Department of Management

Chair of Corporate Strategies

The lifecycle of innovative Start-ups

Evidences from the company “Mirror”

Supervisor

Prof. Federica Brunetta

Co-Supervisor

Prof. Karynne Turner

Candidate

Antonio Formica

ID. N. 690491

Academic Year 2017/2018

Table of Contents

Introduction **4**

Chapter one: Start-ups: an overview **6**

1. Start-ups: an overview 7

2. Impacts and trends 10

3. Start-up Stages and Funding 16

4. Start-up Valuation 21

Chapter two: MIRROR **29**

1. Company's Overview 30

2. The market 32

2.1 Market Problems and Opportunities 37

3. Strategic Tripod Analysis 39

3.1 Industry Analysis 39
3.2 Institutional 50
3.3 Resource-based View 54

4. SWOT Analysis 58

4.1 Strengths 58
4.2 Weakness 58
4.3 Opportunities 58
4.4 Threats 59

5. Business Model 60

5.1 Business Model 60
5.2 Business Model Canvas 60

6. Operations 67

7. Marketing and Sales 69

Chapter three: Network Analysis **71**

1. Network Analysis 72

1.1 The Social Network Analysis (SNA) *72*

1.2 The origin of SNA *72*

1.3 Application *76*

2. Evidences from the company MIRROR 79

2.1 Research purpose *79*

2.2 Sample *79*

2.3 MIRROR's Network *81*
2.4 Limitations and next steps *87*

Conclusions **89**

APPENDIX I: Artificial Intelligence Systems and their impact on the Patent System **91**
1. Artificial Intelligence Systems *92*
2. Artificial Intelligence Patentability *94*
3. The impacts of AIs on Patentability requirements *97*
4. AI-Generated Inventions Patentability *99*
5. Patent Infringement by AI *101*
6. Final considerations *102*

Bibliography **104**

Introduction

Start-ups are recently founded organizations characterised by the search of a sustainable and scalable business model. They fuel employment and growth rates of many advanced and developing countries and are the main driver of innovation and of productivity's increases. In fact, star-ups have already revolutionised many sectors, from urban transport to retail and hospitality, reaching huge dimensions in terms of revenues and employees and adding value to economies for billion dollars. However, the pathway toward start-ups' success is difficult and characterised by huge initial losses, difficulty in accessing traditional way of funding, dependence on private equity and high failure rates. Only the ones with very innovative ideas, which can solve a market problem, with smart teams, and with a great execution will be able to grow and thrive in the modern highly competitive economy.

This work will focus on the early stages of start-ups, which are the most critical and riskiest phases of a start-up lifecycle. Firstly, an overview of what start-ups are is presented, providing a definition and listing their common attributes. Then, their huge impact on the overall economy is demonstrated through some statistics and the current trends on start-ups are explored, in this context, an interesting analysis of the effects that the development in Artificial Intelligence start-ups may have on the patent system is provided of the Appendix of this text. Furthermore, lifecycle of start-ups is examined, and the different stages of their growth are distinguished. Finally, the results of the involvement of Venture Capital firms in the funding of start-ups is evaluated and an overview of one of the most controversial start-ups' aspects, namely the enterprise valuation, is explored.

Then, the focus shifts to the analysis of the evidences from MIRROR, a new company, founded and run by the author of this work, operating in the sector of the luxury fashion e-commerce. The aim is to explore the first steps of a start-up, from the foundation to the go-to-market. In particular, this work is going to examine the preliminary analyses performed in order to assess the market

profitability of the business and then to build the business model, highlighting the underlying market problem which is solved by the company. Then, the execution of the business model and the first results are exhibited.

Finally, the first data on users' actions on the platform are analysed through the use of the Social Network Analysis (SNA), a useful tool which allow to analyse the relationships between actors of networks of social interactions. This instrument has been used to assess the centrality of the brands on sale on the platform, and consequently to use the evidences resulting from the analysis to boost the future growth of the company through the improvement of the supply of the most central brands.

Chapter one: Start-ups: an overview

1. Start-ups: an overview

A start-up is an organization formed to search for a repeatable and scalable business model (Blank, S. 2013). More specifically, a start-up is a young, innovative, growth–oriented business in search of a sustainable and scalable business model (Dee, N. et al. 2015) which is going to solve a market need or problem.

Start-ups face a high level of uncertainty, the bulk of them fail, however the minority which become a successful company have good probabilities to become large and influential. As of January 2019, more than 300 start-ups have become unicorns, which means that their valuation exceeds $1 billion (Table 1.1). However, it should be noticed that the bulk of unicorns comes from USA and China. (Cbinsights 2019)

Table 1.1 – Top 10 Unicorn start-ups worldwide (2019)

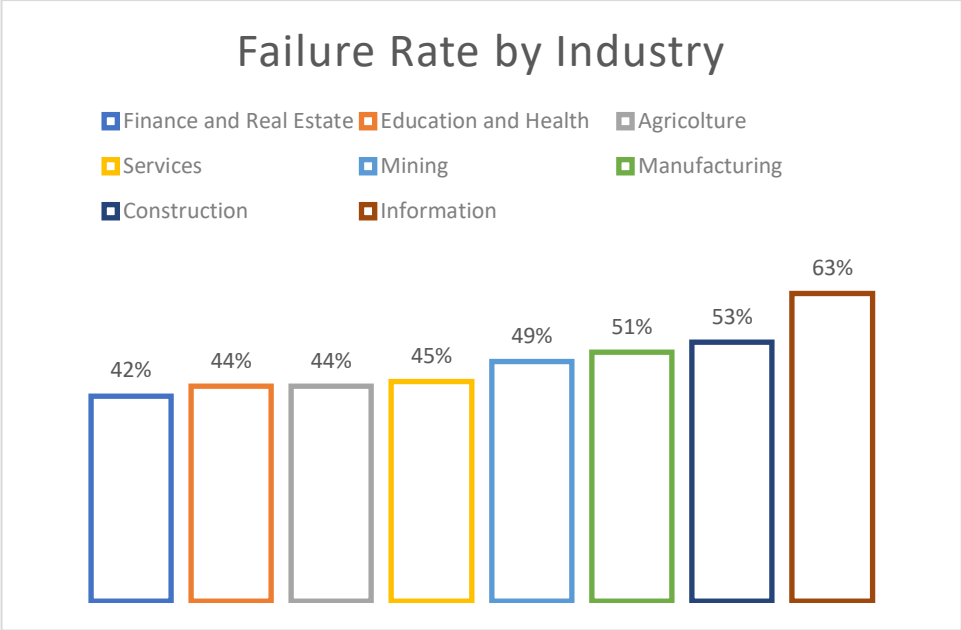
Company	Valuation ($B)	Date Joined	Country	Industry
Toutiao	75	2017	China	Digital Media / AI
Uber	72	2013	USA	On-Demand
Didi Chuxing	56	2014	China	On-Demand
Wework	47	2014	USA	Facilities
Lu.com	38	2014	China	Fintech
Airbnb	29	2011	USA	eCommerce
SpaceX	21	2012	USA	Other Transportation
Palantir	20	2011	USA	Big Data
Stripe	20	2014	USA	Fintech
JUUL Labs	15	2017	USA	Consumer Electronics

(Source: Cbinsights 2019)

Start-ups companies have common attributes. All of them, at early stage, have small revenues or even losses, are dependent on private equity, have no history, have a high risk and constitute an illiquid investment (Damodaran, A. 2009).

1. No revenues or operating losses: during early stages, the bulk of start-ups financial efforts are invested for establishing the business rather than generating revenues. As a result, they have small or no revenues, and more often huge operating losses.
2. Dependent on private equity: start-ups rely mainly on equity from private equity source. At the beginning, the equity is provided by the founders or their families or friends. As the company grows, Venture Capital firms are the main source of funding in exchange for a share of the ownership of the start-up.
3. No history: most of start-ups have just one of two years of data available. This has a big impact on valuation, since it makes difficult to forecast future earnings and identify comparable firms.
4. High risk: start-ups constitute a risky investment, in fact a large proportion of new companies fail during the first years of life. However, the failure rate depends on the sector in which the start-up operates. As figure 1.1 shows, finance and Real Estate start-ups are the most solid and durable, with the lowest failure rate of 42%, while the riskiest are start-ups operating in the Information sector, with a failure rate of 63% (Failory 2018). Among the top reasons why start-ups (Table 1.2) fail there is the absence of market needs for the products or services offered, the existence of financial problems, and choice of the wrong team.

Figure 1.1 – Failure Rate by Industry (2018)



(Source: Failory 2018)

Table 1.2 – Top Reasons Start-ups Fail:

Top Reasons Start-ups Fail	
No market Need	42%
Ran Out of Cash	29%
Not the right team	23%
Get Outcompeted	19%
Pricing/Cost Issues	18%
User Un-Friendly Product	17%
Product Without a Business Model	17%
Poor Marketing	14%
Ignore Customers	14%
Product Mistimed	13%
Lose Focus	13%
Disharmony Among Team/Investors	13%

Pivot Gone Bad	10%
Lack Passion	9%
Failed Geographical Expansion	9%
No Financing/Investor Interest	8%
Legal Challenges	8%
Didn't Use Network	8%
Burn Out	8%
Failure to Pivot	7%

(Source: Cbinsights 2019)

5. Illiquid investments: investing in a private firm is always more illiquid than investing in a public one.

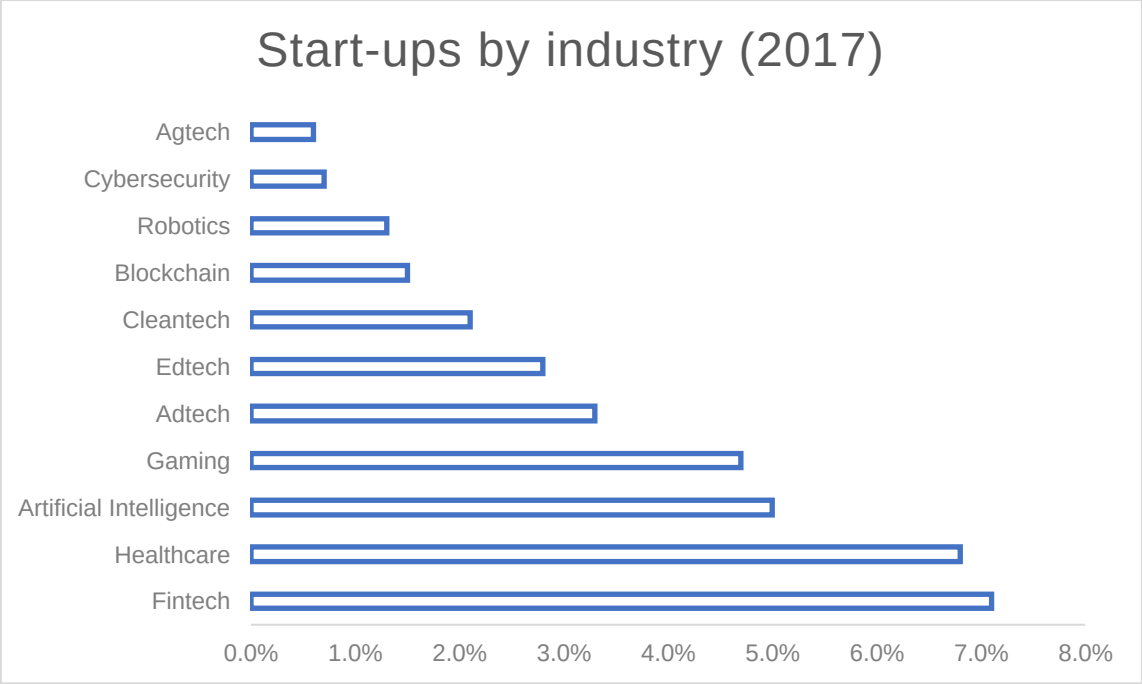
2. Impacts and trends

Start-ups are small in respect to the overall economy, but they have a disproportionately large impact on the economy. Studies have shown that almost all net new job creation of the last years in USA has come from the growth of young companies and that technology-based start-ups continue to make an enormous contribution to the economy once they reach maturity. For example, in USA, firms in technology-based industries, despite start-ups represent only the 4% of all businesses, generate the 70% of all business R&D investment, 59% of R&D jobs, and 27% of the exports (Biotechnology Innovation Organization 2019). Moreover, in 2016 more than a third of all active business enterprises in the U.K. are start-ups launched in the three previous years. Their contribution in the U.K. economy is around a £196 billion per year and created 3.24 million jobs, that corresponds to the 12% of the total employment in the country (Clarckson, N. 2016).

- Employment: Evidences show that small businesses creates a very important share of new jobs created in the economy. In fact, according to the National Federation of Independent Businesses, about two-thirds of the new jobs created in the recent years have been created by small businesses, of which, A. a large share of these new jobs was generated by start-ups. (Damodaran, A. 2009)
- Innovation: According to the strategy guru Clayton Christensen, innovation that disrupted traditional economic mechanisms, is unlikely to come from established firms, since they have too much to lose from the innovation, but more likely to come from start-up companies that have little to lose (Damodaran, A. 2009). In fact, the most revolutionary ideas of the last decades come from young start-ups. Film streaming was pioneered by Netflix, not by some big Entertainment company, music industry was revolutionised by Spotify not by a record company and online retailing was launched by Amazon.com, rather than by traditional retailers.
- Economic growth: The most growing economies of the last decades were those which enjoy also higher rate of new business formation. In fact, in 1990s, the US grew much more rapidly than Europe, mainly as a consequence of the growth of small new technological companies. The same for India, whose growth is strongly associated with the growth of new small technological companies. (Damodaran, A. 2009)

Start-ups are a driver for innovation. They have already revolutionised many traditional businesses, transportation and the hospitality industries have been totally innovated by Uber and Airbnb respectively. Other start-ups are going to drastically change many other sectors. In 2017, the main industries in which start-ups operated were Fintech (7.1%) Healthcare (6.8%) and Artificial Intelligence (5%) (Figure 1.2).

Figure 1.2 – Start-ups by Industry (2017)



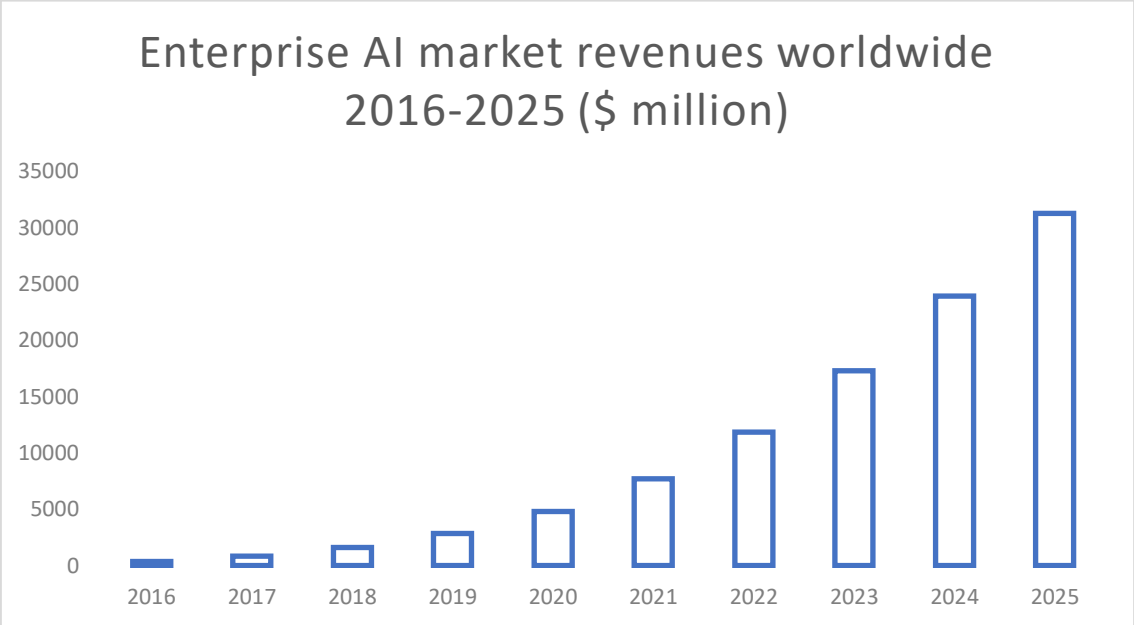
(Source: Statista 2019)

- Financial technology, commonly called “fintech”, refers to those start-ups that are radically changing the expectations and the engagement of consumers by competing with traditional financial services. In 2014, investments in fintech business ventures tripled to $12.21 billion, with a global growth of 201% (Nicoletti, B. 2017) and the number of fintech companies achieved 1379 with a total funding amount of $33 billion in 2015 (Venture Scanner 2015). Fintech is a disruption force in the traditional financial services system. Fintech companies involves a process of “disintermediation through innovation” represented by Big Data, Blockchain, robot-advisors, Internet of Everything (IoE), and the exploitation of digital channels that allows to revolutionise the financial services industry. The competitiveness of fintech start-ups creates better and more innovative products and services to different segment of the market than their traditional competitors. These companies stressing their potential due to knowledge, flexibility and largely dominant costumers base and economic strengths, focus on customers experience as key point of differentiation, that allow them a real edge in costumers acquisition. These

start-ups are spreading worldwide because they are capable of combining speed and flexibility and offer a digital perspective, availability of the information and immediacy for customers. For instance, in the Asset Management industry, some start-ups offer the same savings product of traditional firms but to the maximum number of customers in order to generate economies of scale, for example, they offer robot-advisors for customers with few assets that want to avoid high bank charges.

- Artificial Intelligence has the potentiality to reduce costs, introduce new efficiencies and improve the quality of life, as the One Year Study on Artificial Intelligence (AI100) by Stanford University has analysed (Stanford University 2016). There have been 6 times (AI index) increase in the annual investment by venture capital investors into U.S. based AI start-ups and fourteen times increase in the active AI start-ups since 2000 (Columbus, L. 2018). Furthermore, global revenues from AI for enterprise applications is projected to grow from $1.62B in 2018 to $31.2B in 2025. (Figure 1.3) (Statista 2019).

Figure 1.3 – AI market revenues worldwide (2016-2025)



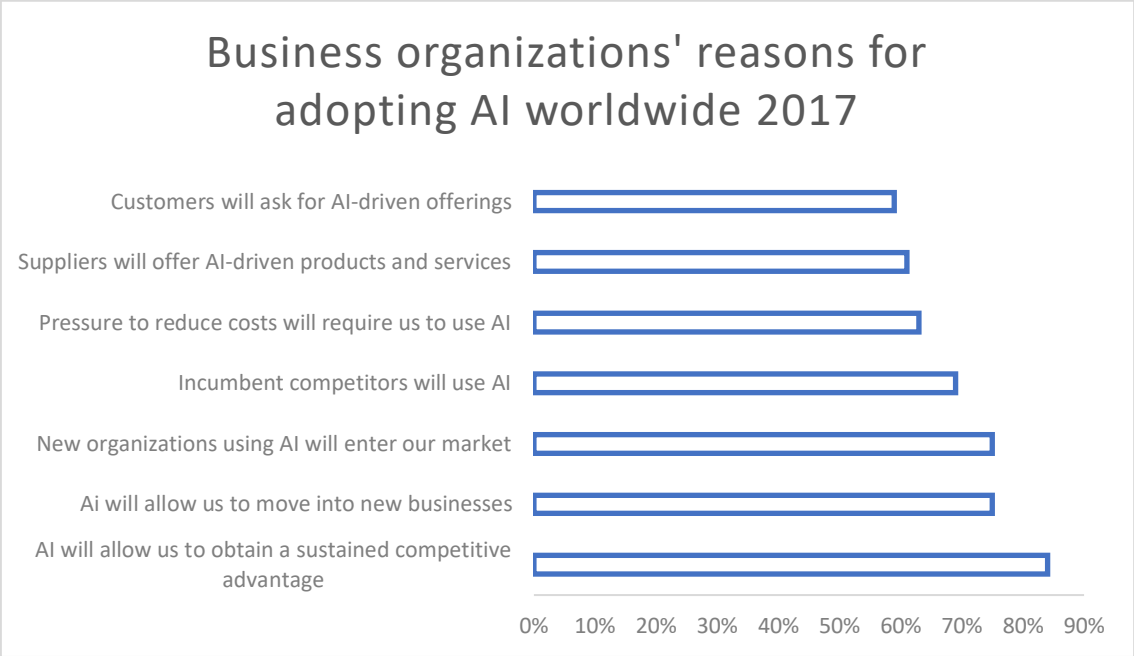
(Source: Statista 2019)

The rapid growth of AI in the start-ups and enterprise are due to various application already developed in many industries. New business start-ups

adopt AI application or algorithm to forecast sales or improving e-mail marketing. AI invention, such us image recognition and tagging, patient data processing, localization and mapping, predictive maintenance, use of algorithms and machine learning to predict and thwart security threats and intelligent recruitment, made aware 84% of enterprises that investing in AI will lead to greater competitive advantages due to the reduction in costs and AI will open up new businesses while also providing competitors new ways to gain access to their markets (Figure 1.4) (Statista 2019). AI technologies development is a priority for all countries. European nations are planning a long-term strategic approach to AI investment, as European start-ups are developing AI applications into cybersecurity, digital identification, public safety, healthcare, and the Internet of Things (IoT); the USA focuses on investing in the short-term projects as represent an essential commercial opportunity and in the long-term ones with the aim of developing transformative technologies to improve industries like automotive, finance and agriculture. However, China is going to exceed all other countries in term of investments in AI. The Chinese government strongly believe in the powerful impact that Artificial Intelligence start-ups represent for the economy and made the future development of AI a priority by setting clear policy guidelines and start-ups are growing through the development of innovative AI technologies across many industries. The Chinese aim is to become the world's primary AI innovation centre by 2030 and consequently attracting more investments in AI start-ups (Tse, C., Chen, L., Chan, V. 2019) The most significant Chinese investments focused on personalized apps, as facial recognition technologies, and in developing AI talent. Artificial Intelligence start-ups in China reached around $4.9 billion in venture capital funding from only 19 investments in 2017, overtaking the US counterparts, that raised $4.4 billion from 155 investments. The Chinese SenseTime Group Ltd, the most valuable AI start-up in the world specialized in systems that analyse faces and images on an enormous scale and works with policing bodies, retailers and health-care researchers across China and internationally, experienced a 400% growth in the past years and aims to increase about $2 million in funding

in 2019. This company raised more than $1.2 billion in 2018 and announced that valued the Chinese AI start-up at more than $4.5 billion. The funding from firms including Fidelity International, Silver Lake Partners and Hopu Capital followed to sell a stake to Qualcomm Inc. in 2017 that valued SenseTime at a more than $1.5 billion. (Tse, C., Chen, L., Chan, V. 2019)

Figure 1.4 – Reasons for adopting AI worldwide (2017)

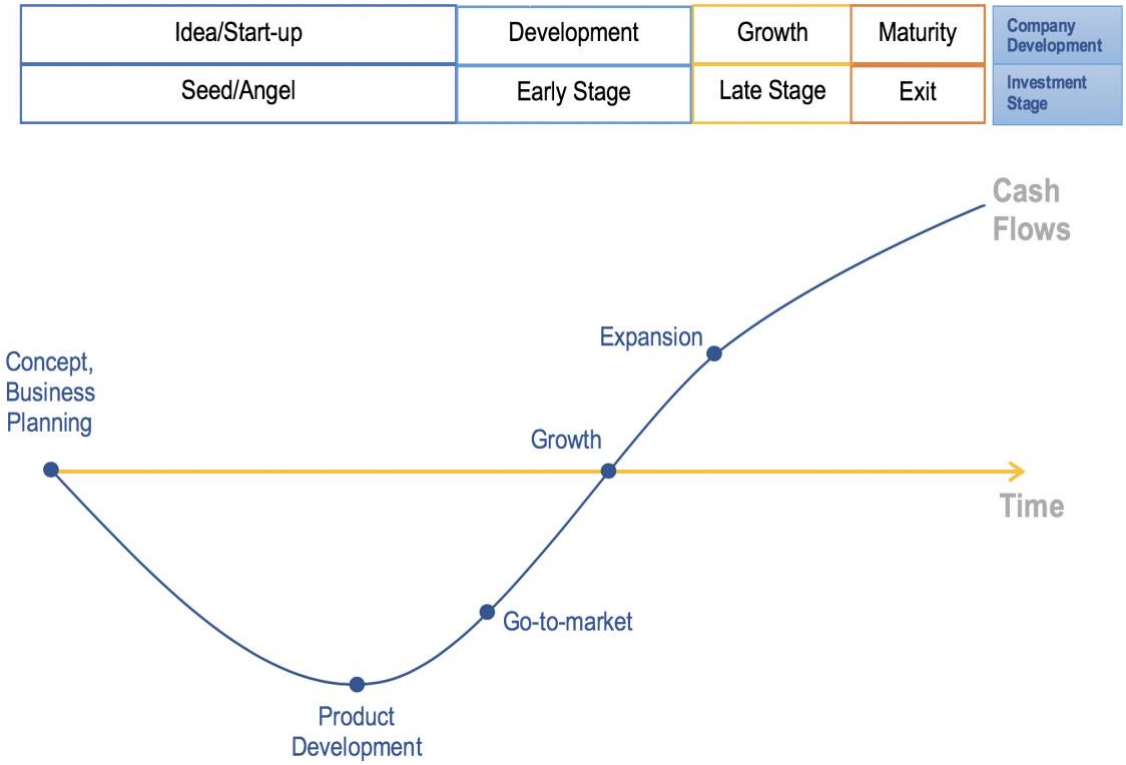


(Source: Statista 2019)

The impact that AI technologies may have in the future, with a particular focus on the patent system is deeply analysed in the appendix of the thesis.

