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THE BUSINESS OF PHOTOGRAPHY: "YOU PRESS THE BUTTON, WE DO THE REST".

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Summary:

[1] *Note: each single brand quoted in this thesis is a registered trademark, even if the ® symbol is omitted.*
Every analysis, consideration or statement with reference to a registered trademark is intended to be seen as the result of personal deductions and conclusions arising exclusively from years of experience as a photographer and the achieved level of knowledge.
I totally exclude every kind of collaboration or strict connection with the previously mentioned brands.

Abstract

I decided to base this whole work on a slogan introduced by Kodak in the late 19th Century and from it came the idea of an essay about the business of photography.
"You press the button, we do the rest" appears to play an extremely relevant role in the evolution of photography in all its branches both in these recent years of pioneering technological progress and more than over a century ago, which marked the end of the first conception of photography.
At that time, Kodak's slogan put down roots for a completely new way of conceiving photography, in which the certainty that only a professional photographer -probably part of an extremely restricted number of artists- may have the skills, the experience and the equipment to deliver a print into the customer's hands began to collapse.
On the one hand, Kodak's slogan turned out to be yesterday's symbol in the evolution not only of the photographic industry viewed from an industrial organization standpoint, but also of the conception that the different categories of users have.
On the other, let's us think about how now it is still extremely current, especially with reference to the series of devices the IT revolution gave birth to, providing final users (regardless of their photographic skills) a high likelihood of obtaining a good quality shot merely by putting a finger on a touchscreen representation of a classic shutter button.
Considering the variables that simultaneously govern the world of photography, its complex structure and its widespread expansion, I believe that this study could clarify the aspects (in addition to a deep economic analysis of the whole sector) usually taken for granted by final consumers or even ignored.
My hope is for users to become more aware of what lies behind the "image" they wish to capture on a camera and which they distractedly obtain, because, modern devices have allowed them to be a dominator of the scene.

A dominator of the scene at the mercy of a camera.

Keywords: *photography, imaging, trend, innovation, dominant design, industrial organization, segmentation, strategy, social networks, to share.*

Introduction and overview on the world and the business of photography

Introduction

This thesis firstly aims to provide a punctual, clear and explanatory analysis of the business of photography, especially addressed to that average user with average knowledge both of technical aspects of photography and of the part it plays on our modern society, dominated by a massive presence of social networks and virtual ties as protagonists in our lives.
But to mention the "average user" (that I will often name Layman, to avoid unpleasant repetitions) without relating it to a specific context or environment and without any historical background depicting which were the different classes of consumers and which ones were likely to be in a more or less imminent future may seem not to bring value and useful information to the reader.
For this reason I firmly believe that a preliminary bird's-eye view over photography's history and evolution would represent a solid fundament to the whole work and facilitate the reader to focus the attention on the significance of all the single pieces that compose the final puzzle of a complex and always transforming business like the one of *imaging*.
I will immediately provide some inputs as "*imaging*" term to start familiarizing with them from the beginning of the excursus I am going through.
With reference to the word *imaging*, it could be referred to several contexts that I will explain more in details in the following chapters, for instance to the broader and general one (in few words, as a simple synonym of photography), to specific imaging industries (like the one of CMOS/CCD sensors producers or lenses manufacturers) or with reference to the social media apparatus that stands behind the development of new technologies, representing one of the major threats at managerial level.
Managers' beliefs about how their market shares would be affected by new trends and consequent market configurations will reflect on the composition of manufacturers' portfolio of photographic equipment, that often excludes or withdraws final products or services related to them (like after sales services and maintenance for professional gear) that on one hand would avoid losses for producers but, on the other, would subtract oxygen to the environment of professional photography, forcing professionals to change their assets and adapt to the metamorphosis of their occupations.

Taking further with this introduction, the third chapter of my thesis will be devoted to an inspection of the philosophic, artistic and social spheres, highlighting not only how the business of photography literally exploded after a period of experimentation and development of the primitive

ways of capturing and storing images from real and unique moments in time, but also the way a professional photographer used to work and his relationship with final clients.
After it, I wish the reader would hold in mind what photography was in the past, its actual status and how is likely to evolve in the future.

The fourth chapter represents the core of the entire work, since extends those that in the previous sections (except of the fourth chapter) of it were general considerations to deeper and broader data concerning the demand and supply side of photography market.
To a larger extent, this section is grounded on two main sources of data:

- Specific classes of products related and destined to different types of final users (*supply side*), so, a list of cameras, lenses and other imaging products taken from publicly available databases;
- A behavioural research (in addiction to a study on the attitudes and feelings of those operating in a professional context) set up on the results arising from a questionnaire that I published in two differentiated photographic environments (photography web-communities and a non-targeted ambient such as social networks), building the *demand side*.

It is important to underline how the answers to the previously mentioned questionnaire not just confirm my personal suppositions in quality of free lance photographer since 2008, but officially show precious information about customers' habits, feelings and knowledge of photography, despite the restricted number of results (however, the complexity of my survey was strictly correlated to the forecasts I made on the volume of users who I supposed would have completed it without a massive and less precise spreading activity, even considering the Italian panorama I took in consideration).
The goal of this chapter is to firstly ascertain those complex dynamics that govern the demand/supply equilibrium, secondly to embrace the reactions of manufacturers to those tendencies translated into continuous changes in their industrial organization, with particular reference even to those that represent firms' corporate philosophies, goals and missions.
A set of statistical data mainly provided by CIPA (Camera and Imaging Products Association) database will clearly express the amount of shipments and their fluctuations at global level regarding a list of participants to such statistical research belonging to three distinct areas: *digital still cameras* and *interchangeable lenses*..
In fact, a study of the aforementioned variables (including those relative to sales, discontinued products/after sale services) would close the circle giving some closing remarks that would not just

complete a reliable analysis, but even anticipate to the reader's eyes what the history of notorious firms' declines taught us.

The fifth chapter will indeed drive the attention to the history of four eminent imaging realities as sources of further considerations on the evolution of imaging industry: Kodak, Ferrania, Polaroid and the Lomography phenomenon.
I believe that these case studies incorporate an average and common path on which the entire photography industry rides, showing both preferential/unexplored routes to development and success and obstacles potentially representing a default situation or, worse, a total collapse of a system.
I will base my case studies on publicly available information, such as articles, data from producers' websites or other web-databases.

Finally, the last part of the thesis will be devoted to the final conclusions, a summary of the most relevant findings and the references list.

Overview on the world and the business of photography

Photography's world represents one of the most complex, controversial and mutating phenomenon human beings began to share their lives with in less than 200 years, since it has reached a so immense importance that we developed a real and unconscious necessity to get information about events, persons, objects, circumstances based on images.
Its level of diffusion is so high that it becomes easier for a Layman to forget the amount of work, research, experiments, risks and resources (both economic and human) that stands behind the perfectly realized photo of an electronic device (for instance) sleeping in the warehouse of a giant on-line shop, perhaps representing the only incentive for a user about to purchase it to effectively add the product to the basket instead of choosing a similar (or even identical) one from a competitor or simply a different supplier.
Infinite examples like the one I just explained could be mentioned, demonstrating that photography's transformation encompasses various contexts and I think that three of them could speak for almost all the others, encapsulating key passages in the history of imaging industry:

- *History;*
- *Birth of professional photography;*
- *Actual status of photography (generally intended)*.

History:

Three main moments could be identified in the earliest stage of photographic evolution, from its birth in 1826 to 1888, the year in which Kodak's slogan largely permeated the market and consumers' minds.

After that point, photography as a business started to assume an exponentially higher importance, not only because of the strong competition it originated in the professional scenario, but also due to the width of social classes that began to ask for portraits or, in general, photographic documentation of events and ceremonies.

But let's jump back to the beginning and have a look to the French background, where photography was officially born in the late 20's of 1800.

The first years of 19th Century were characterized by a massive presence of the ascending middle class, whose need of self-consciousness translated into self-representative images that could (hopefully) manifest all the efforts to reach a higher welfare and a more powerful position in the social apparatus.

To meet their resulting demand for goods, nearly everything had to be produced in greater quantities, without exception for *portraits*[2].

In those years, naturally, they were the classical and unique form of self-representation, drawn by an artist who usually was not only familiar with the history (in terms of personal life, affairs, attitudes) of his subject, but who often was in a close relationship status with him.

Court painters as a constant presence in the nobility started to be replaced by different forms of representation, such as *miniatures* and *physionotraces*, able to satisfy the emergent bourgeoisie's demand for perfection.

Despite the two methods could apparently seem similar, especially if we observe them today, they represent two completely opposite forms of representation, since while the former were tiny portraits still painted maintaining an artistic vein or allowing artistic interpretations, a mere and abstract reproduction of reality was typical of the latter, consisting in no more than a manual skill.

Physionotraces were directly deriving from *silhouettes* (nowadays we find the term in our common usage to indicate a shadowed profile of something or someone), indeed they consisted into drawing

[2] *Gisèle Freund, Photography and Society, 1970.*

the contours of an object, usually a face, whose shape was projected to a surface separating the subject from the physionotracer.
My intent is not to deeply explain how these unusual forms of portrait were working, but only after having seen what a physionotrace and a miniature were looking like, it is possible to make some other crucial considerations in order to understand the delicate passage from an *artistic representation* of a subject to the new, impersonal activity of a photographer.
At this point, it should be easier to understand how these alternatives to standard portraits represented the best compromise for the middle class until the official invention of photography, since they were furnishing the image the nobility was looking for at a lower price than the one a court painter would have asked them to pay.

In the while, a completely new way to impress and print images was growing from its embryonic status and in 1826, few decades later, it was officially invented under the name "Photography". After some years of growth and progress, photography slightly started to completely replace almost all the other forms of portrait and became the most faithful way of reproducing a person or whatever else.
Moreover, the greatest feature that the invention of photography brought to the public was the possibility of creating infinite copies from a single negative.
This way, not only photographers dismantled all the strategies painters were used to experiment in order to render the rich textures of velvet or silk typical of the emergent middle class, but the one of miniaturist turned to be an obsolete and non-remunerative job.
Indeed, while in a big city there were, on average, 4 or 5 miniaturists accounting for the entire market of that area, leaving to the few competitors just the possibility to finance themselves and their families, after 1830 photographers turned out to sell about twelve thousand photos per year, 240 times more than the 50 annual portraits that a miniaturist or a physionotracer was able to sell.

So, all photography's predecessors disappeared and French government purchased in 1839 the rights related to the new invention of photography for public use and, for the first time, it made its appearance in public life. Once photography's diffusion had started, its market turned to be increasingly competitive and if we consider that, consequently, the demand for photographic equipment (including chemicals, enlargers and accessories that were a prerogative of professional studios) rocketed, as long as the creation of magazines and galleries/expositions, photographers started to deliberately unbalance the delicate art/industry equilibrium to camouflage the economic rivalry between each other.

It is clear how photography was perfectly capable to compete with other forms of art such as painting or sculpture, but depending on the type of customer a photographer had to deal with, even the appearance of their attitudes was crucial to make their activities profitable.
Nevertheless, technological progresses slowly classified photography into distinct branches and the same classification emerged when photographers started to specialize their activities.
If during the second half of 19th Century people were still interested in buying portraits of famous figures (such as actors, kings, musicians...), the end of 1800 sees a clear shift toward personal portraits, that rapidly became the most remunerative activity.

Birth of professional photography:
In almost each of all European countries there were around 500000 people employed in the photography's market, whose dimensions and volume of affaires rose exponentially and killed the individual spirit and the manual labour that characterized its earliest stages, leaving space to an increasingly impersonal trade.
In 1888, the Eastman Kodak Company (commonly known as Kodak) was just established, but immediately gave rise to a radical revolution in the way of photographing whatever kind of subject.

In the same year, the young firm with a short, easy to pronounce name came out with an as much immediate slogan: "You press the button, we do the rest".
[3]

It was related to the launch of a revolutionary product, an "all in-one" camera allowing even the unskilled person to imprint a photo on a negative and give it to a print laboratory to get the photos ready to be watched, copied or enlarged, the Kodak No. 1.
After it, a series of brand-new cameras or accessories signed the beginning of an era in which common people were learning to take their own pictures without the help of a professional photographer, with the exception of special occasions or ceremonies.

[3] *Photo from: http://davidarnoldphotography.com/wp-content/uploads/2013/12/Kodak-1.jpg?w=660 .*

At the same time, department stores opened in nearly all big cities, offering the public a relatively vast selection of cameras, accessories and optics.
In addition, photo-vending machines appeared in public spaces, capable of photographing, developing and printing photos in several copies on paper in few minutes to be used especially for documents/IDs (the first model is under the name *Photomaton*).

At this point, professional photography assumed a role similar to the one it has today, since each professional must have developed a series of strategies in order to keep clients loyal and avoid them to choose a competitor because of his lower prices or since his style is closer to their tastes.
We could identify postcards and photojournalism as the two major branches at the beginning of 20th Century, even if they represent two completely different grounds.
In fact, although the former was a considerable slice of the market, in which were totally employed around 33 thousand workers to print an estimated number of 123 million postcards just in France (few decades later, postcards industry's sales were measured in terms of billions[4]), the latter acquired its relevance once newspaper photography not only became more and more popular, being a means of propaganda and a powerful manipulator of opinions, but also facilitated that process for which a set of images would have represented itself a more efficacious storyteller than a long and articulated text in which photos were put there just to illustrate the story.
Moreover, it is worth to highlight how the circumstances in which a photo is published has always had a series of positive or negative externalities, both for the subject and the photographer/firm who rendered it of public domain.
A great example is the one of the delightful young woman drinking a glass of wine shot by Robert Doisneau (who was used to wander the streets and stop at pubs or cafés to take photos of strangers), sitting next to a middle-aged gentleman who was looking at her with a both amused and greedy smile.
After having received the permission to photograph them, the image was sent to Doisneau's agency and everything seemed to correctly proceed until its publication on a magazine (*le Point*), but serious problems aroused when the same photo had been used to illustrate firstly a campaign against alcohol abuses, secondly an article denouncing the widespread youth prostitution.

Few years after, photography for advertising purposes started to emerge and play an extremely relevant role at social and economic level.

[4] *Ado Kyrou, L'Age d'or de la carte postale, Paris: Andre Balland, 1966.*

Together with it, the industrial environment of manufacturers became more and more competitive, giving rise to notable technological progresses in film, sensible paper and chemicals, offering, for instance, an always higher ASA sensitivity (the equivalent of the modern ISO scale).
Other niece markets accompanied the evolution of professional photography until the introduction of digital photography, a nascent industry born from *prior industry affiliations*[5] that merged their knowledge together in order to create a *dominant design*, initially targeted to a restricted group of professionals in the print and press sectors because of the initial high expenses, but likely, then, to generate a massive competition among producers belonging to the same industry[6].
Particularly, the basic concept for a digital camera emerged in 1963, showing a significantly lower resolution than the one of film, destined to be surpassed in a not far future.
I will go through these processes in the following chapter.

Actual status of photography (generally intended):
Leaving apart for a moment some bare technical aspects and the sphere of professional photography, what we are assisting to in the last decade is a gradual and constant tendency of cameras (here intended as basic digital devices able to take pictures, regardless of their type or dimension) to *share* information and to *communicate* with other systems for different purposes.
The data I obtained from the questionnaire I created clearly demonstrate that the need of *sharing* photos and videos is not to be exclusively seen under photographer's perspective (usually due to the exigency of uniformity in the workflow of an efficient studio or according to marketing strategies), but must be associated mostly to the *social* environment.
Except of those high performance professional cameras (whose prices position them on a higher segment than the one of consumer cameras, so that only specific requirements in performances and durability justify to spend the equivalent price of a city car) that are like the scalpel a surgeon needs to complete an operation, nowadays imaging products could be successful and profitable only if they can wirelessly interact with our pc_s, tablets and smartphones and only if they implement user-friendly features to facilitate the consumer in obtaining a photo/video.
As a consequence of it, in few years camera product concepts and expected users' categories varied systematically, ranging from system to system and creating both positive and negative externalities for computing and photography firms.

[5] *Mary J. Benner, Mary Tripsas: "The influence of prior industry affiliation on framing in nascent industries: the evolution of digital cameras".*
[6] *Min Zhang: "The influence of technology evolution on technology adoption: a study of digital cameras".*

If we add two further variables mining photographic industry's equilibria, *shared industry beliefs* and the influence of *imitative behaviours*, the result is an extremely unstable and heterogeneous market, dominated by *"where I'd like to post the photo I shot two minutes ago"* instead of *"according to my photographic view, I wish I could take that photo to that subject and then I will decide whether I want to publish it anywhere or not"*.
The engine that powers the dominant behaviour of those possessing a camera or a smartphone (almost everyone, at least in developed countries) is represented by *social media* and the wheels that move it are the buttons users must press to take a photo.

After this brief introduction, it should be clearer how the engine of my previous metaphor evolved in more than 100 years of professional and consumer photography and how much it is now important that a device could *"...do the rest"* instead of you.

Evolution of paradigms among the 20th Century, under different perspectives

Philosophy and art

Today there are few doubts about whether photography could be considered as an art or not. Thousands of physical or virtual galleries are available for almost all photographic branches (from street photography to other categories representing in the past restricted niches, such as macro-photography and many others) and, photography not only has become everyone's medium of personal artistic expression, but also it is commonly accepted that photography is perfectly comparable with other ancient forms of art.
But if we jump back to its origin in the early 19th Century, there are several examples of how painters, authors, sculptors (in few words, those who were recognized as real and affirmed artists) did not extend a warm welcome to the new-born photography.
One of the first authors expressing his positions about photography was Charles Baudelaire (1821-1867).

Considering himself an aristocrat, he always opposed himself to any movement making art more accessible to the middle-class, for this reason it may not be surprising that he believed that photography should return to its real place, as a simple tool, a servant of the arts and the artists[7]. Moreover, for Baudelaire photography was feeding a "*class of uneducated and dull minds that judge things only according to their physical shapes*", it was an "*invention resulting from the mediocrity of modern artists and a refuge for all the unsuccessful painters*".

Replies to these statements did not wait to come, especially from the most relevant representatives of photography in that period, like Daguerre, who argued: "*Since photography gives us all the guarantees for exactness we wish [...], art **is** photography*".
Many other protagonists of the artistic panorama were disaccording with the emergent belief of photographers, facing a shy initial reaction of consumers (especially aristocrats or those belonging to the nobility) that would have, then, turned into a constantly rising demand for portraits and, some decades after, for certain professional services like wedding photography, even if they where still a prerogative of high-income classes due to the high charges photographers were asking.
In the pre-1888 context, the strongest disincentive for an aspirant photographer to open an activity was not represented by competition, that started to run faster after French government let photography (and the rights related to its patent) publicly available in 1839, but was closely connected to the amount of knowledge and costs necessary to open an independent studio.
In fact, the photographer was also an able chemist, since to be capable of assembling the sensible silver layers and, then, developing them in a darkroom was an essential skill.
The printing process was also carried out by the photographer and it was almost impossible for an average user with no specific competences and an adequate experience to take a photo without the support of an expert.
So, for decades the whole market was totally governed by photographers, each one working in precise fields.
Some of them appeared to tow the entire market toward a completely new conception of photography and this is exactly what happened with the birth of two movements:

1) Press photography;
2) Photographic magazines.

[7] *Gisèle Freund, Photography and Society, 1970.*

Press photography

Before the first photographs appeared on newspapers, ordinary people could *visualize* those events that took place only near them and consequently, even the ideas and opinions about such events/happenings were dominated by a consistent degree of suspect (or, in a less pessimistic view, by a lack of confidence in them).

The first photograph reproduced on a newspaper appeared on 4th March 1880, in *The New York Daily Herald* and it was printed using the halftone process, that translates the photographic image into a pattern of dotes on a negative, transferred then to a metal surface, ready to be put in a printing machine.

Historically, the halftone process was introduced 25 years before, but due to a series of issues, it began to be commonly used by press agencies only after a brake-in process, that allowed them not only to set an adequate structure of press photographers or associations, but also to print images with the same machines used for newspapers.

There is a first sharp difference between newspapers and other periodicals; while the former could not afford to spend time in a selection (and printing) process of photographs to be added in their issues, the latter usually had more chances to contact a photographer and print the most appropriate images for their editions.

A similar process would have occurred to color photography, since it rapidly became a standard for periodicals instead of newspapers that had to closely deal with private laboratories only for rare and special issues in which color photographs would have appeared.

On the one hand, this evolution process of the press sector brought a series of advantages in terms of employment, publicly available and punctual information to citizens and, nonetheless, technological progress.

On the other, the always higher presence of images in the routine of ordinary people gave rise to a change in their conception of photography.

For instance, when images started to appear on newspapers, people used to clip them out and paste them in albums and, thanks to photography mankind acquired the power to view his surroundings with new eyes.

Since photography represents a real happening in all its single details, a judgement focused only on the aesthetic point of view is not enough, because it lacks of the human and social intensity that that moment has in the history.

So, people started developing that self-consciousness of the role that photography was playing in their lives.

This process went on (and strengthened) until Kodak's revolutionary camera (the No. 1, 1888) allowed everyone to capture an image without caring about consequent developing and printing processes, because Kodak would have done it on their behalf.

Photographic magazines

Considering the American environment as a point of reference, the first magazine entirely illustrated with photographs was a supplement of *The New York Times* in 1896 and, consequently, many other agencies followed it, publishing periodicals like *The Mid-Week Pictorial*, *Panorama* and *Parade*, but none of them had success.

We cannot blame the editors of such journals, because their layouts were not far from the one of more recent publications, instead, the reason of the unsuccessful magazines of that period (until the second decade of 1900) has to be found mostly taking into account social variables.

There were many influences affecting this delicate branch but one in particular could be identified as the predominant and it is represented by the invention of *cinematography*.

Despite the first "video" in the history was recorded in 1888 (*Roundhay Garden Scene – Louis Le Prince*), the birth of a new form of expression through images is attributable to Thomas Edison's patent of the *Kinetograph*, in 1891.

It was essentially based on 35mm Kodak film rolls placed in a moving holder illuminated by a lamp, so that the images could be projected on a screen.

If only aristocrats and those belonging to the middle class could afford to access the so called "*Kinetoscope parlors*", spending around $ 25 cents for each spectacle (the average length of a movie was around 5 seconds), a wind of change started accompanying both photography and cinematography and began to shape people's visions[8] [9].

As cinematography acquired more popularity, the perspectives under which photography was seen became increasingly divergent, especially considering photographers and customers as the two main subjects involved.

Several forces were governing photography's evolution.

[8] *Wikipedia*

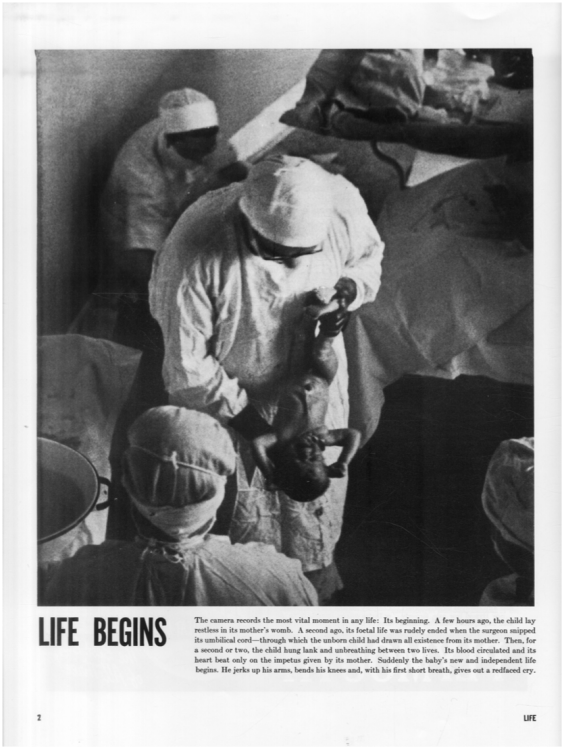
[9] *Gisèle Freund, Photography and Society, 1970.*

From one side, professional photographers were trying to soften the impact that the emergence of amateurs had on their activities, lowering as a consequence the demand for less specific services that could be realized by whoever learned to take his own pictures with a camera like the Kodak No.1 perhaps without pretending the high quality standard that only a professional could have guaranteed.
From the other, masses of curious and determined amateurs were moved by the influence of the primitive "*mass media*" forms, together with a patient learning process that allowed photo-lovers to often replace a professional photographer.
The previously mentioned *mass media* forms initially consisted into cinematography and photographic magazines.

In the mid 1930's, cinemas were always busier and more popular, thanks to longer films, audio synchronization and a wider selection of categories, from the reproduction of concerts or studio sessions to George Méliès' masterpieces.
So, to think in a photographic way became a solid habit for those living in big city centres and on this fertile ground, Henry R. Luce announced the first issue of *Life* in 1936, introducing the new version of the magazine with these words:
"*To see life; to see the world; to eyewitness great events; to watch the faces of the poor and the gestures of the proud; to see strange things — machines, armies, multitudes, shadows in the jungle and on the moon; to see man's work — his paintings, towers and discoveries; to see things thousands of miles away, things hidden behind walls and within rooms, things dangerous to come to; the women that men love and many children; to see and take pleasure in seeing; to see and be amazed; to see and be instructed...*"

The first version of *Life* (grounded in 1883) intended as a general interest magazine, initially was a success since anything similar had never been published before, but it began to loose its allure from the early 1910's.
In the while, a young Henry Luce together with his classmate Britton Hadden founded *Time*, *Inc*. in 1929. They realized that none of the existent magazines had adapted to the fast pace of the contemporary work life, summarizing the events of the previous week and adding some extra space for other sections. Their idea immediately was an enormous success, despite the editors were still simply rewriting pieces of news taken from the *New York Times* and it helped to build the massive organization of Time, Inc., presumably what made Life's success possible.

When Time-Life International was founded, it included 360 offices around the world staffed by 6700 people, including historians, doctors, psychologists, educators [etc.] and, naturally, photographers hired as free-lancers or from photographic agencies.
Seven years later, the first issue of the "new" Life was published with a single photograph filling the first page, showing a newly born child held by an obstetrician with the caption: "Life begins".


