens. In fact, IoT sensors play a fundamental role into the acquisition of data on a great scale. Such data will then be used to take decisions and eventually improve the living in the city.

"The application of the IoT paradigm to an urban context is of particular interest, as it responds to the strong push of many national governments to adopt ICT solutions in the management of public affairs, thus realizing the so-called Smart City concept. Although there is not yet a formal and widely accepted definition of "Smart City," the final aim is to make a better use of the public resources, increasing the quality of the services offered to the citizens, while reducing the operational costs of the public administrations. This objective can be pursued by the deployment of an urban IoT, i.e., a communication infrastructure that provides unified, simple, and economical access to a plethora of public services, thus unleashing potential synergies and increasing transparency to the citizens. An urban IoT, indeed, may bring a number of benefits in the management and optimization of traditional public services, such as transport and parking, lighting, surveillance and maintenance of public areas, preservation of cultural heritage, garbage collection, salubrity of hospitals, and school. Furthermore, the availability of different types of data, collected by a pervasive urban IoT, may also be exploited to increase the transparency and promote the actions of the local government toward the citizens, enhance the awareness of people about the status of their city, stimulate the active participation of the citizens in the management of public administration, and also stimulate the creation of new services upon those provided by the IoT" (*A. Zanella, L. Evangelista. "Internet of Things for Smart Cities")*

Therefore, as explained above, many are the benefits that would make such investments appealing both for economical and efficiency reasons. Industries and Governments in Europe are active and willing to operate in the development of smart cities, and despite some financial and logistical boundaries it is believed that big steps towards this intelligent and sustainable technology will be made shortly.

IoT systems have reached a significant design and are ready to be applied on multiple services forecasting a massive adoption of the IoT program. Technologies and the related

resources are so cutting-edge that many of them are just not yet suitable for the financial and most of all social current situation. However, we are all well confident of a future gradual transformation to a brand-new concept of the “ordinary city” that will upset our reality.

2.5. Travel-Tech

In chapter 1.0 The Historical Context, it is well stated that the era we are now living, the Digital Era, is now experiencing the highest form of globalization ever existed as a result of an ongoing development of communication and transportation technologies. From telegraphs and steam engines, we now can experience smartphones, low cost flights and much more. These features enable us to enlarge our possibility to move and interact worldwide thanks to low travel costs and great accessibility of the related services. Indeed, technological innovations present in the Digital Era are piloting the integration of IT and IOT to traditional services and devices into the creation of a new form of travel called Travel-Tech. This new term stands for a new and easier way to both plan and conduct one’s vacation through a simplification of the planning process for less experienced travellers and a substantial reduction in the purchasing time.

This new form of traveling sees smartphones as protagonists. They are used as a mean to gather together different services, tickets and documents needed for the trip in order to make them all within reach and easy to obtain. Travellers are now depending from mobile technology and connected to every decision-making phase of their journey: from planning, to the choice of the final solution such as the reservation of transportations and accommodations. The majority of airlines and train companies now offer online reservation services and digital tickets, so that it is easy and immediate to reserve for it, making the decision to travel more appealing for a person. Even the hospitality industry is now offering plenty digital solutions to booking online and gives out many offers on different types of accommodation (Booking.com, Airbnb, Homelidays).

This new online approach to the journey made it also possible to share one’s own experience, both during and after the trip, on social networks or communities of travellers on shared rating platform (ex. TripAdvisor). The exposed ranking will influence

travellers' decisions and will push services to operate at their best in order to obtain good remarks and popularity.

Technological innovation has brought up efficiency, automation and customer intelligence to data in the travel industry, but also more opportunities to personalize customer service and product and service innovations. Travel-tech is therefore a sector with huge opportunities and in continuous growth.

2.6. Travel-Tech as Smart Tourism, an implementation of Smart Cities

The concept of smart city offers a broad range of innovations, particularly concerning the IOT technology and IT in every of its forms. It is hence undoubtable that such a visionary design, in the strong globalized reality we are facing, would include not only the services and devices concerning its citizens but it would also look after the experience of its visitors.