3. Start-up Stages and Funding

Figure 1.5 – Start-up Stages



(Author's graph)

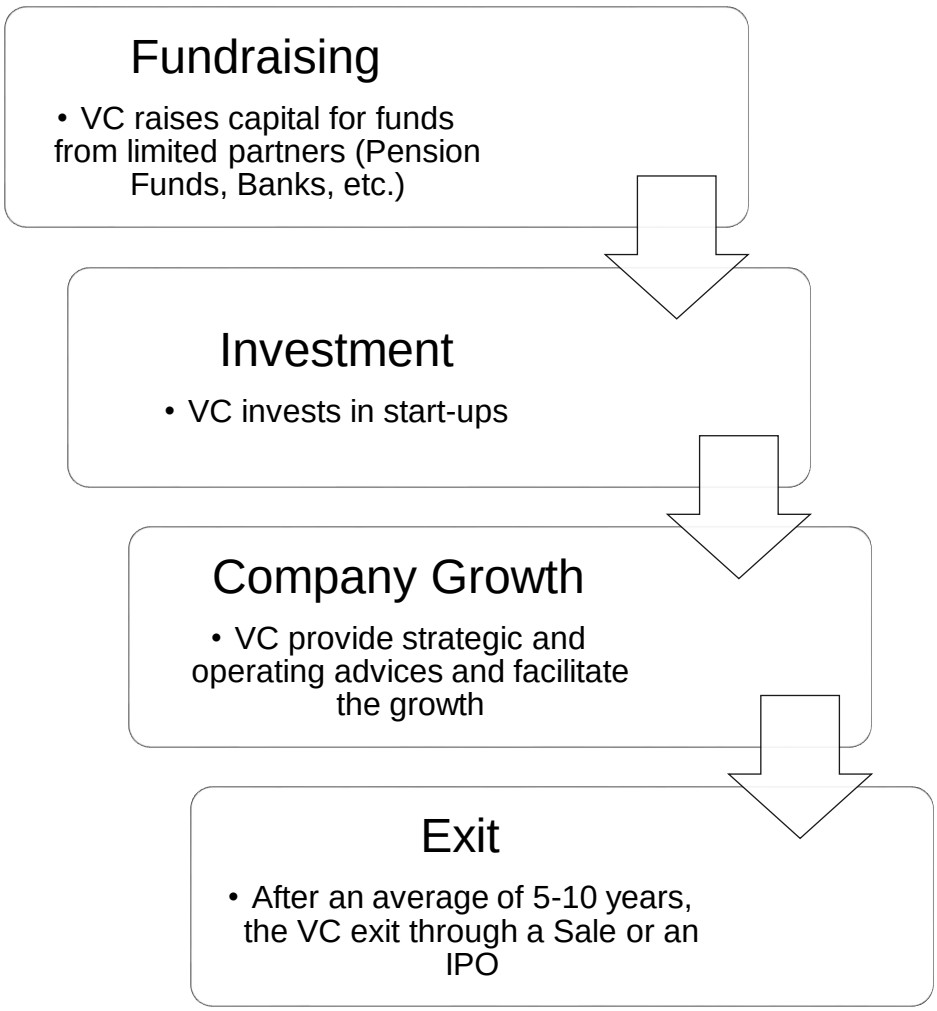
As shown by the figure 1.5, the start-up lifecycle usually starts with the idea generation of the entrepreneur. Then, the entrepreneur initiates a set of activities to turn its idea into a profitable business. In particular this phase is characterised by the business planning and product development. This phase, which is the riskiest, is usually financed by the entrepreneur or by its family or friends.

Once the product has been developed, the company starts operating on the market, trying to get market shares and moving towards the break-even point. This is called Development Stage. Then, once a market position is formed, the company tries to expand its market shares selling more products and investing in marketing. This stage requires high investments, however a start-up may have problems in obtaining conventional source of funding such as bank debt. The reasons are that initially start-ups may not generate cash flows to repay the debt

and may not have the collaterals needed in order to obtain the loan. As a result, equity constitute the most important source of financing for start-up companies.

Venture Capital (VC) represents the most important source of funding for young start-ups. VC firms provide equity capital to early-stage and high-growth potential start-up companies that develop a new technology or a new business model in high-tech industries. The aim of VC firms is to make returns by selling the start-up's shares, which they get from the investment, through an acquisition or an IPO. The expected return is usually significant due to the higher risk of the investment. In order to increase the returns, VCs use an active form of financing: they sit on the board of directors and provide entrepreneurs with advices and contacts (Figure 1.6).

Figure 1.6 – VC process



(Author's graph)

VCs are funds which invest money raised during the fundraising in young, innovative and risky companies. Main investors are Pension Funds, Insurance and banks and they constitutes the limited partners of a VC funds. Despite the fact that almost half of recently founded public companies received money from VC funds, the VC industry is relatively small. In fact, considering the U.S. VC industry, the amount raised in the last fifty years was $0.6 trillion which is only a quarter of the amount raised by the private equity industry. To further show the impact of VC funds on the economy, considering the 1,339 currently public U.S. companies which were founded after 1974, as shown in the Table 1.2, the 42% are VC-backed and they represent the 63% of the market capitalization and 85% of R&D spending come from VC-backed company (Gornall, W., & Strebulaev, I. 2015).

Table 1.2 – VC-backed companies among firms founded after 1974 (2014)

	VC-Backed	**%**	**Total**
Number	556	42%	1339
Enterprise Value $B	4136	57%	7200
Market Capitalization $B	4369	63%	6938
Employees	3083000	38%	8121000
Revenue $B	1222	38%	3224
Net Income $B	151	61%	247
Research and Development $B	115	85%	135
Total Taxes $B	57	58%	98

(Source: Gornall, W., & Strebulaev, I., 2015)

Venture Capitalist represents also a boost for a firm's growth and not only for financial reasons. They provide support, mentorship, strategic advice and network access. The firms finance by Venture Capital funds performs better than those of other similar firms that did not receive VC finance (Gompers, P., & Lerner, J., 2001) and were faster in reaching the market with their products

(Hellmann, T., & Puri, M. 2000). It is not a coincidence that the five largest companies in the world by market capitalization in 2018 (Table 1.3) are all VC-backed. VCs are a fundamental partner for start-ups which allow to generate hundreds of thousands of high-skilled jobs, billions of dollars for investors, trillions of dollars of benefit for the economy, and immense positive spill-overs (Gornall, W., & Strebulaev, I. 2015).

Table 1.3 – Largest companies by market capitalization (2018)

Company	Market Cap ($B)	VC-Backed
Apple	926	✓
Amazon	777	✓
Alphabet	766	✓
Microsoft	750	✓
Facebook	541	✓

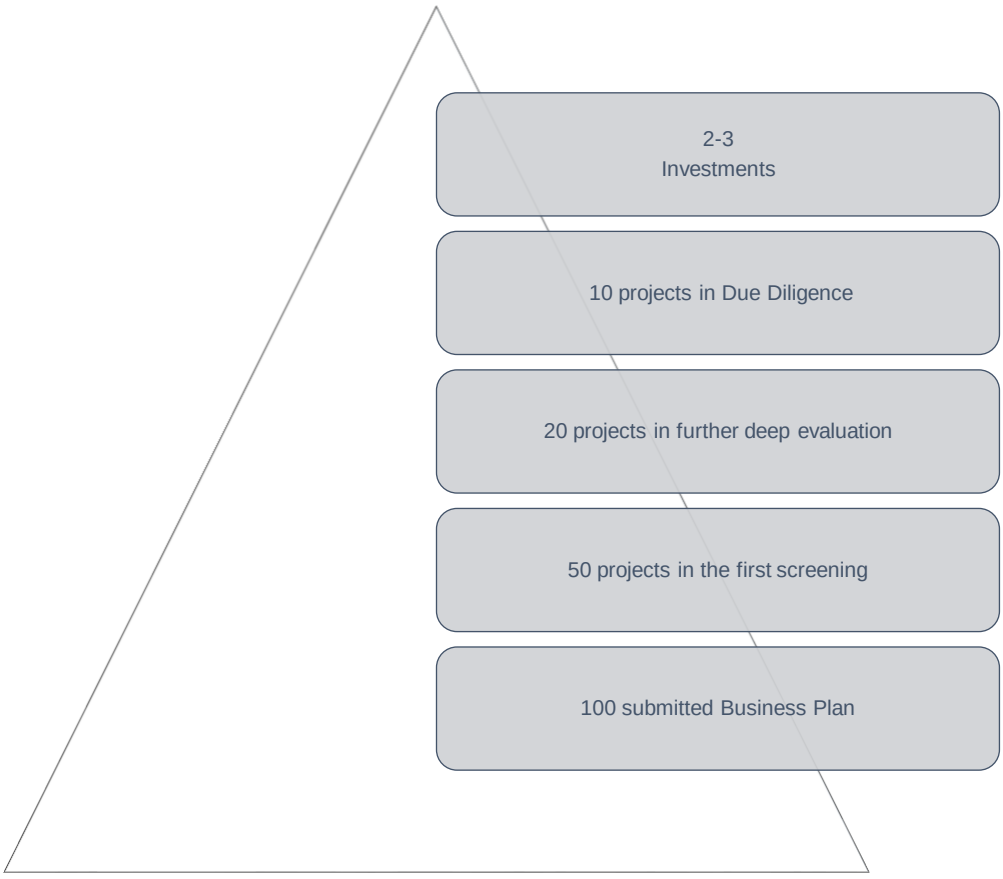
(Source: Statista 2019)

However, conflicts between the entrepreneurs and the investors can also arise. This because there may be a mismatch between parties' interests. In fact, investors' commitments focus more on short terms goals and towards a profitable exit, while entrepreneurs usually focus more on long term performance. (Bronzini, R., Caramellino, G., & Magri, S. 2017)

Finally, usually the entrepreneur applies for a funding request by sending the business plan of its company to the VC funds. Funds make an initial screening rejecting the 50% of the application after a rapid evaluation of the papers. Only the 20% reach the phase of a deeper analysis in which investors meet the firms' team, which gives a short presentation, and conduct a detailed analysis of the data. The focus on this analysis is to assess if the idea can be protected, evaluating the team's experience in the market and its commitment in terms of

times and funds invested in the development of the idea. Then, the most promising projects, around the 10%, enter a due diligence process in which the structure of the operation is finalised. Finally, only the 2-3% of the projects receive the funding (Figure 1.7). Among the reasons why a project is rejected there are: an inadequate business plan, a product development not completed, poor quality or low commitment of the team or simply a VC's preference toward some industry, in which the fund is specialised, or toward the size of the firm. (Bronzini, R., Caramellino, G., & Magri, S. 2017)

Figure 1.7 - Selection Process among Venture Capitalists



(Source: Bronzini, R., Caramellino, G., & Magri, S. 2017)

4. Start-up Valuation

4.1 Evaluation problems

Previously discussed start-ups' characteristics make more difficult to evaluate their value.

On the one hand, for what concerns valuation based on Discounted Cash Flows, there are problems related to existing assets, the growth of the assets, the discounted rate applied and the Terminal Value. (Damodaran, A. 2009)

- Existing assets represent a small proportion of the overall value of a start-up and the absence of historical data makes it difficult to assess how revenues from existing assets evolve if macro-economic conditions become less favourable.
- The bulk of start-ups' value comes from growth assets. The problems are both the absence of revenues and the lack of history on revenues. As a result, past revenue growth can not be used as an input for estimating future revenues and valuation relies more on the firm's own estimates of future revenues, which are often biased. The same for the estimation of income, in fact having not information on past income makes it is difficult estimating how it will evolve in the future.
- The standard approaches for assessing the risk in a company and coming up with discount rates depends on the availability of market prices for the securities issued by the firm. The beta for equity is estimated by regressing returns on a stock against returns on a market index, and the cost of debt by looking at the current market prices of publicly traded bonds. In addition, the cost of equity focuses only on market risk (not diversifiable), since a rational investor will diversify. Start-ups are not publicly traded and have no publicly traded bonds outstanding. Consequently, an equity beta and cost of debt can not be estimated. Moreover, the equity in a young company is often held by investors (founders or VCs) which will demand compensation for the firm specific risk.

- The terminal value accounts for a large proportion of start-ups. In fact, it is not unusual for the terminal value to account for 90%, 100% or even more than 100% of the current value of a young company. Consequently, assumptions about when a firm will reach a stable growth, which is a pre-requisite for estimating terminal value, and its characteristics in stable growth can have a large influence on the value of the company. The task is complicated because it is not sure if the firm will reach a stable growth, and if it will able to compete among potential competitors.

On the other hand, valuation based on Comparable companies is also difficult for many reasons such as, what are the comparable companies (competitors are often not publicly traded and have no market price and if competitors are publicly traded they have very different risk and structures), which multiple it is best to use (because common multiples are often negative in early stages), which is the best proxy for risk (most of the proxies used are market based, as beta or standard deviation of equity returns, as a result they cannot be computed for young companies that are privately held), how to adjust for survival and illiquidity.

4.2 Venture Capital Method

The common approach used in valuing start-ups is called Venture Capital Method. It works as following:

1. Estimation of the expected earnings or revenues in the future. Two to Five years is the typical range, and usually the forecasted period match the period of investment planned by the VC.
2. The value at the end of the forecast period is assessed by multiplying the expected earnings in the future in the future year by the multiple of earnings (PE ratio) of comparable public firms or of companies recently sold or gone public.

   Equity value at the end of the forecast horizon = Expected $\text{Earnings}_{\text{Year n}}$ * Forecaster PE

Alternatively, they calculate the Enterprise Value of the entire business by estimating the revenues at the end of the forecast period and multiplying it by the revenue multiple.

Enterprise value at the end of forecast period = Expected Revenues $_{year\ n}$ * Forecasted EV/Sales

3. The estimated value at the end of the forecast period is discounted at a target rate of return. This discount rate is usually set high enough to include both the risk that the company will to survive and the risk of the business.

   Equity value today = Equity value at the end of forecast period (n) / (1+Target rate of return)^n

   The usual Target Rates of Returns are usually very high compared to the normal discount rate applied to discount normally public traded company and depends on the stage of development of the company (Table 1.4)

Table 1.4 – Target Rates of Return by Stage of Development

Stage of development	Target of return
Start-up	50-70%
Development	40-60%
Growth	35-50%
Maturity	25-35%

(Source: Damodaran 2009)

However, the actual returns earned by VC are much lower, as showed in the

Table 1.5. In fact, returns of an average VC over the last 20 years is 16.9%, that is much lower than the required target of return at any stages, but higher than the returns earned by investing in public markets.

Table 1.5 – Returns earned by VC (2007)

	3 year	5 year	10 year	20 year
Early/Seed VC	5%	5%	33%	21%
Balanced VC	11%	12%	14%	15%
Later Stage VC	12%	11%	9%	15%
All VC	9%	9%	17%	17%
NASDAQ	4%	7%	2%	9%
S&P500	2%	6%	1%	8%

(Source: Damodaran, A. 2009)

4. Finally, to calculate the percentage of the company that the VC is entitled to in exchange for the investment, a Post-Money Valuation is calculated by adding to the Pre-Money Valuation the new capital infusion.

   Post-money valuation = Pre-Money valuation + New capital infusion

   Then, the capital infusion is divided by the Post-Money Valuation to obtain the proportion of the which the VC is entitled to.

   Proportion of equity to new capital provider = New Capital Provided / Post-Money Valuation

However, the VC Method presents many imperfections. The problems are that it focuses on the short term, rather than the long term; it ignores operating expenses and it mixes relative with intrinsic valuation and use only the discount rate as the vehicle for all uncertainty.

4.3 Modifications to the VC Method

In order to overcome these problems, A. Damodaran (NYU) suggested some modifications to the Venture Capital Method, in order to estimate the intrinsic value of start-up more reliably.

According to him, to estimate future cash flows a “top down” approach, which goes beyond earnings and focus also on operating expenses, must be used. This approach consists in estimating the total market for a product or service and derive the rest of the numbers from the top line. In practise, it is an estimation of the capital needed to sustain a level of revenues calculated starting from the estimation of the total market. It is a process made up by the following steps:

1. Estimating the total potential market for the products and services. So first, the product or service offered by the firm must be defined in order to circumscribe the potential market. In fact, narrowly defining the product will significantly reduce the potential market and vice versa. For example, considering Amazon.com only as a book retailer (as it was at its beginning) would have circumscribed its potential market to $10 billion. Then the market size and its evolution over time must be estimated.
2. Market Share: Found the total market and its evolution, the market share that the firm will gain must be identified. It will depend both on the quality of the product or service offered by the firm, in respect to competitor’s one, and also on the management ability. Even the resources that the company can invest to sustain that market share and marketing investments must be taken into account.
3. Operating expenses: Estimating the operating expenses associated with the estimated revenues could be difficult because both because of absence of history and because usually they have very large operating losses at the time of the estimate. To do this, the operating margin of established company in the industry will be estimated. Once set the target margin, an estimation of how firms will move toward that margin over time must be done.

4. Investments for growth: The estimation of how much the firm is reinvesting to generate the forecasted growth is critical in order to evaluate the reliability of revenues increase and margin improvements. It is a critical point because these reinvestments will constitute a cash outflows which will reduce the earnings of the investors or even make losses which must be covered through a new capital infusion which reduce investors equity shares.

Then, in estimating the cost of equity and debt, the problems are that start-ups are often held by undiversified owners or by partially diversified venture capital funds. Consequently, the cost of equity cannot incorporate only the market risk, but also the firm specific risk. For what concerns the cost of debt, start-ups have not outstanding bonds which measure the default risk. Finally, it is also difficult to weight the debt and equity to arrive at the cost of capital because of the lack of data.

To calculate the discount rate, the following steps have to be applied:

1. Sector averages: even if the company is not traded, there are generally other companies in the same business that are publicly traded. The betas of these firms can be used to estimate the market risk associated with being in this business. To do this, the beta for publicly traded firms must be unlevered to arrive at the beta of the business.

   Unlevered Beta for sector = Average Regression Beta for publicly traded firms / [1+)1- Tax Rate) Average Market D/E Ratio for sector]

2. Adjust for diversification or its absence: To account for the absence of diversification, the R-squared and correlation coefficients in the regressions across publicly traded firm can be used as indicator of how much risk in these firms comes from the market. To obtain the total beta that captures all the risk of being in a specific business (rather than just the market risk), the market beta is divided by the correlation of the publicly traded firms with the market:

Total Beta = Market Beta $_{\text{publicly traded firm in the business}}$ / Correlation with market $_{\text{publicly traded firm in the business}}$

The resulting cost of equity obtained using the total beta, which is higher than the market beta, will be the cost of equity of an investor who is completely invested only in this business. For an investor with some diversification, as a Venture Capital fund, the resulting total beta will be lower since the portfolio of investments held by a venture capitalist will be more highly correlated with the market than an individual company.

Total Beta $_{VC}$ = Market Beta $_{\text{publicly traded firm in the business}}$ / Correlation with the market $_{VC\ \text{portfolio}}$

Consequently, as a firm attracts larger and more diversified venture capital firms, its cost of equity will get lower.

3. Consider the use of debt and its cost: An interest coverage ratio can be computed and used to obtain a synthetic rating and a pre-tax cost of debt, by adding the spread of the rating obtained to the risk-free rate. Finally, a spread must be added to capture the small size of the business.
4. As firms grow, their risk and cash flow characteristics will change, as a result, the cost of equity, debt and capital will change over time. Thus, a firm in start-up phase totally funded by the owner, as it grows, it has to see the cost of equity declining over time, because it attracts more diversified investors, and should see a higher use of debt.

Moreover, the terminal value of the company, which represent a big part of the value of a start-up, must be calculated as a function of the perpetual growth rate and the excess returns (difference between returns on invested capital and the cost of capital) associated to the growth rate. Then, to taken into account the risk of failure the value of the firm can be calculated as an expected value of the two scenarios: the intrinsic value (from the discounted cash flows) under the going concern scenario and the distress value under the failure scenario.

Expected Value = Value of going concern (1 – Probability of failure) + Distress Sale value (Probability of failure)

Finally, the effect of illiquidity has to be taken into account, a fixed illiquidity discount, which studies have identified in the 25-35%, must be applied for all firms.

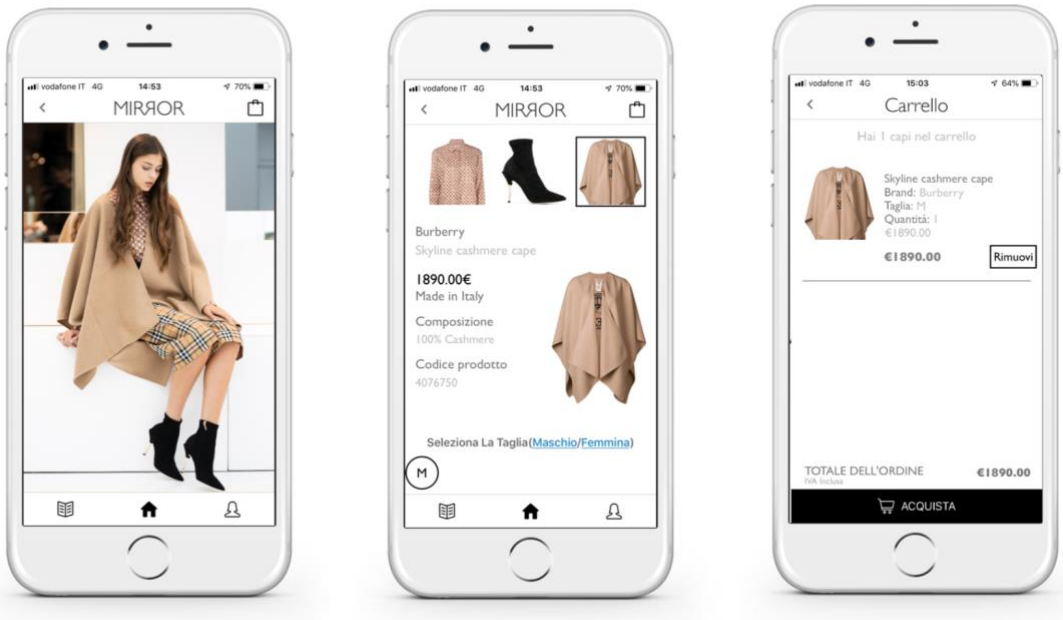
Chapter two: MIRROR

1. Company's Overview

MIRROR is the e-commerce platform through which users can shop the trendiest fashion items directly from influencers' and models' outfits' photos. Photos of the outfits are uploaded on the Mirror App and just by tapping on the look in the screen, it is possible to see the details of each item, add to the cart, buy and receive it within 72 hours worldwide (Figure 2.1).

Mirror adopts a flexible business model, known as Marketplace (or Online Boutique) model. Operating as marketplace for multi-brand physical boutiques and designers, Mirror gives to them an additional distribution channel in order to offset the drop in their sales due to the consumers' shift towards ecommerce. However, the boutique name is not disclosed because the sale is on behalf of the platform.

Figure 2.1 – Mirror's App screens



(Source: Mirror srl)

The main advantage of this model is that it avoids inventory risk since no inventory is kept by Mirror. However, the drawback is that the stocks could be finished also by physical stores.

Items, being provided by Mirror's partner boutiques and emerging designers, are luxury and premium products with a price range from few hundreds to thousands of euros. Actually, five of the ten "hottest brand Q1 2018" according to Lyst are available on Mirror (Gucci, Dolce & Gabbana, Valentino, Givenchy, Moncler) (Murray, G. 2018) and an expansion of the supply is scheduled for the 2019 in order to satisfy an increasingly demanding global audience.

From a front-end point of view, Mirror enjoys an innovative users experience. Intuitiveness and simplicity are the main drivers of the revolution that Mirror will conduct in the online fashion industry aiming at making the shopping experience smarter and much more excited. In fact, through the apps for iOS and Android, Mirror allows users to both being inspired by hundreds different looks carefully styled by fashion influencers and purchase products by simply tapping on the look. Once the item is added to the cart, the user has just to type its shipping address and choose the payment method. The payment can be made using PayPal or credit cards. Users can monitor the shipping and ask for the return within 14 days directly in the dedicated section of the app. Since Mirror can not still compete for diversity and quantity of supply, it focuses on the exclusivity of the products and on fashionableness of matches as well as the careful selection of influencers and fashionistas which make the looks. Mirror aims at becoming a space of daily inspiration for fashion lovers which can get inspiration from hundreds of different outfits and styles.

Mirror's idea is creating a virtual space in which an e-commerce and a "social network" can cohabit, a platform for the sales of luxury fashion products which may become a space of daily inspiration for fashion lovers which can get inspiration from influencers' looks.