LIFE BEGINS

The camera records the most vital moment in any life: Its beginning. A few hours ago, the child lay restless in its mother's womb. A second ago, its foetal life was rudely ended when the surgeon snipped its umbilical cord—through which the unborn child had drawn all existence from its mother. Then, for a second or two, the child hung lank and unbreathing between two lives. Its blood circulated and its heart beat only on the impetus given by its mother. Suddenly the baby's new and independent life begins. He jerks up his arms, bends his knees and, with his first short breath, gives out a redfaced cry.

2 LIFE

At the beginning, many efforts were put in order to make the magazine readable by a whole family and ensure that the reader would have understood the mission of the periodical.
In the same context, to understand and dominate mass psychology was the key of Life's success, since any human and social condition affecting human beings would move them, providing the hope for a better future.
When the first issue was published in 1936, its initial printing was of 466.000 copies, that more than doubled a year after.
Despite imitations were created almost everywhere, its format and its success were so affirmed that in 1972 more than 8 million copies were printed all around the world.

After having briefly introduced the history of *press photography* and *photographic magazines* it should be easier to comprehend how they contributed to create two distinct roles of photography, depending on the subject we associate it to (*photographers* and *consumers/amateurs*).
The activity of *professional photographers* was facilitated until the launch of all-in-one cameras, then they rapidly found themselves in a critic situation, in which to *differentiate* their portfolio seemed to represent the only solution to keep their activity opened.
But most of them surely underestimated the influence that social changes and technological progress would have had on their work.
The increasingly higher competition among producers of photographic equipment made possible for everyone to choose a camera or a lens from a vast selection and the availability of virgin films (ready to be used) contributed to render photography more and more popular among all classes of

people. The more popular photography was becoming, the faster the adaptation of suppliers to demand's requests had to be.
This endless fight in photographic market's interior caused an exponential reduction in what we can call "press time", with particular reference to newspapers, defined as the time at which a pressrun begins.
A classical example of how rapid had to be a photographic documentation of an event is represented by Life twenty two and a half pages (twenty in color) edition of Monday, February 1st 1965, on Winston Churchill's funeral, that took place on January 30th in London.
Two years earlier, a researcher drawn up a highly confidential list of all that was to happen upon the death of Winston Churchill (the nature and location of the ceremony, the parade route, the site of the tomb and the day of the funeral, that had a 90% chance of falling on Saturday).
After it, Life purchased some rooms in which its photographers could have worked in total secrecy and as soon as Churchill felt ill, those rooms were rented.
So, there was nothing else to do than waiting for Churchill's death and when it happened, as predicted, his burial took place on Saturday.
The story depicted by Life required 17 photographers, more than 40 journalists and technicians, two helicopters and an airplane.
Once the ceremonies had finished, all the films were immediately carried at the airport, where a plane transformed into an editing room (with tables, typewriters and darkroom equipment) was waiting them, ready to take off.
During the 8 hours journey to New York, the entire work on Churchill's death editorial was completed and sent to the press machines.
In those times, such an organization literally linked readers to the event, much more than what television did.

Going back to the analysis of the variables governing the changes in professional photographers' activities, I believe that the closer relationship between marketing campaigns (and advertising) and photography represented a point of passage from the old conception of photography, focused on professionals, toward a new consumer-driven market.
With rare exceptions, all photographs published in newspapers or magazines performed an advertising function, even if it was not immediately evident.
Moreover, advertising always represented the most important source of revenues for whichever kind of publication and it is worth reminding how such advertisements were targeted depending on the average reader of the publication we take into account and his financial possibilities.

Manufacturers of cameras, lenses and other photographic accessories literally dominated the market, since they acquired, after decades of progresses in terms of optical/mechanical, the know-how necessary to implement in their new products consumers' needs arising from a deep knowledge of the dynamics governing the business of photography.

Finally, the role of photography associated to amateurs generated a variety of conceptions of photographic art, depending on the type of user we refer to.
Some users decided to buy a camera because they were fascinated by the possibility of capturing their own postcards on holidays or simply because they wished to document private/familiar events.
Some others felt they could express their visions through the viewfinder of a camera, naturally after a learning process allowing them to govern the camera.
There is a higher likelihood that the latter could develop an artistic relevance if compared to the former and the reason is to be found in the influences that characterized their elevation as artists, especially from the creation of the internet and ICT.

Tradition

Even if the internet and other ICT (Information and Communication Technologies) are mainly "responsible" of the shift toward the modern photographic paradigm, some relevant phenomena of 20th Century could be seen as the precursors of modern photography's conception.
Particularly, in the second half of the Century determined features were implemented in reflex or rangefinder cameras, such as metering systems, shutter modes or AF sensors.
On the one hand, the new characteristics facilitated those professional operating in highly congested environments (typically journalists wedding photographers), allowing them to focus their attention on a target (say the *bokeh* of a portrait as a priority, for instance) without caring about the reaction of the camera body in terms of the opposite parameter (shutter speed, in our example).
On the other, they literally opened the market to additional classes of consumers switching from a "random photographer" status to a more sincere curiosity about photography.
The first light meters (introduced in the early 40's), the *Actinometers*, were not physically implemented in camera bodies and had the shape of a pocket watch.
They borrowed their names from science, since an *actinometers* are instruments used to measure the heating power of light radiation, particularly solar radiation.
They consisted into a piece of light sensitive photo paper, whose darkening time was used as an input value for scales that would have indicated the most appropriate exposure time for a determined ASA sensitivity.

In the while, the primitive forms of "compact" spot light meters were about to be launched.
The first prototype was built in 1935 by Arthur Dalladay, an editor of *The British Journal of Photography* and it was called "The *SEI photometer*".
It was composed by a rotating unit that allowed the user to compare the exposure time of two distinct zones in order to be converted in ASA readings and, consequently, into a shutter speed.
Naturally, we are referring to a new-born technology for that period, but the success of the idea behind the first project was a spark for nano-technology's engine.

Some decades after, in 1960, the first reflex or rangefinder cameras were equipped with a selenium metering system, that was not requiring any source of energy to work.
Cameras were still completely manual and few models were initially equipped with an internal metering system. Their prices and features were mainly devoted to a professional use, in fact those other cameras thought for a non-professional use had not an internal light meter, so users had to purchase it separately.
But once shutters started to be powered electrically (through a battery), even spot meters became dependent on a battery. To be more precise, firstly manufacturers added a small interchangeable battery that was only devoted to the metering system, leaving the shutter still mechanically activated. Secondly, about two decades after, cameras were entirely dependent on batteries.
So it was easier to obtain a perfectly exposed photo and almost everyone was potentially able to understand how cameras worked.
From the 60's, competition among manufacturers of cameras literally exploded and each producer was expecting an immediate reaction of a direct competitor after the launch of a new camera.
The direct consequence at industrial level was an increasingly wider offer of photographic equipment and it reflected into a weaker position of the leading firms in the market (in terms of market share).
At the same time, it would have been impossible (and counterproductive) for manufacturers to slow down the pace at which they were developing and launching new products, since the direct competitor would have won.

If we consider, instead, the consequences in terms of demand, as more functions were implemented in cameras, the more choices were at consumer's disposal at the moment of purchasing a Canon camera instead of a Nikon or Olympus one.
It means that the effect of a broader selection of camera bodies, lenses and accessories for each of the main producers was consisting in more power in customers' hands rather than into the one of

manufacturers. In few words, the entire market was rapidly shifting from being *producer-driven* to being *consumer-driven*.
It is also important to always highlight how niche products escaped these market threats.
The impact of such an evolving industry unavoidably reflects into a change of what we can call *traditions*.
The action of capturing a photo is strictly connected to a wish of holding a particular moment in time, but it is clear how the importance of that instant changes in relation to the simplicity of obtaining a "copy" of it on paper (and how long its relevance lasts as time passes by).
That simplicity is today in everyone's pockets, since we are able to capture whichever moment in few seconds with a smartphone's camera.
If we hold 60's and 70's as a point of reference for now, producers of films, darkroom chemicals, photosensitive papers, enlargers and related accessories expanded as well their production, in order to meet the increasingly higher demand.
Almost everyone was potentially capable of developing black and white negatives even working in a small bathroom previously darkened.
With more space available, users were able to even print their photos with a magnifier and to experiment different exposure times or areas to be masked in order darken or lighten them.
The same phenomenon was less frequent with color negatives, since their developing and printing processes required (and need even today) a much higher degree of precision than the one black and white negatives require.
Moreover, the instruments involved in C-41 developing process were more expensive and the temperatures of baths had to be perfectly respected in order not to irreparably damage a negative.

In the while, in 1975 for the first time a picture was grabbed by a digital camera.
Nobody was aware firstly of the existence of that camera, secondly of the potential of such an invention.
The inventor of the first 100x100 pixels digital camera was Steven Sasson, who introduced it to the public in the same year.
Neither Sasson's employers nor Kodak's executives believed in the project, as the inventor declared: "*They* (his bosses) *were convinced that no one would ever want to look at their pictures on a television set*"[10].
Before briefly explaining how his camera was working, I believe that the whole primitive world of digital photography needs to be correlated with the social context in which it started to penetrate.

[10] *New York Times: http://lens.blogs.nytimes.com/2015/08/12/kodaks-first-digital-moment/?_r=0*

Consumers were always more confident in their capabilities of photographing whatever subject with a film camera, also, film photography was a highly consolidated tradition.
From a mere economic standpoint, the expensive equipment in a professional's bag had to contribute in generating an added value, so, none of photographers would have taken the risk of investing resources in a new nascent technology as digital photography.

In 1973, Steven Sasson went to work for Eastman Kodak and soon after his arrival, he was given a seemingly unimportant task, to see whether there was any practical use for a CCD (*Charged Coupled Device*), which had been invented few years earlier.
Not only he discovered how to use such a technology as a substitute for film as a sensitive material, but he managed to permanently store the images on the same digital magnetic cassettes people were putting in their hi-fi sets to listen to music.
Initially, all the digital information were stored on a RAM memory, but they would have disappeared after switching the camera off.
"*I needed a more permanent form of storage* –he declared in an interview for David Friedman's Blog on April 11, 2011- *and the only form of permanent digital storage I had available at the time was a digital cassette. It took about 23 seconds to record and the tape would hold 30 images, a number I choose, by the way, to be conveniently between 24 and 36. I didn't want to store just one or two images on there, because then they'd say* (the user) *it would not be very useful and I didn't want to store a hundred or a thousand images on there, because nobody knew how to deal with that concept.*"
Digital cameras have some similarities to film cameras: in both types of cameras, a lens focuses an image onto a *recording medium*. Once the recording medium has received the image, the raw file is processed to produce a permanent image.
But the major difference between a digital camera and a traditional one is in the *storage medium*, represented in the former by a memory card or, as in Sasson's prototype, a digital cassette and in the latter by a sensitive chemical layer on a plastic film[11].
Final users would have needed time to familiarize with the new concept of photography that was emerging after Sasson's invention.
During the same interview, he also argued: "[…] *so the key, I think, when you put across an idea is that you have to understand the culture you are dealing with, first and foremost, and to put everything very much like the culture is used to and then put only the essential elements of you idea out there, so nobody could get confused about it* […]".

[11] *David Friedman Photoblog: http://www.davidfriedmanphoto.com/blog/2011/04/inventor-portrait-steven-sasson.html*

I will embrace a more detailed analysis about the relationship between *time* and *performances* (or even the *gain*) when we relate it to a specific technology in the last section of this chapter, devoted to the technological progress.

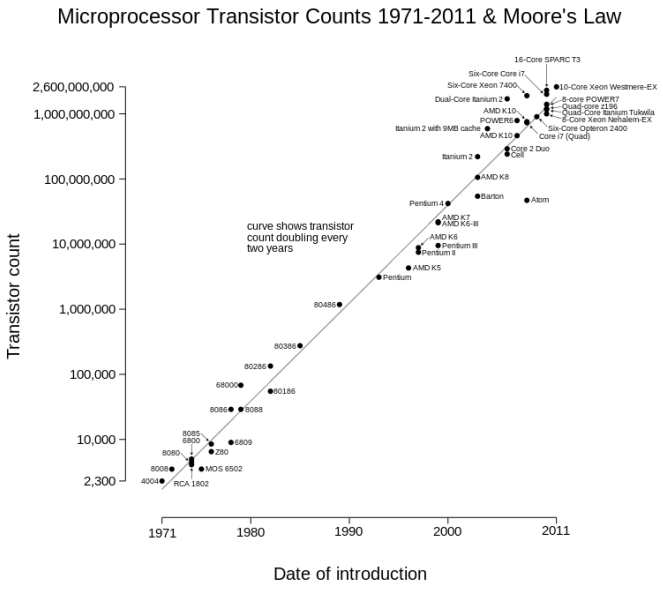
However, it is worth reporting one last consideration made by Steven Sasson at the end of the interview: "[…] *I'd like to say to inventors: be aware that your invention is in an environment where the rest of the world is inventing along with you, so by the time the idea is mature it will be in a totally different world. I think that was the case with digital camera*".

Sasson, being aware of the enormous potential of its invention, clearly anticipated those that would have been the needs of digital users.

Basing his convictions on the scientific laws that govern technological progress, especially in computing department, he won the battle with Kodak's managers.

The *Moore's Law* is a typical example of how it is possible to precisely predict the speed at which technological evolution runs and it has direct impacts on almost all kinds of activities.

According to it, *the number of transistors in a dense integrated circuit doubles approximately every two years*.[12]



[13]As a direct consequence of Moore's Law, Sasson argued that a consumer would have been able to capture a 2.0 megapixels photo in 15-20 years and that is what exactly happened.

A 2.0 Megapixel photo was sufficiently detailed to be printed on the cover of a newspaper.

In 1991 Kodak launched the DCS 100, its first "compact" digital camera consisting into a CCD (*Charge Coupled Device*) sensor array retrofitted on the back of a Nikon F3 (one of the most used cameras by journalists of that time).

It came with a shoulder-pack containing a computer, 200MB hard drive to store about 100 images, enormous batteries and a tiny LCD screen to view stored images.

The total weight was about 7kg.[14]

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[12] *Wikipedia*

[13] *https://en.wikipedia.org/wiki/Moore%27s_law#/media/File:Transistor_Count_and_Moore%27s_Law_-_2011.svg*

[14] *The Economist: http://www.economist.com/blogs/babbage/2012/01/kodaks-woes*

Since the price of the DCS 100 (*Digital Camera System*) was $25.000, only some companies or agencies with very specific needs afforded to purchase the camera.
But to only deliver the camera in a photographer's hands was not enough, since nobody was able to use the complex of accessories it consisted on.
In fact, Kodak organized classes lasting between two and five days dedicated to those photographers who needed to learn using the DCS 100.
At the Centre for Creative Imaging, Kodak gave at photographers' disposal several Macintosh IIfx computers, scanners, dye sublimation printers and other devices related to the camera.
The DCS 100 was shooting 1.3 megapixels images and it was built using a camera body that photographers were familiar with, probably the only incentive that pushed them to use it.
Only 15 years after, prices of digital cameras started falling and that was the same period in which the so called *Kodak Moment* simultaneously began.
In September 2003, Kodak restructured its business re-investing the cash flow in new digital technologies and it laid off 26.000 workers from 2003 to 2007.
That was the start (or, better, the final stage) of Kodak's decline, that worsened until the corporation filed for bankruptcy in 2012.

I took in consideration digital photography to introduce how the market shifted toward a consumer-driven structure.
If we apply this line of thought to modern digital cameras, it is evident how the customer's choice of purchasing a Canon camera instead of a Nikon one (for instance) is, on average, influenced by subtle marketing operations.
The modern amateur assisted to the fast evolution of digital photography with a similar approach to the one of those who lived, a century before, the growth of film photography as a tradition.
In the early 90's, the first compact digital cameras started appearing on the market as long as the first desktop computers became more popular and used.
The cameras were based on a Kodak sensor, much smaller than the 24x36mm *full frame* standard size set by Leica around a half century before.
Some of the storage mediums on which images were saved are still used today (for example, Compact Flash or Secure Digital memory cards).
An analysis of how technology evolution influences technology adoption is crucial in order to shed light on the strict relationship between the several components of such a new category of products like digital cameras.

Moreover, the primordial digital cameras world was nothing more than a series of industrial affiliations that determined a nascent industry.
Once again, I will go deeper into the emergence of digital cameras as a *dominant design* later in this chapter.
As time went by, users became always more accustomed to digital photography and once the price of computers got closer to average users' financial possibilities, film photography definitely withered.
Traditions changed again and the habit of delivering a 35mm roll to the photographer at the corner of the street and of waiting at least a hour to get standard sized prints in a paper-case also containing your negatives disappeared.
People were consolidating the new habit of creating personal photo galleries on their computers, even if the ground was not mature enough for them to be shared online.
Social networks were still at an embryonic stage, so online galleries were not popular and "social" enough to compete with small photoblogs and private offline galleries set up only for backup purposes.
In the while, prices of digital cameras continued to fall and manufacturers launched entry level cameras, in an effort to attract another slice of demand represented by those curious users without clear ideas about photography except the mendacious conviction that a reflex camera would have produced better images than the ones of compact cameras.
Producers not only managed to attract the previously mentioned class of users, but also demonstrated how such entry-level cameras were representing a fertile field for technological and qualitative improvements.
But if, on the one hand, manufacturers continued to feel the positive effects of an always greater portion of the demand composed by consumer-prosumer amateurs, on the other they had to find a strategy aimed to convince them to update their equipments purchasing a new reflex camera.
So, a battle among the leading producers started, whose weapons were *megapixels, ISO sensitivity, frames per second, AF points,* and so on.
Initially, each fighter acquired a specific portion of demand thanks to some features implemented in their cameras and difficult to be reproduced, at the beginning, by competitors.
An example could be the Canon EOS 5D Mark II (*full frame*), whose excellent video quality attracted a whole class of video lovers who could not afford to buy an expensive camcorder with its relative accessories and who found in the 5D a perfect substitute, with which they could also have captured marvellous photos.

The direct competitor was Nikon, with its D700 (*full frame* as well), a 12 megapixels reflex camera (instead of the 5D Mark II, equipped with a 21 megapixels sensor) that presented some advantages if compared with the 5D, but with an enormous disadvantage.
It lacked of the video feature.

Going back to a more general view, what happened is that consumers (regardless of their level of experience or knowledge about photography) started to take part in the process of development not only of new cameras (and the new features implemented in them) but also of the whole market.
The engine of such a rapid evolution is the social media environment.
We could identify *social networks* and *photography online communities (forums, blogs, youtube channels…)* as the protagonists playing the greatest part.
From one side, the unconscious necessity to share photos and videos brought a need for more interconnected devices.
From the other, after the launch of the first iPhone by Apple in 2007, smartphones started acquiring more and more relevance in the photographic context.
Nowadays, the offer of smarphones includes models whose cameras shoot high resolution photos or videos that could be even comparable to the ones taken by much more expensive professional cameras, if not cropped.
Leaving apart for a moment the change in people's habits for what concerns the simple action of grabbing a picture, it is important to underline how the previous tradition of printing their own photos suddenly declined.
Particularly, it was found that 35 average users out of 73 (48,6%) and that 114 skilled users out of 163 (69,9%) usually print their photos.
(I obtained the previous data from the questionnaire I created for the two mentioned classes of users, but I will take it into consideration in the fifth chapter).
It is worth noticing that less than the half of the average users (so, without any specific photographic competences) are used to print their photos.
In addition, the average print size (width in cm) lies between 11 and 15 cm (39,5%), followed by 31,6% of consumers whose prints present a width between 16 and 19 cm.
Despite the restricted number of users I had the possibility to interview, I firmly believe that there has been a revolution on the attitude adopted by consumers with regard to photography.
The fact that for the majority of users it is enough to watch their photos on a screen implies that even the average importance of the moment they captured with a camera or a smartphone is falling.

Apart from those potential photo amateurs who are hypothetically starting to develop a real interest in photography, the action of just living few instants of joy due to a determined happening (for example a well composed plate served at a restaurant) has been replaced by the action of taking out the smartphone off the pocket and grabbing a photo.
I think that the attitudes like the one I quoted could often derive from a sort of certainty that that photo will be held in hard disk of a smartphone so that in the future it will be possible to appreciate it more than "now".
Usually there is not a project in user's mind to be realized through a specific photo, nor a real need. The fact that their pocket devices will deliver in their hands (and in few seconds) a photographic response of what they are looking at is enough to feed the positive feeling they have.

In the past, the cost of a single photo (considering the price of films and/or the one of the first extremely expensive digital cameras) acted as a strong constraint against the "easy photography" proliferation.
The variables contributing to keep the market under control were, indeed, *time* and *costs*.
But once the amounts of both the previously mentioned variables diminished, *traditions* began to change completely until today.

Perceptions and trends
I believe that the two terms *perception* and *trend* can perfectly be associated to an analysis of the current photographic environment and for this reason I choose them as keywords for this paragraph.
A perception could be defined as *an interpretation or impression; an opinion or belief*.
A trend is *a general tendency or course of events; a current style or vogue* (source= Farlex Dictionary).
I believe that, with reference to photography, the latter could be considered as the direct consequence of the former.
I already introduced how photography was welcomed by those commonly recognised as "traditional" artists and it should be clear that the public perception of photography faced an endless evolution once the *information* (firstly through the press machine, secondly through a TV screen) started circulating more easily.
I also put a particular emphasis on the emergence of cinematography and magazines, mentioning how they contributed to shape people's visions and to change their perceptions of what photography was.

My intention is to go deeper into these social variables in order to find out the origins of the average class of users I often mentioned in my work.

After the advent of cinematography, what changed so radically in people's minds was the idea of representation.
Once photography became more and more popular (say, the end of 19th Century), the common perception that it was evidently becoming the most ordinary *language* of the modern society started to soften.
People started to be distinguished even due to their different *visions* (of the world, the society, the art or whatever else).
The objectivity of the image rapidly assumed an enormous power of persuasion, operating at subconscious level and managers found in photography the strongest marketing instrument ever used.
So, photography became a means of manipulation, able to create needs, to drive them and to sell the good or the idea related to such needs.
I will return on this point at the end of the paragraph.
At the beginning of 20th Century, another prerogative of middle-high classes of population started to meet even a less noble ambient.
Pre-planned holidays and journeys were becoming slightly common up until those years in which even long range means of transportations were no more a luxury.
Then, the number of organized tours rocketed and their organization was always taking into account the fact that unless tourists were becoming passive objects transported from place to place, almost all of them had in their pockets a small camera.
Once home, the photos they taken during the holidays could fill the holes created in their memories due to the strict schedule of all the trips.
What happened was that cameras were seeing in users' behalf and, naturally, producers of photographic equipment took advantage of this situation in order to generate higher profits.
In 1963 Kodak launched the new "*Instamatic*" line, characterized by easy-to-use and inexpensive cameras.
In 10 years, Kodak sold around 60 millions *Instamatics* and they also developed a smaller version (holding a small-sized film) that consumers could carry in their pockets without feeling its presence.
The workflow an user had to follow in order to get the prints was totally internalized, indeed Kodak managed every step of such procedures.

But few years later, Polaroid created a completely new product, that revealed itself as the most dangerous competitor for Kodak's products.
Polaroid cameras were capable of developing and producing a finished print in few seconds, without requiring any kind of darkroom, even portable.
So, competition among the two producers rose and some specific applications of the Polaroid concept allowed it to expand its business and its market share.
For instance, Polaroid created a partnership with Hasselblad (one of the leading medium format cameras producer), giving birth to a Polaroid back for V series cameras.
Since medium format cameras were often used in fashion or studio photography, the entire production process of the final image had to be perfect, as well as the images obtained.
For this purpose, photographers started shooting a preview on a Polaroid paper sheet so that they could have modified the composition or the light before the final photo.
Nevertheless, Polaroid previews represented an extremely efficient mean of costs abutment for agencies or specific editorials, since it became easier to produce a schedule of a photographic service without sending to a laboratory the negatives for eventual tests or samples.

I believe that Polaroid could be considered as the precursor of digital photography, since users were obtaining in few seconds a small print ready to be used for whichever purpose.
The main difference between the two systems is strictly correlated to the diffusion of the first personal computers, that allowed consumers to watch their photos on a screen and catalogue them as they preferred.
The capillary diffusion of computers started in the 90's, so until that moment Polaroid was living a temporary condition of monopoly.
But once almost everyone had a personal computer dialoguing with a digital camera, the business of instant prints suddenly collapsed and Polaroid was forced to discontinue all its products.
The company was also filed for bankruptcy twice in the 2000's.

What I believe is worth highlighting is how Polaroid contributed with its products to the general shift toward a more easy way to capture images, without pretending the high quality of a negative.
For those who were not seriously interested into photography but who could afford to spend some money on a camera, a Polaroid was the unique solution.
Their cameras were compact and did not require any specific knowledge to be used.
At this point, it is clear how the Polaroid concept has many similarities with digital cameras as a concept.

Leaving apart digital world viewed from a mere technical standpoint, digital photography surpassed the market of instant prints thank to two extremely relevant variables: *industry affiliation* and *image quality*.

The prior industry background behind the emergence of digital photography consists into several firms that grouped themselves in order to develop a common project and finally arrive to a *dominant design*.

In 1991, 83 entrants in the US digital market came from three prior industries[15]:

1) Photography (25 firms);
2) Consumer electronics (19 firms);
3) Computing (25 firms);
4) Unrelated industries and start-ups (14 firms).

The other variable is represented by the increasingly higher quality that the digital sensor was providing if compared to the one of the film.

The first digital *full frame* camera (its sensor's dimensions were 24x36mm, the Leica standard) was the Canon EOS 1Ds, a 11 megapixels massive camera body.

Its resolution, if compared to the density of its sensor, is still today capable of providing excellent images up to 400ISO.