Thanks to the implementation and accessibility of today's transportations and the possible wide selection of vacation types, tourism has become desirable and available to all the segment of society, making it one of the most profitable businesses in our current and future economy. Making tourism accessible and bringing visitors to new places means consumption, word of mouth, and local profits. The use of technology in enhancing tourism accessibility and lowering costs and timings promotes both mass movements and high profits from hospitality industries as well as local businesses. Even though economy is largely benefitting from this prolific business, on the other hand, the increasing number of tourists is having a huge impact on host communities and the environment. Some of the issues caused include environmental problems, traffic congestion and lack of human resources in the tourism sector. It is hence fundamental to efficiently and sustainably manage increasing tourist numbers while also ensure that the developed city is able to respond to the needs of both visitors and the local community. Digital technology seems to be the most logical and effective solution into changing the urban landscapes and framework of the cities to become smart cities as well as smart tourism destinations. IoT and intelligent objects will make it easier both for tourists and for hosts to live together.

The automatization and cyber intelligence would not only be used to implement sustainability, transportation and security (benefitting both visitors and citizens) but will also be used in the hospitality services. In *avant-garde* cities travel-tech will be indispensable to adjust to the tourist's individual preference and make its journey easy and exciting like never before. Intelligent devices will reduce the waste of time, which is essential since the limited time available during a vacation and will additionally reduce costs. Cost reduction in fact, would benefit both the traveller and the host.

CHAPTER 3:

DOGGHIS. Digital Online Global Guest Host Interface System.

As foreseen above, the present time is characterized by simplicity, immediacy and convenience. Mankind have always been trying to solve existent problems and adapt anything at its advantage. This is now more than possible thanks to the upgrades made by human discoveries and implementations of technologies. With the help of digital devices and technological systems it is now possible to adjust anything in order to fit our demands and live, work, consume effectively and proficiently.

The majority of startups offered in the market today, consist in the creation of methods, services or devices aimed at facilitating our everyday life with the contribution of technological features such as IoT and ICTs. Indeed, these innovative ideas can be applied to many fields, and they can solve many diverse problems so that, once put together, they can create a harmonic organism of fully digitalized cities.

Objects that interact and are connected to both the internet and other objects or people are obviously highly requested in the sector of tourism and hospitality and are being developed as the so called "Travel-Tech".

Fulvio Tesoro, Dogghis' founder and CEO, had previously worked as owner and manager of multiple B&Bs for many years, from which he could learn the efforts and costs afforded in the process of check-in and check-out and the many problems that may arise from it, such as late-night arrivals or the frequent loss of keys. He knew that the always arising market of hospitality and house renting systems was unconsciously demanding a solution to an existent problem.

Designed to help hosts that rent out houses or rooms to tourists, Dogghis is the first and unique digital interface for hosts and guests that completely automatizes check-in and check-out. As its mission states, Dogghis will *"Guarantee every **Guest** a seamless, wonderful, experience in any apartment. And guarantee every **Host** a new freedom in the management of their tourist apartments."*

Figure 3.1: Dogghis' Device.
Source: dogghis.com

3.1. How does it work?

1- RESERVATION: Dogghis, thanks to its hardware, allows any approved Guest, with only one click via the App, a complete access to the Host's apartment, without the need for actual keys. Once the guests book the apartment online, they will receive a link to download Dogghis, where they will complete the check-in before the arrival, sending the requested documents.

2- SELF CHECK-IN: It verifies the identity of guests before their arrival via the self-check-in system using Face Recognition (Selfie + ID Card). The accesses are securitized by the IP camera of video control and, once verified by the camera, the door of your apartment will be automatically unlocked without the need of physical keys, and most of all at any time, while the IP camera will record the entrance of guests.

3- BUREAUCRATIC PROCEDURES: It automatically manages in an easy and intuitive way, all bureaucratic procedures regarding the check-in and check-out of Guests. (Tourist rental contracts, identity document collection, tourist tax, extra payments, communication to police headquarters). The notepaper will be automatically sent to police headquarters.

4- CHECK OUT: During your stay, Dogghis will always be with you, until the time of the check-out, where it will eventually call a taxi for you.

The startup will reduce time and costs thanks to its accessibility and simplicity, while putting together a few steps in the digitalization of the check-in\out procedures and guaranteeing autonomy to both hosts and guests.