2. The market

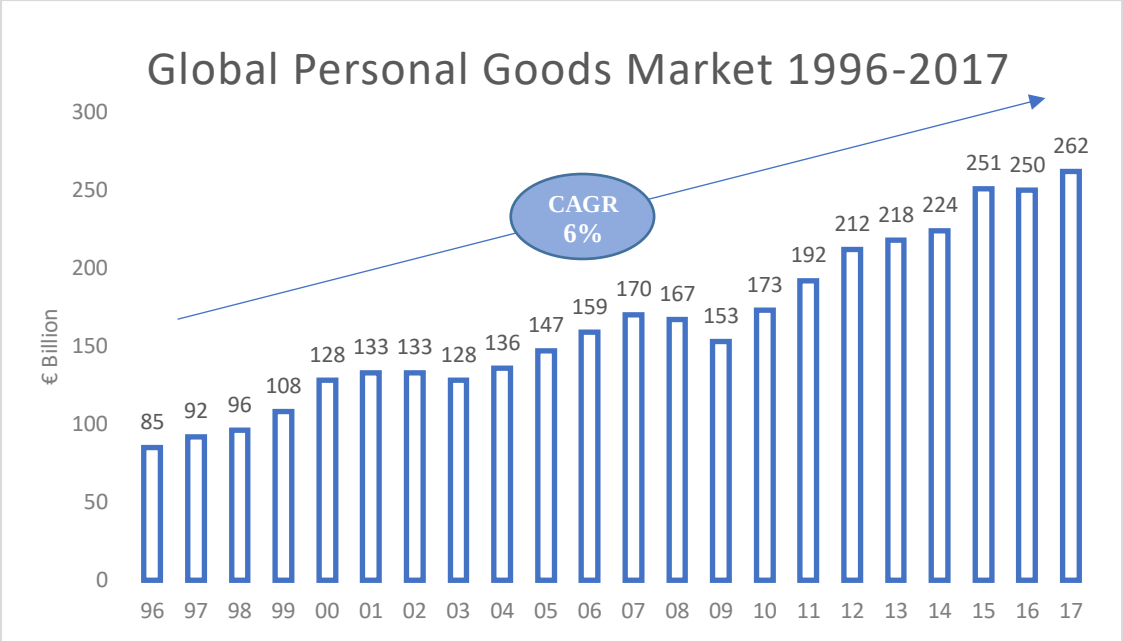
The overall luxury market, tracked by Bain & Co., is worth €1,160 billions (2017) with a 5% growth in respect to the previous year. It included 9 segments personal, luxury goods, luxury cars, luxury hospitality, luxury cruises, designer furniture, fine food, fine wines and spirits, private jets and yachts, and fine art (figure 2.2) (D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017).

Figure 2.2: Global Luxury Market 2017

(Source: D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017)

The global personal luxury goods market (figure 2.3) has been showing a sustained growth since 1996 with a compound annual growth rate of 6%. In 2017 it exhibits a growth of 5% reaching a market value of €262 billion. This growth is mainly due to a generational shift, with 85% of luxury growth in 2017 fuelled by Millennials and Z. The most growing region is Asia which grew by 9% from 2016 to 2017, then Europe, Japan and Americas which grew by 6%, 4% and 2% respectively. More than 60% of the sales comes from Europe and Americas (D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017).

Figure 2.3: Global Personal Goods Market 1996-2017



(Source: D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017)

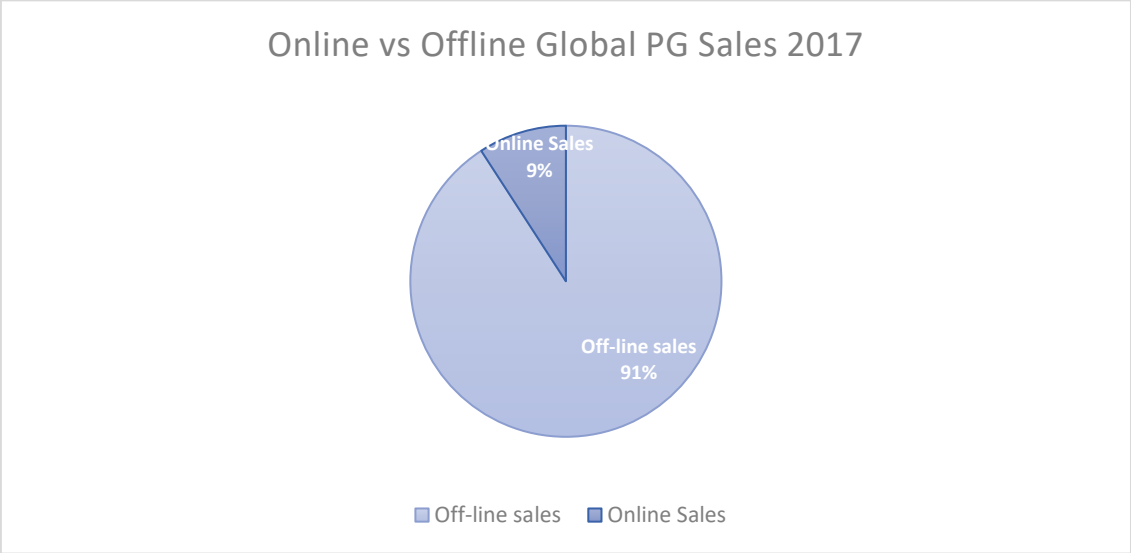
The target market of this analysis is the Online Personal Goods Market. It is one of the most dynamic market, with a compound annual growth rate of 26% since 2003 (figure 2.4).

Figure 2.4: Global Online Personal Goods Market 2003-2017

(Source: D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017)

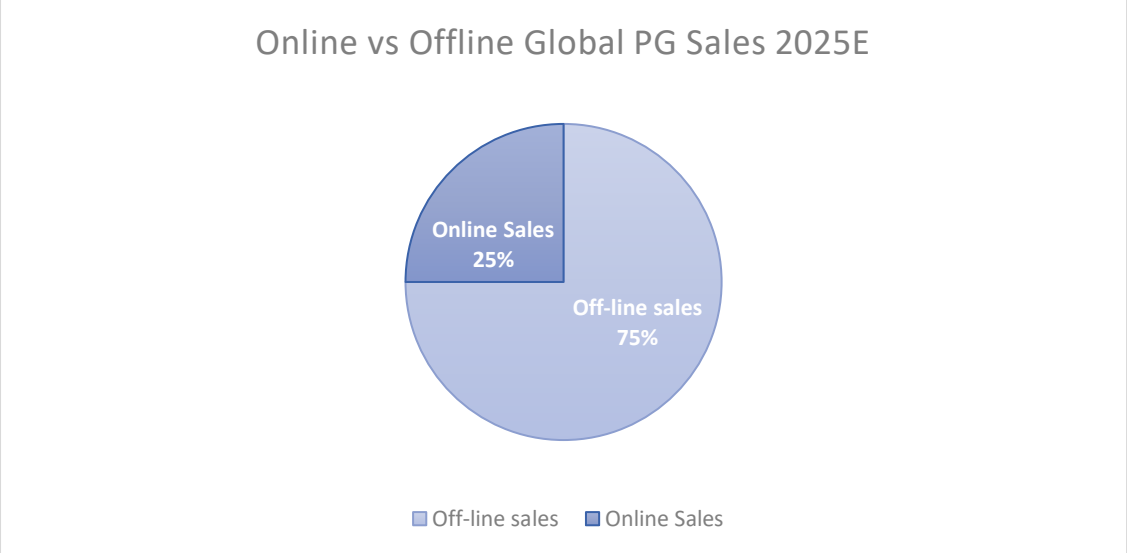
In 2017, online sales represented the 9% of the total market, for a market value of €24 billions (Figure 2.5). This share is going to increase to the 25% by 2025 (Figure 2.56) for a market value of about €90 billions (assuming a total market growth of 3% compound annual growth rate).

Figure 2.5 – Sales. Online vs Offline (2017)



(Source: D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017)

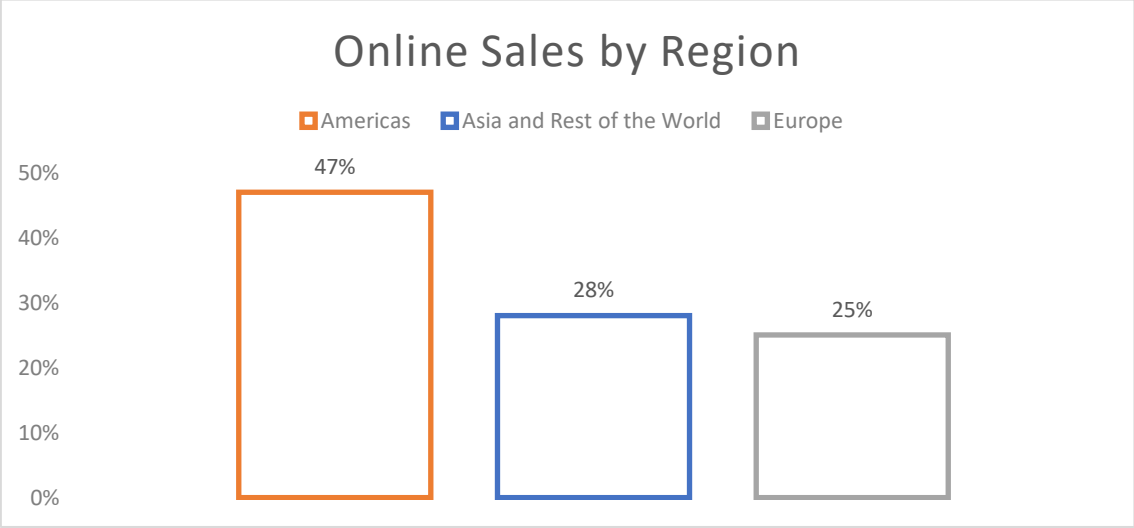
FIgure 2.6 – Sales. Online vs Offline (2025E)



(Source D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017)

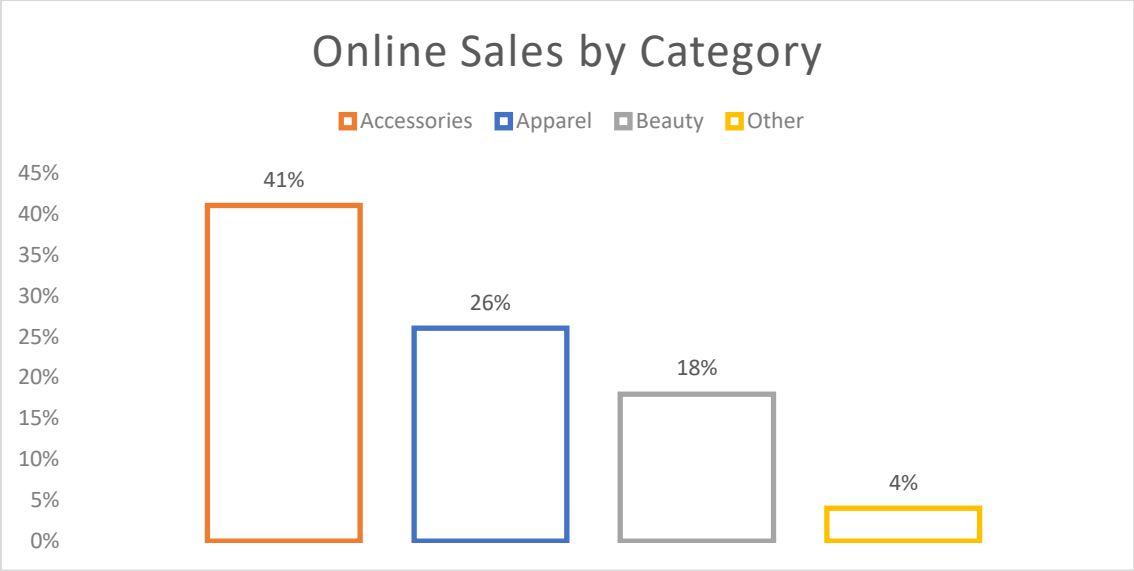
For what concerns consumers' nationality (figure 2.7), 47% of the online sales come from American customers, 28% by Asian, 25% by Europeans. Accessories and Apparel are the most purchased categories online, together they account for the 67% of the market, followed by Beauty and Others which account for 18% and 4% respectively (figure 2.8).

Figure 2.7 – Online Sales by Region (2017)



(Source: D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017)

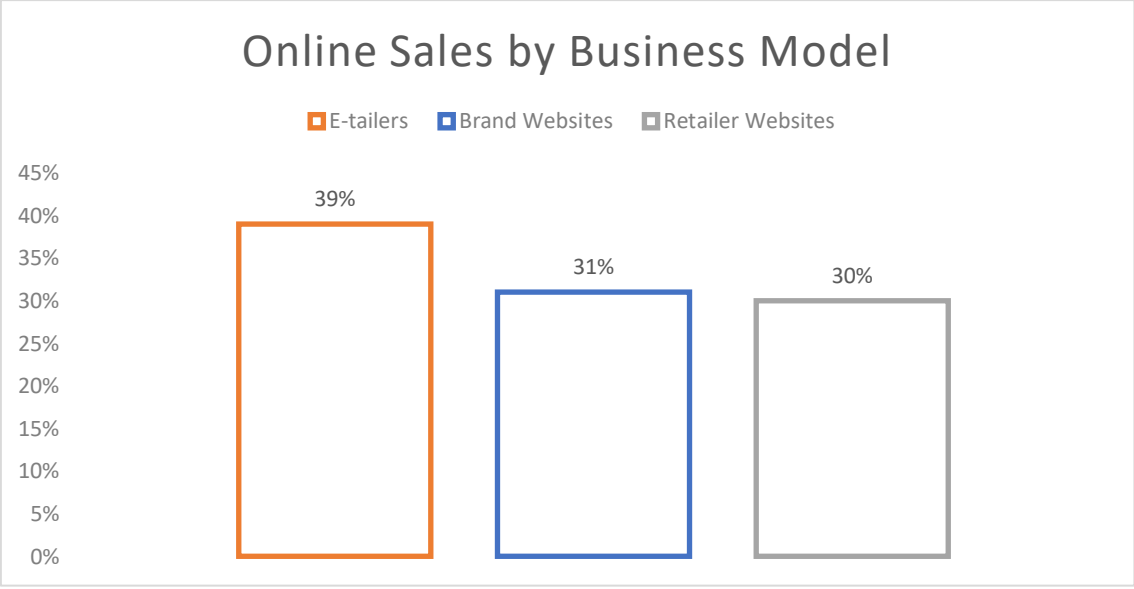
Figure 2.8 – Online Sales by Category (2017)



(Source: D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017)

For what concerns business model, e-tailers are the predominant business model in the online sales market (figure 2.9).

Figure 2.9 – Online Sales by Business Model (2017)

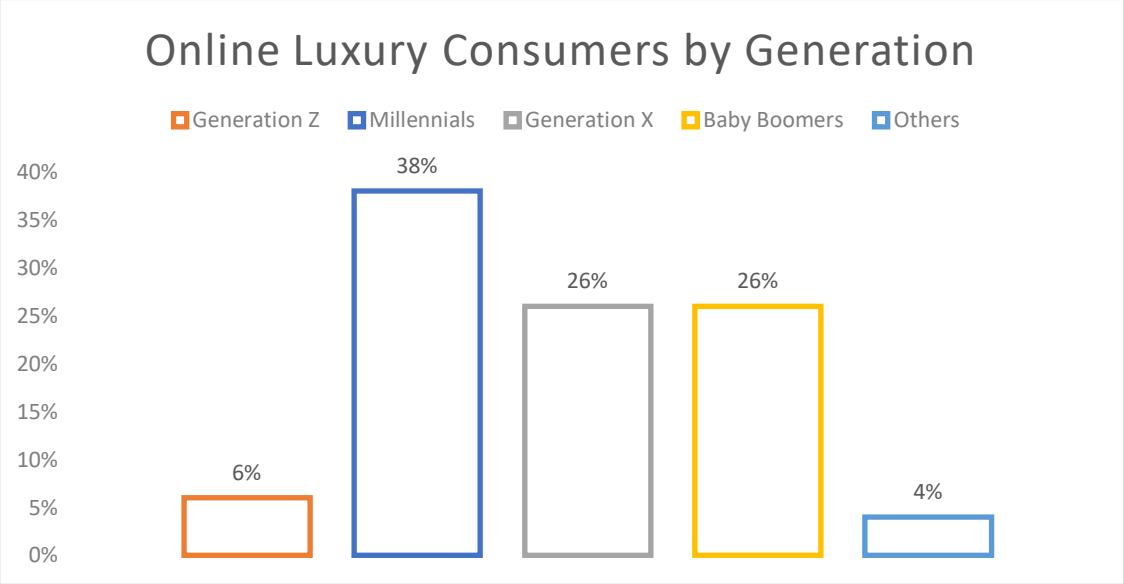


(Source: D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017)

2.1 Market Problems and Opportunities

Since it has been invented, online sales have been made in the same way: photos of the product are displayed in cold backgrounds on the websites of the sellers. Even if the logistic of the traditional ecommerce providers have been improved more and more, with some players which offer 90-minutes delivery in the main cities, the shopping experience is still slow and not intuitive. Furthermore, the traditional experience does not match with the new customers' preferences. In fact, nowadays the market is dominated by Millennials (Figure 2.10 and Figure 2.11) which have tastes and preferences much more different by previous generations (D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017).

Figure 2.10 – Online Luxury Consumers by Generation (2017)

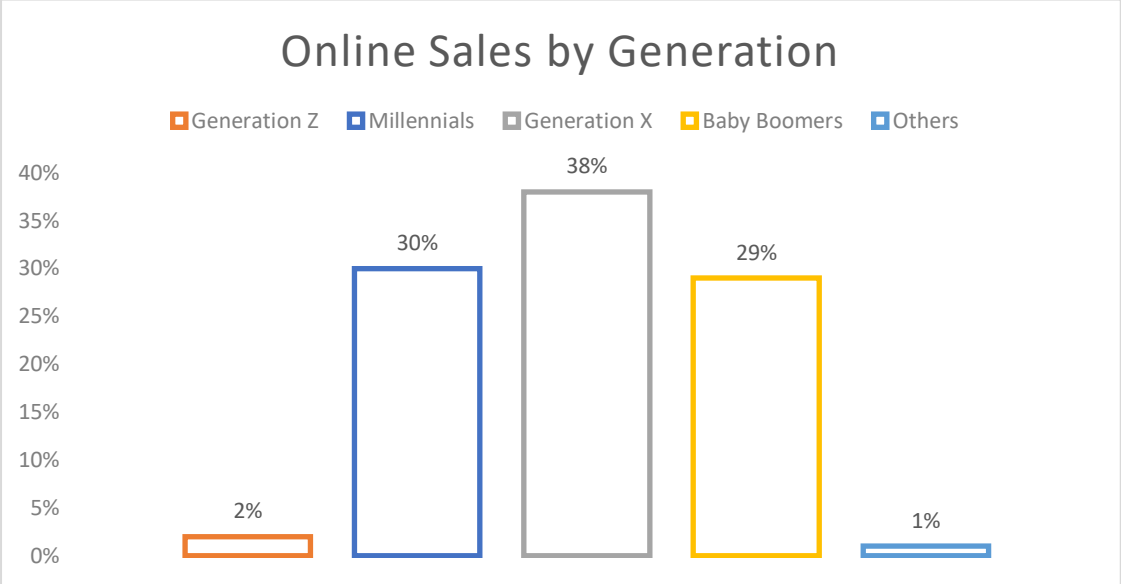


(Source: D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017)

They look for an immersive shopping experience, different from the traditional one, more excited and smarter. They spend many hours of the day on social networks and are very affected in their shopping decisions by personalities such as fashion bloggers and influencers. In particular, the last characteristic is the most significant, in fact many studies have shown how much personalities such as influencer can affect customers' shopping decisions. The 72% of consumers is affected in their shopping decisions by influencers (El Qudsy, I. 2018), 92% of

them trust more on influencers advices than in traditional marketing forms such as advertising or celebrities' endorsements (Chiang, J. 2018). Thanks to this relationship of trust between consumers and influencer, the influencer marketing can be associated to the word-of-mouth marketing which generates twice the sales of traditional marketing forms (Bughin, J., Doogan, J., & Vetvik, O. 2010) and has a retention rate which is the 37% higher (Wong, K. 2014). Moreover, taking into consideration just "Micro-influencer", namely influencers which focused in a particular market niche and have a range of followers between 10,000 and 50,000, the influencer marketing has a ROI much higher (Wissman, B 2018).

Figure 2.11 – Online Sales by Generation



(Source: D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017)

Furthermore, an average person spends about 6 hours a day online, and 116 minutes just on social network platforms (Asano, E. 2017) which equals to 5.3 years in a lifetime. In particular, Millennials and Z Generation spend about 3 hours a day on social network platform (Young, K. 2018).

Mirror's idea is creating a virtual space in which an e-commerce and a "social network" can cohabit, a platform for the sales of luxury fashion products which

may become a space of daily inspiration for fashion lovers which can get inspiration from hundreds of different outfits and styles carefully created by influencers. The e-commerce platform is mobile oriented, able to exploit the consumers' shift toward mobile purchases, which reached 40% of the total online sales in 2018 (from the 35% of the 2017) (Finkelstein, H. 2018). All these features in an intuitive mobile application in which it is possible to experience a fast shopping experience as well as a relaxed discover of new trends and looks.

3. Strategic Tripod Analysis

3.1 Industry Analysis

3.1.a Industry Rivalry

The degree of Rivalry among the industry is affected by concentration, diversity, product differentiation, exit barriers, cost conditions and excess capacity.

There are many firms that act as e-tailers in the Luxury and Premium space (Figure 2.11).
It is possible to identify two different business models, Multi-brand Online Retailer Model and Marketplace model.

- Multi-brand Online Retailer Model: companies using this model act as traditional e-retailer in the sense that they buy selected fashion items among brand collections and then they resell them on their platform.
The main players are:

1. Yoox Net-a-Porter (YNAP): it is the result of the merger between the Italian YOOX and NET-A-PORTER (on 1-1 basis) in 2015. YNAP is the largest player in the market with an estimated market share of 9% globally. It operates three business lines:

    - Multibrand in-season: NET-A-PORTER and Mr. Porter. They sell products of the current seasons at full price.

- Multibrand off-season: YOOX and The Outnet. They sell products of the previous seasons at discounted prices.
- Online flagship stores. YNAP powers the e-commerce of more than 30 top fashion brands. It helps brand in the operations but usually the design of the website and the choice of the products sold in the platform is competence of the brand.

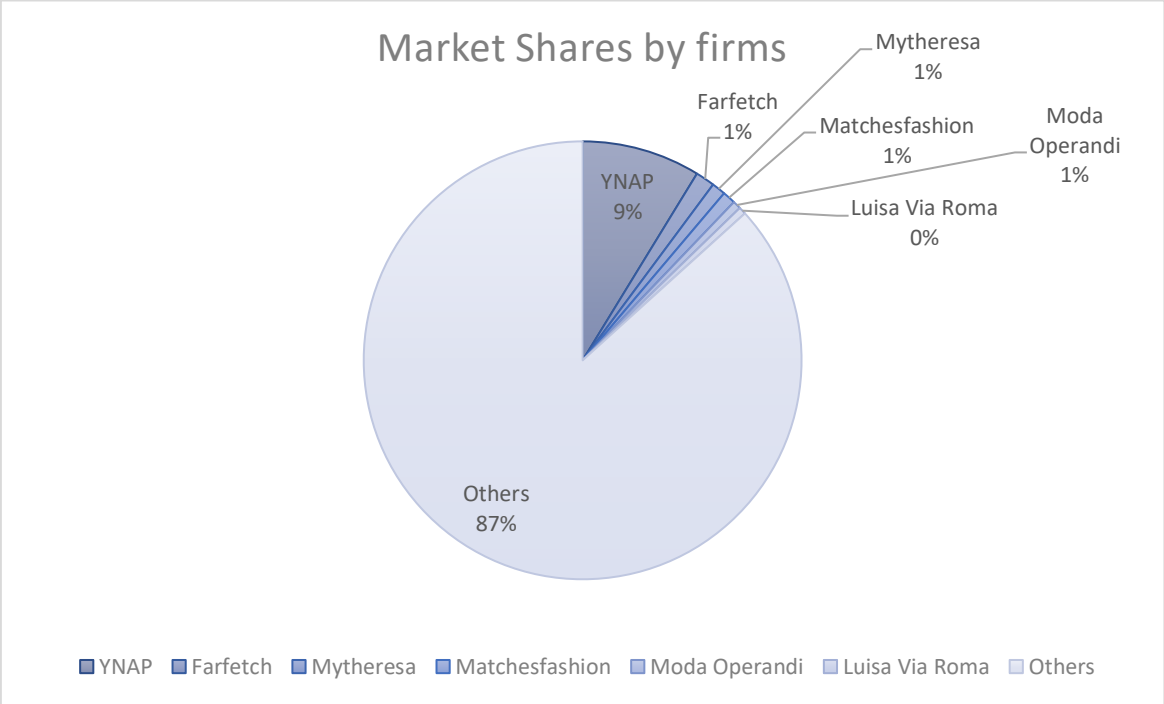
The group handled 8.5 million orders from 180 countries in 2016 with an average order value of €334 (€600 at NAP) and 2.9 million active clients. It operates 250,00 sqm of warehouse capacity in eight locations around the world (60% in Italy) and runs 90 photo studios. YNAP mainly utilises DHL and UPS as delivery partners, Yamato and FedEx in some locations and owns 55 vans for its Premier Delivery. (Cereda, F. 2017)

2. Matchesfashion: Born as physical store in London In 1987, it was the first importer of many top Italian brands. It started its online presence in 2006. In 2017 had €230 million of revenues (Adegeest, D. 2018) and an Average Order Value of €500 (Cereda, F. 2017), combines an elite client scheme with special event and private sales and a 90-minutes delivery in London. Finally, it also offers its own private label, Raey.
3. Mytheresa: Mytheresa is a German e-commerce platform. It born as physical store in Munich and then, in 2006, it expanded to online sales. The company sells products from over than 200 designers to 130 countries, in 2017 generated €245 million revenues (Adegeest, D. 2018).
4. Moda Operandi: Moda Operandi is the e-commerce platform where consumers can shop the designers' complete runway collection. In 2017 it generated $165 million revenues (Pymnts 2017) and has the highest Average Order Value among competitors, $1400 (Fernandez, C. 2017)
5. Luisa Via Roma: Luisa Via Roma is an Italian e-commerce platform base in Florence. Its activity online started in 2004. In 2017, LVR generated €130 million revenues. (Adegeest, D. 2018).