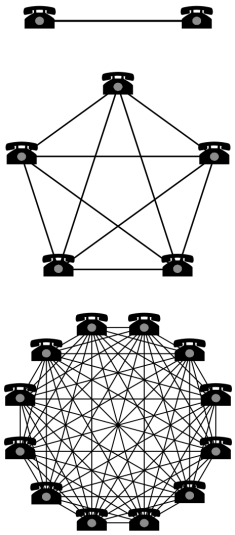
The 1Ds was an expensive professional camera, but Canon (as well as all the main competitors) created four main segments for what belongs digital cameras (three of them dedicated to reflex cameras and one additional segment for compact or bridge cameras).

[16]Even an entry-level Canon EOS 300D (6.5 megapixels) facilitated users in obtaining a good quality photo, ready to be printed, shared or enlarged.

So, people's impressions on photography were rapidly changing due to the positive externalities generated by the close connections between cameras and computers.

According to *Metcalfe's Law*, the value of a telecommunications network is proportional to the square of the number of connected users of the system[17].

As we can deduct from the picture, each additional subject creates new ties with existing users on a net (for example the *world wide web* or *social networks*).



[15] *Mary J. Benner, Mary Tripsas: "The influence of prior industry affiliation on framing in nascent industries: the evolution of digital cameras".*

[16] *https://en.wikipedia.org/wiki/Metcalfe%27s_law#/media/File:Metcalfe-Network-Effect.svg*

[17] *Wikipedia*

If we correlate the same concept to an industrial environment, it is clear how the two phenomena could be perfectly comparable.
Each component of a specific industry will put efforts in order to generate relationships with other existent subject.
Naturally, their dimensions could differ depending on the degree of affiliation among the system, but the success of an industry or the dimensions of a net are also strictly related to the barriers to new entries.
Such barriers, at social level, could be represented by different languages, different cultures and costumes, different political and juridical situations…
The internet reached a so high level of uniformity and accessibility that the typical barriers to entry of the early stages of the *world wide web* radically changed.
As a consequence of it, even photography went through a process of modernization likely to modify its role on the modern society.
The advent of social networks like Facebook, Twitter or Instagram signed the beginning of an era in which the majority of consumers are passive users transported by the latest *trend*.
It is rarely possible to find a well-defined project or *vision* behind an Instagram account (excluding professional photographers' profiles), despite the user perhaps take his/her photos only with a smartphone.
Moreover, immediately after the launch of the first smartphones equipped with a front camera users could grab a "*selfie*" with, mobile editing apps or filters directly implemented by the manufacturer in its products began more and more popular.
More than a Century earlier, photo-montages represented a real and concrete exigency of a professional photographer shooting in particular conditions and/or delivering their picture for specific uses. Today almost everyone could benefit from software or applications like Photoshop, mostly in order to correct those errors that could have been avoided while shooting the photo.
The filters implemented in modern devices and social networks improve the image quality through an algorithm that changes determined parameters of the photo depending on a recognition of the captured scene.
The massive usage of such filters somehow demonstrates how the average user feels satisfied after having captured a moment with their smartphone (or tablet) forecasting to obtain a determined effect after the appliance of that specific filter.

Producers of smartphones invest billion of dollars in R&D with the aim of implementing new features in their products or improving the existing ones.

Manufacturers also promote the cameras implemented in their products through huge marketing campaigns essentially based on a theatralization model.
Since the internal memory of cell phones rose exponentially, now it is possible to store a huge number of photos, that could be watched and magnified on a super sharp display (like the *Retina Display* implemented by Apple in its products).
Always considering as outliers all those users with a minimum knowledge of photographic theory, I believe that the fight between cameras manufacturers and producers of smartphones or similar devices will continue until one of the two will prevail and dominate the market.

I will return later on this topic, providing some statistical data arising from the questionnaire I drafted in the fourth chapter and some conclusions at the end of this thesis.

Technological progress

The emergence of digital photography, as we saw in the previous paragraphs, brought photograph on everyone's hands.
The actual status of photography is the direct consequence of three decades (at least) of continuous technological innovations resulting from a primitive *industrial affiliation* process, that gave birth to digital photography as a *dominant design*.
A dominant design could be defined as a standard set of technologies and interfaces as well as a shared understanding of what performance attributes are important.[18]
However, the period preceding the creation of a dominant design is characterized by high uncertainty and turbulence, since each component of the industrial organization behind a specific project needs to go through a R&D process.
The initial decisions about which features the future digital cameras would have included brought firms to an initial period of ferment and experimentation, even according to the pioneering evolution of computers.
But once industries converged into the first camera (conceived as the dominant design we are referring to) and some standard features were implemented in few models, competition started to run extremely fast.

[18] *Mary J. Benner, Mary Tripsas: "The influence of prior industry affiliation on framing in nascent industries: the evolution of digital cameras".*

In that environment, firms had to focus their attention on whether they would have survived in a so highly competitive market and, then putting efforts in order to develop some barriers to the entry of new competitors.
At the same time, two variables played an extremely relevant role on industrial organization of photographic industry (related to digital photography, naturally): *shared beliefs* and *imitative behaviours*.
For what belongs the shared managerial beliefs about what customers will value in the future as a feature for new products, it is important to underline how firms belonging to the same industrial district (or affiliation) are more likely to take into serious consideration those information flowing from inside the industrial structure itself.
As a consequence, the greater the number of other firms from the same prior industry that introduce a product feature during a period, the greater the likelihood a firm will introduce the produce feature in that period.[19]
Almost the same reaction has to be related to imitative behaviours.
From 1983 to 2003, 83 firms entered the digital camera market: 31 of them had no patents, 20 firms had fewer than 50 patents and a core of 20 firms owned over 1000 patents related to digital cameras.
One of the last 20 firms was Kodak, detaining a close-monopolistic power for what belonged CCD/CMOS sensors.
However, the main worry firms started to deal with was represented by what consumers were willing to pay for as a feature implemented in a digital camera.
Despite some of those features diffused rapidly on the majority of cameras, representing standard functions (such as flash or color images), some others were characterized by a high degree of uncertainty.
Functions like LCD display, zoom lens, movie clips, removable storage and dual webcam capability were included systematically in descriptions of digital cameras and some publications, however, manufacturers had no expectations about how the demand of such implementations would have behaved.
Some of the aforementioned features met the needs of photographers, as far as the development of determined characteristics, such as *resolution*.

[19] *Mary J. Benner, Mary Tripsas: "The influence of prior industry affiliation on framing in nascent industries: the evolution of digital cameras".*

I believe that a parallel between resolution and another function of the emergent digital cameras could clarify the reader's view on the strategies commonly used by firms belonging to an industrial affiliation.
The first camera to offer a higher resolution than VGA was developed and launched by Kodak in 1995 and by 1996, more than 50% of cameras had an equal or a higher resolution than the one of Kodak's camera.
At the same time, producers abandoned functions like video clips, believing that if people would have wanted to take movies, they had purchased a camcorder instead of a digital camera.
Ironically, a decade after the first consumer reflex camera, Canon introduced its EOS 5D Mark II, capable of shooting marvellous videos at a 1920x1080 (Full Hd) resolution through a 21 megapixel full frame sensor.
Note that the average resolution of camcorders in those years was close to 3 megapixels.
Moreover, the need of a computer powerful and stable enough to sustain the heavy workflow that a 5D Mark II generated when used for video purposes fed the business of computing firms and software houses developing the most used post-processing suites (e.g. Adobe Photoshop or Apple Final Cut).

Going back to a general view over technological progress, it is clear how the affiliation of different industrial realities gives rise to an *open system*.
An open system could be defined as a technology composed by several internal linked technologies that interact generating a dominant design.
After its creation, a dominant design has an impact both at the interior and at the exterior of production facilities.
Particularly, there exist an internal and an external architecture of the industrial organization that stands behind a dominant design.
Though, the externalities that arise from the features of a dominant design could have consequences on both internal and external environment, even if the latter is extremely more evident.
An example demonstrates the relevance of an external dominant design.
If a consumer purchases a camera that uses only a particular port as mean of connection with computers, his/her concerns will be totally related to the connectivity that the camera has with complementary devices such as computers, printers or televisions.
But the same user would not care about the type of sensor the camera is equipped with (or would not be aware at all of its existence).

As a consequence, complexity, the degree to which an innovation is perceived to be difficult to use, is negatively related to adoption[20].

Moreover, additional consumption externalities like *network effects* are generated as long as the number of consumers who purchase compatible items with a specific device increase.

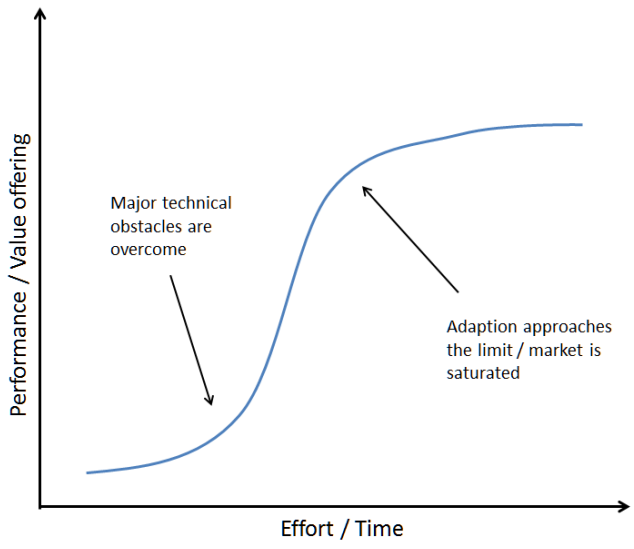
Before making some final non-technical considerations about the evolution of photography I think that a brief analysis of the main indicator of technology performance for what concerns digital cameras would be appropriate.

1) If we take *median resolution per dollar* as an index (in 2004 USD terms), we can find that it reflects the consequences in terms of costs to achieve a specific resolution. For example, the cost of a 1.5 megapixel camera in 1996 was about $12000, in 2000 it was about $500 and in 2005, a 4 megapixel camera's cost was about $200.
2) *Camera weight* could be considered as another relevant index, since consumers generally prefer lighter cameras instead of heavier ones: I also confirmed this last statement through the questionnaire I will comment in the following chapters;
3) Finally, *camera size* is tied with *camera weight*, indeed consumers prefer smaller and compact cameras to huge reflex bodies (even in this case, I obtained extremely interesting data from the answers to the questions I proposed in my survey).

The previous index contributed to the evolution of cameras and other photographic equipment among the past two decades.

But the relationship between the time a given technology lasts for, its performances and the gain it generates for the firm that develops it, is rarely uniform.

It is possible to put such variables on a graph that is commonly known as the *technology S-curve*, because of its shape.



[21]The technology S-curve suggests us that the performances of a specific technology will grow in time up until a certain pint, that represents the physical limit above which a technology becomes unable to go.

The distance between the ascending and the descending part of the S shape represents the *maturity* of a technology and its duration is proportional to the success of the strategies

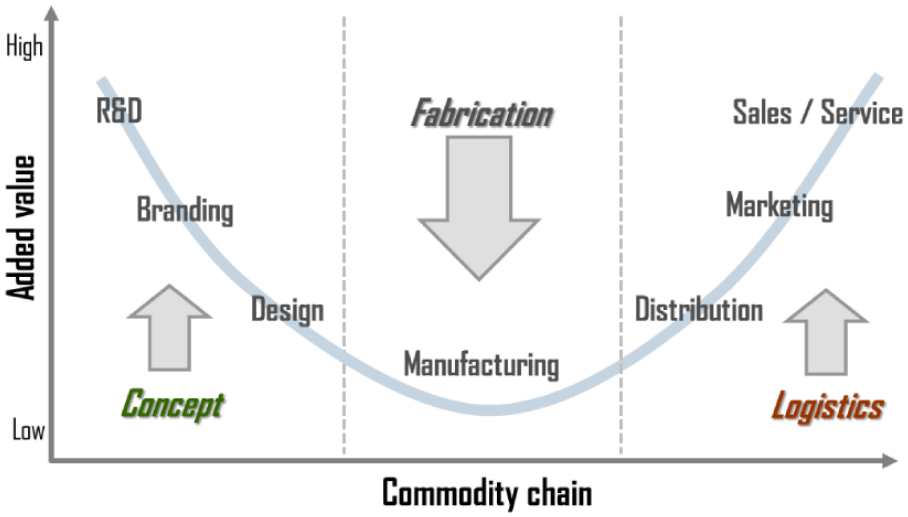
[20] *Min Zhang: "The influence of technology evolution on technology adoption: a study of digital cameras".*
[21] *http://i1.wp.com/blog.bearing-consulting.com/wp-content/uploads/2013/01/image7.png*

adopted and the skills of people working on a specific project.

Moreover, there is another important concept we can borrow from industrial economics in order to shed light on the changes of the markets in the context of modern *supply chains* or, more in general, *value chains*.

The concept is represented by *smile curves*.

A smile curve has a similar structure to the one of technology S-curve and it indicates the relation between stages of production of a specific good and the stages' share of total product's value added. [22]



It should not be surprising that the highest shares of product's value added are related to R&D and after sales service, especially considering the variables governing the industrial organization of whatever reality.

It is evident how relationships between subjects playing different roles in the context of a top down or bottom up reality made possible to move from a producer driven supply chain to a buyer driven supply chain, in which more intermediate goods or services are imported and then, precumably, exported again.

Going back to a more general view over the technological progress in photographic field, I firmly believe that the most effective way to be aware of the real status of imaging industry and photography's world is to interview some influent representatives of the modern imaging panorama. Particularly, I obtained two extremely relevant interviews regarding two different, but complementary issues:

-How the activity of a professional photographer has changed in the last decade, with particular reference to the tight ties between web-communities (or, more generally, the social context) and the profession of photographer: through an interview to *Juza*, founder of JuzaPhoto, one of the most relevant photographic we-communities not only in the Italian background, but even at international level, especially considering the attention to the high quality of the content of his website;

[22] *https://people.hofstra.edu/geotrans/eng/ch5en/conc5en/img/commoditychainaddedvalue.png*

-Where are the technological evolution and the demand for *free contents* moving the attention and the efforts of professionals: in particular, Marco Stucchi is without any doubt the protagonist of the Italian progress in the context of *immersive photography* and *digitalization* of cultural heritages. After his dense interview, the reader will surely have a clearer idea of the direction photography's business is actually moving toward.

First interview to Juza

Let's begin with a brief general overview: what is JuzaPhoto?

It begun many years ago as my personal website, but over the years it has become a photography network and a resource of articles and information about photography, from review to locations, species and much more.

JuzaPhoto is much more than a standard photography forum, since users could benefit of reviews, guides, articles and news about photography's world: which of its sections would you identify as the leading ones?

The galleries, of course, are the 'hearth' of JuzaPhoto: every day thousands of new photos are posted here; nowadays there are about 970,000 photos and we will likely reach one million by the end of 2015.

The discussion forums are very active, too; the third most successful section is the 'review' section, where it is possible to find opinions, photos and specifications or nearly all cameras and lenses.

You recently decided to switch from DSLR$_s$ to mirrorless cameras, despite you continue to use Canon or other FF lenses: what did you mostly push to make such a radical change?

I like to experiment and to try new technologies; other than that, I appreciate the compact size and the light weight of ML cameras. That said, I shoot very often with cameras and lenses loaned from manufacturers or friends, so I use nearly everything, from heavy DSLR$_s$ as the Canon EOS 1DX and EOS 5Ds to ML as the Sony A7s, Sony A5100 and others.

Are you satisfied of the quality of mirrorless cameras?

Yes; in terms of image quality they are on the same levels of DSLR$_s$ (often they use the same sensors), and in terms of camera body the main limitation was the slow AF, but recent mirrorless have made great improvements in this aspect.

Would you return to DSLR$_s$ if you had a chance? If not, are there some incentives that would potentially change your mind?

As I said, I still use both, but I own only a mirrorless as my personal camera and I would not trade it for a DSLR... I believe that MLs are the future and that in 5-10 years all cameras will be mirrorless, even though the flagship professional MLs will look like current high-end DSLR$_s$ in terms of size and ergonomics...not all MLs need to be small.

A great part of your activity was previously based on workshops, nonetheless they represented a great portion of your total income: is it true? And is it the same today? If not, why (according to your opinion)?

It is correct, but after several years teaching workshops I have decided to leave this activity (even though it gave a good income) and to work exclusively with the website. Honestly I no longer enjoyed them as at the beginning of my 'career'.

What would you suggest a new photographer to do in order to get positive results (keeping open the activity) and maintain a proactive strategy?

One of my favorite quotes, from the photographer Arthur Morris..."work as hard as humanly possible". Other than that, I believe that determination is essential... many (great) photographers fail to earn a living from their work because they get discouraged. There is a lot of competition and with time it will get even harder, so you really need to be determined to succeed.

To conclude, please, provide five keywords you would correlate to the current photographic environment in general.

-*Social* - this is the 'social network' generation, and social network have influenced the trends in photography (often in a negative way, sadly).

-*Photoshop* - the post processing has an enormous impact on digital photography; the photographers need to learn both the techniques in the field and the post processing techniques. This is a good thing, if it is not exaggerated and if you keep a good balance between the real scene and the photo.

-*Masses* (of photographers) - nowadays photography is cheaper and easier (in term of technics), so there are a lot more people that share this passion. I believe that it is a good thing.

-*Changes* - in these years there have been huge changes in photography; the biggest one has been

the switch from film to digital photography, that nowadays is essentially complete; the second one is the switch from reflex to mirrorless, that is in the middle; the third one will likely be the complete merge between photo and video cameras (with full electronic shutter), that has begun but still needs a lot of work, in particular in the high-end area.

-Print (no more) - until a dozen of years ago printing was an essential aspect of photography; nowadays, many photographers no longer print (me included), since the screens have reached extremely good image quality. I believe that things like printing, film cameras, DSLR cameras will remain, but they will become a very small niche of photography in future.

Second interview to Marco Stucchi

Marco, could you please briefly describe what your *digitalization* activity is and how it began?

My digitalization activity of cultural heritages was born in a totally casual way, when I read on a specialized newspaper about the possibility of photographing almost all kinds of structures –both external and internal-, providing a 360° panoramic view.

The result was a completely new visual experience, allowing a virtual visitor to literally explore a specific place as in reality.

At that time, $DSLR_s$ were still in their primitive stages, so their performances were absolutely not comparable with the actual standards, both in resolution and chromatic fidelity terms.

I immediately understood the potential and the power of such a technique and the rapid evolution of both hardware and software infrastructures gave a solid and natural contribution to the maturing process not only of digital photography (a prerogative of few professional in the previous years) but also of my specific sector.

You started your professional activity shooting with film cameras: would you please describe which advantages brought digital photography (and whether it effectively happened or not)?

The photographic history is strictly related to the film and the previous sensitive materials.

In the past fifteen years we assisted to a historical revolution of such a sector, despite it is not the unique to face such a change.

For more than 150 years the light passing through a lens was impressing a chemical emulsion, that has been replaced today by a series of photocells contained into a sensor, that convert a luminous input into an electric signal first and, then, into a simple number.

I would provide another example of a correlated environment, the one of *transistors*, that slightly replaced *thermoionic valves*, giving the opportunity to an embryonic binary computation to rapidly evolve and become a standard in all fields.
In the same way, the evolution of digital photography brought infinite advantages, allowing us to take photos with our smartphone/tablet while walking in the streets or to capture private moments to be posted on social networks.
Also, we can easily enhance the quality of our photos through specific *filters* and get the prints delivered at home the day after.
These simple actions that we now take as granted were not possible twenty year ago.
Today, film photography is, however, finding again a position in the market and it is mostly destined to artistic representations or experimentations or darkroom works.
Several authors and analysts claim that the interest on film photography is likely to consolidate again in the years coming, especially in young users' minds, often curios to experiment new techniques.
Despite that, the whole professional production has unavoidably totally shifted toward digital photography.

According to your experience, which future scenarios do you imagine and how would you depict them?
Digital photography, with all its declinations, entered the digital world as the result of the development of connected disciplines like computing and telecommunications.
The high qualitative standards reached by digital photography could not have become part of our lives without a perfect synergy of all its affiliated branches.
My work could be classified exactly as a concentration of all the correlated technologies to the one of digital photography.
Through my immersive photos, everyone becomes able to enter inaccessible places or to virtually visit cultural sites, especially those people unable to walk or freely visit whatever kind of location.
So, my work does not only play an important role at social level, but also favours a widespread cultural expansion.
As a consequence of digital photography's diffusion, some other highly specific and technologically advanced branches emerged, for instance:

- Spherical photography and ultra-high definition photography;
- Multi-spectral photography and/or multi-spectral analysis;

- Thermic photography;
- Medical photography;
- Stereoscopic photography.

So would you affirm that photography is becoming an always more inter-disciplinary activity?

Yes, definitely.

As I said before, photography's development is tightly tied with computing and their developments are unavoidably strictly connected.

I would compare the relationship between photography and computers to the one between film photography and chemical experimentation and progress.

Also, if we think about this matter for a second, it is clear how photography directly influences almost all sectors of technology, economy and of culture.

What are today's expectations for a young person determined to open his/her professional activity as a photographer?

A young person willing to seriously get closer to professional photography must not only be in possess of a strong artistic sensibility, but also must incarnate a vocation for technology and computing, since every single aspect of his or her future activity and its success is going to be connected to the knowledge of such sectors.

Naturally, an artistic vision remains a *natural predisposition* that could be hardly transferred or even acquired, however, the skills in computing or net management are indispensable in order to let the work of a photographer available for online visitor and potential clients.

Sadly, I knew more than one person whose artistic visions would have deserved an enormous success but whose skills in informatics were so scarce that they negatively influenced the activity and totally obscured their artistic sensibility.

During our conversation you often mentioned that digital photography lives under the influence of IT (*Information Technology*) and telecommunications evolution: could you please better explain your position?

Sure. Technology experienced an extraordinary acceleration among the past 30-40 years, so that it pushed production processes toward a so high degree of automation and computerization that nobody could ever had imagined it this way.
It is clear how progress unavoidably characterizes everyday's life and how a need for continuous evolution and maturation is intrinsic in human being's nature, but what I believe is absolutely surprising in our contemporary life is the speed at which the technological evolution occurred and, above all, the multitude of sectors involved in it.
The one about the origins and the causes of such a fast development would be an extremely interesting debate, however, I'm going to underline how computing and telecommunications played a fundamental role in such a fast-evolving environment.
Computing and electronics (the technological support that allows to launch programs both at software and hardware level) made possible to rapidly complete extremely complex and precise calculations, that previously needed to be manually executed.
Engineers, scientists, architects, physics, analysts [...] are today able to deal with mathematical researches and threats in a restricted time.
Telecommunications allowed to "*transfer and share*" always more data and information between a wide range of subjects (universities, enterprises, researchers, scientists...) wherever in the world.
To transfer documents, photos, sounds -in general, data- became part of our routine, but such an activity would be absolutely impossible (or, at lest, it would require much more time) to be done almost instantly.
That's why telecommunications represent a fundamental pillar of development and technological progress and it was unavoidable that even photography would have taken an enormous advantage from this situation.
I often push people to reflect about the actions we can easily do every day.

To conclude, please, provide five keywords you would correlate to the current photographic environment in general.
The photographic sector is facing a deep and continuous transformations, that consequently reshaped in a decade the scenario.
On the one hand, some traditional professions totally disappeared leaving space to other new.
On the other, the same occurred to many firms operating in the imaging industry.
Some of them failed in taking advantage of unique opportunities end exited the market after massive losses in terms of market share, instead of some others that understood the potential of the new digital era and successfully completed the transition toward a digital world.

I believe that 5 words could perfectly depict the current situation:

- *Continuous innovation*;
- *Mobility and internet*;
- *High resolution*;
- *Computing (relationship with photography)*;
- *Broad diffusion of fast internet connection for all devices*.

The two interviews put on evidence how the industry of photography evolved from its first dominant design to our recent days.
The consequence of such a rapid evolution is to be found even in customers' habits, that unavoidably changed.

Today, almost everyone has a camera in the pocket and the device in which it is implemented has been studied in order facilitate all the necessary procedures in order to capture a photo. Smartphones are capable of automatically focusing, adjusting the exposure, recognizing faces and even storing in its memory what happened 5 seconds before (or after) the shutter button was pressed.

So, once again after more than 100 years, manufacturers managed to create an all-in-one device that only asks to its owner to tap on a button with the finger, because the technological brain would "do the rest".

I will provide some other information and conclusions in the fifth chapter of this thesis.

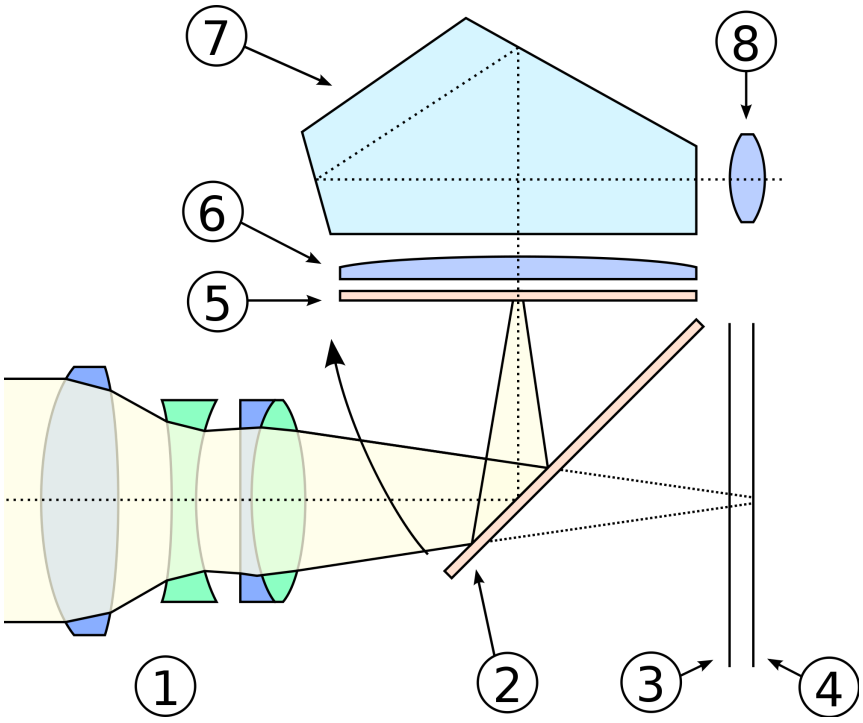
Study on and comparison between the demand and supply sides of photography market

Introduction

In this brief introduction I will provide some basic technical information about how cameras and lenses work, in addition to the definition of the main functions I will quote during my analysis.