3.1.1. Advantages for Hosts

- ✓ The physical presence of hosts won't be required anymore, exonerating them from time constraints and costs of paying a delegate. Digital keys and online documents will allow an autonomous and easy check-in.
- ✓ Thanks to the self-check-in systems, Dogghis will be able to verify the identity of the guests before the arrival while at the same time, assist them on the in-app chat if needed.
- ✓ Check-in bureaucracy is as well automatized and easy. Dogghis manages rental agreements, the dispatch of notifications to police headquarters

while also collecting city taxes or extras. What about the host? He won't' be bothered to move.

- ✓ Dogghis increases occupation rates. Using the app will allow you to enter the Airbnb business travel program. Business travellers only book this type of ads.

3.1.2. Advantages for Guests

- ✓ Get a 24/7 access to your accommodation without the need of actual keys. Once you book, you will be free to autonomously enter the location. Access the apartment with one-click only via App during the whole duration of your stay.
- ✓ When you travel, you only want the best from it. Since your arrival, Dogghis will guide you home, giving you all the info needed on both the accommodation and the city. You will be able to book tickets to museums and events and before leaving, he will even call the taxi for you! A true digital receptionist, isn't it?
- ✓ Check.in is automatized, easy and quick. Check-in before your arrival, sign the residence contract and enable your access to the apartment. You can also pay the city tax and extras easily and in one-click.
- ✓ Sojourning in an apartment will become a unique experience. If you happen to travel for work, you know how important it is to not have time constraints. A quick check-in will be fundamental.

3.1.3 Installing Dogghis:

The installation comprehends both the application, a physical hardware and the smart IP camera. The team has been working hard to ensure an easy and ready to use installation, making hardware devices compatible with any type of intercom, door or main entrance. The system won't interfere with the condominium so that no authorisation will be required. Dogghis' specialized technicians will take care of the installation of hardware devices inside the apartment. The service will take place within 56 working hours after the initial registration, and will last approximately 2 hours, because our society demands

efficiency and immediacy. Once the team verifies that the hardware works perfectly, Dogghis will be ready to be the Assistant that any host has always desired.

3.2. The technology used:

Hardware devices used for Dogghis are based on a proprietary technology in order to allow a great and continuous reliability and a full control on accesses, even remotely, besides offering a simple and always effective performance. Additionally, thanks to the technology used, guests won't have phone costs and they won't need to use data or roaming connection to access apartments.

The app will be easily accessed from all devices, and it will use Domotic Technology: The digital keys will be easily operated without international roaming or data traffic, while remote control will be used by the host, who will be enabled to open the apartment remotely from any location on the globe.

Security is a fundamental feature when it comes to preventing unsafe situations both to the host and guests. Dogghis' team put much effort into securitizing the startup through any facet. Encrypted connections and https protocols are used. User authentication is the first fundamental feature that relies on security which is ensured by its efficient biometric technology system. It in fact happens through a double authentication, both detecting the phone number and controlling accesses with IP cameras. The first verification of Guest Identity cross-checks the document's photo and the selfie sent, while the second smart verification takes place during the visitor's first access where the camera confirms the coherence feedback of the guest's identity with document photos and selfies.

Concerning bureaucratic procedures, files are safely protected by encryption and banking security standards are used for each payment due.

3.3. Behind the startup: Practical strategies into the making

Fulvio Tesoro, as a smart entrepreneur and startupper, has been following Blank's definition of startup, and he is well aware that with Dogghis, he is actively searching for a repeatable and scalable business model, which he believes, it might be a lucky guess.

He indeed is not certain of Dogghis exact business and future, since what he is initially offering, it is indeed a door-locking system aimed for the hospitality industry. But what if this smart-touristic device is unconsciously starting a whole new business in domestic and multilateral door-locking services? The existence of such a question proves the adaptability and flexibility of the startup facing multiple markets, which means, higher probabilities of profitability.

It is common knowledge that startups are in fact, very risky since unpredictable. The entrepreneur bearing the challenge must foresee many difference aspects, guess some predictions and finally have some good fortune by his side in order to accomplish a life-changing goal. In doing so, Mr. Tesoro, along with Mario Calamita, Dogghis' CTO, have been following the four fundamental tenets for a profitable startup. (Mentioned 1.2.2)