- Online Boutique/Marketplace Model: companies using this model act as a marketplace for multi-brand physical boutiques and designers giving them an additional distribution channel. The main advantage is that they do not bear inventory risk because no inventory is kept by the distributor (the platform). The main player using this model is Farfetch. Mirror uses this model too.

1. Farfetch: founded in 2008 by the Portuguese José Neves, Farfetch is an e-commerce platform, based in London, which sells the products of more than 500 physical boutiques, so giving them an additional way to sell their items. For this service, Farfetch retains around the 30% of the Gross Merchandise Value (GMV), which is the total value of the item which the platform sells (Cereda, F. 2017). During the years, the firm has seen huge growth, reaching 1 million users in 2017 and gaining partners as JD.com and Condé Nast Farfetch has not an inventory, but the stock is provided by its partners. The company hit €340 million of revenues in 2017, with an annual increase of 59% but it exhibited an after-tax loss of €100 million, higher than the loss of the previous year of €70 million. Despite the recurring losses investors believes in this project and in 2018 Farfetch achieved an IPO with a valuation of around $5 billion. Another online retailer, Macy's, is worth around $12 billion, but its revenues are 60 times greater. Farfetch's valuation is more similar to a technological company's valuation, which is as Farfetch describes itself, rather than the retailer one. (Wahba, P. 2018)

Figure 2.12 – Market Shares by Firms (2017)



(Sources: Fortune, Fashionista, Pymntns, fashion united)

Table 2.1 – Market shares by firms and HH Index (2017)

Company Name	*Online Sales*	*Market shares (s)*	s^2
YNAP	€ 2.100	9%	0,00766
Farfetch	€ 340	1%	0,00020
Mytheresa	€ 245	1%	0,00010
Matchesfashion	€ 230	1%	0,00009
Moda Operandi	€ 145	1%	0,00004

Luisa Via Roma	€	130	1%	0,00003
Total Market	**€**	**24.000**	**HH Index**	**0,00812**

(Sources: Fortune, Fashionista, Pymntns, Fashion United)

The Herfindahl-Hirschman Index (HHI) = 0.008 (Table 2.1) which means that the market is highly fragmentated.

For what concerns diversity and product differentiation, all e-tailers offer similar products and services (i.e. the online purchase of fashion products), the main differences consist in creating a unique user experience (i.e. Mirror), in the differences among delivery services (i.e. same-day delivery) or in the width of the choice.

Table 2.2 - Benchmark Analysis of the e-tailers (2017)

Business Model	Company name	Online Sales (Million, €)	Monthly users (Million)	Stock	Gender	Innovative User Experience	Inspiration level
Multibrand Online Retailer Model	YNAP	2100	70	yes	both	no	low
	Mytheresa	245	2.8	yes	woman	no	low
	Matchesfashion	230	2.4	yes	both	no	low
	Moda Operandi	145	N/A	yes	woman	no	low
	Luisa Via Roma	130	5	yes	both	no	low
Market Place Model	Farfetch	340	21	no	both	no	low
	Mirror	N/A	N/A	no	both	yes	high

(Sources: Fortune, Fashionista, Pymntns, Fashion United)

The industry has not significant exit barriers (obstacles that prevent a firm from exiting the market), however huge investments in marketing and in Artificial Intelligent systems (which some players are going to develop) which can analyse data and offer a customised experience to customers, could represent a barrier to the exit of such companies.

Multibrand Online Retailers have high fixed costs, in case of excess capacity, price reduction can be common. Instead, for players operating a marketplace model this problem is less common.

Another business model can be identified in the market, it is the Aggregator Model, however companies using this model can not defined as real competitors in the sense that they do not directly sell products. These players display the products on their platforms, but they redirect the customers to the website of a real seller in order to finalize the purchase. In this sense they are more similar to a partner than a real competitor.

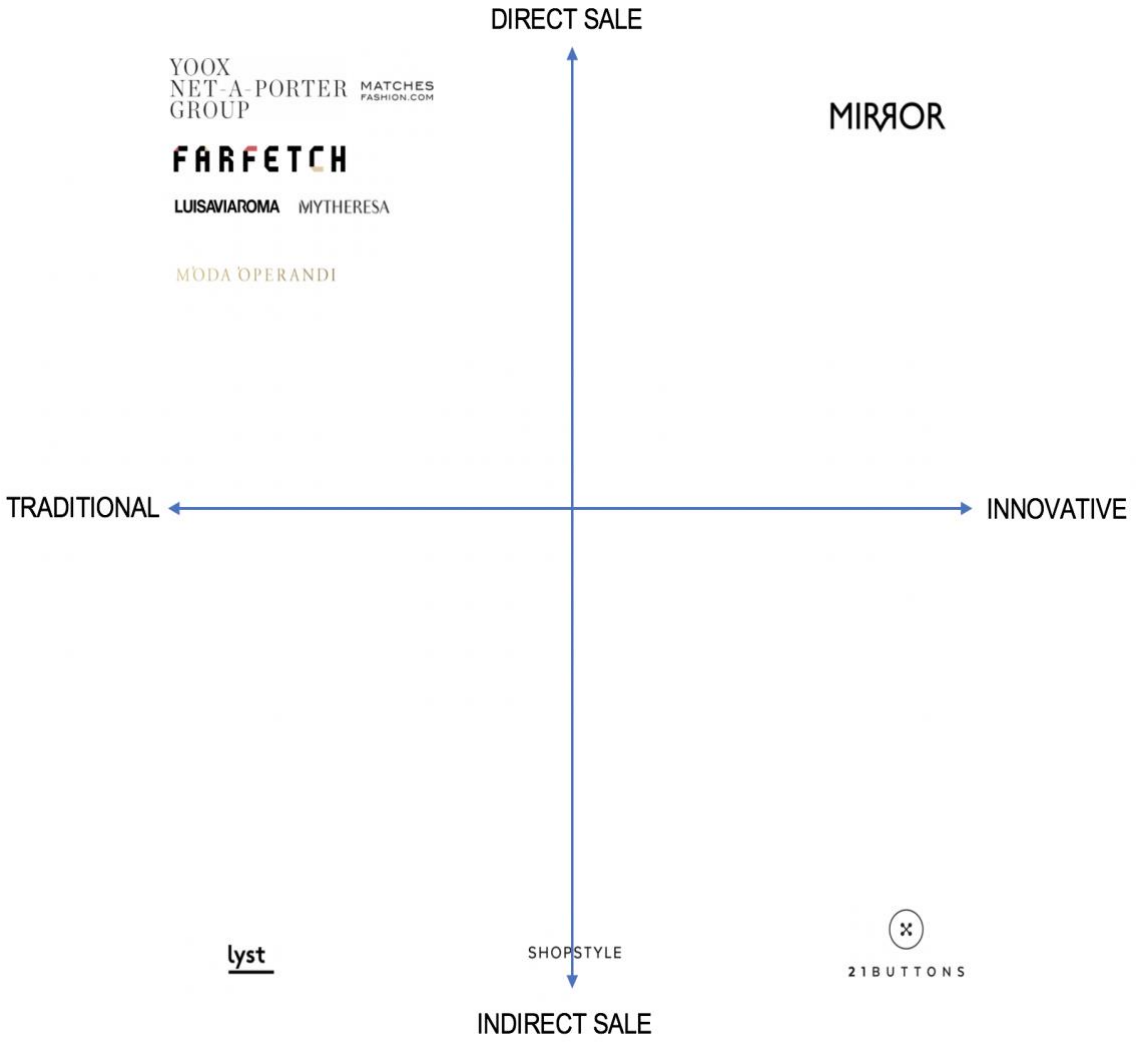
- Aggregators: aggregators are not real competitors because they do not sell their own products, but they act just as intermediaries between users and pure e-commerce platforms. In fact, such platforms show to the customers millions of items, but users are redirected to another e-commerce to make the purchase. This makes the shopping experience much slower and less intuitive. Nevertheless, such platforms are quite popular because of both the wide range of choice and the innovative shopping experience of some of them.

1. Lyst: Founded in London in 2010, it is a search engine for fashion products with more than 3 million active users per month. It is a platform that aggregates inventory from across a great number of other fashion e-commerce sites and allows users to view the products from more than 10 thousand retailers. In 2016 it generated $ 215 million of GMV (60% from USA), shows 4 million products and has an average order of $ 250 (Weiß, M. 2017).

Lyst reached a gross merchandise value of $325 million and achieved $21 million of net revenue, by taking a commission on each sale generated, in 2018. The 60% of Lyst's revenue comes from U.S., 30% from Europe and 10% from Asia (Kansara, V. 2018).

2. Shopstyle: The US website launched in February 2007 focused on aesthetics and user experience through the aim of recreating a digital magazine experience. ShopStyle sell over 14 million products across apparel, accessories, beauty, home furnishings and kids' items and achieved $1 billion in gross sales to its global network of 1,400 retailers (ShopStyle). ShopStyle is also the commerce engine behind ShopStyle Collective, a network of 14,000 bloggers and social media users who earn a percentage of every sales driven through the platform based on a Cost Per Acquisition (CPA) structure.
3. 21 buttons: Founded in 2015, it is a social network that allows users to share pictures of their looks and outfits together with the links to buy the products contained in the photo from other e-commerce platforms. Each item has a buy button, 21Buttons generates revenue for any clicks that lead to a sale and gives a percentage margin to the influencer/user who generated the lead. Users are not just influencers, but also people who are fascinated by fashion. In 2018, 21 Buttons reached 6 million app downloads and has raised $15.7 million (Cuccinello, H. & Bergstein, R. 2018). However, it does not have control over uploaded photos and does not sell products directly as it redirects to other platforms for purchasing.

Figure 2.13 – Market Positioning Map



(Author's Graph)

The company Mirror, adopting a marketplace model, so a direct sale strategy, and an innovative user experience, differ from other competitors which either offer a traditional user experience selling directly or propose innovative feature but without a direct sale (Figure 2.13).

Finally, because of the companies' attempt to differentiate themselves and their strong growth during this year, without eroding competitors' space, the intensity of the Industry Rivalry can be considered medium.

3.1.b Substitute Competition

When substitutes exist, customers may decide to switch to them. The existence of substitutes affects the demand elasticity of an industry and therefore the profitability of the overall industry.

In the case of the online fashion luxury industry, the main substitutes are physical fashion luxury retailers. They offer the same product but offering a different service, since customers need the physical proximity to the store and the time to visit it. Consequently, the force of the Substitute competition can be valuated as medium

3.1.c Threat of Entry

When an industry is profitable, new companies are encouraged to enter the market. In absence of restriction to entry the industry, profits may fall to competitive level. However, barriers to entry, such as legal barriers or government restrictions, large economies of scale, huge investments need to start the business, absolute cost advantage or exclusivity on channels of distribution, help companies to retain some advantage in respects to new entrants.

In the online fashion luxury industry, despite the set-up costs need to start e-commerce business is relatively low, the capital requirement needed to constitute a wide choice of products of luxury brands and the large investments in advertising needed to create a user base, constitute a notable barrier to entry. Moreover, in the Mirror case, the artistic content of the photos taken by influencers, and uploaded on the platform, are a source of differentiation which constitute an additional barrier to entry. As a result, the threat of entry can be considered of medium intensity.

3.1.d Supplier Power

The power which a supplier has on the buyers (and vice versa for what concerns the buyer power) measures how much value generated it can retain in respect to the other. This power derives from:

- Price sensitivity, which is influenced by the share of input on total cost, product differentiation among the suppliers, competition among buyers.
- Relative bargaining power which depends on possibility to vertically integrate, switching costs, availability on information, size and concentration of buyers and suppliers.

Suppliers in the industry are both fashion luxury retailers (just for players using the marketplace model) and fashion luxury (emerging and established) brands. They are a source of product

For what concerns price sensitivity, the products themselves represent the main costs to bear in order to running a fashion e-commerce business and differentiation among suppliers which are brands is high, but among supplier which are physical retailers is low, since target brands of such stores are almost the same. Buyers competition depends on the suppliers, established and trendy brands are the most demanded, while for emerging brands the demand is lower, finally, for physical retailers the demands depends on the brands and on the deep of the choice they have. For what concerns the relative bargaining power, excluding the main players, the bulk of e-tailers are small if compared to established luxury brands and have high switching cost due to the unique brand characteristics which make also difficult to vertically integrate. However, for what concerns the marketplace model, e-tailers are usually bigger than physical retailers, moreover they have more information about price and costs and have no switching cost which may also permit vertical integration, as the case of Farfetch which acquired a physical retailer in London.

For these reasons this power can be considered of medium intensity.

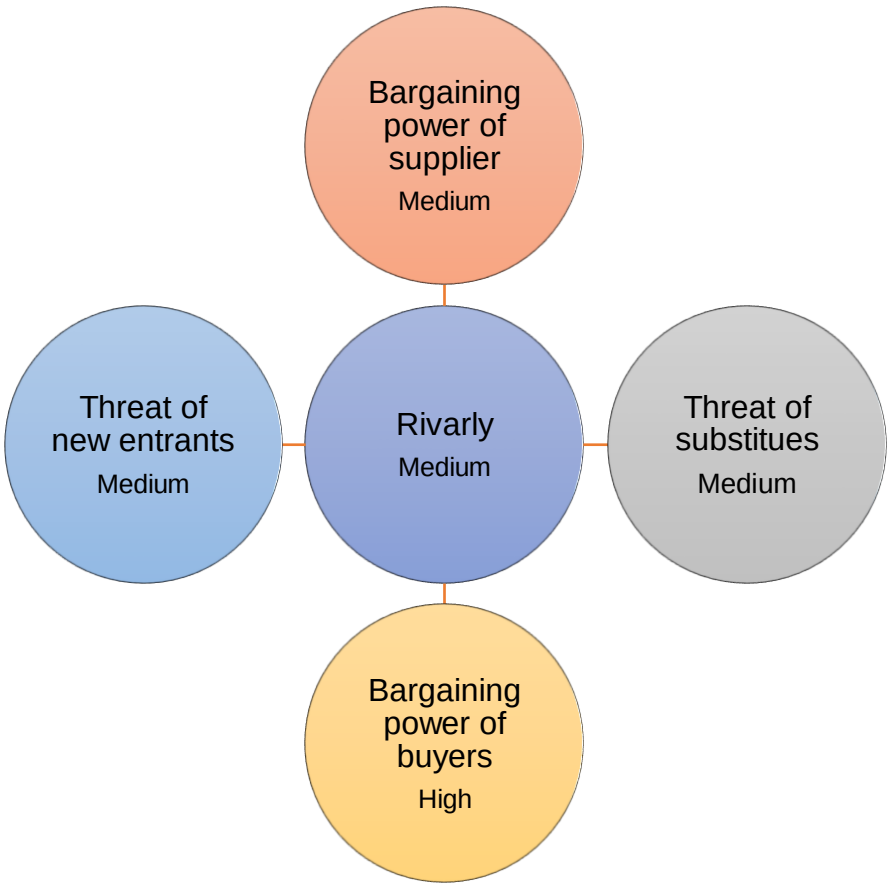
3.1.e Buyer Power

In the online fashion luxury industry, the bargaining power of buyers is high. Price sensitivity is high since consumers have many alternatives for the same product and there are no switching costs. Customers can compare a number of different e-commerce platform choosing the one which offers the best price for a given product. The only difference among e-tailers regards the service offered, as a result, the buyer power can be considered high.

3.1.f Average Intensity

As the previous analysis shows and as mapped in the Table 3.1, the industry exhibits a medium-to-high intensity level of competition. Mapping the forces into a single table

Figure 2.14 – Average intensity of competition



(Author's Graph)

3.2 Institutional

3.2.a Innovative Start-up

It born in July 2017 as “società a responsabilità limitata” (i.e. limited company) and then it was registered as “Start-up Innovativa” (i.e. innovative start-up). The concept of innovative start-up was introduced in Italian legislation in 2012 by the so called “Start-up Act” (Italian Ministry of Economic Development 2016). It sets the requirements for being listed as innovative startup and enjoying the deriving benefits. Innovative start-ups can be limited companies which meet the following requirements:

- Be new or have been operational for less than 5 years;
- Have their headquarters in Italy or in another EU country, but with at least a production site branch in Italy;
- Have a yearly turnover lower than 5 million Euros;
- Do not distribute profits;
- Produce, develop and commercialize innovative goods or services of high technological value;
- Are not the result of a merger, split-up or selling-off of a company or branch;
- Be of innovative character, which can be identified by at least one of the following criteria:

    1. at least 15% of the company’s expenses can be attributed to R&D activities;
    2. at least 1/3 of the total workforce are PhD students, the holders of a PhD or researchers; alternatively, 2/3 of the total workforce must hold a master’s degree;
    3. the enterprise is the holder, depositary or licensee of a registered patent (industrial property) or the owner of a program for original registered computers.

The benefits of being listed as innovative start-up are:

- Innovative start-ups can draw up the act of incorporation and statutory modifications using a standard model and digital signature
- Innovative start-ups are exempt from the payment of stamp duty and other administrative fees.
- Innovative start-ups, incorporated as srl (ltd), have some rights similar to spa (Inc). For example, they can create shares with specific rights, namely without right to vote; issue participative financial instruments; offer to the public of capital shares.
- 12-months extension of terms for covering losses which exceeds 1/3 of the company's capital.
- Regulations concerning "dummy companies" (i.e. non-operational companies and companies registering systematic losses) do not apply to start-ups.
- Exemption from the duty for VAT credit compensation of VAT credit above 15,000 Euros (increased to 50,000 Euros).
- Innovative start-ups can hire personnel through fixed-term contract for a maximum length of 48 months (instead of 36 months) and they are not required to maintain a statutory ratio between fixed-term and active open-ended contracts.
- Salaries can have a variable component linked to efficiency or profitability of the company, the productivity of the employee or the team of employees, or to other parameters.
- Capital shares (stock options and work for equity schemes) can be offered as remuneration.
- Tax credit of 35% of the company's total cost for permanent employment of highly qualified staff during the first year of the new working relationship.
- Tax incentives for corporate and private investments in start-ups made by individuals (19% tax credit up to a maximum investment of 500,000 Euros) or legal entities (20% fiscal deduction up to a maximum investment of 1.8 million Euros).
- Innovative start-ups can collect capital through equity crowdfunding.

- Innovative start-ups have guarantees granted by the Public Guarantees Fund for SMEs that cover 80% of the bank loans up to a maximum of 2.5 million Euros and it is provided through a simplified fast-track procedure.
- Start-ups can receive more legal, corporate and fiscal support to the process of internationalisation provided by the Italian Trade Agency.
- Start-ups are exempted from the standard bankruptcy procedure. Waiting times are cut, and the administrative and reputational burden reduced.
- Smart&Start Italia: is a financing scheme for innovative start-ups based in Italy. It consists in €200 million (between €100,000 and €1.5 million for each start-up) to spend in investment goods and management costs, at a 0% interest rate. Moreover, the 20% of the funding is converted to an outright grant when the start-up is based in a Southern Italian Region.
- Italia Start-up Visa: simplified online mechanism for granting working visas to extra-EU applicants intending to set up a new innovative start-up in Italy.
- Italia Start-up Hub: extension of the visa of extra-EU citizens (that are already in possession of a regular residency permit) which intend to set up an innovative start-up after the visa expiry converting a residency permit into a “permit for entrepreneurs in an innovative start-up”.

These measures, according to the “Evaluation of the Italian “Start-up Act” report by OECD, had a positive effect on the start-up sector, but further analysis must be ran in the future. In particular, start-ups which benefited from this measure, have increased revenues, value added and assets by 10-15% more than start-ups which did not benefit from this measure. Moreover, these start-ups have higher probability of receiving bank loans and of receiving VC funding. (Menon, C. et al. 2018).

3.2.b Fiscal Compliance

As discussed in the previous paragraph, the billing system specifically developed, distinguish customers on nationality and kind (B2C or B2B) and consequently it creates invoices whose VAT depends on the legislation that must be applied.

Four cases can be distinguished: sale to Italian customer; sale to B2C EU customer; sale to B2B EU customer; sale to extra-EU customer.

1. When the order come from an Italian customer, Italian fiscal rules must be applied, and the invoice must include the Italian VAT.
2. For Business to Consumer (B2C) EU customers, according to the art. 41, co. 1, lett. B), D.L. 30 n. 331/1993, regarding the "intra-community distance sales", two cases must be distinguished:

    - Italian VAT not applied: if sales occurred in an EU country exceed €100,000 (or the lower limit set by the country) in a year, country's VAT must be applied to the sale. Moreover, the Italian seller must register a VAT number in that country and comply with the country's fiscal rules.
    - Italian VAT applied: if the sales do not exceed the aforementioned limits, Italian VAT and Italian fiscal rules are applied to the sale.

For Business to Business (B2B) EU customers, art. 41, co. 1, lett. B), D.L. 30 n. 331/1993, regarding the "intra-community distance sales", must be applied. The sale occurs without VAT and fiscal compliance must be ensured (i.e. indication of "non imponibile ex art. 41, del d.l. n. 331/1193", indication of the ISO number and of the national VAT registration number, registration of these invoices on a special register dedicated to EU invoices, etc.)

For both B2C and B2B extra-EU customers, according to the art. 8, co. 1, lett. A) del D.P.R. n. 633/1972, regarding exports, invoices must be filled without VAT and compliance must be ensured (i.e. indication on the invoice of "non-taxable VAT art. 8, co. 1, lett. A) del D.P.R. n. 633/1972", registration of the invoices on a special register dedicated to non-EU sales, and the presence of a customs document which certificate exportation.

3.2.c Key Partners Legal Terms

A contract is signed between Mirror and the commercial partners. It contains duties for both the platform and the partner.

- Partners must maintain updated their software for the management of the inventory in order to avoid that orders will be placed for items that are out of stock.
- Partners must let Mirror's fashion influencers partners to visit their store in order to choose the looks for the photos and take them
- Partners, once the order is placed, must immediately prepare the order with the package and give it to the shipping partner.
- Mirror must coordinate all the process in exchange of the 25% of the value of each product.
- Mirror must give to the partner the remaining part of the value of the items at the end of each month.
- Customers have 14 days to returns the order.

A contract is also signed between influencers and Mirror, it states that the photos taken using Mirror's commercial partners' product can not be used on other platforms without Mirror's authorisation.

3.3 Resource-based View

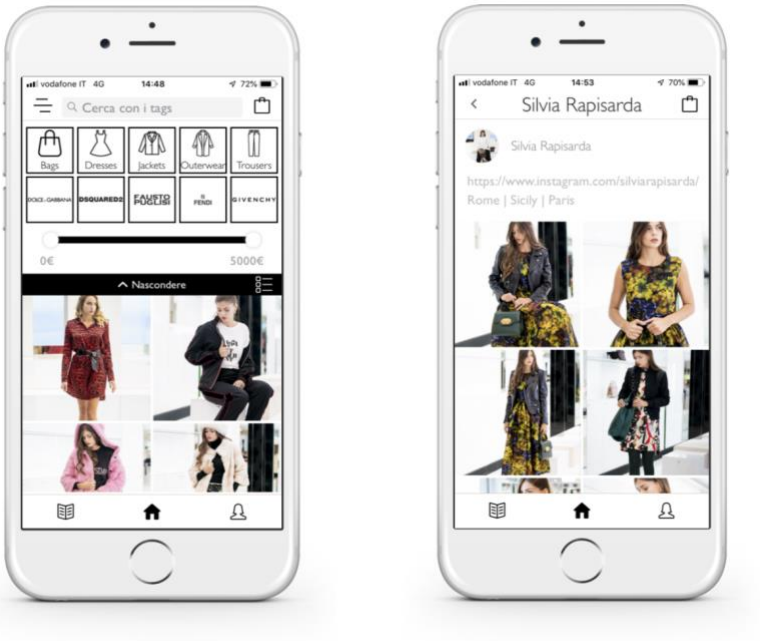
According to the Resources-based view, key resources can be divided into physical, intellectual, human and financial.

Given the marketplace model, which avoid owning a warehouse, adopted by Mirror, physical resources are mainly technological.