The picture shows the interior of a reflex camera with all its components.

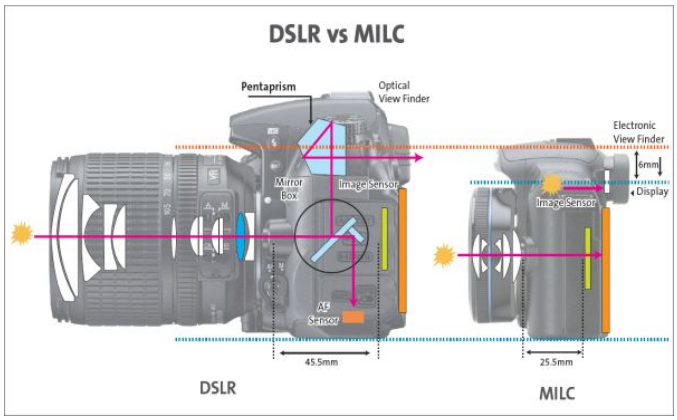
1) *Lens;*
2) *Mirror;*
3) *Shutter curtain;*
4) *Sensor/film;*
5) *Focusing screen;*
6) *Condenser lens;*
7) *Pentaprism;*
8) *Ocular*.



When capturing a photo, light passes through the lens of a camera (from left to right, in the previous image) and firstly shows the scene to the photographer thanks to a pentaprism (see the Rectaflex history, in the following paragraph). When the photographer presses the shutter button, the mirror lifts up exactly as the shutter curtain (aimed only to protect the sensor/film both from light and dust) and, after having impressed the sensitive layer, they return in the initial position.

Mirrorless cameras differ from reflex ones since they do not incorporate a pentaprism and a mirror. So, the sensor directly elaborates every function and the photographer almost always needs to watch the scene through

an electronic viewfinder (except of classic rangefinder cameras).



Finally, I provide few fundamental definitions of the main functions of whatever camera I will analyse in my work.

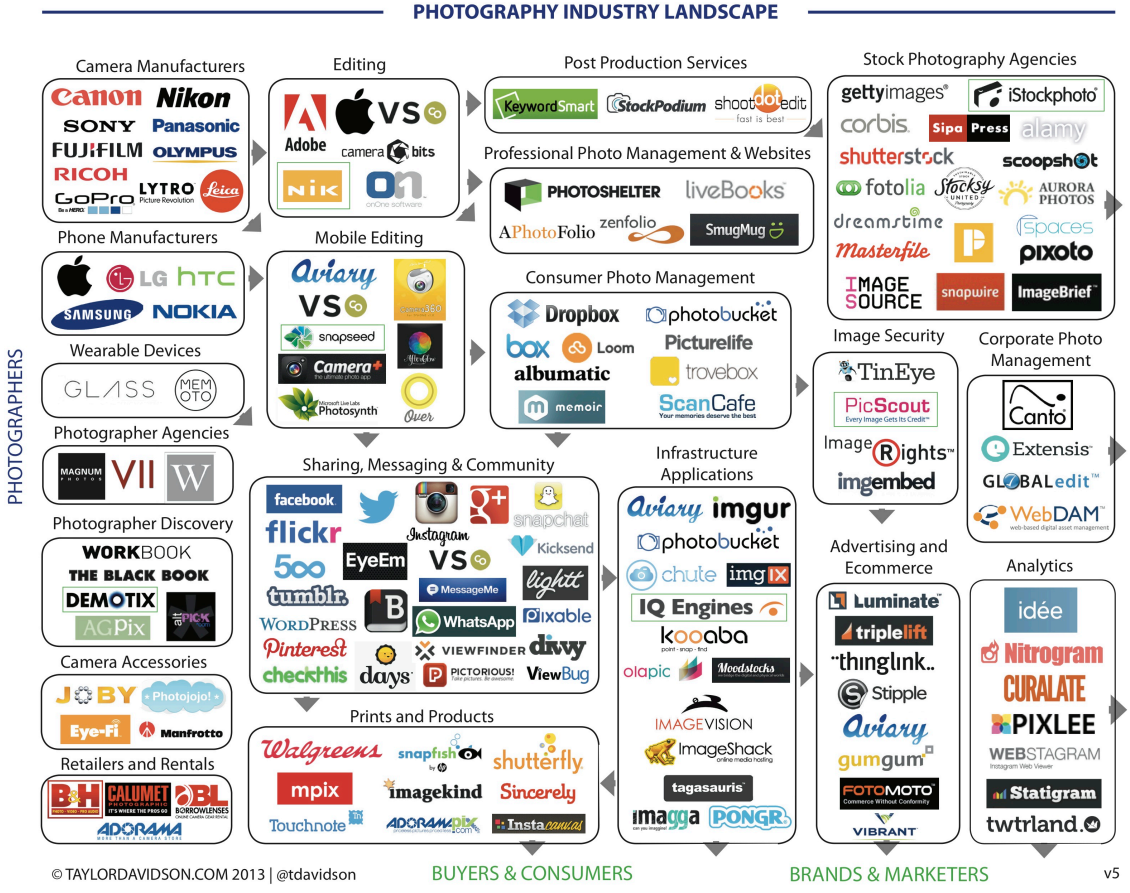
ISO sensitivity: is defined as the sensitivity of a sensor or a specific film to the light that reaches it. the higher the sensitivity is, the faster the exposure time will be.

Exposure time: the time interval occurring between the pressure of a shutter button (so, the impression of the sensor/film) and the coverage of the sensitive layer.

Zoom lens/prime lens: while the former allow users to change the focal without physically moving, the latter require to get more or less closer to the subject in order to entirely include it in the image.

Supply

As I introduced in the previous chapters, the supply of photographic equipment faced a widespread evolution and in this analysis I will take into account the products offered by the main manufacturers from the years of the first dominant design in the context of digital cameras.
Once digital cameras became strongly affirmed on the market, allowing journalists and photographers to immediately get or send via internet (or other primitive telecommunication systems) their photos, producers started diversifying their offers depending on the category of users their products were addressed to.
Moreover, the need of an efficiently organized supply chain clearly emerged.
Particularly, it is extremely difficult to obtain precise information about the industrial organization of producers, however, it is worth giving a general overview on the complex of relationships between all the affiliated sectors to the one of photography.



The image shows a stylized view of the photographic industry landscape, that involves different types of subjects.

Each category of products or services in framed into a box and each box is connected with an arrow to the others.

It is important to highlight how considerations about photographic industry should start from an examination of the main producers that compose the supply side of photographic market.

As a consequence, it would be easier to identify which segments of the offer meet determined subjects composing the demand side.

Nevertheless, the evolution on telecommunication technologies in addiction to the abutment on the costs of determined devices or components (such as storage units or DSL internet subscription programmes) allowed small projects to became solid partners of the leading forms (in this case, related to the photographic sphere).

An example is surely represented by the most used social networks, that played a fundamental role on the shift toward a completely new conception of photography.

Looking at the box relative to the social media communities, it could be found that it is originated by *mobile editing software/websites* and *consumer photo management applications*.

Usually, the outputs deriving from social media communities are strictly related to *print services* or other *infrastructure applications* that allow users to share their images on paper or online.

I chose the example of social media since not only I believe it could represent an extremely actual topic, but even to anticipate the trends that emerged from the results of the questionnaire I created. In fact, in an environment characterized by a high degree of standardization and inter-connection among different platforms with the aim of maximising the compatibility of modern devices with a always broader range of applications, consumers are used to instantly have at their disposal an instrument capable of capturing, sharing, modifying and (eventually) printing photos.

There are five macroclasses of products that characterize the offer of photographic devices. Almost all the manufacturers have the following types of imaging products in their portfolio, naturally excluding smartphones.
The only exceptions are represented by highly specific devices like *medium/large format cameras*, devoted to a niche segment of the photographic market and by particular types of cameras, such as Leica rangefinder cameras or panoramic cameras like the Linhof.
I will briefly analyse each single class of products, providing examples of cameras belonging to them.

1. *Reflex cameras;*
   1.1. Consumer cameras;
   1.2. Prosumer cameras;
   1.3. Professional cameras;
2. *Mirrorless cameras;*
3. *Compact cameras (bridge);*
4. *Film cameras;*
5. *Smartphones*.

Reflex cameras
A reflex camera differs from a rangefinder or a compact/mirrorless camera due to a mirror contained in it, that allows the user to see through a viewfinder what stands next to the lens. Previously, cameras were not equipped with a prism, projecting the image from the lens to the user's eye.
The first camera to implement such a system was the Italian Rectaflex, in 1947.
With the Rectaflex serie 1000, users were able to see a correctly inverted image and to rapidly focus the image through a specific focusing screen.

Nowadays, Rectaflex's system became a standard in all the reflex cameras, regardless of their format.

Reflex cameras are classified as follows: *consumer cameras*, thought for beginners but implementing enough features to be used even for professional purposes, *prosumer cameras*, built with more solid materials and usually a perfect substitute for a big and heavy professional camera and, finally, *professional cameras*, almost always waterproof and well protected against falls, dust and heavy use and with the highest performances available in terms of autofocus, shutter speed, ISO sensitivity and others.

[23]

Entry level reflex camera | Prosumer reflex camera | Professional reflex camera

There are two main formats of sensors: the *full frame* sensor, whose dimensions (24x36mm) were set as a standard by Leica during the fires half of 20th Century (and still it represents the standard size for sensors) and APS sensors, smaller than full frame ones and, usually, offering a 1,6 or 1,5x magnification factor.

The benefits of using a full frame or an APS sensor depend mainly on two variables: the budget of a user and the type of photography the camera is destined to.

In general, a smaller sensor would represent an advantage in case of nature photography or in all those circumstances in which priority is given to a higher magnification.

The 1,6 or 1,5x multiplication factor uses only the central portion of the focal range covered by a lens and, consequently, subtracts some areas of the image that would otherwise be impressed in the remaining part of a bigger sensor.

[23] *http://www.bhphotovideo.com/images/images2000x2000/Nikon_25492_D3200_DSLR_Camera_With_856049.jpg*
http://beafoto.pl/userdata/gfx/d811b26b4cbc9c77e84aba3705a8fd6b.jpg
http://nikonrumors.com/wp-content/uploads/2014/02/Nikon-D4s-DSLR-camera-4.jpg

Once APS cameras became more and more common, producers started to develop lenses whose focal was adapted to the smaller size of the sensor in order to generate an identical image to the one a user could have captured with a full frame camera.
Today, APS cameras reached a quality level comparable to the one of full frame cameras.
For this reason, they are often used by professionals as a second or third camera body to be used during a photographic session.
It is worth noticing that the price of full frame cameras, initially sensibly higher than the one of APS, started diminishing due to the recent creation of a sub-category of full frame cameras.
They implement a high quality sensor in a smaller body, often without a pop-up flash.
The lower price of such cameras is justified by limitations in some technical performances.
Usually, the minimum shutter speed of professional or semi-professional cameras is 1/8000 sec., while all the full frame cameras belonging to the sub-category I took into consideration present a minimum shutter speed of 1/4000 sec.
Despite this difference does not imply serious negative consequences for a photographer (regardless of his/her level), in determined light conditions a 1/4000 sec. minimum shutter speed could potentially not be enough in order to compensate the high aperture of a portrait lens, forcing the user to opt for a ND (*Neutral Density*) filter to darken the scene.
This limitation could be considered as one of the most successful marketing strategies adopted by manufacturers in order to protect a determined segment of their customers and products.

The demand for a more affordable full frame camera was absolutely evident, but until 2012 (when Canon launched its 6D at an average price of € 1200), consumers were constrained to look for a used full frame camera like a Canon EOS 5D Mark II or a Nikon D700, whose average price is still close to € 1200, the price range of a new EOS 6D or a Nikon D610.
The formula thought by producers immediately worked, leaving relatively intact the segment of expensive professional cameras.

Before taking further with an overview on mirrorless cameras, it is important to highlight the crucial role that the video function (implemented in reflex cameras with the Canon EOS 5D Mark II, 2008) played in the context of the evolution of digital photography.
Today, almost all reflex cameras allow users to take Full Hd videos and some of them have been updated to 4K resolution.
Consequently to the extreme diffusion of reflex cameras used in cinematography, a series of accessories began to appear.

All the main producers of accessories for cameras or lenses developed several solutions in order to render the usage of reflex cameras in professional cinematography as closer as possible to high level camcorders in terms of quality.
The advantages of reflex cameras in quality of camcorders are mainly related to their compact sizes and their reversibility, allowing users to switch to the photo mode instantly.

Finally, in the recent years producers implemented in their cameras features enhancing the connectivity between a camera and different types of devices.
Ethernet ports and, above all, Wi-Fi modules are becoming increasingly more popular.
Particularly, in a social media context the Wi-Fi feature would help users in sharing the photos with their smartphones or tablets.
Once the camera has captured a photo, it sends it automatically to a specific destination, that could be represented by mobile devices or even computers.
In fact, Wi-Fi or Ethernet ports turned out to be a right hand for professional photographers operating in studio, for which a fast and uniform dataflow (and, consequently, an ordinate workflow) is essential.
The same advantages are related to journalists, especially those press photographers covering public events. In this case, the more rapidly a photo would arrive to the press agency the photographer is working for, the faster its publication will be.

Mirrorless cameras
A mirrorless camera is based essentially on the same principles of reflex or rangefinder cameras (that I will take into consideration in the following paragraphs).
A camera body with interchangeable lenses or even with a fixed lens in which a sensitive support (a sensor or a film) captures the image through a simple movement of the shutter curtain.
The absence of the mirror brings the advantage of having extremely low vibrations (due to its movement) and contributes to maintain an extremely compact size of the camera.
However, the most evident limitation that especially the first models of digital mirrorless cameras presented is related to the viewfinder.
In the case of digital cameras, mirrorless bodies appeared when the *live view* technology (that allows a user to see directly on the LCD screen where the lens is pointing and the scene next to it) was already a standard equipment of almost all SLRs.
So, producers could put more efforts in R&D in order to find an appropriate solution while leaving a simple live view mode as a basic feature of their ML cameras.

Innovations did not wait to come and, few months later, almost all the new models of mirrorless cameras had an incorporated viewfinder, whose functions immediately started to be innovated and to provide a always more precise and rapid response.

Mirrorless cameras not only gave birth to a completely new segment of the imaging industry (despite its primitive origin is to be found in film rangefinder cameras).
Their massive and rapid diffusion contributed to a shift of consumers' priority toward a lighter and more compact camera instead of a high resolution DSLR.
As a consequence of it, producers realized how big was the potential of ML cameras of creating an entire new category of the market.
Today, there is a set of accessories and lenses specifically designed and developed for mirrorless cameras, so that users who don't have specific exigencies that could justify the purchase of a reflex camera can now opt for the new and lighter type of cameras.
Particularly, it is worth noticing that even producers like Carl Zeiss launched the first lenses whose focal (and dimension) is adapted to the smaller format of a mirrorless camera.
For example, Zeiss announced in 2015 new lines of lenses dedicated to ML cameras, despite they can be used even with other types of cameras.
The lines are called *Loxia*, *Batis* and *Touit* and each of them contain a set of lenses with a wide range of focals and apertures.
In my opinion, this new-born segment of the photographic industry is likely to reach the market slice dominated by reflex cameras in the coming years.
Nonetheless, producers of lenses and accessories became clearly aware of the power of ML cameras on creating value added through the development of new dedicated products.
In this way, a new unexplored path of the market will be gradually inspected and will generate both positive and negative externalities for all the segments or the markets related to the one of mirrorless cameras.

Compact cameras

The market of compact cameras (in the context of digital photography) appears to be, together with the segment of the primitive DSLRs, the oldest and strongest business of the photographic panorama.
Its relevance is to be highlighted not only under the perspective of a simple segment of the market, but also related to the role compact cameras played in the evolution of the modern digital photography.

On the one hand, the first digital cameras were characterized by an affordable price and a basic connectivity to the current devices at the disposal of an average family or person, though, they represented the ideal solution for average users.
After the launch of the first digital compact cameras, the cost of a single photo suddenly collapsed and whoever had the possibility of using a computer would have been able to see, store and even print the photos.
So, producers continued to invest in R&D in order to improve the performances of compact cameras and correlate them with the emergent dominant design of $DSLR_s$
On the other, digital compact cameras opened the doors of photography to a mass of amateurs willing to easily capture their photos even without any knowledge about photography.
The amateurs put the roots of the actual status of photography and it is interesting to notice how the gradual shift of consumers toward reflex cameras (because of their lower prices) became faster as more "professional" features were implemented in compact cameras.
The first compact cameras were not capable to shoot in RAW format (the digital equivalent of a film negative, both in technical terms and in legal terms) and were not allowing the user to choose manual settings or, at least, shutter/aperture priority.
When manufacturers implemented the aforementioned features in compact cameras, the fall on prices of $DSLR_s$ was already started, so those consumers willing to go deeper in their passion for photography used to prefer reflex cameras to compact ones.
In fact, the flexibility of a reflex cameras allows users to get the total dominance of the scene, that can be managed changing highly specific modes or settings or using different types of lenses.
However, some models of compact cameras, like the Canon G series, the Nikon Coolpix P series, the Fujifilm X series, and other similar, could be considered as an exception, since they implement in a miniaturized body (and, consequently, a smaller sensor) almost all the features of a reflex camera.

Film cameras

Film cameras have represented the leading segment of imaging industry until digital cameras started to appear in everyone's pocket.
I already analysed the evolution of film cameras in the second chapter of this thesis, so I will only depict the actual status of film photography as a component of the supply side of photographic equipment.
Once digital cameras became a standard, standard film cameras started to be excluded from the mass market and slightly disappeared from the warehouses of retailers.

Almost all the manufacturers discontinued the majority of their film cameras and only two categories of standard cameras remained.

The first is represented by classic rangefinder produced by Leica, Carl Zeiss, Voigtländer, Contax, whose particular application made possible for them to remain in a "protected" segment, since it attracts a niece of users tied to a more traditional conception of photography.

If we take Leica as an example, the red-labelled cameras are extremely expensive if compared to reflex or mirrorless cameras with the same dimensions or the same format.

However, a restricted percentage of consumers continue to purchase them and contribute to keep the segment alive.

The second category is represented by medium/large format film cameras.

As I previously mentioned in the introduction to my work, the first cameras ever built were based on a sensitive layer of silver particles whose dimensions exceeded the format that would have been established decades after by Leica, the 24x36mm full frame.

If, on the one hand, at the origins of photography's market the size of a sensitive film rarely was subjects to discussions about the quality it would have generated, on the other, the emergence and affirmation of compact cameras with smaller films put on evidence how larger formats than the full frame were ensuring an extremely higher resolution.

For this reason, all those photographers who needed to obtain the highest quality for their photos elected medium format cameras as the ideal solutions for their work.

The same phenomenon is to be correlated to large format cameras, whose film dimensions exceed the 6x6 or 6x9mm of a medium format one.

[24]The digital revolution gave rise to the emergence of digital backs for the main brands of medium format cameras, as Hasselblad or Mamiya.

However, their extremely high cost could be compensated only by a professional use, so medium format films survived and it is still used today.

The affordable price of *film scanners*, in fact, allows users to spend much less resources (around € 5 for a 120mm film and the amortized cost of a, e.g., € 200 scanner) in order to

24 *http://www.bhphotovideo.com/images/images2000x2000/Hasselblad_3034216_CFV_50_Digital_Back_50_737967.jpg*

digitalize and store an analogue photo on their computers.

Particularly, in Kodak's managers beliefs, the HR500 Plus Scanner was likely not only to soften the impact of digital photography on thousands of private laboratories (whose business was essentially grounded on the development and the print of photos from the films users delivered to them), but also to create a new and stable field of work for almost all photographers, who could continue to use their analogic equipment without losses.
But Kodak's beliefs rapidly turned out to be erroneous.

Smartphones
The market of smartphones (but even tablets) represents one of the most rapidly evolving and one of the most important phenomenon both from a technological and a from a social standpoint.
What happened is that the leading firms producing and developing smartphones managed to create a real need for such devices for almost every category of user.
From a teenager whose unique business is to (apart from studying) create and hold different types of social relationships, to a top manager whose activity is to manage a business.
Initially, cameras were only considered as an option or a simple feature connected to other functions of a cell-phone.
The precursors of smartphones were an evolved hybrid between a simple mobile phone and a PDA (*Personal Digital Assistant*), often with a home-operating system (for example, the Symbian developed by Nokia).
Users were able to computer several types of operations, including capturing photos with a camera whose resolution was rarely exceeding VGA.
Social networks were still levitating and consumers rarely used to upload their photos on a public community.
But once smartphones penetrated the market, the situation completely changed.
The devices became the missing part of a complicated pattern of social networks, video communities (YouTube, Vimeo...) and virtual relationships among users.
Few devices were initially offering a front camera and the quality they could offer was incomparable to the one of modern smartphones.
Not many months after, almost all the smartphones were capable not only of capturing stunning photos with an average resolution of 5-8 megapixels, but event to record Full HD quality

(1920x1080 pixels) movies with the main camera and HD quality (1920x720 pixels) movies with the front one.
So, cameras implemented in smartphones started to assume an extremely relevant role and often influenced consumers' decisions about whether to opt for a top-class smartphone equipped with a 5 megapixels camera or for a basic device with a 8 megapixels camera.
In the while, app developers put efforts in order to create and update their applications, that should always have been in line with the new features of smartphones' cameras (time lapses, HDR photos, outputs from mobile post-processing apps...).

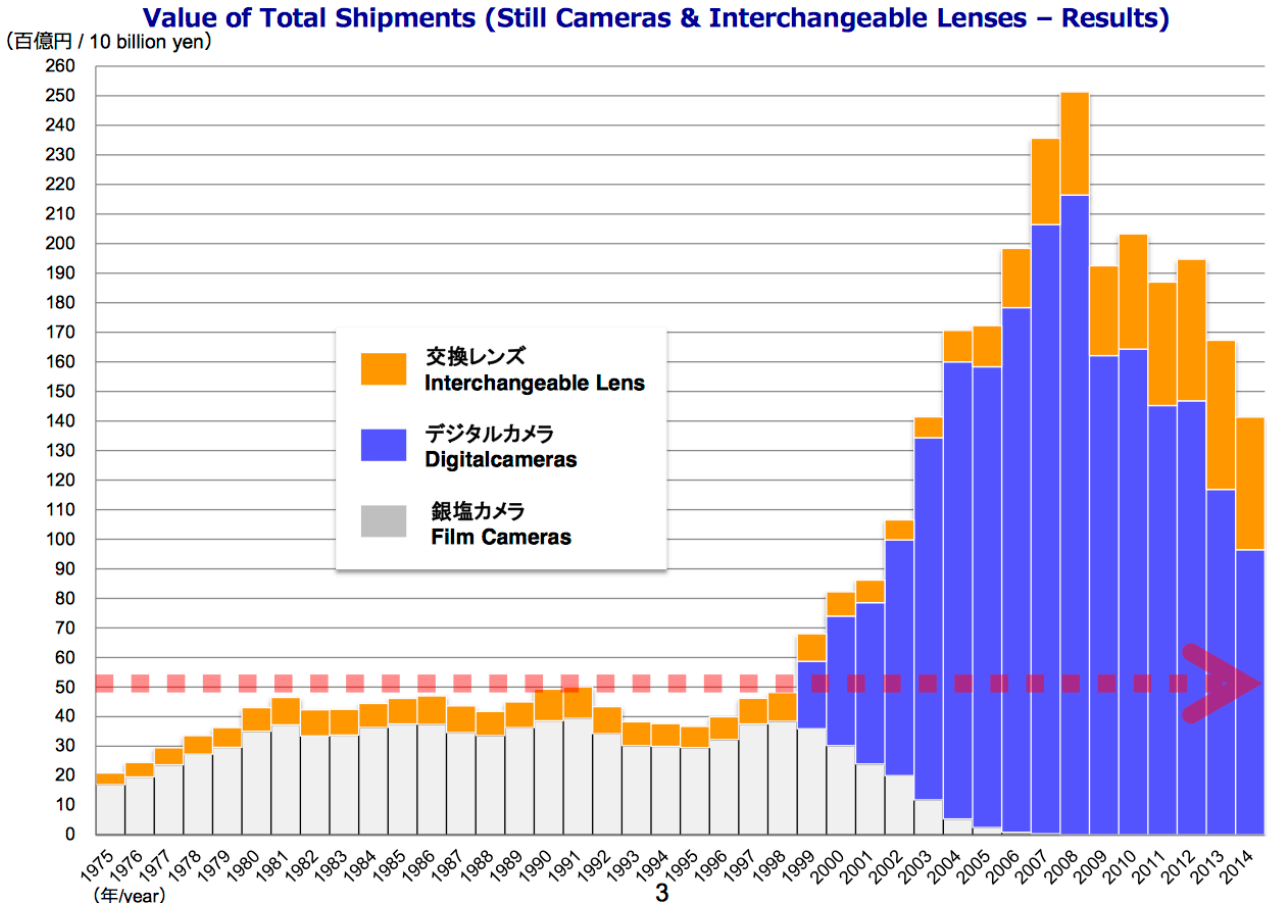
Today, there exist different categories of smartphones whose nature mostly correlate them to photography.
In addiction, producers expanded their portfolio with products like the Samsung Galaxy S4 zoom (there are other similar products in the market), a smartphone that incorporates a real camera, with a zoom lens commanded by the touchscreen surface.
Finally, some other producers launched smartphones with an extremely high resolution, if compared to the dimension of their sensors.
For instance, Nokia introduced in 2012 a 38 megapixels camera implemented in a smartphone (the 808 PureView).
The idea of associating a high resolution sensor with a smartphone immediately appeared attractive for consumers, however, the 808 PureView was not thought for more skilled and expert users.
For the same price of the Nokia, consumers could have purchased a compact camera with a bigger sensor and, surely, better overall performances.
Though, it is interesting to find out how an average user would behave if he/she, in general, had to decide which type of camera to buy between a 2006 reflex camera with a 6 megapixel sensor (so, apparently a low resolution) or a 38 megapixels smartphone.
That is exactly what I took in analysis in one of the questions in the survey that I created and that I will explain in detail in the next paragraph.