1. Make progresses one step at a time: Dogghis could be an interface system used not only in the hospitality industry but also for infinite many other markets and uses. The idea relying under the digitalization of door-locking systems could be a world changer, but when creating something new, it is best to stay humble, take a safe path and proceed with short incremental steps.
2. Remain simple and flexible: Dogghis 100% is both simple and flexible. It is based on accessibility, ease and reliability. It does not offer a bumbling multitude of services, on the other hand, using it is as simple as unlocking the door. This simplicity is the key for flexibility, since it can be adapted to many different situations, needs and eventually markets.
3. Flourish on competition: Mr. Tesoro was integrated in the market of touristic apartments and B&Bs when ideating the startup. This is the reason for which he was well aware of already existing clients who would do anything to avoid waking up in the middle of the night for a late check-in. On the other hand, digital door locking devices were also getting their way into the market (Amazon is still working on domestic ones in order to permit the delivery even if the owner is absent). He knew the market existed, and he knew it was rapidly growing. He knew this was the right time.
4. Concentrate on the product and not on sales: "*If the product needs sales personnel or marketing, it means it is not good enough" (chap. 1.2.2)* After just one first presentation of Dogghis, a great quantity of people requested the service. The

startup now counts more than 300 requests even though it is not even on beta test yet. The word of mouth is the most powerful marketing tool.

Modern society was demanding easy and immediate solutions to everyday problems. The proficient duo of Fulvio Tesoro and Mario Calamita, provided such solution.
Dogghis undoubtedly has solid and proficient bases for a successful start, additionally considering that its service is greatly demanded and perfectly suitable for the present and future times. Because of its innovative and digital nature, it can be considered as an IoT device, thus, it will impeccably fit in the modern concept of smart cities and smart tourism.
The market of tourism has been changing dramatically during the last decades, indeed following the trends of innovation. ISNART (Istituto Nazionale Ricerche Turistiche) studied and highlighted such changes on a quantitative survey on Italian's touristic behaviour. Data stress out predominant changes on costs contraction (-17.2% in the last 10 years). This outcome is not surprising due to the sharp peak of prices and costs in hospitality services observed in the last ten years. This made traveling now accessible to a broader scale of social classes thanks to the many advantages technology has brought by, for example, simplifying booking processes, increase information's availability and entering low cost touristic services. The business of renting private apartments or rooms to tourists has been having a boom on both profitability and popularity causing a sharp increase in the size of the concerned market, therefore, it is inevitable to deny that Dogghis is cleverly entering a flourishing and safe market.

3.4. A Flourishing Market: The Innovative Home Sharing Service

Dogghis has been created to initially and perfectly fit the newly arisen market of Innovating Home Sharing Services. This dramatically proficient business was created by the now most powerful touristic platforms: Booking.com and Airbnb.
Brian Chesky, Joe Gebbia, and Nathan Blecharczyk, Founders of AirBnB, when they first came up with the idea of persuading strangers to sleep in one another's home at a cheaper price than the market offered, could not imagine that they were not only about to create one of the most proficient startups in history, but, to create a whole new market in

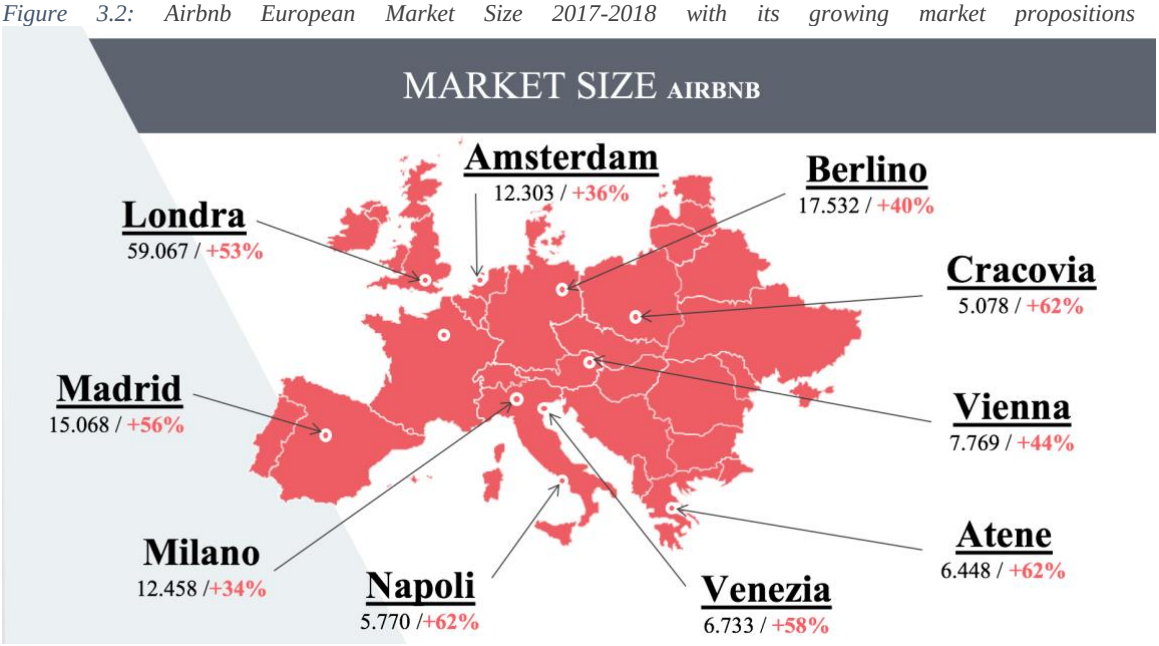
touristic house renting. This new disruptive business is constantly and intensively growing today counting more than 5.000.000 touristic accommodations in the world with a global economic impact of 61 billion euros in 2017, accounting to sharply rise up to 340 billion euros by 2020. It is a considerable amount isn't it? Dogghis' team indeed found it appealing enough to base their upcoming new business on it.