Mirror's technology is composed by:

- A mobile application for Android devices (Figure 2.15)
- A mobile application for iOS devices (Figure 2.15)

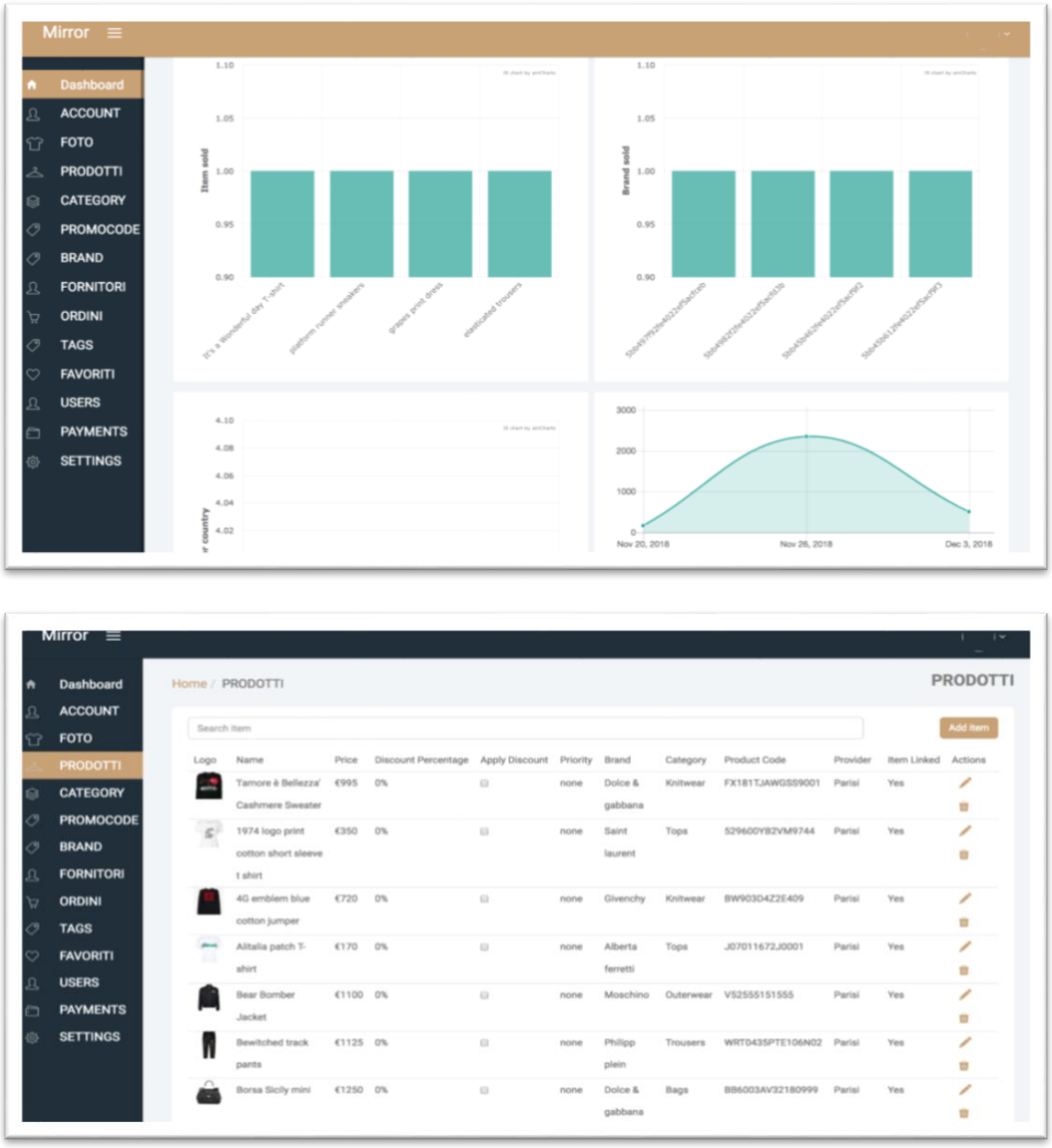
Figure 2.15 – Mirror's app screens



(Source: Mirror srl)

- An internally developed Content Management System (CMS) in which to manage photo upload, items information and orders and when to display data and statistics on orders. (Figure 2.16)
- Application Programming Interface (API) which are used to allow the link between commercial partners and the platform.
- A landing page in which information about the company are disclosed.
- A Website has been currently developing
- Algorithms which customise the user experience, suggesting the most suitable products to the customers, have been currently developing.

Figure 2.16 – Mirror's CMS screens



(Source: Mirror srl)

The main intellectual resources are customers' database, commercial partners and influencers partnerships and the artistic content of the outfits' photos displayed in the platform.

For what concerns human resources, the company presents a flexible structure, the majority of the activities are automatized or outsourced. Mirror's team is composed by young graduates in finance, management, fashion marketing and

engineering, moreover consultants experienced in this field provide daily advise on strategic and operating choices. Its tasks involve the creation of the commercial network, exploiting team's personal connections, the management of the contents and the customer care and financial and marketing tasks.

As start-up, Mirror's financials resources are limited, the company is fully financed by the owners and is currently looking for a funding round.

According to the VRIO model (Table 2.3), company's resources should be valuable, rare, not imitable and well organised in order to achieve a sustained competitive advantage. The main resources are the Platform, the customised experience, the contents and the partnerships with commercial partners and fashion influencers. All the resources are valuable and rare. However, despite the complexity, the platform is imitable. Instead, imitability is for the experience customization, contents and partnerships, since the artistic content (i.e. unique outfits/matches) of the photos, the customised shopping experience provided by the algorithms (currently under development) which suggest the most suitable products for each client, and the partnerships which include exclusivity agreements, are not imitable. Finally, excluding the experience customization, whose development is not currently accomplished, all the resources are well organised.

Table 2.3 – VRIO Model

	V	R	I	O	Competitive Advantage
Platform	✓	✓	×	✓	Partly
Customised experience	✓	✓	✓	×	Partly
Contents	✓	✓	✓	✓	Sustained
Partnerships	✓	✓	✓	✓	Sustained

(Author's Graph)

4. SWOT Analysis

The SWOT analysis (Figure 2.17) is an instrument which allows to visualise the internal strengths and weakness and the external opportunities and threats of a company.

4.1 Strengths

Mirror's strengths are its flexible marketplace model which allow to avoid building an expensive warehouse

The influencers involvement which affect the shopping decisions of the 72% of consumers

A revolutionary and intuitive user experience which can match the new consumers' preferences such as the gradual shift towards mobile purchases and the need for a simpler shopping experience driven by the generational shift and the involvement of influencers.

4.2 Weakness

The main weaknesses of the company derive from being a start-up. It can currently offer only few products, because the commercial partners network is limited, and has few users, since it started operating very recently (December 2018), nevertheless metrics on new users and conversion rate are encouraging. Marketing efforts may have a positive impact in boosting the growth, however they will be significant.

4.3 Opportunities

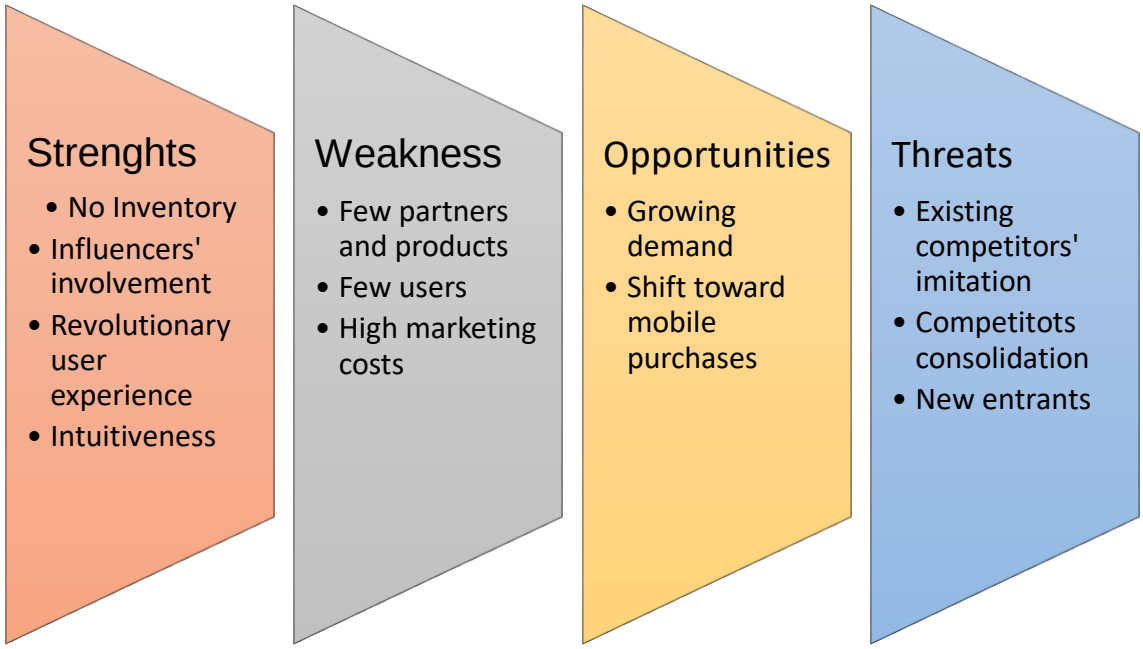
Online fashion luxury sector is one of the most growing and dynamic sectors, since 2003 it has been increasing at an annual growth rate of 26%. In 2017, online sales represented the 9% if the total fashion luxury market. This market is going

to increase to the 25% of the overall market, from €24 billion to €90 billion. This market trends are a big opportunity for an e-commerce platform tailored for Millennials, the generation which buy most online. Moreover, the mobile orientation of Mirror represents another opportunity in a context in which mobile purchasing are growing more and more, reaching the 40% of the total online sales in 2018 (D'Arpizio, C., Levato, F., Kamel, M., & De Montgolfier, J. 2017).

4.4 Threats

Despite the efforts to differentiate itself, Mirror may face competitors' imitation in providing ready-to-buy outfits and the collaboration with fashion influencers. Moreover, despite the high expected growth rate, competition may become fiercer for both new entrants and competitors' consolidation.

Figure 2.17 – SWOT Analysis



(Author's Graph)

5. Business Model

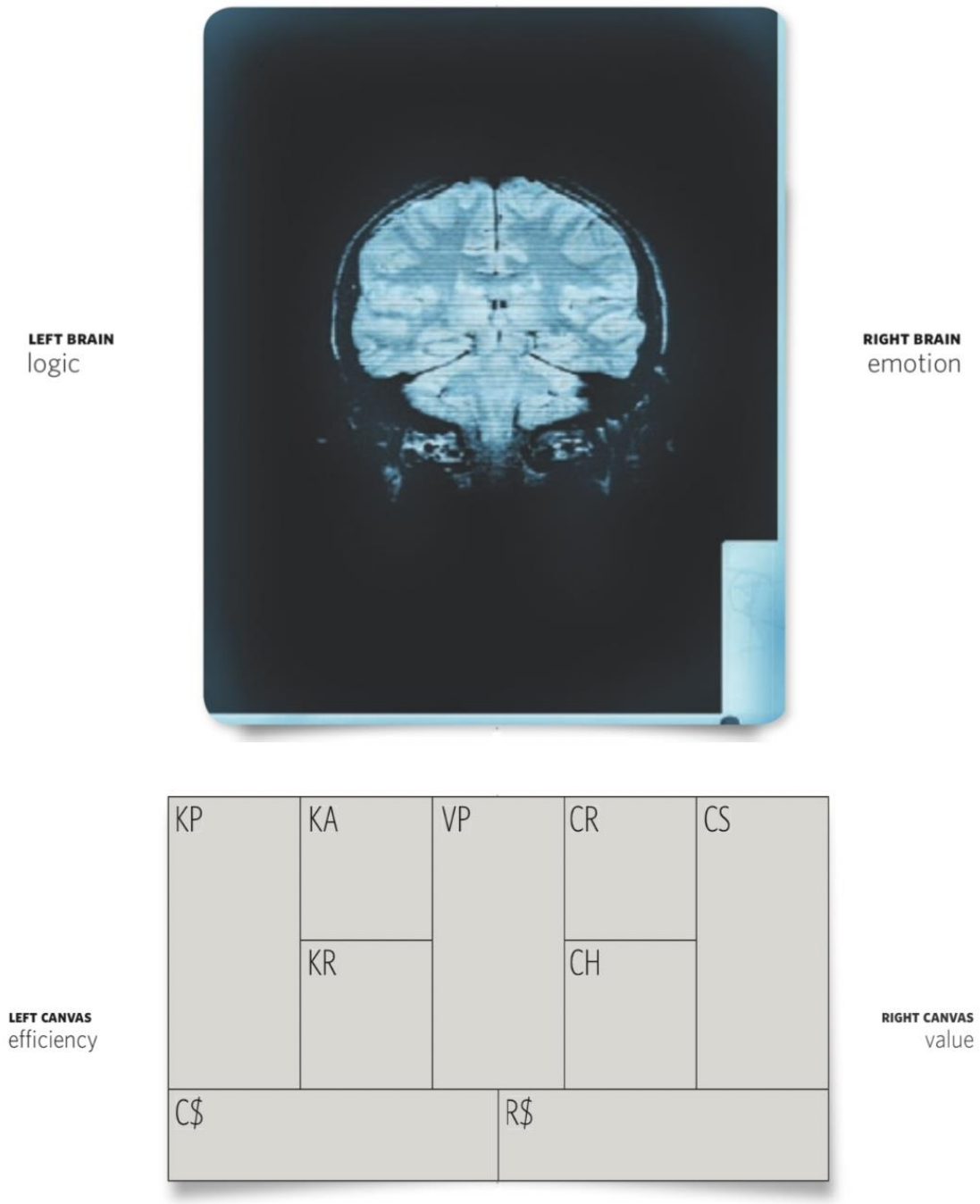
5.1 Business Model

The Business Model is a plan which describes the rationale of how an organisation creates, delivers and capture value. (Osterwalder, A. 2010). This means that it explains which are the resources and activities which satisfy a firm's customers' needs and which capture the value created by performing the supply of a product or of a service.

5.2 Business Model Canvas

The most used instrument which summarised a business model is the Business Model Canvas. It is a tool composed by nine blocks which represents the main components of a company's business model. It permits to visualise the main activities, resources and relationships with the main firm's stakeholders in a map which is designed taking inspiration from the human brain. In fact, as the right part of the brain represents logic, the right part is devoted to efficiency and as the right part of the brain represents emotions, the right side of the model involves value creation (Figure 2.18)

Figure 2.18– Business Model Canvas Rationale



(Source: Osterwalder, A. 2010)

5.2.a Value Proposition

Value proposition represents the way in which a company generates value to customers by satisfying a need or solving a problem.

Mirror aims at creating an immersive shopping experience, more excited, smarter and different from the traditional one. A virtual space in which an e-commerce and a “social network” can cohabit, where fashion influencers can style outfits of the trendiest brands and customers can easily purchase them and receive the order quickly worldwide. Finally, Mirror represents an additional distribution channel for Italian physical retailers which will offset the drop in physical sales due to the consumers’ preferences shift towards online sales.

5.2.b Key Partners

Mirror’s key partners are physical fashion luxury retailers and brands, which represents the commercial partner, influencers and fashionistas, which style the outfits displayed on the platform, and DHL which is the shipping partner.

The commercial partners supply the products sold on the platform. Target commercial partners are high-end stores with top luxury brands or exclusive emerging brand or directly brands. A link between the software for the managing of the commercial partner’s warehouse. The name of the commercial partners is not disclosed. The role of the commercial partners is significant since it is responsible for the product and for the packaging of the product

Fashion influencers represent a key partner for Mirror, they can be defined as an individual with a large number of followers on social media, who has the power to affect purchase decisions of others because of its authority, knowledge, position or relationship with its audience [influencermarketinghub.com]. Influencers target is represented by Micro influencer devoted to high fashion clothing and accessories and with more than 10,000 followers on Instagram.

The shipping partner is DHL Express, the German world’s leading logistic company which currently employs over 360,000 people and serves 220 countries (DHL). Thanks to its express delivery, Mirror’s products can reach customers globally in 48 hours from the collection of the product.

5.2.c Key Activities

Key activities are the development of the platform and of the network of partners and the management of the purchasing process and the customer care.

Platform development and management is a crucial activity because it permits to differentiate the platform from other e-tailers. Making the apps and the website intuitive and user-friendly and the Content Management System easy to use, let customers and commercial partners keep using the platform and enjoying a simple shopping experience for both sides of the purchasing process.

Since the main operating activities are not directly operated by the company, Mirror's key roles are the creation of a growing network of commercial partners and fashion influencers, carefully selecting them, and the facilitation of the interaction between them. These activities are fundamental in order to achieve a rapid but solid growth and because the company's reputation is greatly affected by the performance of the partners.

Finally, the customer care activity concerns the actions devoted to ensuring an easy and satisfying shopping process, solving all issues concerning the shopping experience such as the payment or delivery process and returns, refunds or cancellation of the order.

5.2.d Key Resources

As discussed in the 3.3 Resource-based view section, resources can be divided into physical, intellectual, financial and human. Adopting a marketplace model, Mirror avoids owning a warehouse, as a result, physical resources are mainly technological. They include an iOS app and Android app, a Content Management System, Application Programming Interface, a landing page and a website and algorithms to customise the shopping experience which are currently under development. Intellectual resources are customers' database, commercial partners and influencers partnerships and the artistic content of the outfits' photos displayed in the platform. The majority of the activities are automatized, or outsourced, human resources' tasks involve the creation of the commercial

network, the management of the contents and the customer care and financial and marketing tasks. The company is fully financed by the owners and is currently looking for a funding round.

Considering the Platform, the customised experience, the contents and the partnerships with commercial partners and fashion influencers, as main resources for the VRIO model. The company has a sustained competitive advantage for the partnerships and the contents and a partly competitive advantage for the platform and the experience customization.

5.2.e Customer Segments

Customers segments are online shoppers, users interested on getting inspiration by the looks, commercial partners and fashion influencers.
The first segment involves online shoppers of luxury clothing and accessories, regardless gender, nationality and generation, even if the main focus is on Millennials which constitute the most growing generation which purchase online in this sector.

The second fashion lovers and fashionistas which want to be updated on new trends and to get inspiration by the looks displayed on the platform.
The third category is composed by the commercial partners, which are physical retailers and brands operating in the fashion luxury sector.

Finally, fashion influencers are the last category. They style the outfits and take the photos which are uploaded on the platform and displayed on the app.

5.2.f Customer Relationship

Mirror, being an online retailer, based its customer relationship on automated services. The system is customised basing on nationality and gender, in fact two languages (Italian and English) and three currencies (£, $, €) can be chosen (other are going to be added) and orders can be delivered in 220 countries.

Finally return can be requested directly in App by scheduling the collection of the order to be returned.

5.2.g Channels

Mirror reaches its customers through its online platform, composed by an iOS app, an Android app and a website which is currently under development. Partnerships with fashion influencers and ads campaigns allow Mirror to reach a vast audience and being sufficiently promoted. Finally, DHL delivers the order to the customers.

5.2.h Cost Structure

The company presents a large proportion of variable costs. The main variable cost regards the payments of the products sold to the commercial partners, which retain the 75% of the value of each product. However, this strategic choice allows the company to avoid the expenses related to the ownership and the management of a warehouse and the consequently inventory risk, since unsold products are responsibility of the commercial partner. Other important variable costs are the payment of payment systems, such as PayPal and Mercury Payments, whose fee for the use of their service is about 2.5% and the cost related to bearing a part of the delivery costs and of the returns.

The other main costs are related to the development and management of the platform and to the marketing campaigns.

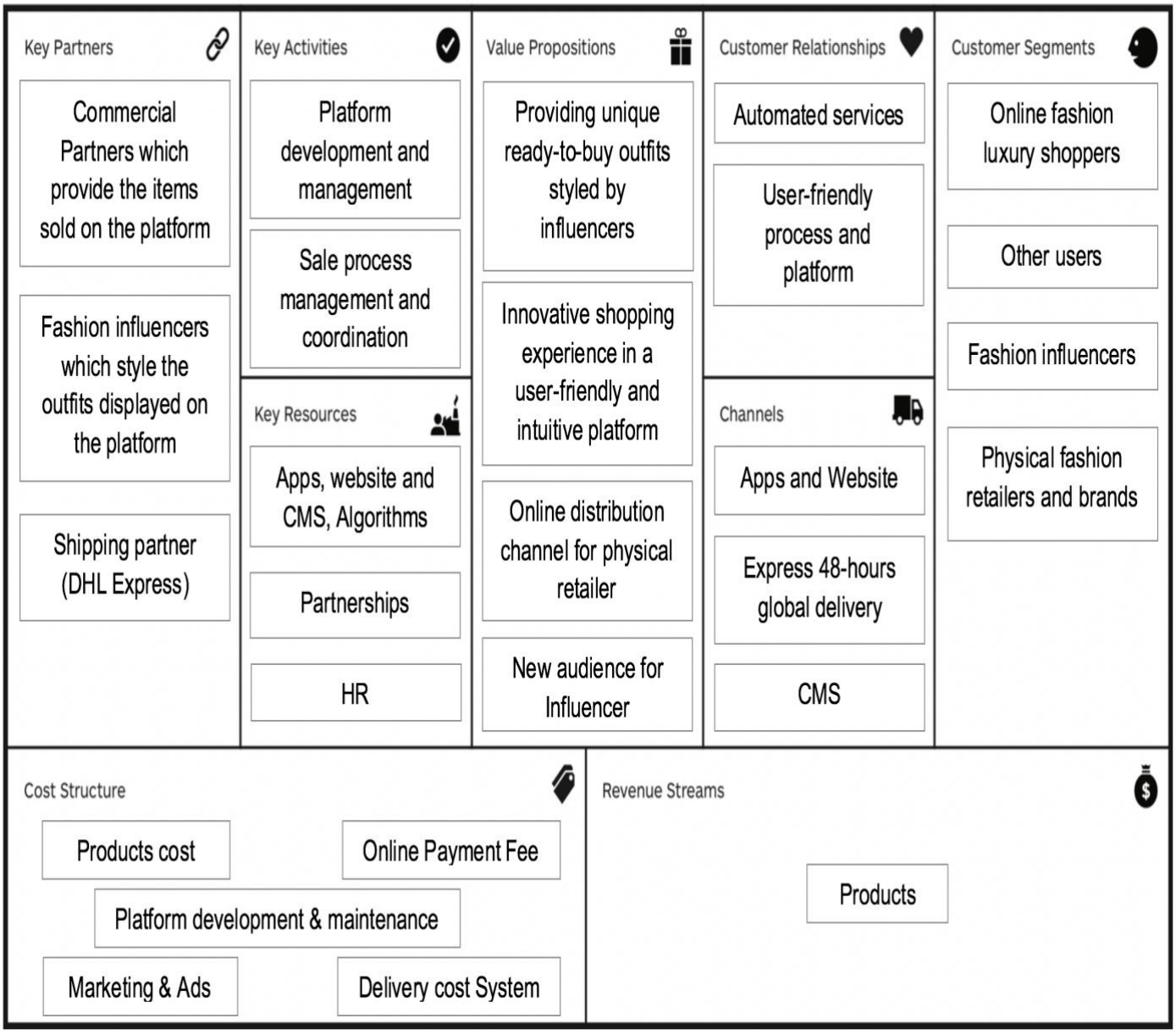
The company lies between the definition of cost-driven company and value-driven company because despite it try to offer a personalised and high-end service to its clients, the company's flexible structure and its business model which avoid a large part of the risks and costs in respect to other e-tailers.

5.2.i Revenue stream

Mirror's revenues are a percentage of sales. It retains the 25% of the value of each product sold.