Finally, it is extremely difficult to predict how, generally, the market segment of smartphones and tablet will evolve in the future.
However, it is almost assured that the performances of the cameras implemented in smartphones will continue to exponentially enhance.
Another strong evidence is represented by the tendency of camera manufacturers to add in their products features like the Wi-Fi (as I previously explained).

Producers clearly understood how a native connectivity between professional cameras and smartphones or tablets would have played an extremely important role, and so it is.
To share and *to connect* became the two keywords that are towing the entire actual market of photography, or, at least, a vast portion of it.

Before concluding this paragraph, I believe that a statistical analysis about the production and the shipment of photographic equipment (particularly, *digital still cameras* and *interchangeable lenses*) could, on one hand, provide an idea of how many cameras and lenses are yearly shipped from their production sites to the rest of the world and focus the reader's attention on tangible and reliable data, on the other prepare the ground for the study on the demand side of photographic equipment that I will present in the next paragraph.
I obtained the data from CIPA (*Camera & Imaging Products* Association) database, an international industry association consisting of members engaged in the development, production or sale of imaging related devices, including digital cameras.
I will analyse respectively: the *value of total shipments of both still cameras and interchangeable lenses*, the *value of total shipment with reference to DSC* (*Digital Still Cameras*), the *quantity of total shipment of DCS*, the *quantity of interchangeable lenses cameras*, the *quantity of total shipment of interchangeable lenses for DSC*, the *average price of DSC on shipping basis*, the *average price of interchangeable lenses for DCS on shipping basis*, the *production and shipment of DCS relatively to the year 2014* and, finally, *the production and shipment of interchangeable lenses for DCS in the same year*.

Units are to be converted from ¥ (Yen) to USD or Euros.
Exchange rate (updated to November 1st, 2015):
1 ¥ = 0,008291 USD ~ 0,0083 USD (1000 ¥ = 8,291 USD ~ 8,3 USD)
1 ¥ = 0,00753111091 € ~ 0,0075 € (1000 ¥ = 7,53111091 € ~ 7,5 €)

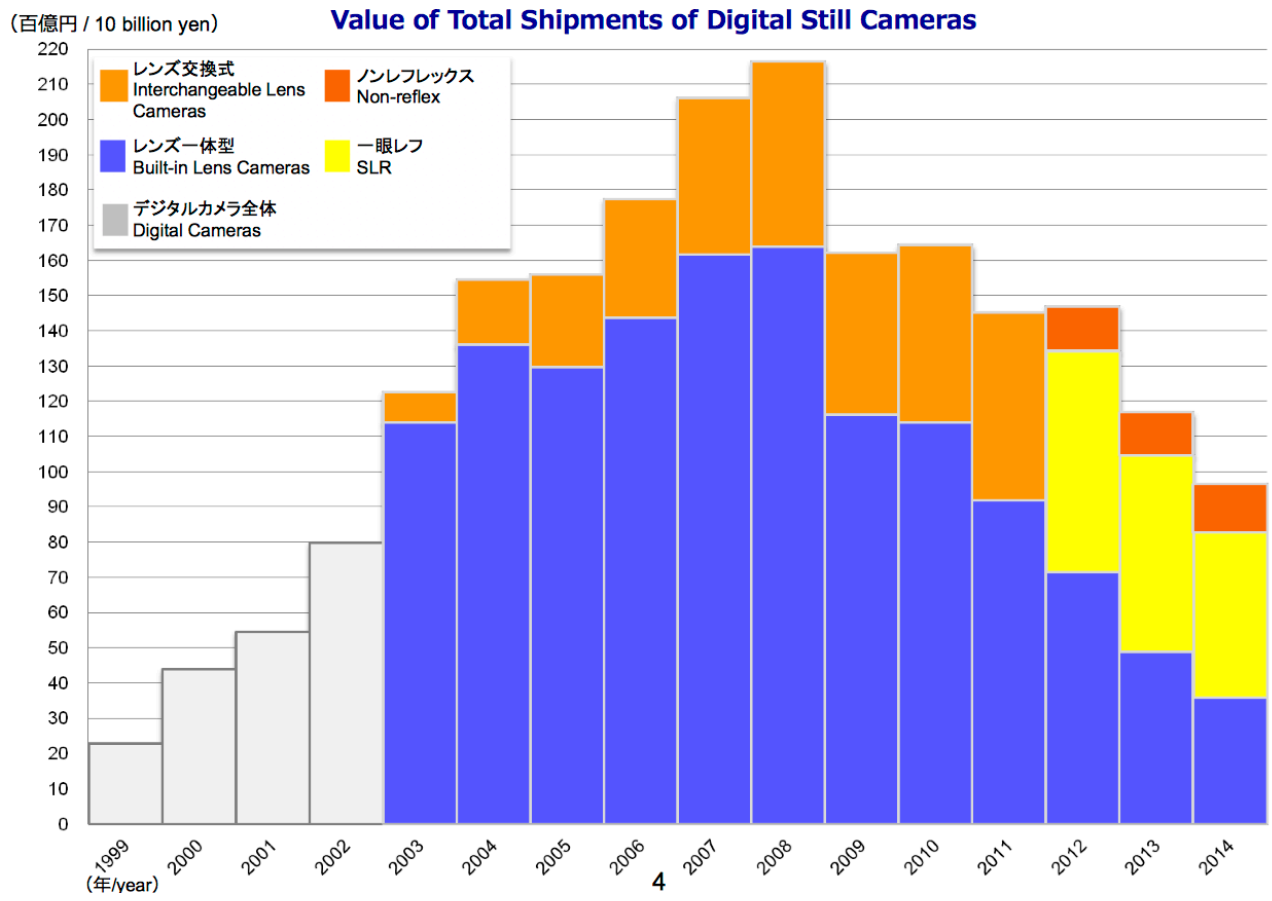


3

It was found that, as picture 3 shows, the market of film cameras and interchangeable lenses remained relatively stable until the year 1999.

The reason of that is strictly related to the still primitive stages of development and diffusion of digital cameras (as I previously explained), temporarily unable to subtract market share to film cameras.

Once $DSLR_s$ and other DSC penetrated the market with high initial standard of quality for whatever purpose of usage, the gap in the value of shipment between film cameras and DSC began to exponentially rise in favour of the latter.



If we look more closely to the value of total shipments of DSC, there are four main classes of digital cameras that could be taken into account.

The grey lines have been added since the first models of digital cameras were not properly consisting into an all-in-one digital camera, but (see page 23) in external modules incorporated into camera bodies originally hosting films instead of digital sensors.

From the emergence of digital cameras as a dominant design, different colours indicating the other categories of cameras could replace the grey lines.

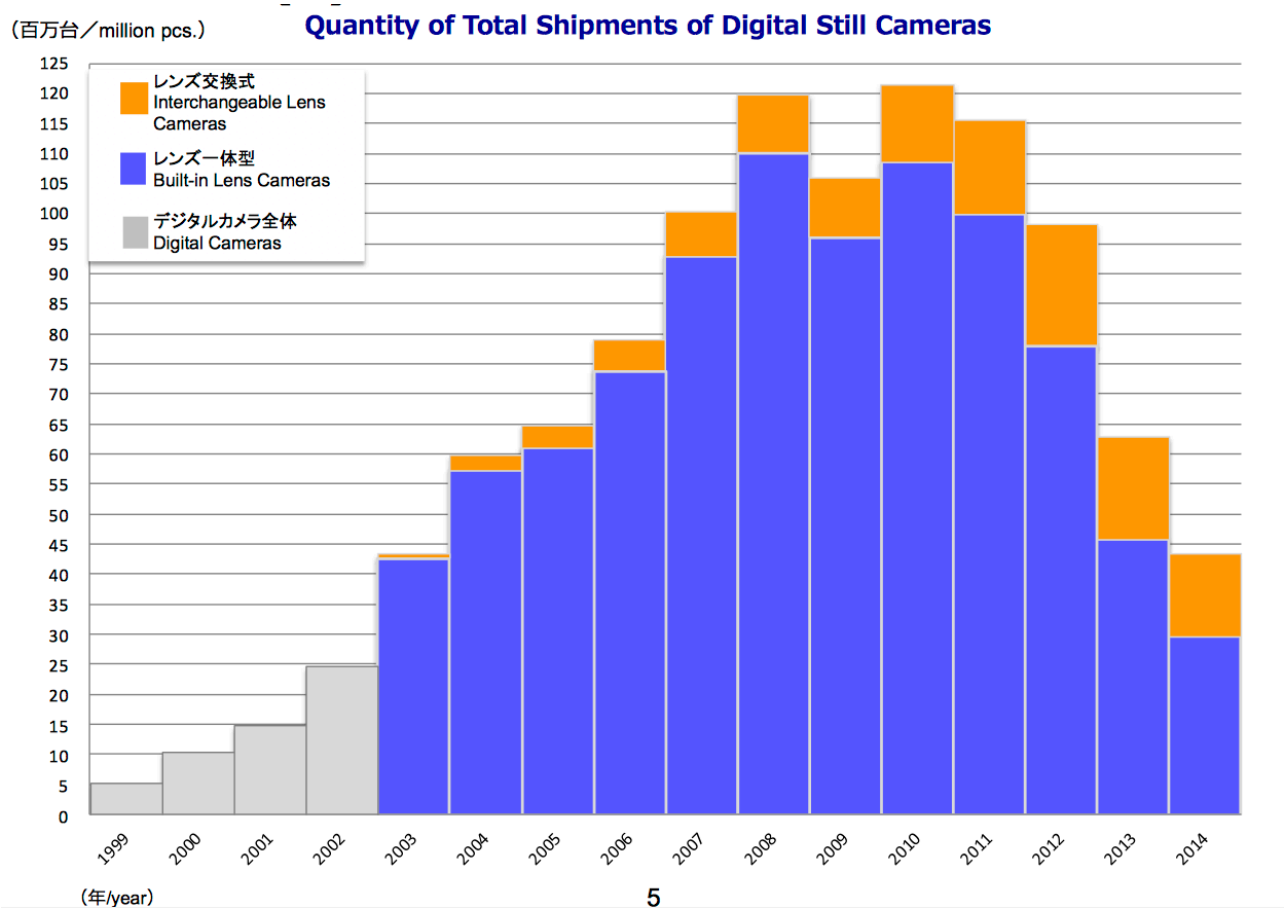
It was firstly found that the value of total shipments of DSC continued to rise until 2008, without any relevant fluctuations in the preceding years.

Secondly, it was found that the value of shipments fell to ¥ 1110 billion from the 1600 relative to the previous year and continued to dramatically descend until 2014.

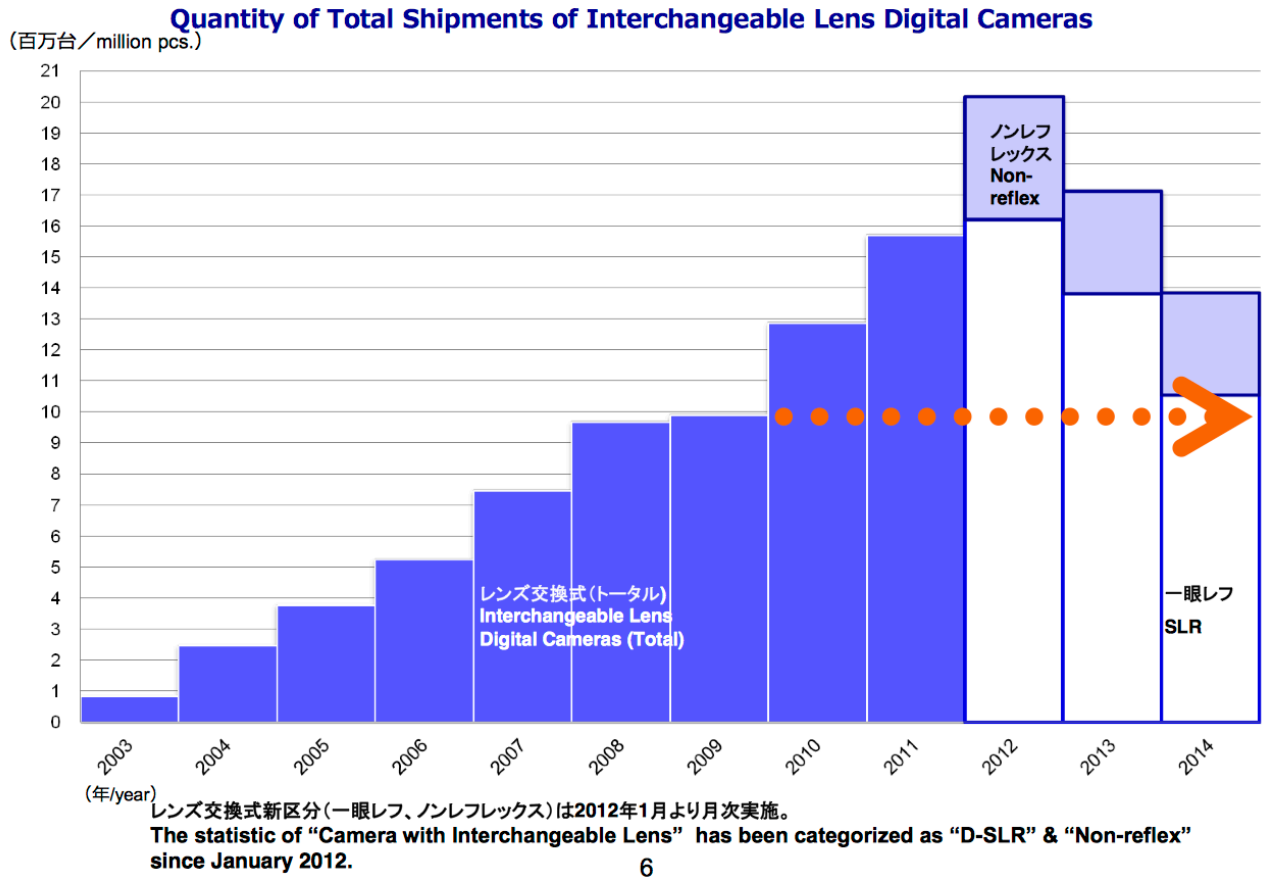
What caused the loss of market share of DSLR$_s$, built-in-lens cameras (compact/bridge cameras) and other interchangeable lens digital cameras is without any doubt the birth and immediate widespread expansion of mirrorless cameras, here classified as *non-reflex* cameras.

The massive diffusion of such a system clearly compensated such a loss of market share, acquiring consequently that market slice and customers' trust.

Indeed, few time later, manufacturers would have started to launch interchangeable lenses specifically designed for mirrorless cameras.
You find below the same graphical representation relative to DSC in quantitative terms (million of units sold).



The previous graph differs from picture 4 not only because of the variable taken into consideration (*value of shipments of DSC* vs. *quantity of shipments of DSC*), but, first and foremost, because it allows the reader to notice how another product (or consequence) should have so strongly influenced the market of digital cameras that the quantity of DSC shrank.
That product is the modern smartphone, that ate a considerable slice of the digital cameras market. I already discussed about the explosion of smartphones' market, so I am not about to spend other words about them for now.
Going back to the effect that mirrorless cameras had on the total value of shipments of DSC, the next graph focuses the attention only to interchangeable lens digital cameras.



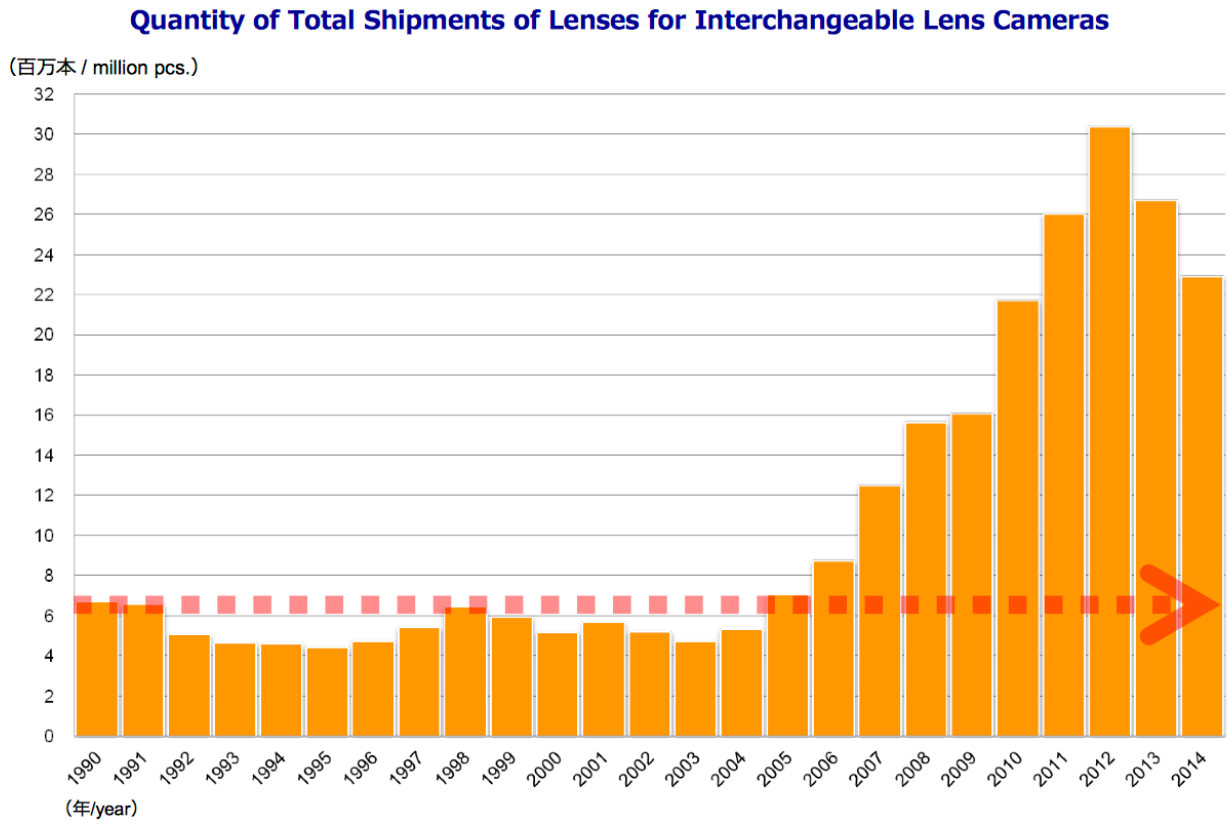
6

It was found that the quantity of total shipments gradually rose until 2012, when the initial class was split in two categories (reflex vs. non reflex DSC).

From that point, quantity of shipments started decreasing until 2014 by the same amount it gained from 2011 (around 6 millions units).

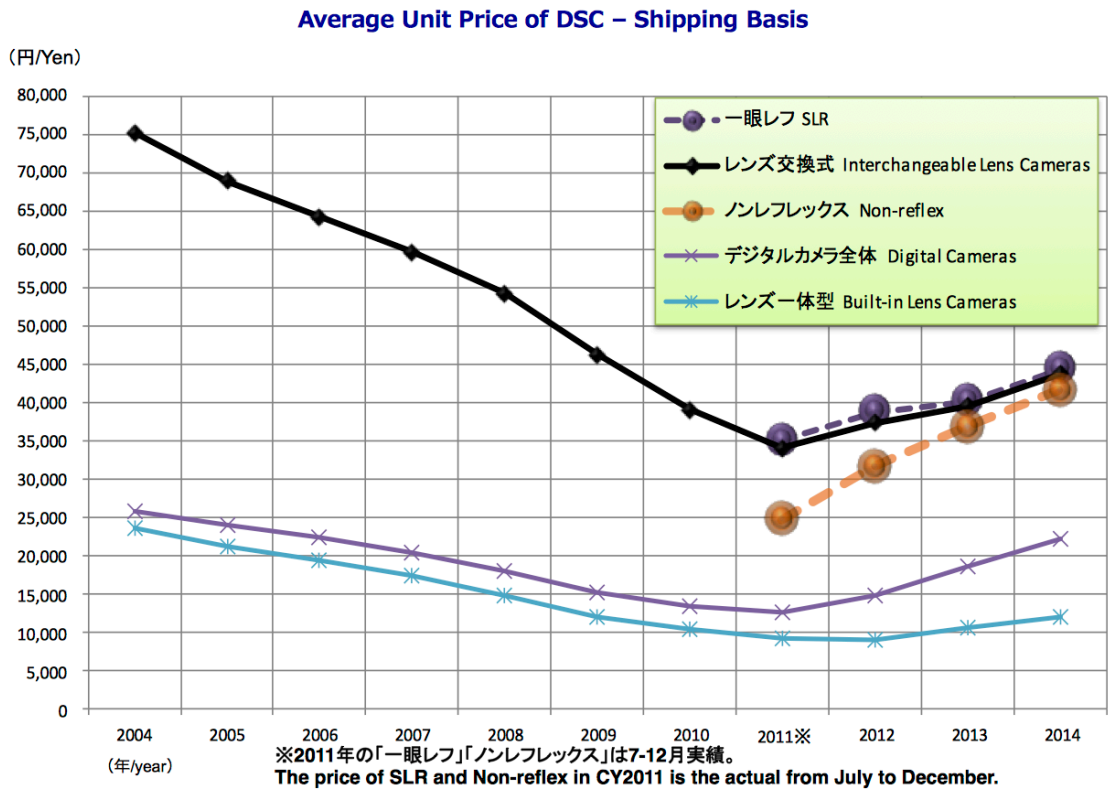
Once again, I believe that the usage of smartphones as cameras by a certain class of users (that I will take into consideration in the nest paragraph) represents the main cause of sucha loss of market share of DSC.

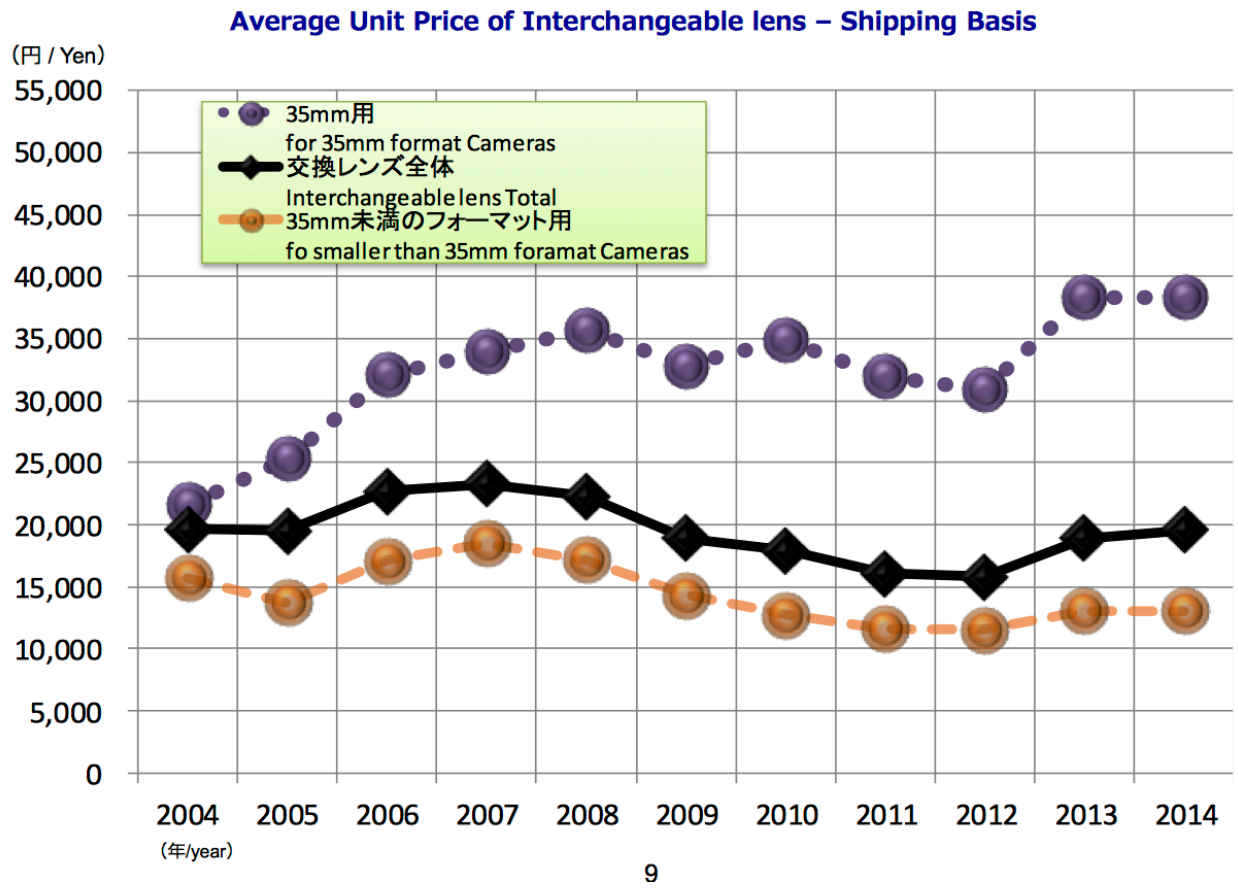
The following graph describes the quantity of total shipments of interchangeable lenses for DSC.



The graph represents in million of units terms the quantity of total shipment of lenses for DSC, that, not surprisingly, is in line with the data obtained in picture 3.

I believe that an analysis of the average price of digital still cameras and interchangeable lenses could represent a source of additional information about photography's market, especially with relation to the smartphones' one.