Previsions on Airbnb's market speak frankly:

- The first eight months of 2017 totalled an overall increase of +56 million arrivals compared to the same period of the previous year (source: TRIP Forecast of international tourist flows from Ciset-Ca 'Foscari)
- 86.7% of operators expect further growth also in 2018 (Source: TPT Sl&A, Rome)
- In Italy, 85% of travellers at the time of booking consider a private rental. The occupancy rate of Airbnb accommodation is very close to that of hotels and is constantly growing (Source: Repubblica.it)

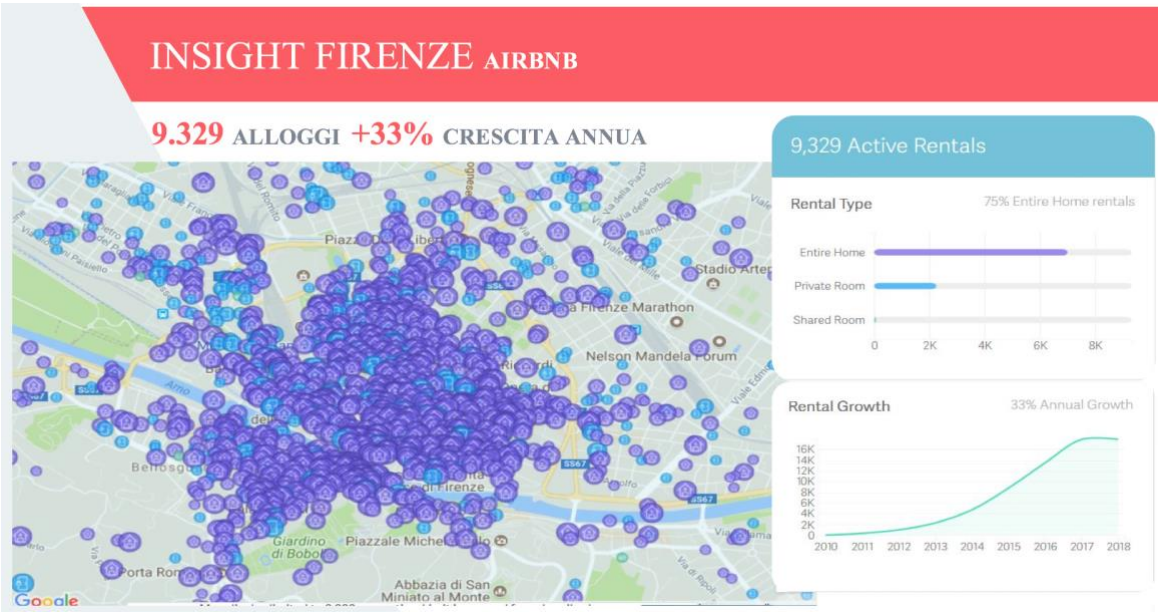
The market's expected outcomes are overwhelmingly positive and growing. Dogghis is exploiting the Home Rental flourishing market situation, situating in this segment, and providing additional efficient services. Airbnb's expanding market, encouraged the necessity and demand of an additional secondary service capable of simplifying and improving the management of rented apartments. Dogghis' disruptive invention is aimed at eliminating the human intervention during the check-in process digitalizing it, hence, accelerating the process and eliminating costs and time wastes.