5.2.l Business Model Canvas Map

Figure 2.19 – Business Model Canvas

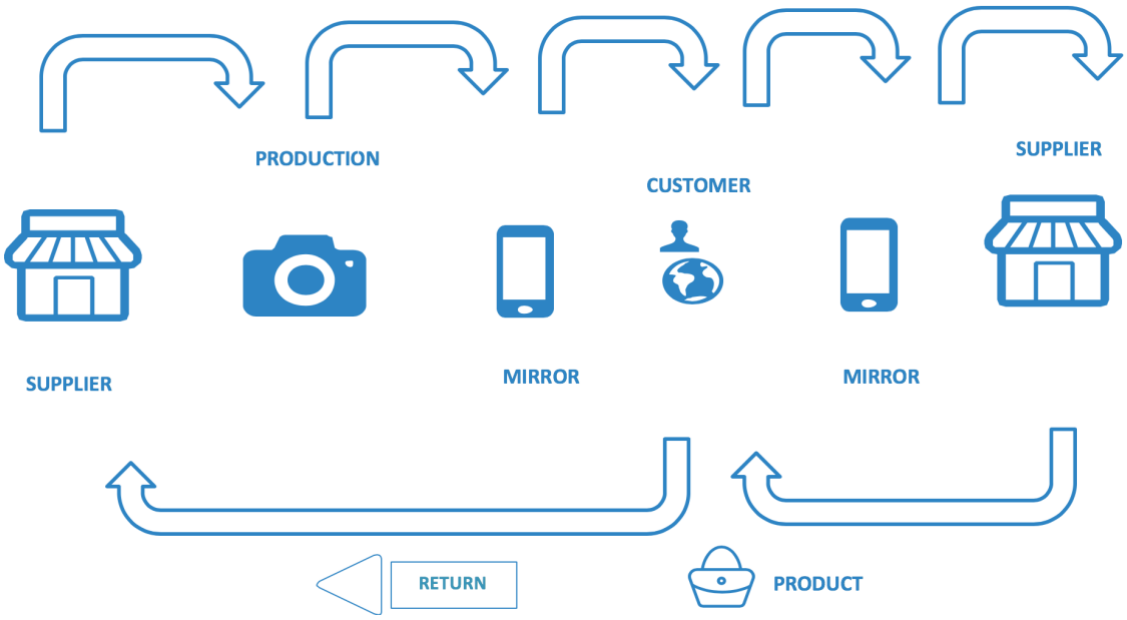


(Author's Graph)

6. Operations

From an operation point of view, the process, shown in the Figure 2.20, is composed by three steps (figure 2.21):

Figure 2.20 - Process

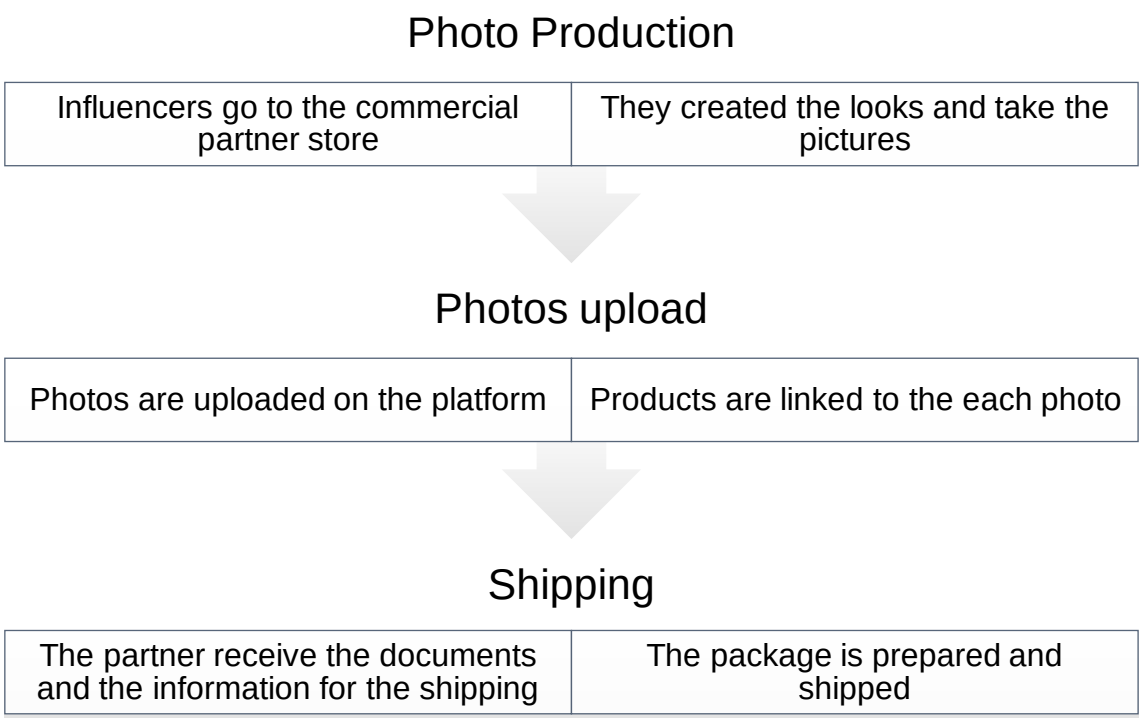


(Author's Graph)

1. Photo production: Influencers and Fashionistas go to the commercial partners' stores at the beginning of each season. They make the looks and then take the photos.
2. Photos upload: once the photos are taken, they are sent to Mirror together the product codes of each product photographed. Photos are uploaded on the platform using the Mirror's back-office. Then, using the product code, each product is linked to the photos.
3. Once orders are placed, commercial partners receive the communication of the order, the invoice and the transportation document by email or by logging-in the section of the back-office dedicated to commercial partners in which it is possible to download them. Finally, they prepare the orders with the

packaging provided by Mirror and give them to the Mirror's shipping partners which will collect the packages in the stores and deliver them to the customers worldwide within 48 hours.

Figure 2.21 – The process



From a technical point of view, Mirror, through API, links itself with physical boutiques' software for the management of their inventory. Thanks to this, it can check in real time the availability of each product and place the order. In fact, when a customer purchases a product, a notification containing all order details is sent to the commercial partner, the boutique prepares the order using the packaging provided by Mirror and gives it to the Mirror's shipping partner, DHL, which will collect the package in the boutique and deliver it to the customer within 48 hours. The boutique receives also the transportation document and the Mirror's invoice to the customer that must be attached to the package. These documents are automatically generated thanks to the integration with the shipping partner's software and thanks to a billing system created ad hoc, which will generate different invoices according to the nationality and kind of customers.

7. Marketing and Sales

The traffic is the key of success of every e-commerce platform. More traffic generates more orders thus more revenues. Consequently, it is critical to carefully choose the best way through which focus the marketing efforts. The Marketing strategy chosen rely on Social Media Marketing and Influencer Marketing.

Social Media Marketing consists in the sponsorship of the platform through social networks ads. Facebook e Instagram are the best channel in terms of audience and engagements. From 12 December 2018 to 31 December 2018 the strategy consisting in a 15-seconds video promoted on Instagram and Facebook gave the following result:

Table 2.4 – Social Media Marketing Results

12 December - 31 December	
Social Media Marketing	
Audience	144191
Click	3021
Conversion rate	2,1%
Budget	€ 500
Cost per click	€ 0,17
New users	170
Acquisition cost	€ 2,94
Orders	6
Average Order Value	€ 400,00
Revenues	€ 2.400,00

ROI	480%

(Source: Mirror srl)

For what concerns influencer marketing, it consists in the sponsorship of the platform on influencers' social networks accounts. It is the most effective form of marketing on a long-term view. In fact, as discussed above, the 72% of consumers is affected in their shopping decisions by influencers (El Qudsy, I. 2018), 92% of them trust more on influencers advices than in traditional marketing forms such as advertising or celebrities' endorsements (Chiang, J. 2018). Between consumers and influencers there is a strong relationship of trust which can be associated to the word-of-mouth marketing which generates twice the sales of traditional marketing forms (Bughin, J., Doogan, J., & Vetvik, O. 2010) and has a retention rate which is the 37% higher (Wong, K. 2014).

Influencers targeted are "Micro influencers" with a range of followers between 10,000 and 50,000 focused in a particular market niche. Their involvement, according to Forbes, generates a ROI much higher than traditional influencers (Wissman, B. 2018). It is not easy to calculate the effect of influencers on a business, but according to influence.co their conversion rate is 3.13%. Data related to Mirror's use of influencers are not available yet since the tracking of their involvement in the marketing strategy has been delayed to March 2019.

Chapter three: Network Analysis

1. Network Analysis

1.1 The Social Network Analysis (SNA)

The theory of networks has provided explanations a myriad of social phenomena in many disciplines from psychology to economics, from individual creativity to corporate profitability. It consists in the assumption that individuals are embedded in thick webs of social relations and interactions (Borgatti, S. et al. 2009). These social structures can be depicted and analysed through the use of network and graph theory. This is the Social Network Analysis (NSA) which breakdown a social structure in terms of “nodes”, which are the actors of the network and “ties” which are the relationships or the interactions which connect the actors.

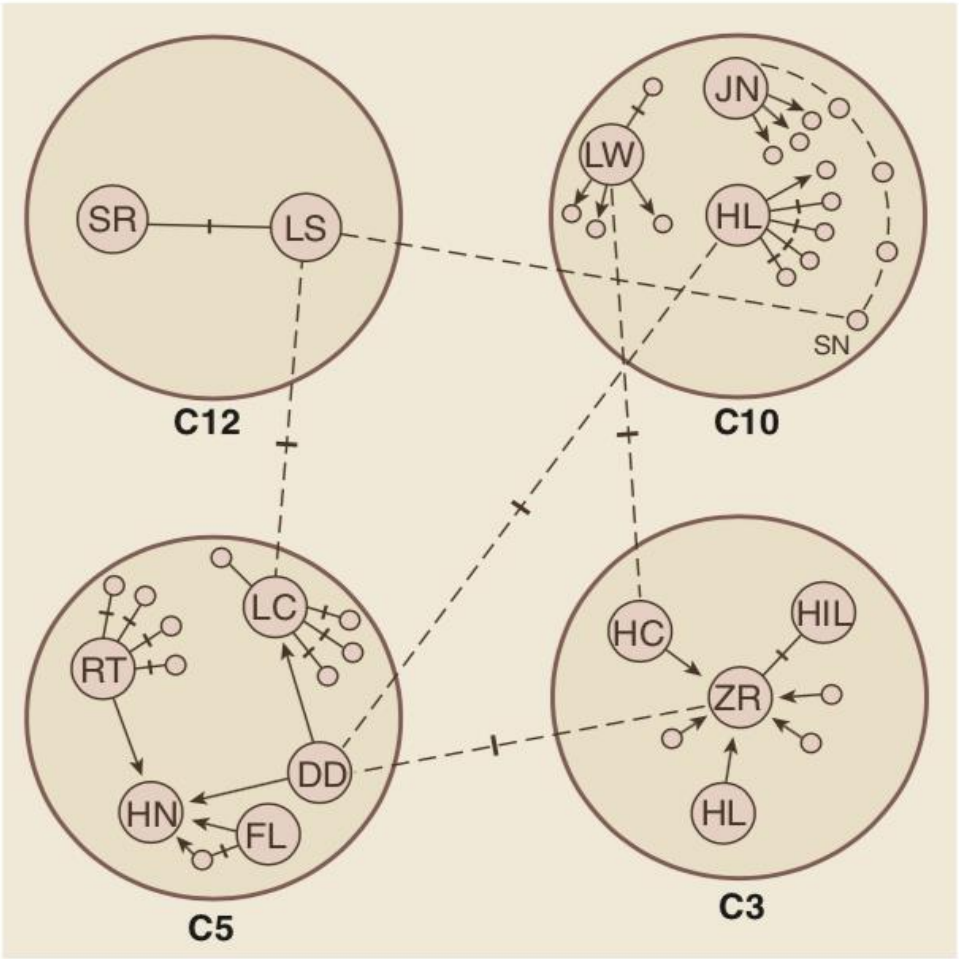
1.2 The origin of SNA

Networks research is a hot topic today in a variety of disciplines, the online articles related to “social networks” tripled in the past decade (Borgatti, S. et al. 2009), however originally this method was circumscribed to Sociology.

The first contribution to the network theory was in 1932 by Jacob Moreno, a psychiatrist. At the Hudson School for Girls in New York there were an abnormal number of runaways: 14 girls run away in just two weeks, this numbers corresponded to a runway rate 30 times higher than the norm. According to Moreno, the reason for the runaways was related to the underlying social network rather than to individual factors such as personality or motivation. So, Moreno and Helen Jennings mapped the social network at Hudson using “sociometry”, which is a technique for graphically representing individuals’ feelings toward one another (Fig. 3.1): the largest circles (C12, C10, C5, C3) represent the cottages in which the girls lived, the small circles (nodes) represent the girls, the 14 runaways are identified by initials. The lines (ties) represent the feelings, nondirected lines represent feelings of mutual attraction, while directed lines

represent one-way feelings of attraction. Moreno argued that was the girls' location in the social network that determined whether and when they ran away, consequently the links in this social network provided channels for the flow of social influence and ideas among the girls which ended up in the runaways (Borgatti, S. et al. 2009).

Figure 3.1 – Moreno's network of runways



(Source: Borgatti, S. et al. 2009)

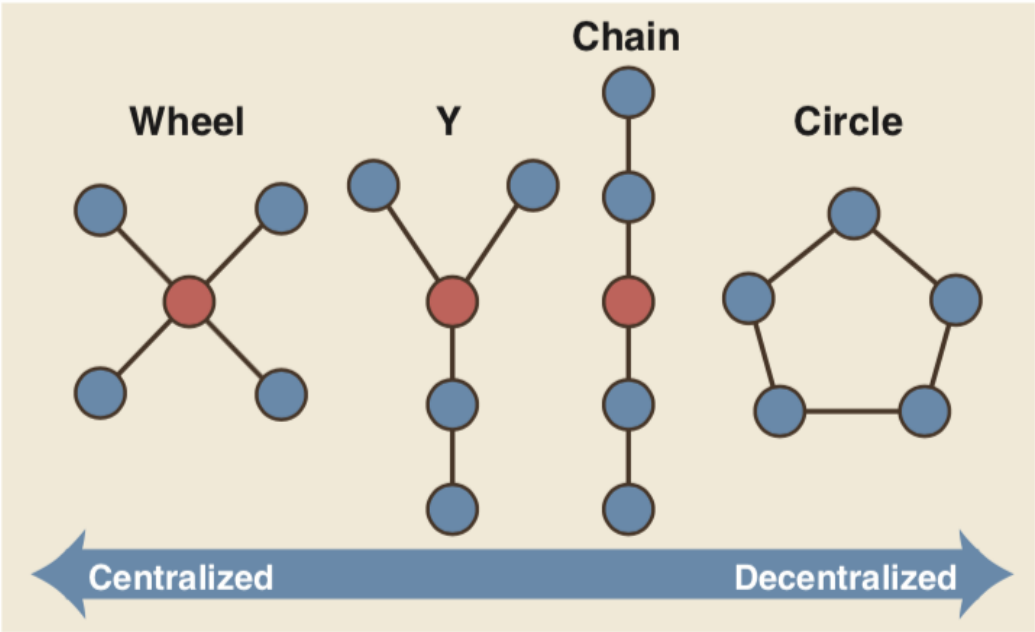
Moreno's approach to sociometry, with its "social atoms" and its "laws of social gravitation" was modelled basing on physics. Despite this idea of modeling the social sciences on physics was not new, in fact, centuries before Moreno, the social philosopher Comte hoped to find a new field of "social physics" and the French sociologist Durkheim claimed that human societies are like biological systems made up of interconnected components, as a result the reason for social

actions can be found not in individuals' aims but in the structure of the social environments in which they were embedded. Moreno, through sociometry, found a way to make tangible this abstract social structure.

During the following years many other studies in a number of fields, including psychology, political science, and economics were made:

- A Massachusetts Institute of Technology (MIT) team, headed by Bavelas, studied the effects that different communication network structures have on the speed and accuracy with which a group can solve problems (Fig. 3.2). The more centralized structures outperformed decentralized structures, such as the circle, even if mathematically was shown that the circle structure had the shortest minimum solution time. This because, conversely to the theory's suggestion, the more peripheral members of a network direct information to the most central node (the red circles in the figure 1.2), who decided what the correct answer is and sent the answer back to the other nodes. The fastest performing network structures were those in which the distance of all nodes is minimised.

Figure 3.2 – Network Structures analysed by Bavelas (MIT)



(Source: Borgatti, S. et al. 2009)

- In the 1950s, Kochen and de Sola Pool, a mathematician and a political scientist respectively, elaborated the “small world” problem which ended up, decades later, in the Stanley Milgram’s popular notion of “six degrees of separation”.

- Network analysis was used by sociologists to understand if urbanization destroyed community, and if cities played a central role in this drama. Through various analysis they found that urbanism reduce network the density of social relations, which, in turn, negatively affects psychological measures of personal satisfaction and well-being.

- During the 1960, a number of social anthropologists, influenced by the pioneering work of Radcliffe Brown, began to use network-based for their works. For instance, Bott examining 20 urban British families found that the denser the network, the more likely the couple would perform the household tasks separately and independently, conversely the more likely the couple shared many of the same tasks, showing that the structure of the larger network can affect relations and behaviors.

In the 1970s Lorrain and White found a way of building reduced models of the network by collapsing together nodes that are structurally equivalent, namely with similar ties. So, they make possible to build a network in which the nodes consisted of structural positions rather than individuals. This idea was broadly applicable to the analysis of agents in other field, such as the structure of the U.S. economy. It was also observed that structurally equivalent individuals experience similar social environments, consequently they may develop similar attitudes or behaviors. Another key contribution was the influential strength of weak ties (SWT) theory developed by Granovetter which ended up into a theory of social capital.

Finally, by the 1980s, social network analysis had become an established field within the social sciences. It has a professional organization, International Network for Social Network Analysis (INSNA), an annual conference (Sunbelt), a specialized software (UCINET), and its journal (Social Networks) and its used in

a number of fields, including physics, biology, management consulting, public health, and crime fighting.

1.3 Application

As previously discussed, the Social Network theory analyses social structures in terms of “nodes” or actors and “ties”, which are the relationships or the interactions which connect the actors. There can be different types of ties which can be summarised, as Table 3.1 shows, in four basic types: similarities, social relations, interactions, and flows. These ties and network properties in general, such as the clusteredness of networks or the distributions of node centrality can be originated by the so-called opportunity-based antecedents, which is the likelihood that two nodes will come into contact, and the benefit-based antecedents, which is a mechanism of utility maximization or discomfort minimization that leads to tie formation.

Table 3.1 – Basic ties types

Similarities			Social Relations				Interactions	Flows
Location	**Membership**	**Attribute**	**Kinship**	**Other role**	**Affective**	**Cognitive**	e.g.,	e.g.,
e.g.,	e.g.,	e.g.,	e.g.,	e.g.,	e.g.,	e.g.,	Sex with	Information
Same spatial and temporal space	Same clubs	Same gender	Mother of	Friend of	Likes	Knows	Talked to	Beliefs
	Same events	Same attitude	Sibling of	Boss of	Hates	Knows about	Advice to	Personnel
	etc.	etc.		Student of	etc.	Sees as happy	Helped	Resources
				Competitor of		etc.	Harmed	etc.
							etc.	

(Source: Borgatti, S. et al. 2009)

A node’s position in a network determines in part the nodes’ outcomes and their future characteristics. So, social network research focuses on assessing if an individual outcome is obtained through influence processes (i.e. individuals adopting their friends’ choices) or leveraging processes (i.e. results obtained exploiting connections or a position of power). For example, the popular social capital theory states that the rate of return on an actor’s investment in human capital (i.e. knowledge, skills, abilities) is determined by its social capital (i.e. its

network location). This is the main difference with traditional social research, which instead explains an individual's outcomes or characteristics as a function of other characteristics such as income education or gender.

A key task of social network analysis was to create graph-theoretic properties that characterize structures, positions, and properties and distribution of ties. One of the most important and studied concept is centrality which is a property of nodes concerning its structural importance on a network. For example, Freeman's Betweenness, a type of centrality which captures the property of frequently lying along the shortest paths between pairs of nodes. For instance, by analysing historical data on marriages and financial transactions of Medici family of the renaissance Florence, Padgett and Ansell argued that the Medici's rise to power was a function of their position of high betweenness within their network, which allowed them to broker business deals and act as an essential centre for communication and political decisions. This can be interpreted as potential power that an actor may exercise on others by using its positing, power or influence to persuade other nodes or distorting information.

The primary focus of network research is to explain differences in outcomes through variation in structure across different groups or contexts. These outcomes can be categorised into two groups: homogeneity or performance. Node homogeneity concerns the similarity of actors in respect to behaviours or structures. For instance, different organizational governance structure that a group of firm adopts can be explained by firms' characteristics. Performance refers to a node's outcomes in respect to a certain good. For instance, researchers showed that the firm's centrality predicts the firm's ability to innovate, measured as number of patents.

The most common theoretical mechanisms which explain the consequences of social network variables are:

- Direct transmission from node to node. The idea is that there is a flow from one node to the another. The flow can concern a physical good such as money or can

be intangible such as the contagion of ideas (this is called mimetic or imitative process).

- The adaptation mechanism. According to this mechanism nodes become homogeneous as a result of experiencing and adapting to similar social environments. If two nodes are linked to the same others, they experience the same environmental forces adapting to them and becoming increasingly similar.

- The binding mechanism. It is the idea is that social ties can link nodes together in a way that the new entity, resulting from the union, has property much more different by the originals. On this mechanism is based the popular notion of the performance benefits of "structural holes". A structural hole is the absence of links among a pair of actors in an ego network (which is the set of nodes with direct ties to a focal node, called "ego," together with the set of ties among members of the ego network). This means that in the presence of many structural holes there can be a person which can take advantage by brokering connections between otherwise disconnected segments (Burt, R. 2000). Conversely, the absence of structural holes around a node means that the nodes are connected together so they can communicate and coordinate acting as one and having a high bargaining power. This is the principle at the basis of the worker's unions and political alliances.

- The exclusion mechanism. It refers to the situations in which one node excludes a third node, by forming a relation with another. For example, in the supply chains. a firm can intentionally lock up a supplier to an exclusive contract excluding competitor firms from accessing that supplier.

2. Evidences from the company MIRROR

2.1 Research purpose

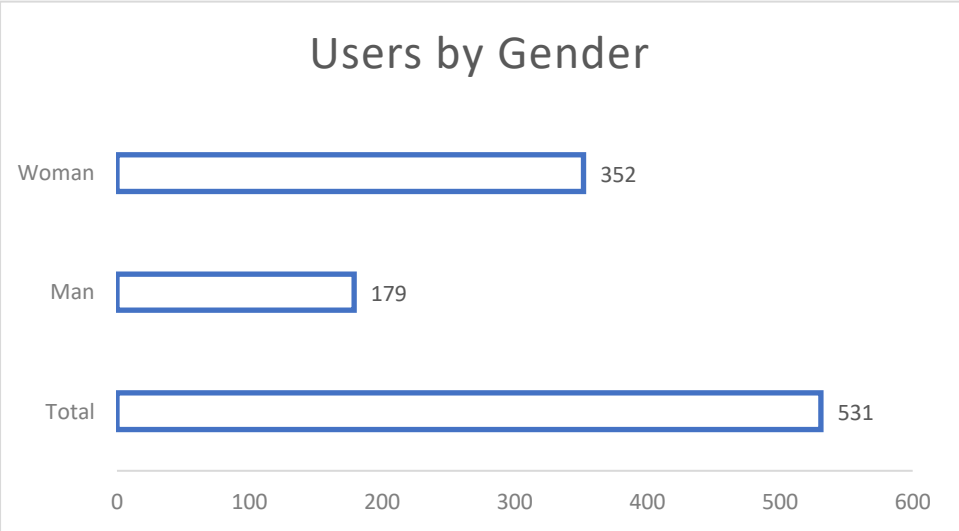
Network Analysis has been applied to the company Mirror in order to understand what brand is the most significant for the company and which variable can affect the sales of a certain brand.

2.2 Sample

The sample of this analysis are the first 531 users of the platform registered between December 14th, 2018 and January 14th, 2019. They are identified by the letter C following the number (example: C.001 for the first user) and the group is composed by 352 female users and 179 male users (figure 3.3), the main nationality is Italian, followed by Russian, American, French and English (figure 3.4), while the main generation is Millennials (44%), followed by Z Generation (28%) (figure 3.5).

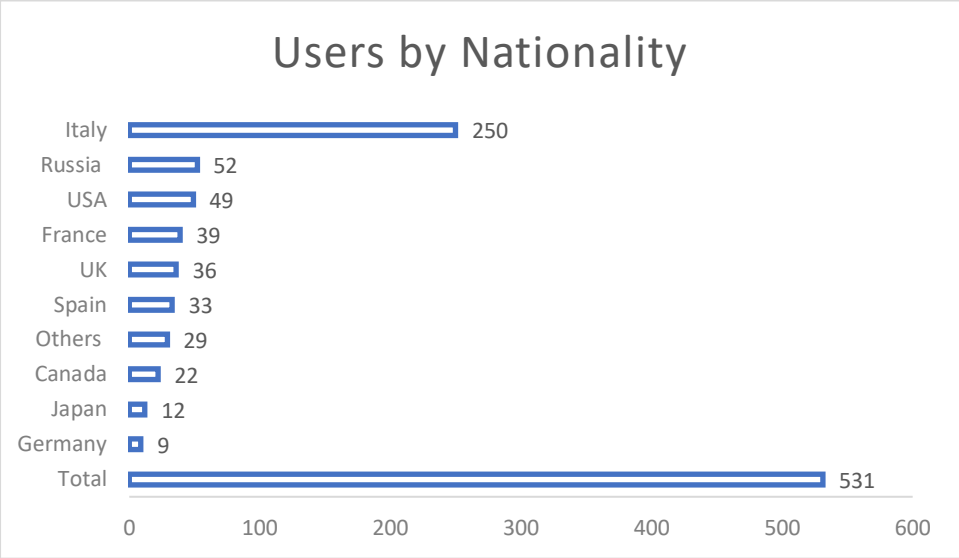
Another kind of actors is suppliers, they are 5 and provide the products which are sold in the platform. They are labelled by the letter S following the number (example S.01)

Figure 3.3 – Users by Gender



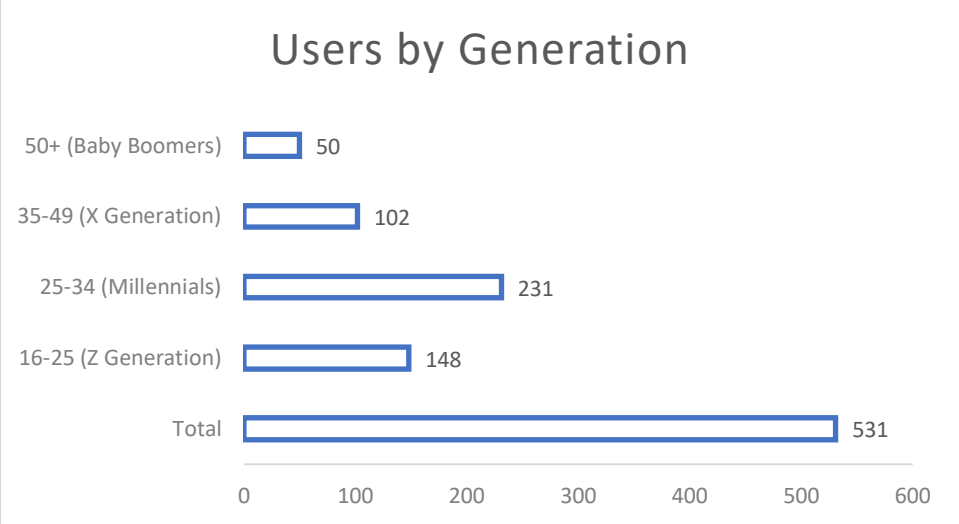
(source: MIRROR srl)

Figure 3.4 – Users by Nationality



(Source: MIRROR srl)

Figure 3.5 – Users by Generation



(Source: MIRROR srl)

2.3 MIRROR's Network

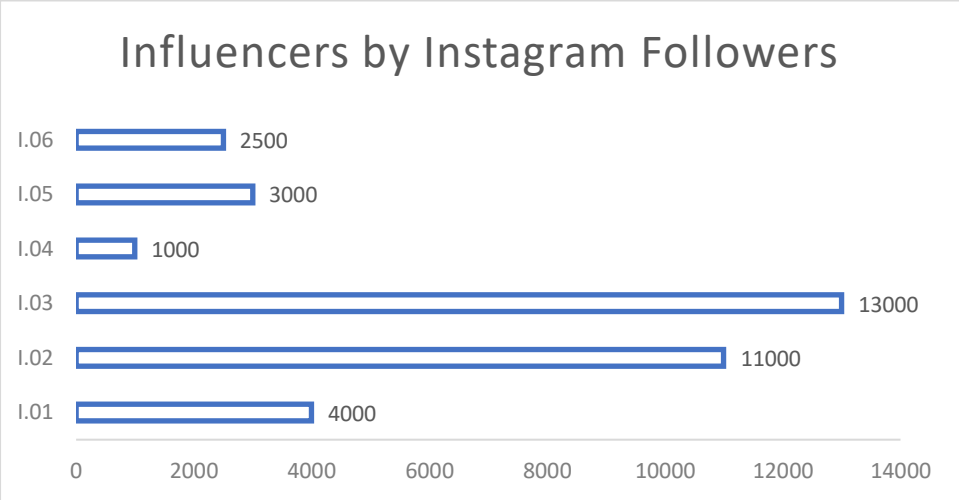
During the period analysed, among 39 brands available, those whose items have been purchased were only 11 on 39. Of these only 5 brands were purchased by more than one user.