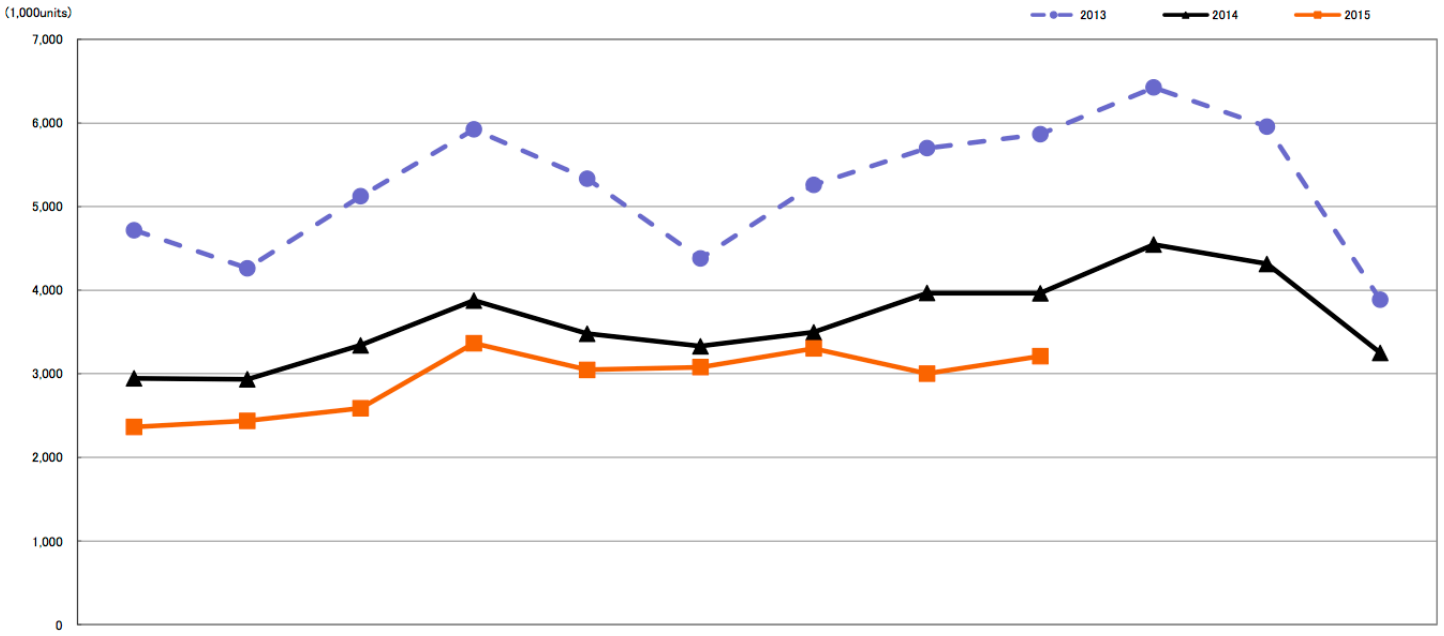




It was found that, while interchangeable lenses' prices remained relatively stable among a decade, prices of DSC were characterized by a constant downhill from 2004 to 2011.
Then, prices of DSC started to ascend again, together with the new-born segment of mirrorless cameras (non-reflex cameras).
Considering the actual rising average price of prosumer reflex cameras and mirrorless cameras, I would expect a future increase in both DSC and interchangeable lenses' average prices.
The first mirrorless cameras were, without any doubt, not only a high quality product under the technical aspect, but could be also considered as an experiment of manufacturers.

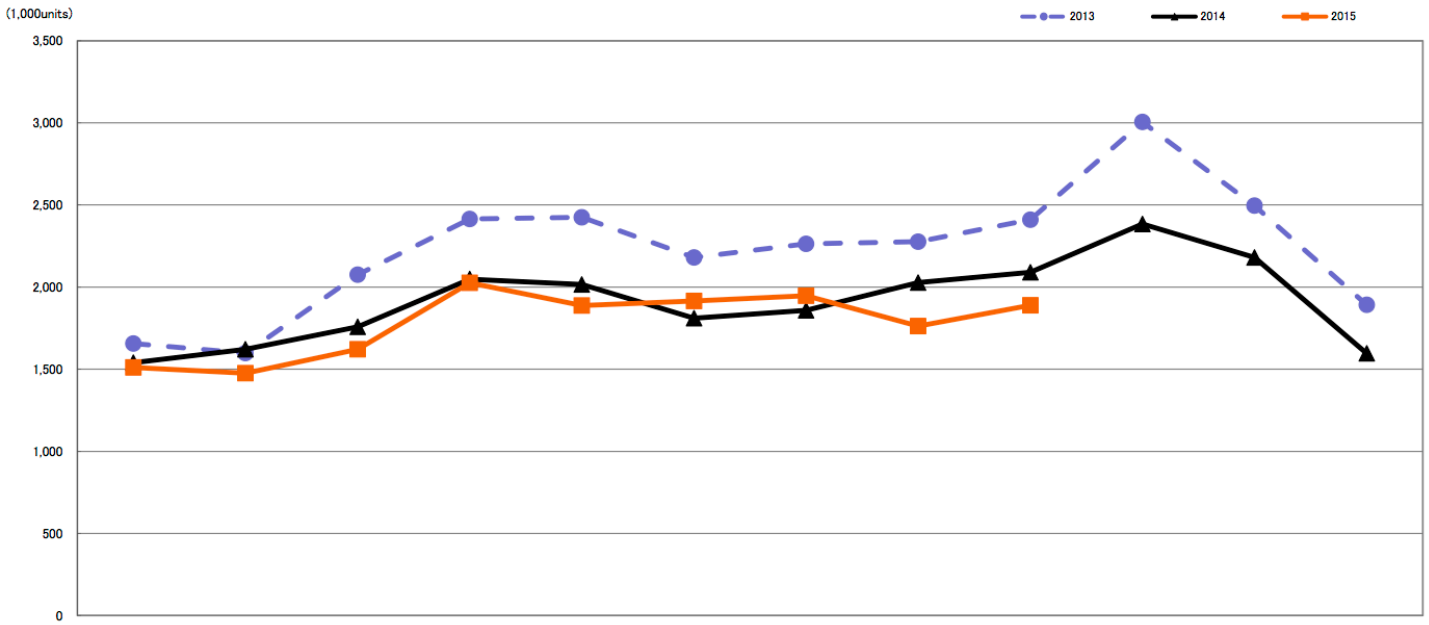
Finally, I believe that additional historical data about the quantity of total shipment and production of DSC and the quantity of total shipment and production of interchangeable lenses would potentially give rise to infinite other considerations about how the photographic industry has evolved in more than a decade.
In the following pictures are listed the members participating to CIPA statistical research.

Quantity of Total Shipment of DSC【Worldwide】
Comparison of 2013, 2014 and 2015 :Jan.-Sep.



	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2015	2,363,912	2,436,324	2,587,319	3,365,033	3,046,288	3,080,103	3,304,174	3,001,654	3,210,297			
	80.3%	83.0%	77.5%	86.8%	87.6%	92.5%	94.5%	75.7%	81.0%			
2014	2,945,506	2,934,500	3,339,487	3,875,163	3,478,485	3,328,051	3,494,964	3,966,972	3,962,604	4,546,136	4,313,284	3,249,256
	62.4%	68.9%	65.2%	65.4%	65.2%	76.0%	66.4%	69.6%	67.5%	70.7%	72.4%	83.6%
2013	4,717,228	4,261,903	5,124,859	5,924,759	5,333,899	4,380,187	5,260,126	5,700,342	5,866,425	6,426,480	5,957,073	3,886,372

Quantity of Total Shipment of Interchengeable Lens【Worldwide】
Comparison of 2013, 2014 and 2015 :Jan.-Sep.



	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2015	1,510,201	1,475,669	1,620,779	2,025,567	1,887,623	1,915,550	1,946,547	1,762,121	1,889,529			
	98.1%	91.0%	92.2%	98.9%	93.6%	105.8%	104.8%	86.9%	90.4%			
2014	1,539,706	1,621,041	1,757,644	2,048,454	2,015,877	1,809,833	1,857,904	2,027,497	2,089,907	2,383,409	2,180,531	1,596,089
	93.0%	101.4%	84.7%	84.9%	83.1%	83.0%	82.1%	89.1%	86.7%	79.3%	87.4%	84.4%
2013	1,655,581	1,598,443	2,074,766	2,414,136	2,424,641	2,179,732	2,263,256	2,275,921	2,409,867	3,004,637	2,495,210	1,891,401

Digital Still Cameras

NO	Member
1	Olympus Corporation
2	CASIO COMPUTER CO.,LTD.
3	Canon Inc.
4	Xacti Corporation
5	SIGMA CORPORATION
6	Sony Corporation
7	Nikon Corporation
8	Panasonic Corporation
9	FUJIFILM Corporation
10	RICOH IMAGING COMPANY, LTD.

Interchangeable Lenses

NO	Member
1	Olympus Corporation
2	Carl Zeiss Co., Ltd.
3	Canon Inc.
4	Kenko Tokina Co.,Ltd.
5	COSINA Co.,Ltd.
6	SIGMA CORPORATION
7	Sony Corporation
8	Tamron Co.,Ltd
9	Nikon Corporation
10	Panasonic Corporation
11	FUJIFILM Corporation
12	Mamiya Digital Imaging Co.,Ltd.
13	RICOH IMAGING COMPANY, LTD.

Demand

In every industrial sector, one of the most effective strategies in order to raise profits and to create new *value added* both for a firm itself and for the entire system with all the affiliated realities, is to have the clearest picture possible of the subjects that will purchase the final products.

A detailed, reliable and vast source of information about final customers, regardless of their type (private users, companies, wholesalers, retailers...), surely represents an enormous advantage for decision makers.

With regard to photography's market, the total absence of actual data and information about the behaviours of consumers and about how they adapted, they are adapting and they will adapt their photographic conception to the new imaging (and related) products, brought me to investigate these aspects trough the creation of a questionnaire.

In particular, I targeted my survey to two separated classes of consumers: *average users* (or, at least, those users without any photographic skills) and *amateurs/professionals*.

The reason why I decided to melt together the two components of second category of consumers is simply related to the fact that both amateurs and professional photographers are characterized by, at least, an acceptable level of knowledge about photographic theory and about how cameras work.

As a consequence, it is clear how the final data obtained from the questionnaire would not have been relevant at all if I had put together the two classes of consumers it is based on.
There is a high probability (if not a certainty) that an average user would ignore what a diaphragm (and what different lens apertures imply in the final photo), a shutter, a pentaprism, a RAW file or a pixel are.
Instead, every photo amateur would at least perfectly know what such features consist on, so, they would express their opinions basing on a solid and existing knowledge.
Moreover, a positive externality generated by this classification of users is represented by the tendencies of users for what belongs the use of smartphones.
It clearly emerges how the percentage of skilled users who exclusively capture their photos with a smartphone is 0%, in contrast to a 19,4% of unskilled users (the *average users*).
The "*use of smartphones*" (always referring to a photographic use) as a variable tells us effectively not only about the habits of consumers, but also about their knowledge and interest in photography.
In addiction, the answers to some opened questions highlight some relevant trends, that totally confirmed what I supposed and anticipated in the previous paragraph of this thesis.

I will singularly analyse all the questions and, then I will comment each single result, eventually providing some additional information.
The questionnaire consists on 33 questions and some of them require an opened answer.
I totally obtained 236 complete answers, divided as follows:
-73 answers from the questionnaire published on my Facebook profile, representing the first class of consumers, the *average users*;
-163 answers from the identical questionnaire shared on three of the most important online photographic communities in the Italian panorama: JuzaPhoto.com (www.juzaphoto.com), NikonClub.it (www.nikonclub.it) and Canoniani.it (www.canoniani.it). These answers are related to the second category of users, *amateurs/professionals*.
It is worth noticing that the questions I structured have been thought considering the restricted sample at my disposal.
Some users complained about the type of questions they were forced to answer because of the restricted choice of brands and situations I took into account.
I agree and I understand the need of a broader analysis both in terms of mentioned brands and in terms of behavioural endeavouring.

However, considering the limited number of users I would have reached, a more detailed analysis not only would have required an incomparably extended sample, but also, I would have been forced to create a deep segmentation of all the types of consumers filling my survey.
So, I believe that a miniaturized questionnaire on such a complex topic as photography could represent a reliable source of useful information in order to ascertain which is the actual status of photography.

Findings

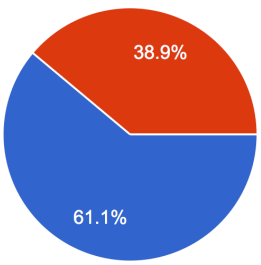
In order to facilitate the reader and to avoid unpleasant repetitions, from now I will indicate the two classes of consumers who answered my questions with two letters:

-Group A: *average users*;

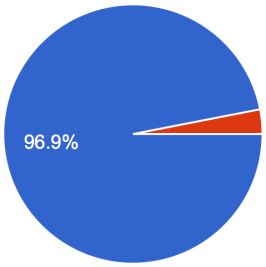
-Group B: *amateurs/professional photographers*.

The first question aimed to have an idea of the nationality of the users who filled the questionnaire.
Almost all of them (in both consumer classes) are Italian, except of two German users, and one user for each of the following countries: United Kingdom, United States of America, Serbia, Japan and Switzerland.

2) Please, select your sex:



Male: 61,1%
Female: 38,9%



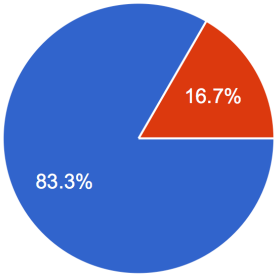
Male: 96,9%
Female: 3,1%

3) Select your age range:

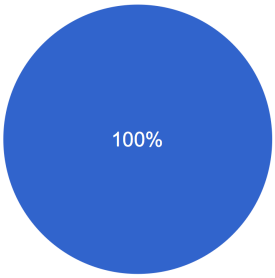
Age	Group A	Group B
12-18	4,2%	3,7%
19-25	**61,1%**	16,6%
26-35	16,7%	**33,1%**
36-50	13,9%	30,1%
More than 50	4,2%	16,6%

4) Do you have any hobbies? To see the results, please analyse the excel sheets

5) Do you have a camera?



Yes: 83,3%
No: 16,7%

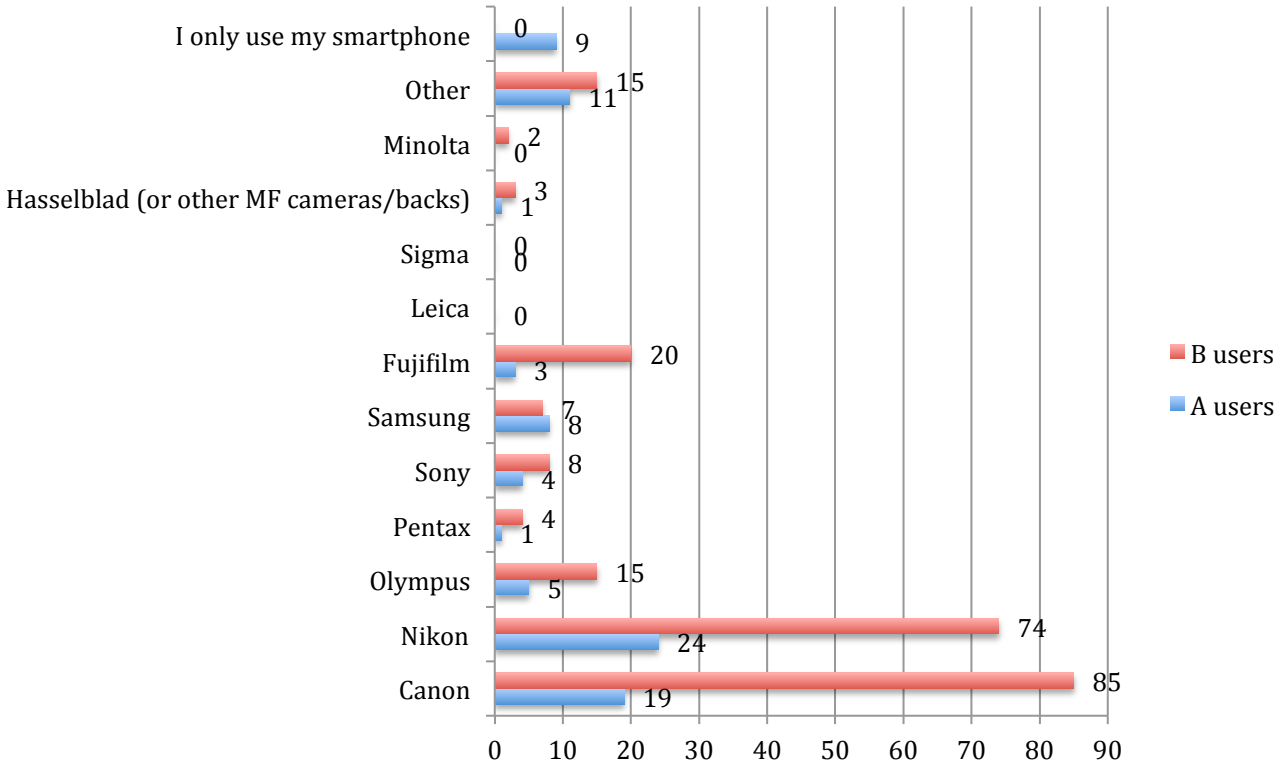


Yes: 100%
No: 0

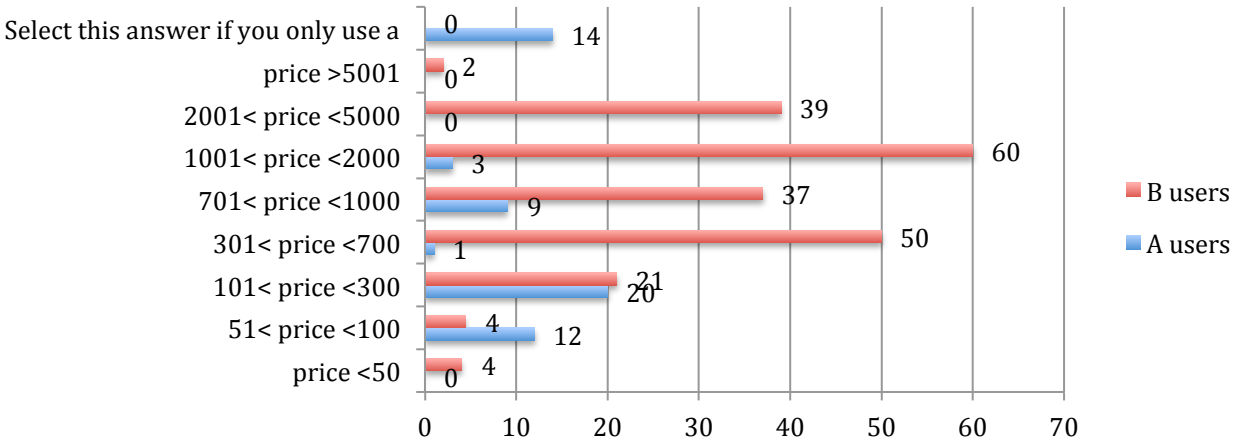
6) How often do you use it?		
Always, I'm a professional	1,4%	3,1%
Very often, I have a great passion for photography	26,4%	**88,3%**
I only use it during my holidays/journeys	23,9%	8,6%
Rarely, I almost always use my smartphone	**38,9%**	0%
Never and I neither use my smartphone frequently	9,7%	0%

7) Which type of camera do you have?	A users	B users
My smartphone	**42**	44
Consumer/bridge camera	35	31
Mirrorless camera	8	40
Reflex camera	22	**148**
Film camera	7	44

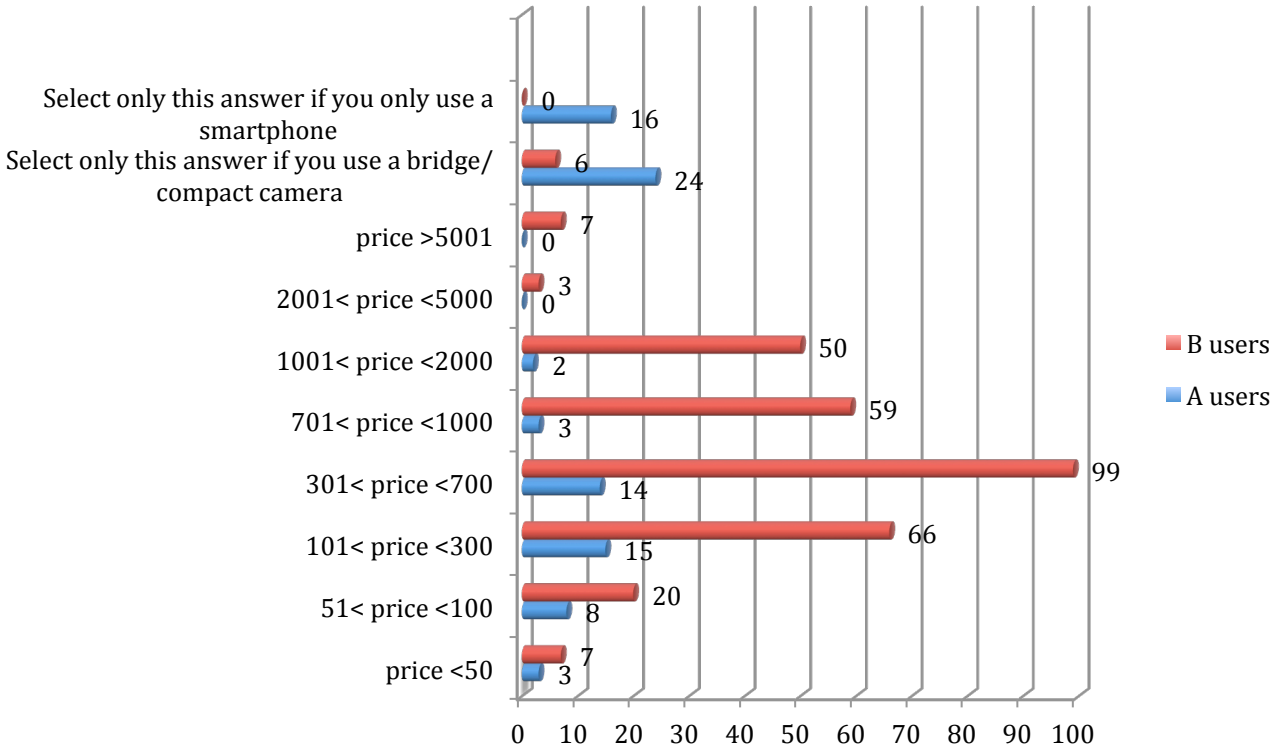
8) Which is the brand of your camera?



9) Select the price range of your camera: all prices in Euros and intended as original prices.



10) Select the price range of your lens: all prices in Euros and intended as original prices.



11) How many lenses do you have?	A users	B users
1	5,1%	1,9%
From 1 to 3	**38,8%**	27,3%
From 4 to 6	2%	**48,4%**
From 7 to 10	4,1%	11,8%
More than 10	4,1%	10,6%

12) How many photos do you shoot every day, on average?	A users	B users
From 0 to 1	**30,6%**	5,5%
Between 1 and 3	18,1%	19%
Between 3 and 6	23,6%	**32,5%**
Between 6 and 10	13,9%	17,2%
More than 10	13,9%	25,8%

13) If most of your photos are shot with your smartphone, why do you prefer to use it instead of a camera?	A users	B users
It's easier and faster to take a good quality photo	**51,4%**	4,3%
I often take nicer pictures with my smartphone rather than with a camera: if so, please, explain in few words the reason of that, according to your opinion and experience (use the next question to do it)	10%	0,6%
Because nowadays exist many apps allowing me to choose manual settings	8,6%	1,2%
The majority of my photos is not taken with a smartphone	30%	**93,9%**

14) Please, explain the reason why you selected option 2 in the previous question.
To see the results, please analyse the excel sheets

15) Are you satisfied of the photos you take with your smartphone?		A users	B users
No=	**1**	6,9%	**38,7%**
	2	15,3%	29,4%
	3	**41,7%**	20,2%
	4	25%	7,4%
Yes=	**5**	11,1%	4,3%

16) Do you print your photos?	A users	B users
Yes	48,6%	**69,9%**
No	**51,4%**	30,1%

17) If so, how do you print them?	A users	B users
By myself, with the printer I usually use at home/office	14,3%	18,3%
I ask to a professional photographer	40%	37,4%
I order all my prints online	**45,7%**	**44,3%**

18) On average, which is the size of your prints? (width in cm)	A users	B users
<10 cm	2,6%	0%
11< cm <15	**39,5%**	11,1%
16< cm <19	31,6%	28,2%
20< cm <30	23,7%	**35,9%**
>30cm	2,6%	24,8%

19) Are you satisfied of the quality of your prints?		A users	B users
No=	**1**	0%	0,8%
	2	7,7%	5,9%
	3	23,1%	16,1%
	4	**46,2%**	**52,5%**
Yes=	**5**	23,1%	24,6%

20) If not, which is the reason of it, according to your opinion?	A users	B users
Honestly, I don't know: but I bet it is due to the quality of the photo	**37,5%**	**53,8%**
I see the photo perfectly sharp on my smartphone, so I think it has to do with the printing process	31,2%	46,2%
Surely it is strictly connected to the low quality of the camera I used	31,3%	0%

21) Suppose you have a budget of € 1500 (with € 150 flexibility) for your first reflex camera (without lens) and with image quality as your main priority: which of the following cameras would you choose, according to their features and prices and regardless of your photographic skills?	A users	B users
2005 Canon EOS 5D (used), 12 megapixels, full frame sensor, 3 frames per second: € 500	30,6%	29,4%
2014 Nikon D7200 (new), 24 megapixels, APS-C sensor, 6 frames per second: € 1200	**37,5%**	13,5%
2015 Nikon D810 (new), 36 megapixels, full frame sensor, 5 frames per second: € 1500	31,9%	**57,1%**

22) What did influence you mostly on the choice of the camera?	A users	B users
Brand	18,1%	25,8%
Megapixels	18,1%	5,5%
Frames per second	15,3%	4,3%
Aesthetic	2,8%	2,5%
Price	2,5%	11%
References: sentiment from the web and word of mouth	**20,8%**	**50,9%**

23) If you chose Nikon D810, which lens would you buy, according to your € 150 extra budget?	A users	B users
A basic zoom lens covering a large focal range (e.g. Sigma 18-200mm, € 150 used)	**46,3%**	1,8%
A new prime lens with high aperture	27,8%	**58,3%**
An old manual focus lens	9,3%	7,4%
I didn't choose Nikon D810	16,7%	32,5%

24) How much did megapixels influence your previous choice?		A users	B users
Totally not:	**1**	15,7%	**33,7%**
	2	12,9%	26,4%
	3	**38,6%**	24,5%
	4	24,3%	13,5%
A lot:	**5**	8,6%	1,8%

25) Which camera would you prefer to take a photo with?	A users	B users
A 6 megapixels Fujifilm S5Pro (2006, reflex camera)	**61,1%**	**85,9%**
A 38 megapixels Nokia Lumia (2013, smartphone)	38,9%	14,1%

26) Why? To see the results, please analyse the excel sheets

27) In the last years, producers implemented in their cameras tools as GPS or Wi-Fi: please, provide a simple example of a situation in which you would use them.
To see the results, please analyse the excel sheets

28) Which features do you believe could be useful to be implemented in future cameras?
To see the results, please analyse the excel sheets

29) Suppose that you have an average knowledge of photographic theory: what do you believe could justify to spend € 5 for a 36 poses film, spending hours developing it and printing photos by yourself to have a similar photo to the one you could have taken with a digital camera?	A users	B users
It looks more professional and artistic	**44,4%**	13,5%
It is closer to my conception of photography	19,4%	11%
Nothing: today, digital cameras reached a comparable level of quality to the one of the film	22,2%	**47,2%**
Other: please, select this answer and briefly explain your reason in The following question	13,9%	28,2%

30) please, explain the reason why you selected option 4 in the previous question.
To see the results, please analyse the excel sheets

31) Would you be happy if a camera could allow you to change focus afterwards (during post-processing phase)?	A users	B users
Yes	**77,8%**	**53,4%**
No	22,2%	46,6%

32) If you had a real passion for photography, would you decide to open your activity?	A users	B users
Yes	43,1%	38%
No	**46,9%**	**62%**

33) If not, why?	A users	B users
Due to competition	**37,5%**	21%
Too less remunerative than other jobs	28,6%	25,9%
It is more convenient to continue operating in a sporadic regime	17,9%	7,4%
It has become an almost useless job, as I can find all the photos I need on stock websites (e.g. Fotolia...)	7,1%	3,7%
Select this answer if you would decide to open your activity	7,1%	**29%**
Other reasons	1,8%	13%

All the opened answers given by both categories of users could be found on the relative excel sheet, available on a page that I created on my website: www.carlotagliaferri.it/homepage/tesi.html .