Figure 3.2: Airbnb European Market Size 2017-2018 with its growing market propositions



Source: Airdna https://www.airdna.co/

Figure 3.3 Florence Market Insight and Annual Growth.



Source: Airdna https://www.airdna.co/

3.5. Dogghis as an IoT device.

Dogghis, is an undeniable example of IoT. Its technology enables, through a number of hardware devices connected to the network, to control the opening of doors and allow the access without the use of physical keys, while it also to verifies and recognizes the identity of those who are crossing that access.

The relationship between electronic hardware devices and physical objects - in this case doors, access gates or gates – enables a connection with specific security protocols to electrical checks of physical objects and creates an intelligent service or better yet a real IOT protocol.

To better understand the structure of data flows through the connection between hardware and physical objects with software support:

1. The APP: The first information is managed and processed on the software side. The sending of the ID identity documents of the Guest, their biometric data are processed by the software and kept available on the server to authorize the hardware to issue a command on the physical objects (access points)
2. SmartCam: the second set of data is dealt by the video camera that will send real-time images of the guests' biometric data to the server, which will check the consistency of the received parameters and command the hardware to issue commands to the physical objects.
3. Server Back End: It is the heart of Dogghis. Working with extraordinary immediacy, thanks to its innovative technology, it will be able to intelligently compare the two series of data images (the ones previously received and the real-time ones) and unlock the door in a few seconds if facial recognition is approved.

The Internet connection is therefore able to intelligently connect these three things, detecting and communicating the data, making a first-level selection and performing actions based on the information received (the parameters involved mainly concern images).

3.6. Dogghis as a Smart-Tourism device to implement Smart Cities.

As previously stated, smart cities refer to urban planning strategies and creations aimed to improve the quality of life in a city, while also trying to meet the needs and demands of its citizens. As mentioned in *chapter 2.4*, technology is the heart of such an innovative project. In fact, a totality of the most advanced technologies present in the market will be needed in the implementation of these "sci-fi towns". At the moment, the most efficient and cutting-edge technologies are represented both by ICTs and the whole range of IoT. The functionalities offered by these new engines are perfectly suitable to the aim of creating a smart city made up by smart objects able to cleverly connect to other objects or to people into a detection and solving of problems and demands.

Indeed, tourism is a crucial point that affects cities' welfare. A well-functioning and innovative city would obviously offer an up to date technology to better off services and resources in order to both grant an effortless cohabitation between visitors and citizens and give a positive impression to newcomers.

The technology that stands under smart tourism is called Travel-Tech and represents an easier way to both plan and conduct one's vacation through a simplification of the planning process and a substantial reduction in the purchasing time. Dogghis certainly fits this definition. The app will simplify the traveling journey from the beginning to the end. Once arrived in the given city, the app will escort its guests to their apartment by highlighting a path on the map. Once arrived, Dogghis will even open the door for them. It will additionally digitally provide them the required documents that have to be signed so that they will have anything they need at their fingertips, leading to a dramatic reduction in purchasing time.

Guests who are facing Dogghis' technology for the first time will allegedly be pleased with such an easy and new revolutionary way to carry out their stay. The mere fact of having neutralized the inconvenience of sticking to an arrival time to be able to stay in a tourist apartment is a great way to start living your vacation without restrictions. Dogghis' technology allows you to carry on the undertaken journey without barriers, in freedom and autonomy from the time you book the residence, to the time of your arrival in the city, until the time of taking possession of the booked apartment. All thanks to a

technology that finally made digital the only physical moment still present in the hospitality industry.

Besides, a lot of time has passed since we, as travellers, bought a plane ticket physically in a travel agency or printed a boarding card for a booked flight. Thus, today, proposing an innovation that totally digitalizes check-in and check-out procedures will inevitably overwhelm and please most of the people who travel.

Then, after the first impression is made, its users will not be able to do without it because once an easy act becomes easier, it is hard to go back to the starting point. This is what disruptive technology is about. Dogghis is a startup that, by facilitating and fastening the processes, could disrupt the traditional concept of check-in or, all the more, of entire door-locking systems.