These brands are:

- Gucci: the Italian luxury brand, operating since 1921, hit €4.3 billion sales in 2016 globally. Under 35 accounts for the 62% of the brand's sales (Mau, D. 2018). On MIRROR, 5 influencers on 6, whose user base on Instagram is about 30,000 followers, wear 20 Gucci items. Platform's sales account for €2,200. This brand is one of the "hottest brand Q1 2018" according to Lyst.
- Valentino: the Italian luxury brand, operating since 1960, hit €1.2 billion sales in 2016 globally. On MIRROR, 5 influencers on 6, whose users on Instagram are about 30,000 followers, wear 22 Valentino items. Platform's sales account for €2,400 thousand. This brand is one of the "hottest brand Q1 2018" according to Lyst.
- Saint Laurent: the French luxury brand, operating since 1961, hit €0.5 billion sales in 2016 globally. On MIRROR, 3 influencers on 6, whose user base on Instagram is about 25,000 followers, wear 18 Saint Laurent items. Platform's sales account for €1,100.
- Givenchy: the French luxury brand, operating since 1952, hit €1.2 billion sales in 2016 globally. On MIRROR, 5 influencers on 6, whose users on Instagram are about 30,00 followers, wear 16 Givenchy items. Platform's sales account for €900. This brand is one of the "hottest brand Q1 2018" according to Lyst.
- Alberta Ferretti: the Italian luxury brand, operating since 1973, hit €0.3 billion sales in 2016 globally. On MIRROR, 2 influencers on 6, whose user base on Instagram is about 20,000 followers, wear 12 Alberta Ferretti items. Platform's sales account for €800.

The data on Influencers are shown in Figure 3.6, their overall user base on Instagram is 34,000 followers. On average they wear 11 items for brand. Table 3.6 shows the sales by suppliers.

Figure 3.6 – Influencers by Instagram Followers



(Source: Mirror srl)

Table 3.3 – Sales by Supplier

	S.01	S.02	S.03	S.04	S.05	Sales (€)
B.01	2					800
B.02			1			200
B.05	1					300
B.08					1	300
B.10	1					700
B.11			3			800
B.19	1	1				900
B.20	2	2				2200
B.28	1					400
B.36	2	1				1100
B.38	4	2				2400

(Source: Mirror srl)

The expectations from these data are that users will be more affected by a brand which perform better and for which MIRROR has involved more influencers.

Users which have purchased items of the same brands are grouped in figure 3.7. The groups have been built using the UCINET software.

There two larger groups:

1. The top-left group (Group 1) is composed by 6 users which purchased items of the brand Gucci. Of these 5 are Males and 1 is Female; 2 are Italian, 1 American, 1 French, 1 British and 1 Russian; 4 are aged between 25 and 35 and 2 between 16 and 24 years old.
2. The top-right group (Group 2) is composed by 6 users which purchased items of the brand Valentino. Of these 2 are Males and 4 are Females; 3 are Italian, 2 British and 1 Japanese; 4 are aged between 25 and 35, 1 between 16 and 24 and 1 more than 50 years old.

And three smaller groups:

3. The central group (Group 3) is composed by 2 users which purchased items of the brand Givenchy. Of these 1 is Male and 1 is Female; 1 Italian and 1 British; 2 aged between 25 and 34 years old.
4. The bottom left group (Group 4) is composed by 3 users which purchased items of the brand Saint Laurent. Of these 1 is Male and 2 are Females; 1 is Italian, 1 American and 1 French; 3 are aged between 25 and 35 years old.
5. The bottom right group (Group 5) is composed by 2 users which purchased items of the brand Alberta Ferretti. Of these are 2 Females; 2 are Italian; 2 are aged between 24 and 34 years old.

Data about the purchases are summarised in the Table 3.2.

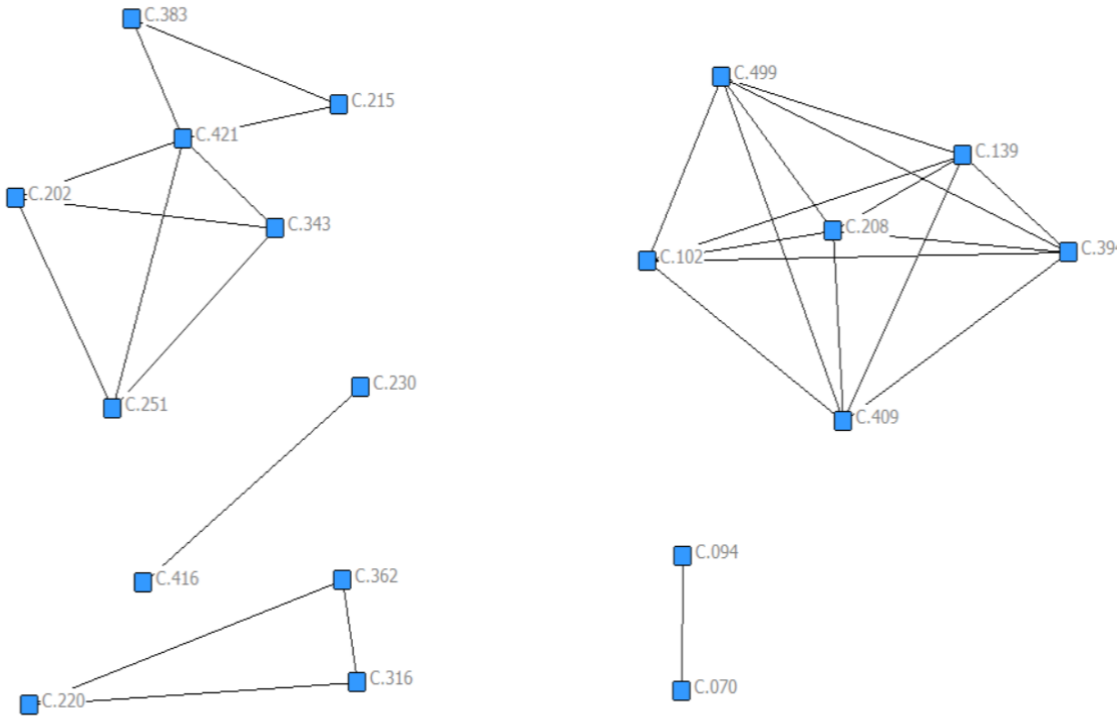
Table 3.2 – Users Purchases (Dec 2018 – Jan 2019)

C.070	ITA	W	25-34	ALBERTA FERRETTI
C.094	ITA	W	25-34	
C.230	ITA	M	25-34	GIVENCHY
C.416	UK	W	25-34	
C.202	ITA	M	25-34	GUCCI
C.215	ITA	M	25-35	

C.251	RUS	W	16-24	
C.343	USA	M	25-34	
C.383	FRA	M	25-34	
C.421	UK	M	16-24	
C.220	ITA	M	25-34	SAINT LAURENT
C.316	USA	W	25-34	
C.362	FRA	W	25-34	
C.102	ITA	W	25-34	VALENTINO
C.139	ITA	W	35-49	
C.208	ITA	M	25-34	
C.394	UK	W	16-24	
C.409	UK	W	25-34	
C.499	GER	M	25-34	

(Source: Mirror srl)

Figure 3.7 – MIRROR's Network

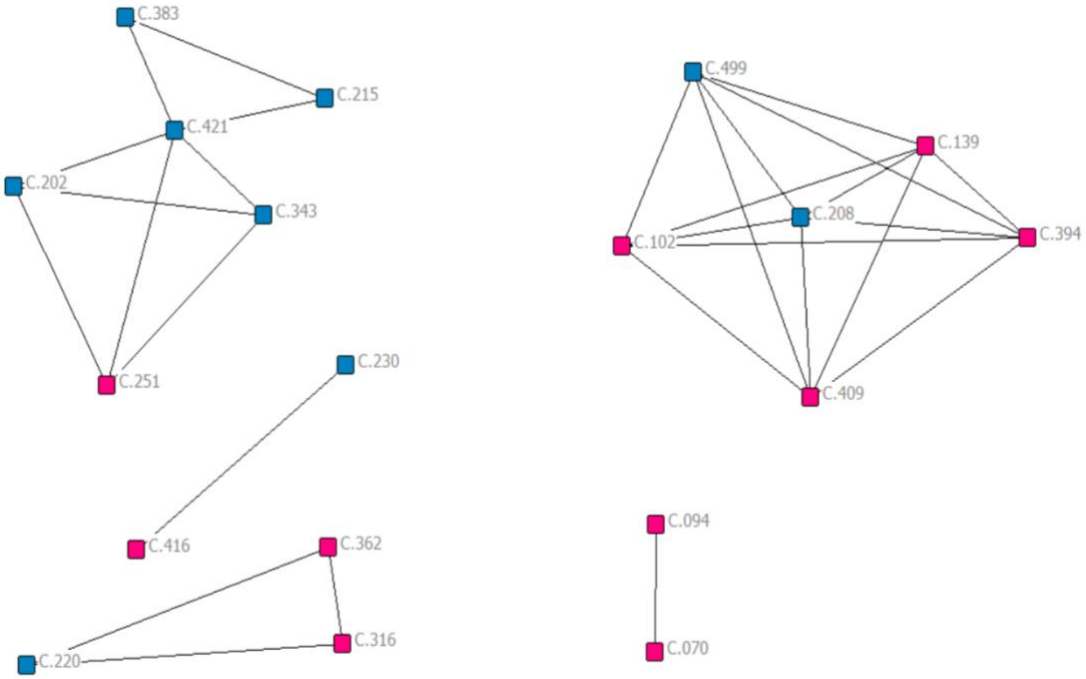


Looking at the MIRROR's networks by Gender (Figure 3.8), by Nationality (Figure 3.9), and by Age (Figure 3.10), it can be observed that, considering the two most significant group, there are many similarities among the nodes of each group:

In the group 1, the 67% of the nodes are aged between 24 and 35 years old; the 83% is male. Moreover, it can be noticed that user C.421 is a central node which span a structural hole (bridging of structural hole).

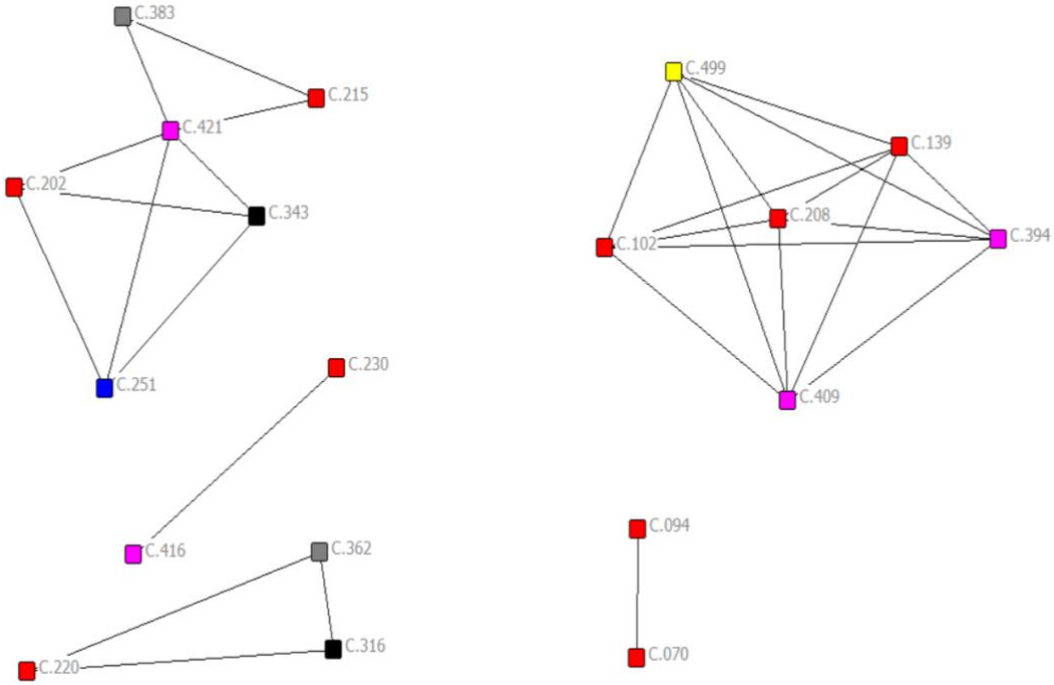
In the group 2, the 67% of the nodes is composed by females; the 67% is aged between 25 and 34 years old; and the 50% is Italian. The user C.208 is a central node of this group.

Figure 3.8 – MIRROR's Network by Gender



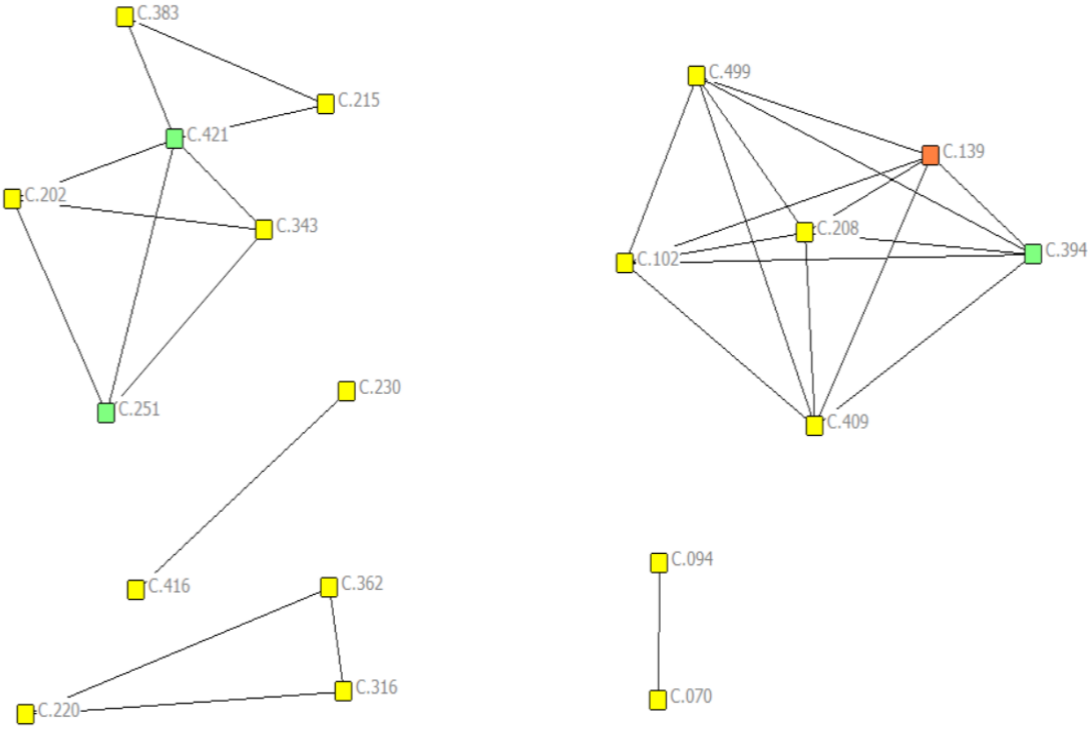
Note. Blue Male, Pink UK

Figure 3.9 – MIRROR's Network by Nationality



Note. Red Italy, Blu Russia, Black USA, Grey France, Pink UK, Yellow Japan

Figure 3.8 – MIRROR's Network by Age



Note. 16-24 Green, 25-34 Yellow, 35-49 Orange

Such high similarities among users could be explained through a mechanism called “homophily”. It states that a contact between similar people occurs at a higher rate than among dissimilar people (McPherson, M., Smith-Lovin, L., Cook, J. 2001). In fact, as can be noted analysing the network, users among a same group have similar gender, nationality and age. In particular, under 35 dominate the network, probably because they are the generation more oriented towards online shopping.

2.4 Limitations and next steps

Despite the attempt to provide in this work an explanation for the users’ brand choices, there are limitations that make a deeper analysis not significant:

- The number of the data collected is not enough to obtain significant results.
- The longitudinal extension of the readings does not allow to map the networks dynamics.
- Relationships and interactions among the different actors (users, influencers, suppliers) can not be tracked.

These limitations are mainly due to the fact that the data collection was limited to a short period of time and to the initial phase of the business, which means that the data are biased by being in a phase characterised by low traffic and users.

Nevertheless, the previous work is a stepping stone towards further future analyses and researches. In fact, having started monitoring the network since the very beginning represents both an important opportunity to study the evolution of a network from the foundation and to see how different kind of actors interact on a platform.

Moreover, platform businesses are currently an “hot” topic in management literature, in fact there are many academic calls for contributions in this field in

order to better understand the interrelationship between business networks and innovation and creativity (Cliquet, G. et al. 2019)

Finally, pursuing this research by monitoring and analysing the evolution of the actors' interaction, will help the management of the company MIRROR to take better choices and growing the business more rapidly.

Conclusions

This work aimed at providing a wide overview of start-ups' early stages of their lifecycle, through both theoretical and practical tools.

After having defined start-ups as a young, innovative, growth–oriented business in search of a sustainable and scalable business model which is going to solve a market need or problem, the common characteristics of start-ups, namely, initial negative cash flows, lack of historical data, dependence on private equity, high failure rates and illiquidity of the investment has been listed.

As demonstrated by empirical evidences, start-ups significantly contribute to the overall economy, the most growing economies of the last decades were those which enjoy also higher rate of new business formation, moreover evidences show that a very important share of new jobs created in the economy and the bulk of R&D investments have been generated by new businesses.

Looking at the start-up lifecycle it is possible to distinguish the idea generation, the business planning and product development, the development Stage and then the maturity. During the initial stages, the most important problem for start-ups is funding. Venture Capital (VC) represents the most important source of funding for young start-ups. In this context, company valuation is crucial in order to obtain a fair deal. The most common valuation method, namely the venture capital method has been discussed as well as some modification proposed by the NYU professor A. Damodaran to get a fairer valuation.

In the second chapter, evidences from the company MIRROR has been studied. After a company overview, the analysis starts with the strategic tripod analysis. Then, the business model has been depicted through a business model canvas. Finally, the execution of the business model and the first results are exhibited.

Lastly, the first data on users' actions on the platform have been analysed through the use of the Social Network Analysis (SNA). Despite the attempt to run a deep analysis of the reasons behind a user's brand choice, the results are not significant because of the lack of more data. However, this analysis will be continued in the future and will provide useful information for the management of the company and for the management literature about the evolution of the actors' relations.

APPENDIX I: Artificial Intelligence Systems and their impact on the Patent System

1. Artificial Intelligence Systems

Artificial Intelligence (AI) is a branch of Computer Science which involves the creation of “intelligent machines”, namely machines programmed to “think” as humans whose functioning is inspired by the way people use their nervous systems and bodies to sense, learn, reason, and take action (Stanford University 2016).

Today AI is one of the most dynamic and growing sectors: 61% of 1600 organisations surveyed indicate AI as the most significant data initiative for 2017 (Lewandowski 2018). moreover, McKinsey estimates that the annual investment in AI was between $8 to $12 billion in 2016 (Columbus 2018).

AI systems are becoming even more common in our daily life. Chatbots, Apple’s Siri, AI systems which drive the video games are all example of how AI technology has been growing more and more since Alan Turing introduced AI as a concept in the paper “Computing Machinery and Intelligence” in 1950.

Self-driving cars, healthcare diagnostics, flying drones and self-driving trucks which will deliver our online purchase, robotics controlled by AI applied in industries such as agriculture or factories, are all example of how AI applications are going to revolutionise our life and our economy.

However, a true AI system is the one which can learn on its own in a variety of fields. In that Artificial Narrow Intelligence or Weak AI systems, like the abovementioned examples of AIs, in which the programmer controls every output, very differ from Artificial General Intelligence (AGI) or Strong AI systems which can think innovatively and reason independently.

On the one hand, Narrow AI concerns the creation of programs that demonstrate intelligence in a specialised area, such as chess-playing, medical diagnosis, self-driving cars, algebraic calculation or mathematical theorem-proving.

On the other hand, Artificial General Intelligence (AGI) can acquire and apply knowledge, and reason and think, in a variety of domains, not just in a single area like chess or game-playing or languages or mathematics (Pennachin and Goertzel 2007), in fact, according to the dictionary, intelligence is “the capacity to acquire and apply knowledge”, and “The faculty of thought and reason” (Pennachin and Goertzel 2007). In other words, AI is a machine that could successfully perform any intellectual task that a human being can. The notion of strong AI is strongly related to the Machine Learning which means that a machine can learn, improving itself without any human input.

To assess the "human-level" of an AI, Alan Turing elaborates a test, known as “Turing Test”, which consists in a remote conversation between an AI and a human in which a third human evaluator has to distinguish which of the two is the machine in a limited timeframe. Nevertheless, some experts consider it a not sufficient test for assessing the human level of an AI since it has been invalidated by the so-called "Chinese Room” argument by John Searle. It basically states that it is possible to simulate knowledge without really understanding it (Encyclopedia Britannica 2017). Anyway, many other tests have been created such as “The Coffee Test” by Wozniak (Machine Intelligence Research Institute 2013) or “The Employment Test” by Nilsson (Nilsson 2005).

Anyway, in the present context, AIs can only understand unstructured data, learn automatically, reaching conclusions (computer reasoning); and can be used to automatize partially the inventing process (Ramalho 2018). In that sense currently available AIs are not Strong AI and are not inventors as such since they can not define the problem to be solved, nor the inputs to use in the inventive process.

Nevertheless, AIs technologies are becoming more and more sophisticated. From a regulatory point of view, is vital to be ready for the near future in which AIs may autonomously create inventions which can receive legal protection.

This raises many questions about patent laws: should society gives the benefit of legal protection to the creations of a non-human “inventor”? Will this achieve the purpose for what IP laws were created? Will this boost human innovation or it will definitely suffocate it? Is the current patent system capable to resist this great change without either hampering AI innovation or disrupting human innovation?

2. Artificial Intelligence Patentability

2.1 Patent System Overview

A patent incorporates two rights: the right to exclude a third party from practising the invention and the right to freely use the invention, in fact in that sense the common patent interpretation as monopolistic rights is misleading (Granieri 2014).

Many theories have been used to justify the patent system, namely the natural rights theory and the personality theory ideated by John Locke and by Hegel respectively. According to the first, an individual should have natural property rights over the products of her mind. According to the last, creations are an extension of the creator’s personality, and the property over such creations are a mechanism for self-development and personal expression (Ramalho 2018). However, the most common and accepted explanations for patents are the Reward Theory and the Prospect Theory (Granieri, M. 2014). The first explanation justifies patents as the reward of the inventor for its contribution to the advancement of the human knowledge. The last sees patents as an incentive to invest in developing promising technologies, this represents a very actual point of view since inventions are usually early stage technologies which need investments to become products (Granieri, M. 2014). On this view, it becomes evident that patents are less justified for those inventions which requires low investments for its development, namely software (Granieri, M. 2014).

The aim of the patent system should be to encourage innovation and the dissemination of useful technical information as well as to incentivise investment

in new technologies that promote economic growth and advance social goals [Merrill 2004]. However, the drawbacks deriving from the patent system should not overcome its benefits. The costs deriving from the temporary “monopoly” that the inventors obtain with the patent is enormous, it creates temporary barriers to entry for new companies (World Economic Forum 2018) and high social cost, for instance in 2005 patents on drugs costs to US citizens $210 billion (The Economist 2015). For this reason, a good patent system should ensure that the value that the society gains from the disclosure of the invention for which the patent is grant exceeds its cost.

According to the Art.52 of the European Patent Convention (EPC), “European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application”. Consequently, in order to access to the patent protection, an invention must have all the *patentability requirements*:

1. Novelty: according to Article 54 of the EPC, an invention can be considered new if it does not form part of the state of the art. The state of the art comprises everything made available to the public (including the Patent Literature)
2. Inventive Step: according to the Article 56 of the EPC, an invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art.
3. Industrial Application: an invention shall be considered as susceptible of industrial application if it can be made or used in any kind of industry, including agriculture.