Conclusions

In conclusion, there are few points I would like to focus my attention on.

Firstly, it is possible to conclude that the differences between the two classes of users I was mentioning in the introduction of this paragraph, are sharply confirmed if we look at the **fifth question**.

The fact that 100% of users in category B possess a camera, instead of a 83,3% of group A, suggests that the decision of targeting consumers and of separating the two realities (Facebook, a virtual simulation of a public square and online photographic communities) produced the desired effect.

Particularly, the effect I was mentioning is related to a potential contamination of answers arising from group A in the group B and vice versa, that did not happen.

Secondly, a marked heterogeneity in the type of camera owned and used by consumers emerged in class A.

It is not possible to identify a trend, since the most used cameras present similar percentages, while in group B 90,8% of users use a reflex camera.

However, each consumer had the possibility to select more than an answer, so we could expect that a user who possesses a DSLR could have also other types of camera.

Thirdly, in the thirteenth question, I believe that the 51,4% of users who think that "it is easier and faster to take a good quality photo" with a smartphone (that is the camera they use more frequently) could represent an extremely relevant phenomenon.

Particularly, in the last decade consumers got used to always have in their pockets a device capable of capturing photos, even without having a minimum level of knowledge about photographic theory.

So, if 93,9% of users belonging to category B don't use their smartphones to take the majority of their photos, 70% of A users declare that they use a smartphone to capture the majority of their photos.

If we analyse the answers given by consumers in the context of the 14th question (particularly, the second option), a lack of knowledge or passion and the compact size (in addiction to the certainty to always have it with them) of smartphones seem to be the prevailing motivations for which users prefer to use their devices instead of a traditional camera.

Fourthly, it emerges from 15th question that the majority of B users claim that they are not satisfied of the photos captured with their smartphones.
Instead, 41,7% of A users declared that they are neither satisfied nor unsatisfied of the quality of the photos they shoot with a smartphone.
In general, about 66,7% of A users complain about the impossibility of obtaining what they had in mind before capturing a photo.
I would comment this data claiming that if, on the one hand, expert users are aware of the limits deriving from the use of smartphones as a camera (all the considerations are made leaving apart the random and unimportant photos that even professionals could take with their cell-phones) and so they consider them just like an accessory, on the other, average users conceive smartphones exactly as a camera.
As a consequence, it should not be surprising that 51,4% of A group are not used to print their photos (instead, 69,9% of group B usually print their photos).
In addiction, considering that the average dimensions of prints for group A is between 11 and 19cm, users rarely experimented the maximum size at which a photo captured with a smartphone could be printed without any losses in terms of quality, sharpness, contrast and tones.
Moreover, consumers are accustomed to the extremely high quality of smartphones' displays, consequently, it could seem that a non-cropped photo presents a in-monitor enormous level of detail, however, the more the photo would be magnified, the less tolerable its loss of detail would be.

The 21th question sheds light (or, at least, aims to do so) on the approach that both categories of users would use if they had to purchase a new camera and a new lens with a budget of € 1500.
Before analysing those that are the answers, it is firstly important to highlight how all the three cameras I mentioned (the 2005 Canon EOS 5D, the 2014 Nikon D7200 and the 2015 Nikon D810) are capable of providing high standards of quality under almost all the aspects.
The only exception could be represented by the performances of the 5D in terms of ISO sensitivity and the consequent higher digital noise produced.
I chose three types of lenses to be coupled with the camera body users would have purchased: a low quality lens covering a broad range of focals, a slightly more expensive high aperture prime lens (for instance, a 50mm f/1.4 or f/1.8) and an old manual lens to be adapted to modern cameras.
With particular reference to old manual lenses, one of the greatest strategies ever adopted by a camera manufacturer is the possibility not only to mount an old lens on modern digital cameras, but also to do it without an adapter.

For instance, Nikon attracted a big slice of the market due to its decision to keep the F mount of Nikkor optics even in digital cameras.
So, users for whom and for whose work/exigencies do not indispensably need an autofocus system or a stabilized lens, old manual lenses would represent an ideal solution, since they cost only a fraction of the modern equivalent lenses with the same focal and, almost always, offer the same quality (if not better, sometimes).
Going back to consumers' decisions, it is extremely interesting to explain what I believe could be the reasons behind users' choices.
It was found that 57,1% of B users would buy a Nikon D810, that is, without any doubt, the most performing camera (in general terms: relatively to single aspects, the situation may change) of the three. Of these users, 58,3% would couple with the D810 a standard prime lens with high aperture, obtaining a surely excellent gear suitable for a considerable portion of the subjects to be photographed.
In fact, the limits of a prime lens are strictly connected to the experience and the vision of a photographer, since the absence of a zoom system forces the user to help him/herself with the legs (walking back or forward with respect to the subject) in order to hypothetically entirely include a too big subject.
Despite that, prime lenses would represent an ideal compromise between a cheap lens and an expensive zoom lens, that would surely exceed the extra € 150 budget in the pocket of users who chose the Nikon D810.
For this reason, some consumers claimed they would have saved some money (opting for a Canon EOS 5D or a Nikon D7200) in order to presumably devote them to a more versatile (and expensive) lens, or even more than one.
Instead, the evidence that average users would be highly undecided about what to purchase clearly emerged from my questionnaire.
There is not a sharp majority in the answers given to question 23 and I firmly believe it could be due to a lack of knowledge about the differences between the models.
In addition to that, 46,3% of users who chose the Nikon D810 would couple it with the cheap zoom lens, probably ensured by an easy coverage of the whole budget.
What I believe is extremely important to highlight regards the priority I suggested to users approaching to hypothetically buy a camera: the *image quality*.
Only 3 B users out of the 93 (so, about 3%) who would purchase the D810 chose the cheap lens and I think it could demonstrate how the quality provided by a photographic equipment does not depend

only on the performances of a camera body (like the professional D810), but, first and foremost, also on the quality of the lens attached to it.
A professional lens mounted on a cheap camera would provide absolutely finer images than the ones obtained by a professional camera equipped with a basic and low quality lens (presumably only because of its low price, additionally to the coverage of almost all the focals).
Further considerations could be made about the choice of a Nikon D810 for what concerns question 22.
A net majority of professional users (50,9%, counterbalanced by 5 other lower percentages) affirmed that they finally chose the camera after having asked for advices or experiences from other users who possess the camera.
This indicates how an amateur or, less presumably (since a professional almost always knows which equipment could be suitable for his/her activity), a professional needs to be sure about the results (in terms of image quality, construction, ISO sensitivity...) a camera could provide, if compared to other similar, before purchasing it.
Instead, we cannot identify a prevailing trend in the factors that pushed average users to choose a camera.
In the same way, while more than 50% of B users did not choose the Nikon D810 because of its high resolution sensor (36 megapixels), the exact opposite seems to happen with average users, that may have been attracted by the high performances of the camera.

The following question (25) is also related to the resolution of a camera in megapixel terms.
I took as an example an APS 6 megapixels camera built in 2006 and I put it in comparison with a modern smartphone with a resolution more than 6 times higher.
Starting from the assumption that (according to Moore's law -see page 24-) technological progress implicates that the resolution of a camera would grow at an always higher rate, it should not be surprising that some users would prefer to buy a 38 megapixels smartphone instead of a professional camera.
However, another time it is possible to identify a discrepancy between the results arising from the two categories of users.
Expert users (B) would almost surely (85,9%) prefer a less contrasted, less dense and bigger sensor of an APS camera to the much smaller one of a smartphone.
Despite a net preponderance of choice towards the Fujifilm could be found even in group A (61,1%), the written reasons of consumers surely appear not only less convincing than the precise

and punctual answers given by the majority of expert users, but also seem to be uniquely related to impressions, not real experiences.

I believe that the 29th question could be one of the most representatives of how the behavioural shift from film photography to the digital world happened.
The question was thought for two different purposes: to find out how many users still believe that film photography is alive and/or still has a place in the imagination or the passion of modern photo-lovers and to ascertain what could justify to spend money today in order to self-develop (or even trough a laboratory) an analogue photo spending probably much more time and efforts in comparison with the average post-processing time that photographers need with software.
It was found that for group B, 40,7% of users believe that there would be no reasons for using again film cameras, since digital sensor reach, if not surpassed, the quality of films.
The open answers written by 28.2% of the remaining expert users highlight how for them film photography still incarnates a solid passion for the slow and precise process to be followed in order to manually print a photo in a darkroom.
Instead, the majority of group A (44,4%) claimed that film photography "looks more professional and artistic".
Few users specified in the opened answer what would push them to do film photography and their motivations were mostly related to the consciousness of what stands behind a photo.

The following questions raise other important considerations about how consumers react to the new implementations in digital cameras.
Similarly to all the other questions, the differences in terms of trends and percentages between the two groups of users are evident.
Almost all users (regardless of their skills) recognized the utility of GPS as a feature of modern $DSLR_s$.
They confirmed, indeed, that the geo-tagging possibility would represent an advantage not only for amateur photographers, but also for journalists or professionals who need to perfectly associate a photo to the GPS coordinates of the place where it was captured.
For what concerns the Wi-Fi module, once again both categories of users seem to be aware, on average, of the main scope of such a connectivity.
Despite that, the absolute majority of expert users would take advantage of Wi-Fi connectivity in order to instantly transfer their photos on a device or a database of an agency, mainly for work purposes.

Instead, the prevailing trend for average users indicates that the need of sharing their photos on social networks is surely higher than the one of expert users, that may wish to immediately publish them on Facebook, Instagram and so on, in order to promote themselves.
A small percentage of consumers claimed that they don't know at all what such features could be useful for and, similarly, some other users wrote that they don't like to use the features when taking photos, since they still tend to associate cameras with basic instruments aimed to only provide a photography (that would, consequently, be post processed with a precise workflow).

The last opened question was devoted to which features consumers would implement into future cameras if they had the possibility of doing it.
In this case, the absolute predominance was the need of lighter and more resistant cameras (despite producers always kept professional massive and tropicalized models in their portfolio), in addition to a enhancement of features like autofocus or ISO sensitivity.
The percentage of A users who did not have idea of which features could be implemented in future cameras is surely higher than that of B users.
Some expert users claimed that they would appreciate a *light field* technology, that allows the photographer to change the focus afterwards.
In fact, it was found that 53,4% of them would be happy of purchasing a camera allowing them to change the focus of an image during the post-processing process.
The same tendency could be noticed in group A, even if, in this case, the percentage of users who would purchase a *light field* camera is much higher (77,4%).

I will leave some considerations about the last question regarding the willingness of opening an activity at the end of my thesis and some other general comments on the results I got from the survey.

In general, I would like to add some closing remarks regarding the demand side of imaging industry.

What firstly emerges is the high heterogeneity of an industry like the one of photography.
The success of a new product (whatever it could be) and the maintenance of the market share for a producer depend on several variables, as long as customers' needs continue to change.

I initially based my study with a behavioural research focused on two main age ranges: teenagers between 12-18 years and adults whose age was between 19-25 years.
Then, I expanded my view including even older users.
There are two main reasons why I used this type of approach.
First, people older than 25 years age surely had an occasion in which they used a film camera and, with a high degree of certainty, they probably directly experienced the process of obtaining a print in their hands from a 35mm film camera.
Naturally, the older the persons we take into consideration, the higher their consciousness about, at least, film photography was is.
Secondly, it is interesting, without any doubt, to endeavour how young users' perceptions of photography evolve.
For about a month in spring 2015, I was asked by the elementary school of the city I live in (Castell'Arquato, in the province of Piacenza, northern Italy) to develop a photography laboratory for a class of student whose age was between 11-13 years.
After a brief introduction of photography's world and the functioning of cameras and lenses, I thought that the best solution for them to collect as more information and experience as possible was to go out of the school, sit down in circle in front of the medieval castle of the village and initially discuss about what photography was for them.
Then, I started expanding my "lectures" through the different photographic branches.
However, what I believe is relevant even in the context of this thesis are the comments made by the young participants.
The most frequent comment, especially during the first lectures was: "Could you please explain me why do I have to know all these information about cameras' functioning or film photography [...] if the only action I need to take whichever picture I want is to wake up my smartphone and...pressing a button?".
But few lectures after, their consciousness began to reinforce and I felt more confident on starting to provide more technical information.
At the end of the course, participants acquired some key notions that could be, at least, a spark for their curiosity about photography's world.
Particularly, I believe that being aware of what *depth of field*, a *focal length*, the *aperture* or, simply, what different focal lengths imply in terms of perspective could help users to have an idea of what stands behind their natural and unconscious conception of photography.

When I showed the young users a simple trick often used in cinematography to give the impression of a contact between two subjects that, in reality, are 2 or 3 meters far from each others, the participants were simply astonished.
To attract their attentions, I found more effective to switch on my camera and take a short video of one of them (a pretty curious and spiteful girl) with two focals (a 17mm and a 135mm) in a funny situation. One of her mates had to simulate to hit her at her back from a distance of two meters and I simply said "Now!" in the precise moment in which the girl had to fall.
Leaving apart how much the situation was funny for the young group, once back in school I showed them the two videos and, while seeing the first one (shot with a 17mm lens) they really did not understand the sense of my test, they had never expected to "feel" the depth compression given by a 135mm (on an APS-C camera, a Canon EOS 7D), consequent into the impression that the laughing boy "killing" his classmate was effectively doing it.
This is just an example of the approach I used in order to create a curiosity in their minds.
But, at the same time, that experience helped me to add a direct feedback to my study.

So, I confirmed how today's average user got totally accustomed to the infinite series of advantages and externalities that the evolution of digital photography brought in their hands.
As a consequence, manufacturers of cameras must spend efforts in order to protect their market segments from the threats of all-in-one devices, becoming always more affordable for almost everyone.
In addition, innovative products like the Lytro (or similar) camera, allowing users to change the focus afterwards are pushing more and more customers to spend less time on studying and acquiring experience with standard (and basic) cameras.
One of the advantages of having shared my questionnaire through a social network like Facebook (for the A group) is the high probability of obtaining results from a young population.
That is exactly what occurred, since 61,1% of A users are in the age range between 19-25 years.
I believe they could represent the most reliable source of data about modern consumers' perceptions about photography.

Before ending, I think it could be useful to take into account another variable moving the modern photographic industry.
Marketing campaigns and marketing strategies adopted by producers are surely aimed not only to attract customers and convince them that they need the product of brand X instead of brand Y but even to unconsciously push them to think that they really need a stuff.

Dematerializing becomes today a keyword for producers.
To remove the shape and the weight of a product to directly reach its essence and communicate it to the potential customer becomes a winning strategy[25].
If we also consider that the loss of weight is not only to be seen from a philosophical/behavioural standpoint, but it really happens even physically (in fact, it emerged from my questionnaire that lighter and more compact cameras would be the most asked improvements for whatever type of photographic equipment), it is evident how the market has changed in the last decade of digital evolution.
And this change is likely to bring our photography conception toward a *virtual* world.
A typical example is the partnership recently introduced by Samsung even with other producers of smartphones in order to develop the concept of an *immersive* photography and let it available to everyone with high tech products like special glasses that host a smartphone at their interior.
Marco Stucchi (see the interview I added in the third chapter) is one of the most important representatives of such techniques, if not the greatest one, considering the experience he acquired among the years.
As he claimed during my interview, "*A young person willing to seriously get closer to professional photography must not only be in possess of a strong artistic sensibility, but also must incarnate a vocation for technology and computing, since every single aspect of his or her future activity and its success is going to be connected to the knowledge of such sectors*".

And I believe this could be enough to understand the path photography's world is going through in its evolution.

[25] *Mark-Up Magazine: http://www.mark-up.it/peso-e-leggerezza-nel-mercato-contemporaneo/*

Case studies

Kodak and "The Kodak moment"

I already provided a brief introduction about the history of Eastman Kodak in the second chapter (see page 9) of this work, so I will take further in my analysis taking as granted everything I wrote about Kodak's history or its products.

Naturally, a detailed essay on the history of such a company would deserve much more space than the one I dedicate to it here, however, my intention is to provide a description of the different phases lived by Kodak in its history, with special reference to the emergence of digital photography.

From 1888, when Eastman Kodak was established, to the second half of 20th Century, the pace at which Kodak was expanding its business never slowed.

The company has always been a point of reference in terms of patents, product portfolio, film and chemicals production and capability of adapting to new emergent market needs or to new opportunities.

In 1975 Kodak's managers accepted to give support to one of such opportunities, that rapidly revealed to be one of the greatest inventions of the Century.

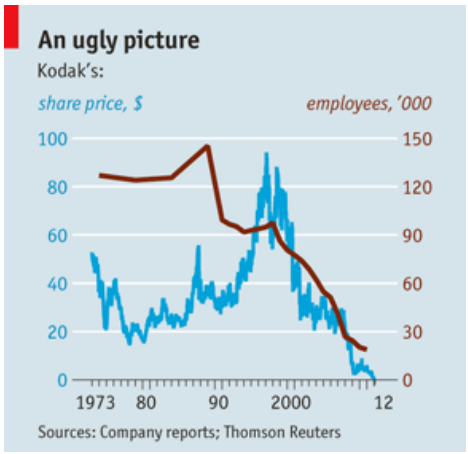
Steven Sasson's first digital camera opened the gates to a fertile field for technological improvements and affiliated products up until today.

By 1976 Kodak accounted for 90% of film and 85% of camera sales in America and until 1990_s it was regularly rated as one of the world's five most valuable brands.[26]

Kodak's revenues peaked at nearly $ 16 billion in 1996 and its profits at $ 2,5 billion in 1999.

However, unless it was still considered as **the** point of reference for film photography (at least in America), its allure began to slightly disappear.

What happened is that Kodak literally invented the technology that destroyed its own business.

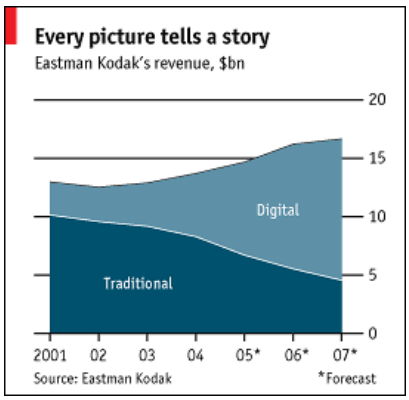


If we look at the following graph, indicating Kodak's performances in terms of share prices and number of employees, share price has fallen by nearly 90%, while the company lost around 100000 employees.

At the base of such a dramatic scenario is a complex of negative factors that affected Rochester (the company town that Kodak still dominates) for which the company could be only partially blamed.

[26] *The Economist: http://www.economist.com/node/21542796*

Surely, it failed to outsource more production and to read emerging markets correctly, especially in an environment characterized by an always more digital life.
For instance, Kodak believed that the new Chinese middle-class would have bought lots of films, but what happened was exactly the opposite. In fact, they initially reacted as in Kodak's expectations, but then the Chinese market entirely switched to digital cameras.
In addition, as Rosabeth Moss Kanter of Harvard Business School said, Kodak "[...] *suffered from a mentality of perfect products, rather than the high-tech mindset of make it, launch it, fix it* [...]".
Another factor that contributed to Kodak's collapse is represented by its difficulties to diversify its business.
It seemed that Rochester was not prepared for the digital onslaught that literally irrupted in the imaging industry, despite it aimed to become a digital company.
But, at the same time, the digital world was still too small to support a big company that was not diversifying enough.



The main competitor of Kodak has always been Fujifilm, a Japanese firm that immediately understood how digital photography could have represented a threat for its business and consequently experimented new tactics and survived.
Fujifilm has spent over $ 9 billion on 40 companies since 2000 and reached the monopolist status in some sectors like films for LCD flat-panel screens.
The company managed to understand how different parts of the market switched from film to digital until the mass market in 2010.
This way, Fujifilm transformed itself in a profitable business with a market capitalization of $ 12,6 billion compared to Kodak's $ 200 million.

If we go back to the third chapter of this paper (precisely, the *tradition* paragraph) we can recall the launch of DCS series cameras by Kodak and use them to introduce a new product launched in the same years in order to help professional photographers to continue using their film cameras.
The product was the $ 50000 HR500 scanner, aiming to allow customers to take pictures with film cameras and then to digitalize images with a high quality for whatever kind of use.
The difference in terms of scanning costs between a scanner and a skilled technician (costing up to $ 60/hour) rendered the former a perfect substitute of the latter.
Kodak was also offering other film scanners for the end customers, with prices ranging from $ 1299 to $ 8900. Their technology was based on *film size*, *scanning speed* and *file size*.

Naturally, Kodak's basic scanner was thought mainly for small laboratories (perhaps working in small city centres) whose needs were to guarantee a fast and quality scan service for the average customer.[27]

Typically, professional photographers used to deal with big laboratories that could sustain average fluxes of 10000 images per week.

The need of counting on a partner that could ensure to store on a Compact Disk or a hard drive all the photos of a session within few hours was one of the primary worries of each professional photographer.

So, Kodak tried with the HR500 scanner to penetrate the market and sell a machine even directly to single photographers. The machine was capable of scanning a photo from a 35mm negative in 7 seconds, providing a 20 Megabytes file.

The scanner was part of a system that included an award-winning software package (DP2) and a single-scan process.

What was concerning Kodak's management were the products of competitors, such as Durst Sigma film scanners.

Apart from secondary characteristics that would not have represented a threat for a Kodak labelled product, the other high-range scanners were implementing Digital Ice™ technology, a CCD sensor for better quality scans and supported negatives up to 4x5cm.

The Digital Ice™ consisted into a double scanning process. A photo was firstly scanned for RGB scale (the standard Red, Green, Blue scan) and secondly with an IR (InfraRed) sensor, whose aim was to eliminate dust and superficial scratches from the surface of a negative.

Since the technology was perfectly working and almost always provided excellent results, Kodak's management started planning how to implement such feature in a second version of the HR500 scanner.

But two sorts of problems immediately arose.

Firstly, a HR500 "MarkII" had to follow a strict "phases and gates" process with 4 phases: *concept* (Gate 0), *technical feasibility* (Gate 2), *design* (Gate 4), *launch* (Gate 6).

All the aforementioned phases would have naturally implied high costs and required highly skilled technicians to be passed.

Secondly, Kodak's managers also questioned what would happen to those customers who had already purchased the HR500 scanner after the launch of the second version.

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[27] *Harvard Business Review: HR500 Plus Scanner – Rapid commercialization or bust at Kodak?*
Richard Ivey School of Business, University of Western Ontario
https://hbr.org/product/hr-500-plus-scanner-rapid-commercialization-or-bust-at-kodak/W11629-PDF-ENG

Unfortunately, many teams missed Goal 6 and late deliveries caused frustration, lost sales and the inability to gain market share and achieve profitability goals.
As a consequence, the results in terms of sales were far from what expected and forecasted.
Initially, there was a push in the organization to calculate not just the NPV (*Net Present Value*) that the HR500 would have generated, but even the number of years it would have taken to generate positive cash flows.
The BEP (*Break Even Point*) was set within 18 months from Goal 6, however, once the product was launched it took more than three years to be reached.
At that point, the management realized that that would have been the unique opportunity to add the previously mentioned features.
Despite the short time-to-market goal set by Kodak's headquarters, the team developing the HR500 decided to keep on working on it and, finally, launch the scanner.
In the end, its performances turned out not to be sufficient in order to keep film production alive.