When reading about smart cities, you will often find examples of smart objects such as intelligent trash cans or smart traffic lights, so why not integrating smart door-locking systems that will cleverly open the door for you?

CONCLUSION

The intensity and rapidity with which the astonishing technological and social developments have incurred in the last century have undoubtedly brought up humans to question their future while also inevitably feel vulnerable in the present volatile epoch. Considerations regarding the prospects of the upcoming years are mixed, the majority of people rely on the power of technology as the solution of a multitude of problems, but its potential is also feared by many given its unpredictability. For this reason, it is necessary to point out and clarify the most important and reliable matters that have been influencing our lives daily in the last decades, and that are going to reshape the future ones.

This dissertation is intended to analyse the various human and technological aspects that carried the latest digital revolution to raise awareness on our current historical and economic situation while subsequently outline the determinants of a predicted future development.

Startups are unquestionably the economy's new force and have quickly redesigned many markets within their demands. Investors are shifting their interests in these new businesses boosting up stock markets in an ongoing startup mania. This business has been refining time by time and is now focusing on more specific technologies aimed at redesigning human habits digitalizing as many activities as possible. Analysing the case of Dogghis was essential to provide a concrete example of the trending business while also representing a model for the future of startups and IoT inventions. Dogghis' team was helpful in describing the procedures involved in the creation of both a startup and an intelligent object, elucidating the overall process of how to create a successful business, solve existing problems using technology and guessing the perfect timing and market demands.

The selected case embodied all the agents that are predicted to be the drivers of a revolutionary technological and digital development in the near future: It is a startup of an IoT device, that will be used as a tech-tourism asset into facilitating operations and improving efficiency fitting perfectly and contributing to the structure of a smart city.

Dogghis seems to be just a little device compared to the set of infinite inventions that would build up a smart city, but change, is provided by little and many. Today's

technology is so powerful and disruptive because so accessible and simple. It doesn't take flying cars and billions of dollars to make a permanent and remarkable change, but rather smart minds, little money, willing investors and accessible and simple solutions.

The outcomes of the digital era are yet hard to predict, but we definitely have the tools to improve life quality and expectancies, economic downturns and environmental issues. As every powerful instrument, reversals can happen if not used correctly or disproportionally, so we better fear human collective behaviour rather than technology itself. But beside that, we undeniably reached a crossroad where we can either choose to make a positive permanent life-changing turn or a take a wrong disastrous path. The field of IoT devices have been positively affecting the overall outcome, firstly, because the change was due to a contribution of little inventions that made a substantial evolution possible in collective terms. Secondly, they have been implemented on worthful applications (most of all on smart appliances and smart energy meters) which makes IoT an active contributor to the overall global welfare and sustainability.

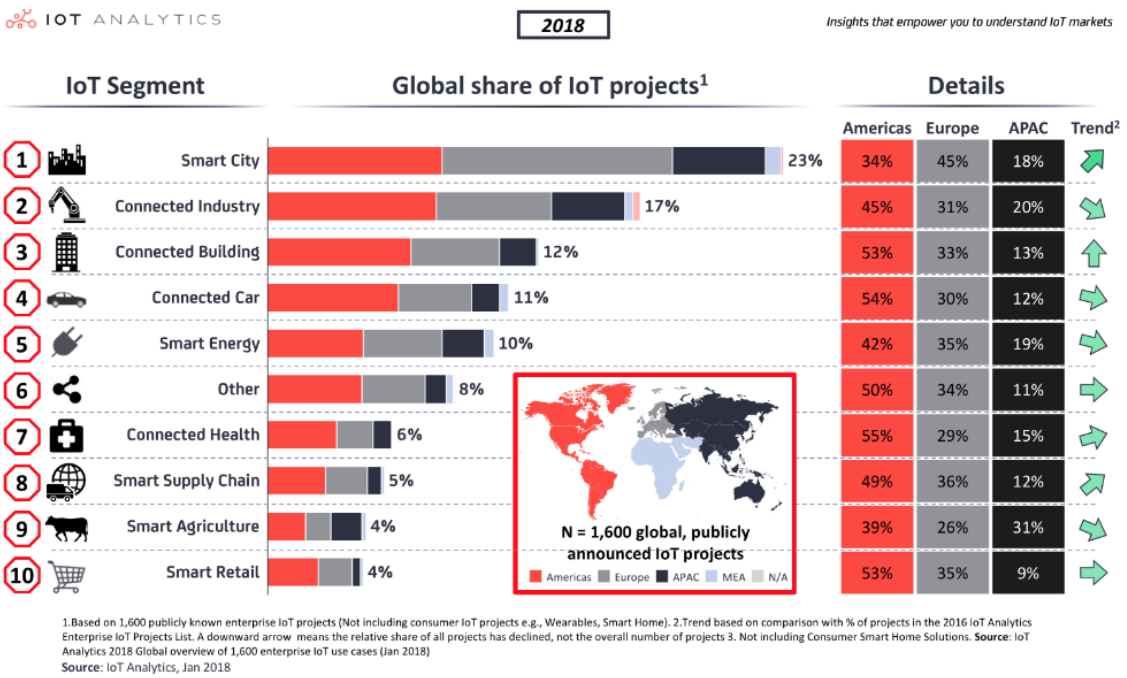


Fig.4.1: The Top 10 IoT Segments in 2018. Source: IoT Analytics, Jan 2018

As the figure shows, IoT is undoubtedly actively performing for great causes. Smart Cities, Connected Industries, Connected Health, Smart Energy and Smart Agriculture, these are just a few examples of segments where technology, through the use of smart

devices, is positively performing and working to efficiently allocate the infinite number of resources needed to guarantee a decent quality of life to an overpopulated globe without destroying the overall ecosystem and reshaping equilibrium.

Therefore, as a final consideration, startups like Dogghis and other smart devices are not to be feared, they rather be praised for the fundamental contribution they are having into contributing to the sustainability of our world and breaking down global inequality. Tech-tourism devices are additionally providing a boost in globalization and economic welfare making unprecedent accessibility to travel and flourishing number of domestic and foreign markets.

REFERENCES

Thiel, Peter. “Party like It's 1999.” *Zero to One: Notes on Startups, or How to Build the Future*, by Peter Thiel and Blake Masters, Virgin Books, 2015, pp. 18–19.

“The Purpose of Change.” *Civilization at the Crossroads: Social and Human Implications of the Scientific and Technological Revolution*, by Radovan Richta, Routledge, 2018, pp. 12–13.

Blank, Steve. “Steve Blank What's A Startup? First Principles.” *Steve Blank*, 25 Jan. 2010, steveblank.com/2010/01/25/whats-a-startup-first-principles/.

“Everyone Is in Tech Business.” *Mind the Change: Capire Il Cambiamento per Progettare Il Business Del Futuro*, by Alberto Baban et al., Guerini Next, 2017, pp. 14–18.

Veltroni, Vittorio. “Creativi per Forza.” *Mind the Change: Capire Il Cambiamento per Progettare Il Business Del Futuro*, by Alberto Baban et al., Guerini Next, 2017, pp. 19–20.

Ntantko. “The Internet of Things.” *Digital Single Market - European Commission*, 26 June 2018, ec.europa.eu/digital-single-market/en/internet-of-things.

Annunziata, Marco. “Transcript of ‘Welcome to the Age of the Industrial Internet.’” *TED*, 2013, www.ted.com/talks/marco_annunziata_welcome_to_the_age_of_the_industrial_internet/transcript.

Batty, M., et al. “Smart Cities of the Future.” *SpringerLink*, Springer-Verlag, 5 Dec. 2012, link.springer.com/article/10.1140/epjst/e2012-01703-3.

Torchiani, Gianluigi. “Caratteristiche e Prospettive Delle Smart City.” *Internet 4 Things*, Internet 4 Things, 3 Apr. 2019, www.internet4things.it/smart-city/caratteristiche-e-prospettive-delle-smart-city/.

Zanella, Andrea, and Lorenzo Vangelista. “Internet of Things for Smart Cities.” *IEEE Explore*, IEEE Internet of Things Journal (Volume: 1 , Issue: 1 , Feb. 2014), Feb. 2014, ieeexplore.ieee.org/abstract/document/6740844.

Scully, Padraig. “The Top 10 IoT Segments in 2018 – Based on 1,600 Real IoT Projects.” *IoT Analytics*, 22 Feb. 2018, iot-analytics.com/top-10-