In addition, Kodak closed the production of $DSLR_s$ in 2004, with its latest model, the DCS Pro SLR/n, a 13,5 megapixel full frame reflex camera hosting Nikkor lenses.
Could Kodak have avoided its misfortunes? Probably not, since when the Rochester giant started to actively react to the changes of the market it was too late.
The main competitors, like Canon, Nikon or Sony were better placed to survive in an always more digital world, given their superior intellectual property.

So, Kodak was filed for bankruptcy in 2012, due to its bad performances and the tangible risk of failure caused by lack of liquidity.
In 2010 Kodak started a discontinuing process for several products, some of them considered as absolute masterpieces and milestones of which the Rochester company has always been proud.
Kodachrome represents the most outstanding example of how a giant could be forced to close the production of a historical product (one of the most used by photographers at global level).
The Kodachrome was a line of color films (for slides and prints) whose peculiarities were marvellous tones and colours, a delicate rendering of skin tones and, generally, an exceptional image quality, so high that many of the most famous photographers considered it as the best colour film ever built.
One of them is Steve Mc. Curry (a *National Geographic* photographer), who was selected by Kodak to have the honour of impressing the last Kodachrome film with a moving set of 36 photos

shot in a journey around the world and through some of the subjects and context he encountered in a lifelong photographic history (see the "Afghan girl" history).

The last physical laboratory equipped to develop Kodachrome films closed in 2010, after having developed Mc. Curry's masterpiece.

But the list of discontinued items from that year was likely to dramatically expand and that is exactly what happened.

In 2014 discontinued operations of Kodak included the *Personalized Imaging* and *Document Imaging* businesses, the *Digital Capture and Device* business, *Kodak Gallery* and other miscellaneous businesses.

Looking at the Notes to Financial Statements, it is clear how such businesses would have represented a net loss for Kodak.[28]

	Successor		Predecessor	
	Year Ended December 31, 2014	Four Months Ended December 31, 2013	Eight Months Ended August 31, 2013	Year Ended December 31, 2012
(in millions)				
Revenues from Personalized and Document Imaging	$ 61	$ 77	$ 738	$ 1,350
Revenues from Digital Capture and Devices operations	-	-	6	36
Revenues from Kodak Gallery operations	-	-	-	29
Revenues from other discontinued operations	-	1	17	50
Total revenues from discontinued operations	$ 61	$ 78	$ 761	$ 1,465
Pre-tax earnings (loss) from Personalized and Document Imaging	$ 9	$ 5	$ (217)	$ 51
Pre-tax earnings (loss) from Digital Capture and Devices operations	-	1	2	(78)
Pre-tax earnings (loss) from Kodak Gallery operations	-	-	1	4
Pre-tax (loss) earnings from other discontinued operations	-	-	(17)	(7)
(Provision) benefit for income taxes related to discontinued operations	(5)	(2)	96	(12)
Earnings (loss) from discontinued operations, net of income taxes	$ 4	$ 4	$ (135)	$ (42)

In 2014 Kodak operated in two main segment, while in 2015 it implemented a new organizational structure based on seven segments in order to make the company faster-moving, more competitive and more entrepreneurial.

2014 segments:

- Graphics, Entertainment and Commercial Films (GECF") Segment;
- Digital Printing and Enterprise ("DP&E") Segment.

[28] *Kodak Annual Report 2014: http://www.envisionreports.com/KODK/2015/15F25FE15E/49766944e43d4d369f7c9e92aa4c1e23/Eastman_Kodak_AR-PS_03-27-15_secured.pdf*

2015 segments:

- Print Systems;
- Enterprise Inkjet systems;
- Micro 3D Printing and Packaging;
- Software and Solutions;
- Consumer and Film;
- Intellectual Property Solutions;
- Eastman Business Park.

I will focus my attention on 2014 data, since it is possible to make considerations on a whole financial year.

Graphics, Entertainment and Commercial Films (GECF") Segment

Graphics

Kodak's graphic portfolio covers the pre-press component of the offset printing market, that includes digital plates, production workflow software, computer-to-plate equipment and digital front-end controllers.

Net sales for Graphics accounted for 54% of total net revenue for the financial year ended December 31, 2014.

Entertainment and Commercial Films

The segment includes the motion film business serving the entertainment and advertising industries. Motion picture products are sold directly to studios, laboratories and independent filmmakers. Despite significant sales volume declines, the agreements made possible for Kodak to continue to manufacture motion picture film while also pursuing new opportunities to leverage film production technologies in growth applications, such as *touchscreens* for smartphones, tablets and computers.

Net sales of the Entertainment and Commercial Films segment accounted for 10% of total net revenue for the financial year ended December 31, 2014.

Digital Printing and Enterprise ("DP&E") Segment

DP&E serves a variety of customers in the commercial printing, packaging, newspaper, digital service bureau market, in-plant and consumer printing market segments with a range of software, media and hardware products.

Digital printing includes both inkjet printing solutions and electrographic printing solutions equipment and related consumables and services.

Packaging and functional printing includes flexographic printing equipment and plates and related consumables and services, as well as printed functional materials and components.

Finally, consumer inkjet systems represent an important part of the DP&E segment.

Net sales of digital printing accounted for 18% of total net revenue for the financial year ended December 31, 2014, while net sales for consumer inkjet systems accounted for 6% of total net revenue for the same financial year.

Finally, Research and Development expenditures for Kodak's two reportable segments of 2014 financial years were as follows.

(in millions)	Successor		Predecessor	
	Year Ended December 31, 2014	Four Months Ended December 31, 2013	Eight Months Ended August 31, 2013	Year Ended December 31, 2012
Graphics, Entertainment and Commercial Films	$ 21	$ 7	$ 13	$ 40
Digital Printing and Enterprise	88	33	55	132
Impact of exclusion of certain components of pension and other postretirement benefit plan income from the segment measure of profitability [1]	(15)	(7)	(2)	(4)
Total	$ 94	$ 33	$ 66	$ 168

What I believe is important to be highlighted in Kodak's history is that each type of firm, regardless of its dimensions, needs to continuously monitor the performances of each single segment of the activity even if it finds itself in the advantageous position of monopolist (or, at least, oligopolist). Kodak's business case, that I tried to at least introduce with this paragraph, is likely to teach to other companies that not always firms live forever.

Most die young, because the corporate world, unlike society at large, is a fight to the death and that is exactly what occurred to Kodak, that, like an old photo, slightly faded away.

Ferrania, Polaroid ("Impossible Project"), Lomography

Ferrania: "The engine restarts".

I believe that Ferrania's case could represent an extremely interesting example of how there still exist firms that believe in the potential of film photography.

Due to a scarcity of detailed information about financial performances and industrial policies, I will simply provide a historical excursus of what Ferrania was and what is the re-born Ferrania today.

Ferrania S.R.L. was a film manufacturing company grounded in 1923 and located in Ferrania, Italy. Its origins have to be strictly connected to World War I, during which an Italian explosives manufacturer (SIPA, *Società Italiana Prodotti Esplodenti*) massively operated in order to constantly provide explosive and ammunitions to those fighting in the war.

Because of the similarities between chemical properties of explosives and films, a subsidiary of SIPA was created in 1923, initially with the name FILM.

Then, its name would have been turned into Ferrania. So, the company started manufacturing photographic films, sensitive papers, photographic equipment and even some cameras.
Its films immediately became very popular in Italy and slightly reached a discreet success even abroad.
They were used both for photographic purposes and for cinematography.
But Ferrania's success soon started to be mined by the massive competition of incomparably bigger competitors like Kodak and, as a consequence, started passing through a long series of acquisitions.
Firstly it was acquired by the 3M Corporation in 1964, until it was spun off in 1996 to 3M's Imation division.
Secondly, it was purchased by Schroder Ventures in 1999 and, lastly, by a Genoese shipping company, the Gruppo Messina (Ignazio Messina & Co. S.P.A.).

A part from the considerations about the financial stability of Ferrania, especially in the last decade of 20th Century, it is important to underline how its success was based on few products well affirmed both in the Italian market and abroad.
Particularly, the *Ferraniacolor* and the black & white film *Pancro 30* were Ferrania's most popular films and the company continued their production until its closure.
In 1999 Kodak officially discontinued the production of *Instamatic* films and Ferrania took advantage of that and managed to remain the only manufacturer of Instamatic films up until 2007.
However, the beginning of 21th Century signed the beginning of Ferrania's declice.
The company initially slowed the production of films, then it gradually finished, until 2012, year in which Ferrania laid off 198 of the 230 employees working in its production facility.

At this point, everyone thought that Ferrania would have rapidly disappeared, leaving the always less remunerative production of film-related products to its giant competitors (Kodak and Fujifilm as the leading ones), but surprisingly, in 2013 Ferrania's heart started to pulse again.
The new FILM Ferrania company was established in the same year and it acquired the whole production line.
Through the *Kickstarter* (www.kickstarter.com) platform, FILM Ferrania launched a crowd funding initiative called "100 more years of analogue photography", reaching the astonishing result of $ 322420 pledged by anonymous backers.

FILM Ferrania's philosophy suggests how strongly the founders continued to believe in film photography and in people's needs in terms of photographic representation.

"*We are people who love film, you are people who love film and people have the power. So let's do this!*"

So, with an initial stock of chemicals the company started producing again some of its most popular films and it is likely to continue expanding, even due to the enthusiastic welcome extended by the public.

I believe that FILM Ferrania chose the best strategy it could to re-launch its glorious past activity.

On the one hand, even considering the discouraging Italian economic situation for whatever SME (*Small Medium Enterprise*), especially emerging, I am convinced that a bank would not have been so confident in a so ambitious project.

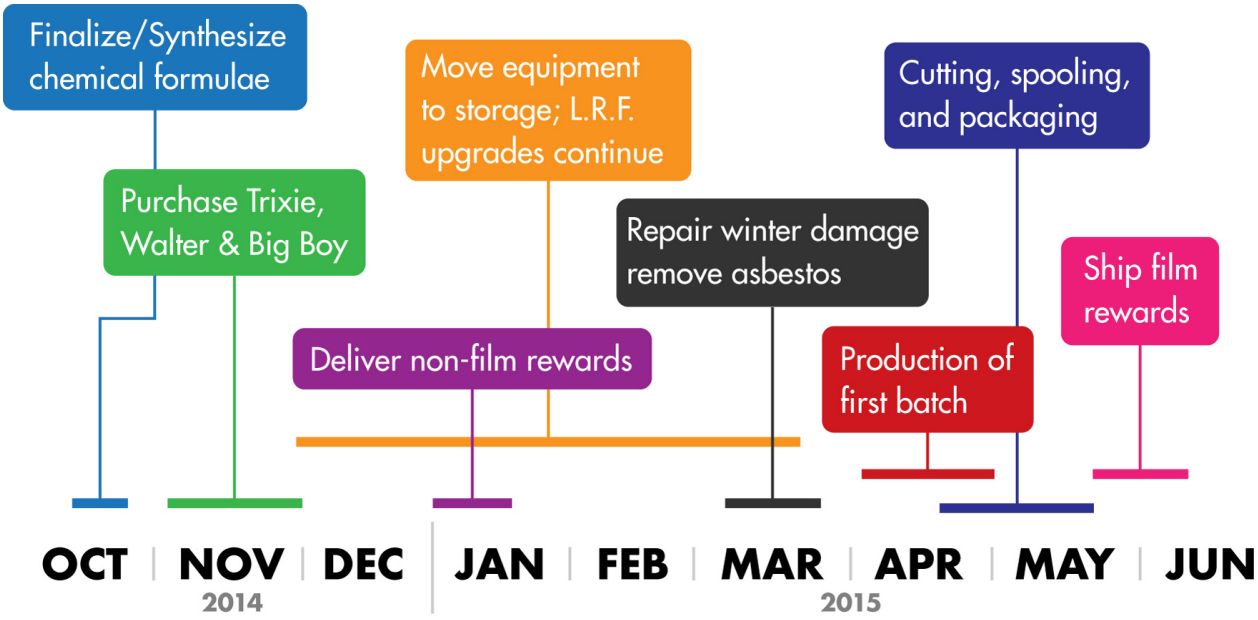
On the other, IT technologies (*Information and Communication Technologies*) provided the silver plate on which FILM Ferrania put its proposal.

Kickstarter represents without any doubt an enormous community allowing privates or companies to gain a high visibility of their projects and being (hopefully) financed at the same time.

That is exactly what occurred to FILM Ferrania, that published on its website all the phases it has gone through from the end of the crowd funding activity.

They called "*The domino effect*" a series of difficulties the team had to face in order to re-start the production activity (including the access to all the parts of the existing old buildings, the removal of huge quantities of asbestos and the installation of all the necessary machineries, such as the indispensable chiller).

They also published a timeline that ends with the shipment of the first batch of their films as a reward for making the revolution possible.

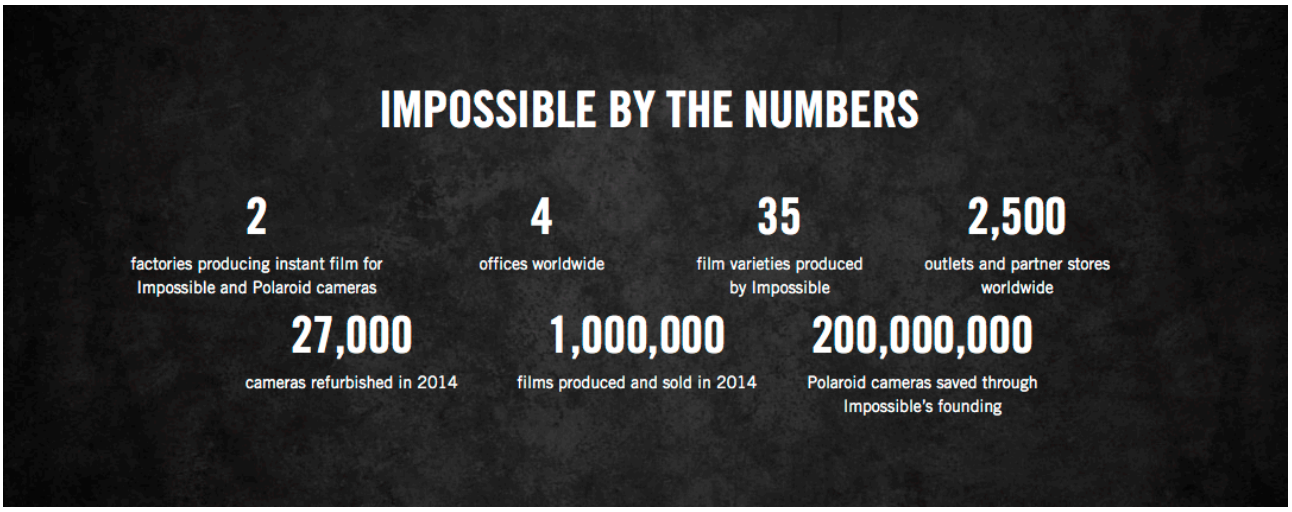


To conclude, I am confident on the potential of FILM Ferrania to start playing again a part in the niche sector of film photography.
My hope would be to feed consumers' consciousness about how important still is film photography and how dangerous could be the risk of making it disappear forever.

Another example of how the digital evolution affected film photography is represented by Polaroid, that is also related to Ferrania's history, as I previously mentioned.

Polaroid ("Impossible Project")
It was three months after Kodak's Instamatic launch that Polaroid created its pocket camera.
The first model was the SX-70 and, as I explained more in detail in chapter 3, it was capable of self-developing films without any kind of darkroom required to do so.
Polaroid rapidly managed to penetrate the market with its revolutionary products and became a real competitor of Kodak.
For decades, Polaroid never concerned itself about the technological progress in film technology and always more advanced reflex cameras from Japanese and European competitors, since their instant cameras were simply covering a totally different segment of the market.

The advantages of previously shooting a photo with a Polaroid camera before a real photo-session were consisting into an immediate preview of what were likely to be the final shots.
But once digital photography began to emerge and started to grow, fed by the continuous investments from the components of the same industry affiliation in order to reach a dominant design, Polaroid success disappeared.
Obscured by the simplicity of obtaining a digital photo, Polaroid was forced to discontinue all its instant films and definitely close the production of such cameras.
However, thousands of Polaroid lovers (and owners of Polaroid instant cameras) complained about the impossibility of using their cameras, that were likely to become simple fashion objects.
Taking Edwin Land (Polaroid's founder) at his word ("*Don't undertake a project unless it's manifestly important and nearly impossible*"), the founders of Impossible Project purchased in 2008 the last factory in the world manufacturing Polaroid instant films.
Today, the fast-growing business has over 140 employees in Austria, Germany, Netherlands, Britain, France, USA and China.
Its core business remains the production of instant films for whichever type of Polaroid cameras (from the oldest ones to the last model).



The Impossible Project is probably (together with Ferrania) one of the greatest examples of how the "traditional" conception of photography is still alive in consumers' minds, at least those users with more than 25-30 years.
Surely it would be extremely difficult to create in new generations' minds the idea of a less immediate and superficial concept of photography, especially thinking about how the quality of a photo taken with a smartphone would be incomparably higher than the one of a small Polaroid print.

But I believe that to provide also a minimum level of photographic culture in the context of primary/secondary education programmes (especially with relation to art) would make the difference between an input to whoever's curiosity and the complete silence about a fascinating art like the one of photography.

Lomography

I think that Lomography could be considered as a son of Polaroid's enormous success.
Lomography is a phenomenon consisting in a globally-active organization dedicate to experimental and creative photography.
Through the years, Lomography gained an incredible success, based essentially on its intrinsic and often affirmed motto "*Don't think, shoot!*" and on the peculiar and unusual characteristics of Lomo cameras.
A miniaturized and 100% plastic camera with a 32mm/2.8 equivalent focal was generating highly saturated images characterized by a high contrast and delimited by a delicate blur that made them appear like an old vignette.
From that moment in the early 90's, Lomography started expanding its business in order to satisfy the demand for their particular cameras, providing an alternative conception of photography deeply tied with a more abstract and old-fashioned way to photograph.
Today Lomography represents a trademark and the headquarters of Lomographische AG are situated in Vienna, Austria.
In its history, 13 are the models of cameras launched by Lomographische AG and all of them work with different formats of film (naturally, they can also be used with standard films) produced by the same company.

I believe that the one of Lomography could be considered part of those phenomena capable of creating new solid trends, especially due to the extreme simplicity in the use of the aforementioned cameras.
The total absence of manual settings or instruments allowing a user to have a complete possession of the scene renders Lomo cameras an easy-to-use instrument to immediately capture visions and, in general, scenes that could be associated with the particular taste of Lomography's films.
Users are often fascinated by such a style, probably without being aware of the traditional techniques that could be used in standard photography in order to obtain almost the same effects, maintaining at the same time an incomparably higher quality standard.

However, it is evident how sharpness, uniform tones and other typical prerogatives of higher quality cameras are not the priority of Lomographers.
I would compare the phenomenon with the recent re-emergence of LP discs as a trend.
Exactly as in the case of Lomography, what happened is that Lp discs gave rise to sorts of "*tribes*" with a passion in common.

Finally, I am firmly convinced of how the average post-production style for certain kinds of photos, like portraits, for instance, is shifting toward more "retro" and abstract tones and poses.
Polaroid, Lomography and, consequently, phenomena like Instagram filters (or similar) surely played a fundamental part on this way of conceiving the "classical" photography.
Such filters are nothing more than complicated algorithms that instantly analyse some parameters of a photo (e.g. its histogram and the distribution of tones and colours) and compare them to a set of standard (average) values used as samples for a determined type of photo.
A similar process is typical of exposure systems of digital cameras, when used in evaluative or center-weighted mode.
Not rarely *hashtags* like #nofilter could be found in the descriptions of photos posted by users on their Instagram accounts.
If, initially, those users capable of finding the most appropriate filter for a determined photo, simply taken by tapping the "shutter button" of their smartphones, were awarded with dozens of positive comments, now it seems that the situation is slightly going to reverse.

Could it be interpreted as a timid return to a more sincere and classical conception of photography?

Conclusions and references

Conclusions

The business of photography is, without any doubt one of the more fast-growing industries of the last two decades.

Since the beginning of its history in the early 19th Century, the evolution of photography both as an art and as a profession never slowed down its pace, especially after the first decades of ferment preceding the year 1888.

At that time, the new-born Kodak was about to launch its revolutionary product, that would have completely changed the way oh photographing whatever kind of subject and regardless of the photographic skills.

This scenario opened my short study, that firstly aimed to embrace several aspects of photographic history, technique, paradigms and perceptions in order to provide the reader with a clear image of what brought the primitive conception of photography ("*You press the button, we do the rest*") to the modern one, completely opposite under some aspects, absolutely identical under some others.

From the first part of my work (especially the third chapter) it could be deduced how the evolution of photography not only changed its DNA under the philosophical and artistic standpoints, but also revolutionized the activity of professional photographer.

It has emerged from different sources (the two interviews I added in the third chapter in addition to several historical and technical experiences) that nowadays a professional photographer needs firstly to be an able marketer.

The ability of acquiring a new client through continuously talking about the photographer's guarantees represents the most effective way to reduce sale resistance in a drastic way.

To acquire new clients becomes, naturally, possible only through the creation of a *responsive*, constantly updated and interesting website, in which a large presence of *headlines* should rapidly address the visitor's eyes to a bargain.

The barriers to entry to the professional ambient are constantly getting weaker, since the price of digital cameras with a sufficiently high quality to "steal" work to portrait or wedding photographers (this is just an example) are falling as well.

So, to talk in terms of benefits with potential clients is the best strategy a photographer could adopt today in order to push a potential client to opt for the incomparable experience of a professional to the one of a photoamateur.

As it becomes more difficult to differentiate one photographer to another, only the best marketers and emotional *storytellers* are likely to get the customer's trust.
The fact that the use of video/audio/print testimonials makes today the difference, together with the need of personally presenting the photos to clients instead of only posting them on a website (that still remain fundamental) could confirm how the market has changed in the past decade.
To be able to create a huge demand for a limited supply and to control then the volume of work through an adequate *pricing* strategy seems to be the key to success for modern photographers.

From one side, Arthur Morris' quote "*work as hard as humanly possible*" (see Juza's interview) appears to be a universal lesson, from the other, as Marco Stucchi claimed in his interview: "*Sadly, I knew more than one person whose artistic visions would have deserved an enormous success but whose skills in informatics were so scarce that they negatively influenced the activity and totally obscured their artistic sensibility*."
Everything becomes a matter of interdisciplinary activities perfectly interacting one with each other and extremely flexible in order to soften the impact of new potential (and probable) evolutions of both photographic technique and imaging industry.

But brilliant marketing strategies appear to be not only a prerogative of the professional photographer.
Manufacturers of photographic equipment continued to adopt marketing strategies in order to attract customers for their new products.
In the fourth chapter I took into account different types of cameras and, even according to my personal experience, it was found that many models of cameras implement an extremely similar sensor (if not identical), even if they belong to different segments.
Thousands of advertisements and campaigns about 2 additional "stops" in the ISO scale of a camera if compared with the previous model or the one of a direct competitor represent the clearest example of how effective marketing strategies are in the market of digital cameras.
What makes the difference between a *good* and a *bad* photo (I personally don't like these kinds of adjectives, but my intent now is not to provide a guideline about how to correctly approach to a photo when commenting it) is surely not the camera used to capture it, especially if there are not notable differences between a camera and another.
Producers are perfectly aware of how the first priority of professional photographers is not the latest and most advanced camera, however, digital cameras' market evolution goes on and manufacturers have to sustain IT development's rhythm.

At the same time, I would highlight how consumers' behaviours have changed as well.
My suppositions have totally been confirmed by the results of the questionnaire I created.
On the one hand, the majority of users (both classes showed the same trend) would not open their professional activity even if they had a great passion for photography.
Basing my opinion on the percentages emerged from the motivations that pushed users to answer negatively to the aforementioned question, the always higher competition and the negative expectations in terms of income arising from a hypothetical professional activity seem to be the prevalent motivations provided by users.
On the other, a constantly ascending trend relative to the usage of smartphones as substitutes of digital cameras ("*The best camera is the one that is always with you*") by average users in contrast to the opposite trend for experts is stealing oxygen to digital cameras manufacturers bringing it to the "dream" of magic cameras that do everything by themselves.
But they would not meet the approval of every singe photographer.

Finally, I decided to add four case studies that I wish they could have moved the reader's sensibility about the world of photography.
I did not choose such companies in a casual way, on the contrary I believe (and, once again, I wish) that they have in common the desire of re-discovering a more "traditional" type of photography, far from the current battles of ISO and megapixels.
Despite they present different implicit approaches and styles, they seem they would suggest (as I would like to) users to abandon the careless approach that push them not to think about the image they are capturing with a smartphone...because after all "I just need to push a button, it does the rest".

Acknowledgements

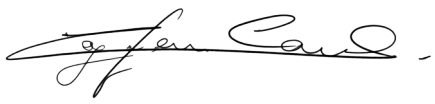
A special acknowledgement goes to Professor Davide Pellegrini, as the supervisor of this thesis for having totally supported my project from the beginning to its conclusion.
I also thank whoever contributed to the realization of this thesis both technically and humanly.

My greatest thanks go to my family (my dad -Roberto-, my mum -Paola-, my brother -Alberto-) for having always believed in my potential and having encouraged me in everything I did until today. Also, thank you for having educated and pushed me to give my best in every situation and to sacrifice what's futile today for what will be distinctive tomorrow.

I would like to thank all my friends, without distinctions, since I needed every single moment I lived in your company and I wish I had had more time to spend together.
Your names would be too many to be written here and too different is the affection that everyone of you has given to me, so I will express all my gratefulness to all of you singularly and personally.

The awareness that someone like *you* may somewhere exist is blood for my veins,
air for my lungs, light for my camera.

Carlo Tagliaferri



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