A fourth hidden requirement is that the matter for which the protection is sought is identifiable in the claims (Granieri, M. 2014), as the Article 84 of the EPC states.

2.2 AIs Patentability

The European Patent Office (EPO), issued new guidelines for the patentability of Artificial Intelligence and Machine Learning on November 2018. According to the G-II 3.3.1, inventions within this subject matter are largely unpatentable, in fact they are "based on computational models and algorithms for classification, clustering, regression and dimensionality reduction, such as neural networks, genetic algorithms, support vector machines, k-means, kernel regression and discriminant analysis" and "such computational models and algorithms are *per se* of an abstract mathematical nature", as a result, guidance provided in G-II 3.3 regarding mathematical methods must be applied.

"Mathematical methods play an important role in the solution of technical problems in all fields of technology", "however they are excluded from patentability under Art. 52 (2)". "The exclusion applies if a claim is directed to a purely abstract mathematical method and the claim does not require any technical means". This means that a patent application concerning AI is not always excluded: if the invention has a technical application it can be patented. For Instance, an algorithm such as a neural network, which is implemented as a computer program, usually is not considered to have a technical characteristic, however, when it is applied to a technical problem, it can be patentable since it has a technical application (Nielsen 2018).

Analogously in the USA, patent claims that are directed to abstract ideas, like mathematical algorithm, are not eligible for patent protection, since "they are the basic tools of scientific and technological work," and that granting a patent on these could hamper innovation. Therefore, The Supreme Court, in *Alice Corporation Pty. Ltd. v. CLS Bank International*, recently excluded patent claims directed to subject matter that can be performed "in the human mind" or by "a human using a pen and paper", with the exception for inventions which provide solutions for a technical problem. Consequently, since the aim of AI is to replicate human intelligence and tasks, this aspect makes more problematic patenting AI (World Economic Forum 2018).

3. The impacts of AIs on Patentability requirements

According to the Article 52 (1) of EPC inventions must be new, involve an inventive step and be susceptible of industrial application in order to be patentable. The diffusion of the use of AIs may profoundly affect two of the patentability requirements, namely Novelty and Inventive Step.

3.1 Novelty and the Prior Art

Cloem, AllPriorArt or Specifio are companies which use AIs technology to provide automated software that can prepare patent applications (partly) automatically. Starting from a seed patent claim, they can make thousands of alternative patent claims through automated drafting techniques (Hattenbach, Glucoft 2015). Although the results are still not perfect, these programs provide some grammatically correct phrases which provide exciting variations on the original application. However, when these technologies become more accurate and capable of managing the entire process of the application, they could generate severe issues for the patent system. In fact, the phenomenon, if not well managed, may lead to an overbearing number of patent applications, which may block the process of examination, since examiners may not have resources enough to manage all these applications.
One of the most impacting potential uses for automatically generated claims involves the Prior Art. In fact, automatically generate claims may be used to serve as prior art to help invalidating other patents; or to saturate the technical space around their own patents to prevent competitors from obtaining improvement patents in the same area; or even to saturate the technical space around competitors' patents to prevent the competitors from subsequently patenting improvements on the competitors' own inventions (Hattenbach, Glucoft 2015).

However, qualifying AI-generated applications as Prior Art raises some problems. For example, it may make more difficult to vet all the relevant prior art because

of the difficulty of managing an increasing number of applications (World Economic Forum 2018).

A possible solution may be raising application and administrative fees needed to start an application [World Economic Forum 2018], however this may discourage deserving inventions to apply for receiving protection. Another solution may be adopting AIs to assist the patent examiners in analysing the increased number of the prior art. However, if AIs becomes advanced enough to be not just a support but autonomous patent examiners, it may arise a situation in which inventors, applicant and examiners are all AIs, with uncertain effects on human ingenuity (World Economic Forum 2018).

3.2 Inventive Step and the Person Skilled in the Art (PSA)

An invention is a new and inventive solution over the existing prior art, however, according to the Article 56, the content of the previously filed patent application shall not be considered when assessing the Inventive Step. The inventive step is assessed by a person having ordinary skill in the art and being familiar with all prior art. It will reject inventions which are “obvious”, so that does not achieve any innovation. According to the Guidelines of the European Patent Office (EPO), the term “obvious” refers to something that “does not go beyond the normal progress of technology”, and that does not imply any ability beyond what is expected from the person skilled in the art (Ramalho 2018).

However, as AIs become more sophisticated and common, it may be used to assist the Person Skilled in the Art or even replace it in assessing the inventive step. This will practically make the inventive step requirement more difficult to pass since what is not obvious for a person may be obvious for an AI (Osborne Clarke 2018). If the standard becomes too high, deserving inventions may be prevented from being patented, thus hampering innovation.

4. AI-Generated Inventions Patentability

Is it desirable that AI creations receive legal protection? Opinions diverge. On the one hand, some argue that granting patent rights to inventions generated by AI will speed up innovation, on the other hand, some thinks that it may "negatively impact future human innovation as supplanting human invention with autonomous algorithms could result in the "atrophy of human intelligence" (Fraser 2016). According to this opinion, as the introduction of the calculator in the classroom has decreased children's ability to do basic arithmetic operations, AI could reduce human creativity (Stanford University 2016) and undoubtedly R&D jobs. However, some balancing systems may be introduced to offset this potential effect. Granting different patent period basing the decision on the level of human involvement on the inventive process or raising patentability standards for inventions created by AI could be a possibility (World Economic Forum 2018).

4.1 Ownership

If AIs create patentable inventions, who should be listed as the inventor of the inventions? The user of AI? The creator of the AI? The AI itself? Or the invention might not even be patentable because no human should be listed as the inventor?

Since patent laws were introduced inventions have always been made by humans. Nowadays, the game is changing. Sophisticated AI could create patentable inventions without any human input. In the 1980s, Stephen Thaler invented the *Creativity Machine*, an artificial neural network that autonomously generates designs, music, discovery and problem-solving (Ramalho 2018). The *Creativity Machine* had the idea for the invention of the *Oral-B Cross Action* toothbrush, and, even if the machine came up with the idea, Thaler was listed as the inventor (Johnson 2018). This raises questions about the inventorship of an invention: should Thaler have been listed as the inventor even if he did not conceive the idea? In the *Creativity Machine* case, the AI contribution was limited,

it just analysed data ending up with a solution, while Thales provided information, set parameters, define the problem and identified the best solution among the many provided by the machine [Ramalho 2018]. In that sense, the *Creativity Machine* is not an inventor, since it did not identify the problem to be solved, neither the inputs to use in the inventive process.

In the European Patent Convention (EPC), there is no explicit definition of inventor, however the common interpretation of the Art. 60 of EPC is that inventors need to be a natural person. The act of intellectual creation is an essential prerequisite to identifying the inventor, therefore who just follows instructions by someone else cannot be identified as a (co-)inventor. This applies to people and corporations as well as to machines, in fact as long as a natural person identifies a problem and comes up with a solution, it will be identified as the inventor, even if totally assisted by an AI. The same is for US law which requires “conception”, “the formation in the mind of inventor", for recognising something as invention and consequently ensuring legal protection to it (World Economic Forum 2018).

However, the problem remains, AIs become ever more sophisticated and will be capable of autonomously create an invention in the near future. If human involvement becomes limited to activate the AI system and reading the results, the concept of inventorship will become questionable.

On the one hand, one solution may recognise AI as inventor. However, the rewarding function of the patent will become meaningless since AI can not benefit from incentives and can continue generating inventions without any stimulus. Actually, an AI is not a legal entity, as a result, a special status for AIs should be created in order to list it as the inventor. This solution may reward both AI's inventor and owner, as a result, may be the optimal choice for encouraging innovation since they will have incentives for continuing inventing and buying AIs.

A second option, namely not recognising any protection to AIs’ invention, may discourage AI's developers from creating them, as a result, many inventions which may have improved the social benefit will not be created.

Finally, listing the AI owner will definitively not match with the aim of the patent system. In fact, the purpose of patents is to incentivise to invent and to disclose inventions, it is not to reward the owner of intelligent computer system (Osborne Clarke 2018).

Many scenarios can be imaged, but certainly, the increasing improvements of AI technologies raise many unsolved questions regarding patent law, which can potentially disrupt many legal frameworks.

5. Patent Infringement by AI

Patent rights include the right of inventors to exclude others from practising the patented inventions. AIs can already infringe patents. However, who should be responsible for AI's actions? The end user, the developer or AI itself?

Despite the efforts to unify patent litigation systems, according to the Article 64 EPC, they vary from country to country in Europe. However, useful guidance on patent infringement that is independent of human involvement can be found in the European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics. It explains that today, AIs should not be considered responsible for patent infringement. Instead, the human agent, such as AI's developer or the end user, should be considered responsible if that agent could have foreseen or avoided the infringing act.

However, the rapid progress of AIs may lead to a situation in which no human agent could be considered responsible. In this case, failing to hold "someone" liable for patent infringement by AI will likely encourage using AI for infringement.

As suggested in the document, one possible solution could be treating the infringement as a product "malfunction" and consequently providing an obligatory insurance scheme (as with cars). Another option would be to consider the AI itself

responsible. However, it would mean recognise AI as a legal entity, “creating a specific legal status for robots in the long run” (World Economic Forum 2018).

6. Final considerations

- **AI Patentability**: being treated as mathematical methods, Artificial Intelligence inventions are largely unpatentable, unless they provide a solution to a technical problem.

- **AIs’ effects on the Novelty requirement**: AIs may be used to generate thousands of variations of patent claims automatically. These may be used as defensive publications in order to protect the space around already patented inventions or to prevent a competitor from patenting improvements of their inventions. However, this may create a situation in which an excessive quantity of applications will block the examination system because of a lack of resources. Possible solutions could be raising application fees or supporting examiners with AIs. Both possibilities have pros and cons, however, the last may be most beneficial if a human supervisor will adequately counterbalance its potential drawbacks.

- **AIs’ effects on the Inventive Step requirement**: AIs may assist the Person Skilled in the Art or even replace it in assessing the inventive step in the near future. However, this will raise the requirement since what is not obvious for a person may be obvious for an AI, thus hampering innovation. As a result, some balancing system should be introduced.

- **AI-generated inventions patentability**: despite at the moment AIs simply assist a natural person in the invention generation, they may become more sophisticated and capable of autonomously creating inventions in a near future. The patent systems need to be updated to face this next challenge.

Preventing their inventions to be patented may hamper innovation since this will reduce AIs developers from creating them, however giving them this right may end up in an “atrophy of human intelligence”. Moreover, this will not match with the purpose of the patent system, since AIs can continue generating inventions without any incentive. Granting different patent period basing the decision on the level of human involvement on the inventive process or raising patentability standards for inventions created by AI could be a possibility. Moreover, the problem of the inventorship of the inventions should also be taken into account, since it is not clear which actor should be listed as inventor. A solution may be creating a legal status for AIs and recognising them as inventor. This will incentivise enough both AIs’ developers and AIs’ owners.

- **Patent infringement by AIs**: AIs can already infringe patents, in such cases the human agent should always be considered responsible for the infringement. However, it could happen that AI takes autonomous decisions without any human responsibility and possibility to forecast it, as a result, a possible solution could be treating it as a product malfunctioning and provide an obligatory insurance scheme. Another solution could be recognised AI as a legal entity creating a legal status ad hoc for AIs.

As discussed, the development in AIs technologies will create several effects on the current legal framework. Some solutions have been discussed, however, the challenge is complex, and a further analysis is mandatory in order to better assess the potential results of these measures and achieve the best outcome for the society.

Bibliography

Adegeest, D. (2018). Luisa Via Roma report record sales of 130 million euros. Fashion United. Available at: https://fashionunited.uk/news/fashion/luisa-via-roma-reports-record-sales-of-130m-euro/2018073131032

Asano, E. (2017). *How much time do people spend on Social Media.* Social Media Today. Available at: https://www.socialmediatoday.com/marketing/how-much-time-do-people-spend-social-media-infographic

Biotechnology Innovation Organization (2019). *Encouraging Innovation and Job Creation by Supporting Start-ups, Entrepreneurs, and Innovative Small Businesses*. Available at: https://www.bio.org/sites/default/files/Encouraging_Innovation_and_Job_Creation_by_Supporting_Start-ups_Entrepreneurs_and_Innovative%20Small%20Businesses.pdf

Blank, S. (2013). *Why the Lean Start-Up Changes Everything?* Harvard Business Review. Available at: https://hbr.org/2013/05/why-the-lean-start-up-changes-everything

Borgatti, S., Mehra, A., Brass, D., & Labianca G. (2009). *Network Analysis in the Social Science*. Science. Available at: http://science.sciencemag.org/content/323/5916/892.full

Bronzini, R., Caramellino, G., & Magri S. (2017). *Venture Capitalists at work: what are the effects on the firms they finance?*. Banca D'Italia. Available at: https://www.bancaditalia.it/pubblicazioni/temi-discussione/2017/2017-1131/en_tema_1131.pdf

Bughin, J., Doogan, J., & Vetvik, O. (2010). *A new wat to measure Word-of-mouth marketing.* McKinsey. Available at: https://www.mckinsey.com/business-

functions/marketing-and-sales/our-insights/a-new-way-to-measure-word-of-mouth-marketing

Burt, R. (2000). *Structural Holes versus Network Closure as Social Capital*. University of Chicago. Available at: https://snap.stanford.edu/class/cs224w-readings/burt00capital.pdf

Cbinsights (2019). *The Global Unicorn Club.* Available at: https://www.cbinsights.com/research-unicorn-companies

Cbinsights (2019). *The top 20 reasons Startups fail*. Available at: https://www.cbinsights.com/research/startup-failure-reasons-top/

Cereda, F. (2017). Yoox Net-A-Porter. Jefferies. Available at: https://www.jefferies.com/CMSFiles/Jefferies.com/files/Insights/YooxNetAPorter.pdf

Clarckson, N. (2016). *UK Start-ups add £196 billion to the economy*. Virgin StartUp. Available at: https://www.virgin.com/entrepreneur/uk-start-ups-add-ps196-billion-economy

Cliquet, G. et al. (2019). *Interfirm Networks and Innovation.* Elsevier. Available at: https://www.journals.elsevier.com/industrial-marketing-management/calls-for-papers/interfirm-networks-and-innovation

Columbus, L. (2018). *10 charts that will change your perspective on Artificial Intelligence's growth*. Forbes. Available at: https://www.forbes.com/sites/louiscolumbus/2018/01/12/10-charts-that-will-change-your-perspective-on-artificial-intelligences-growth/#237456264758

Columbus, L. (2018). *Roundup of Machine Learning*. Forbes. Available at: https://www.forbes.com/sites/louiscolumbus/2018/02/18/roundup-of-machine-learning-forecasts-and-market-estimates-2018/#4899c43d2225

Cuccinello, H., & Bergstein, R. (2018). *Retail & Ecommerce.* Forbes. Available at: https://www.forbes.com/30-under-30-europe/2018/retail-ecommerce/#5900555c4188

D'Arpizio, C., Levato, F., Kamel, M., & De Montgolfier, J. (2017). *Luxury Goods Worldwide Market Study.* Bain & Company. Available at: https://www.bain.com/insights/luxury-goods-worldwide-market-study-fall-winter-2017/

Damodaran, A. (2009). *Valuing Your, Start-up and Growth Companies: Estimation Issues and Valuation Challenges*. New York University. Available at: http://people.stern.nyu.edu/adamodar/pdfiles/papers/younggrowth.pdf

Dee, N., Gill, D., Weinsberg, C., & McTavish, S. (2015). *Startup Support Program: What's the Difference*. Nesta. Available at: https://media.nesta.org.uk/documents/whats_the_diff_wv.pdf

DHL (n.a.) *About Us*. Available at: https://www.logistics.dhl/lu-en/home/about-us/global-network.html

El Qudsy, I. (2018). *Micro-Influencer marketing: What's all the Buzz about?*. Forbes. Available at: https://www.forbes.com/sites/forbesagencycouncil/2018/12/28/micro-influencer-marketing-whats-all-the-buzz-about/#34f027a17bd4

Encyclopedia Britannica (n.a.). *Turing Test*. Available at: https://www.britannica.com/technology/Turing-test

Failory (2018). *Start-up Failure Rate*. Available at: https://www.failory.com/blog/startup-failure-rate

Fernandez, C. (2017). Moda Operandi Looks Beyond the Runways. Business of Fashion. Available at: https://www.businessoffashion.com/articles/bof-exclusive/moda-operandi-looks-beyond-the-runway

Finkelstein, H (2018). *5 trends that will change the way your customers shop in 2018.* Forbes. Available at: https://www.forbes.com/sites/harleyfinkelstein/2018/01/10/5-trends-that-will-change-the-way-your-customers-shop-in-2018/#47af053e4d62

Fraser, E. (2016). *Computers as Inventors – Legal and Policy Implications of Artificial Intelligence on Patent Law*. Available at: https://script-ed.org/article/computers-as-inventors-legal-and-policy-implications-of-artificial-intelligence-on-patent-law/

Hattenbach, B., Glucoft, J. (2015). *Patents in an Era of Infinite Monkeys and Artificial Intelligence*. Available at: https://law.stanford.edu/publications/patents-in-an-era-of-infinite-monkeys-and-artificial-intelligence/

Gompers, P., Lerner, J. (2001). *The Venture Capital Revolution*. Journal of Economic Perspectives. Available at: https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.15.2.145

Gornall, W., Strebulaev, I. (2015). *The Economic Impact of Venture Capital: Evidence from Public Companies.* Stanford University. Available at: https://www.gsb.stanford.edu/gsb-box/gsb-box-get-box-doc/406981/notcase

Granieri, M. (2014). *Intellectual Property for Managers*. LUISS University Press

Hellmann, T., & Puri, M., (2000). *The Interaction between Product Market and Financing Strategy: The Role of Venture Capital.* The review of Financial Study.

Available at: https://academic.oup.com/rfs/article-abstract/13/4/959/1586347?redirectedFrom=fulltext

Italian Ministry of Economic Development (2016). *The Italian legislation in support of innovative startups*. Available at: https://www.mise.gov.it/images/stories/documenti/Executive-Summary-of-Italy-s-Startup-Act-new-format-23_02_2017.pdf

Johnson, I. (2018). *EU Patent Law in the Future of AI and ML.* CPA Global. Available at: https://www.cpaglobal.com/cpa-global-blog/eu-patent-law-in-the-future-of-ai-and-ml

Kansara, V. (2018). *LVMH leads $60 million Lyst injection*. Business of Fashion. Available at: https://www.businessoffashion.com/articles/bof-exclusive/lvmh-pumps-over-60-million-into-lyst

Lewandowski, K. (2018). *2018 Outlook: Machine Learning and Artificial Intelligence*. Available at: https://www.memsql.com/blog/how-machine-learning-artificial-intelligence-affects-workplace/

Li Chiang, J. (2018). *Influencer Marketing Latest Trends& Best practice: 2018 Report.* Musefind. Available at: https://blog.musefind.com/influencer-marketing-latest-trends-best-practices-2018-report-a508540ad625

Machine Intelligence Research institute (2013). *What is AGI*. Available at: https://intelligence.org/2013/08/11/what-is-agi/

Mau, D. (2018). *Millennials Bought a lot of Gucci in 2018.* Fashionista. Available at: https://fashionista.com/2019/02/gucci-kering-revenue-profits-fy-2018

McPherson, M., Smith-Lovin, L., Cook, J. (2001). *Birds of a Feather: Homophily in Social Networks.* Annual Review of Sociology. Available at: https://www.jstor.org/stable/2678628?seq=1#page_scan_tab_contents

Menon, C., DeStefano, T., Manaresi, F., Soggia, G., & Santoleri, P. (2018). *The evaluation of the Italian "Start-up Act"*. OECD. Available at: https://www.oecd-ilibrary.org/industry-and-services/the-evaluation-of-the-italian-start-up-act_02ab0eb7-en;jsessionid=9g8LdvgyWiCoYhBlJJFyM4Hj.ip-10-240-5-157

Merrill, S., Levin, R., Myers, M. (2004). *A Patent System for the 21st Century.* National Research Council, Available at: http://www.consultstanton.com/wp-content/uploads/2015/02/A-Patent-System-for-the-21st-Century.pdf

Murray, G (2018). *The best-selling Fashion Brands*. Refinery. Available at: https://www.refinery29.com/en-us/2018/04/197258/most-popular-fashion-2018

Nicoletti, B. (2017). *The Future of Fintech*. Palgrave Studies in Financial Services Technology. Available at: https://icpf.ir/wp-content/uploads/2018/05/The-future-of-fintech.pdf

Nielsen, M. (2018). *Can AI inventions be patented in Europe?*. Carpmaels & Randsford LLP, UK. Available at: https://www.iam-media.com/can-ai-inventions-be-patented-europe

Nilsson, N. (2005). *Human-level Artificial Intelligence? Be Serious!, Stanford University. Available at:* http://ai.stanford.edu/~nilsson/OnlinePubs-Nils/General%20Essays/AIMag26-04-HLAI.pdf

Osborne Clarke (2018). *Artificial Intelligence - Who owns the invention*. Available at: http://www.osborneclarke.com/insights/artificial-intelligence-who-owns-the-invention/

Osterwalder, A. & Pigneur, Y. (2010). *Business Model Generation*.

Pennachin, C. and Goertzel, B. (2007). *Artificial General Intelligence. Available at:* https://pdfs.semanticscholar.org/782a/ceec18dd97923ea8d1eb93c326133ba980c2.pdf

Pennachin, C. and Goertzel, B. (2007). *Contemporary Approaches to Artificial General Intelligence*. Artificial General Intelligence Research Institute. Available at: https://www.springer.com/cda/content/document/cda_downloaddocument/9783540237334-c1.pdf?SGWID=0-0-45-330089-p43950079

Pymnts (2017). The Increasingly Global Luxury Game. https://www.pymnts.com/news/retail/2017/moda-operandis-global-luxury-ecommerce-gamble/

Ramalho, A. (2018). *Patentability of AI-Generated Inventions: Is a Reform of the Patent System Needed?.* Maastricht University. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3168703

ShopStyle (n.a.). *About Us*. Available at: https://www.shopstyle.com/about

Stanford University (2016). *Artificial Intelligence and Life in 2030*. Available at: https://ai100.stanford.edu/sites/default/files/ai100report10032016fnl_singles.pdf

Statista (2019). *The 100 largest companies in the world by market value in 2018*. Available at: https://www.statista.com/statistics/263264/top-companies-in-the-world-by-market-value/

Statista (2019). *Distribution of Startups worldwide in 2017, by industry*. Available at: https://www.statista.com/statistics/882615/startups-worldwide-by-industry/

Statista (2019). *Revenues from the artificial intelligence (AI) market worldwide from 2016 to 2025*. Available at: https://www.statista.com/statistics/607716/worldwide-artificial-intelligence-market-revenues/

The Economist (2015). *Time to Fix Patents.* Available at: https://www.economist.com/leaders/2015/08/08/time-to-fix-patents

Tse, C., Chen, L., Chan, V. (2019). *World's largest AI startup readies $2 billion Fundraising*. Bloomberg. Available at: https://www.bloomberg.com/news/articles/2019-01-10/world-s-largest-ai-startup-said-to-ready-2-billion-fundraising-jqq7odu4

Venture Scanner (2016) *Fintech Q1 update in 15* visuals. Available at: https://venturescannerinsights.wordpress.com/2016/03/04/fintech-q1-update-in-15-visuals/

Wahba, P. (2018). *Farfetch Files for an IPO on New York Stock Exchange*. Available at: http://fortune.com/2018/08/20/farfetch-ipo/

Weiß, M. (2017). *The #NOAH17 pitches from Farfetch and Lyst compared*. Early Moves. Available at: https://earlymoves.com/2017/07/17/the-noah17-pitches-from-farfetch-and-lyst-compared/

Wissman, B. (2018). *Micro-influencer: the marketing force of the future.* Forbes. Available at: https://www.forbes.com/sites/barrettwissman/2018/03/02/micro-influencers-the-marketing-force-of-the-future/#3933cceb6707

Wong, K. (2014). *The Explosive Growth Of Influencer Marketing And What It Means For You.* Forbes. Available at:

https://www.forbes.com/sites/kylewong/2014/09/10/the-explosive-growth-of-influencer-marketing-and-what-it-means-for-you/#547f668352ac

World Economic Forum (2018). *Artificial Intelligence Collides with Patent Law.* Available at: http://www3.weforum.org/docs/WEF_48540_WP_End_of_Innovation_Protecting_Patent_Law.pdf

Young, K. (2018). *Three differences in how Z Generation and Millennials use social media.* We Are Social. Available at: https://wearesocial.com/uk/blog/2018/03/three-differences-gen-z-millennials-use-social-media

Summary

Table of Contents

Introduction **4**

Chapter one: Start-ups: an overview **6**

1. Start-ups: an overview 7

2. Impacts and trends 10

3. Start-up Stages and Funding 16

4. Start-up Valuation 21

Chapter two: MIRROR **29**

1. Company's Overview 30

2. The market 32

2.1 Market Problems and Opportunities 37

3. Strategic Tripod Analysis 39

3.1 Industry Analysis 39
3.2 Institutional 50
3.3 Resource-based View 54

4. SWOT Analysis 58

4.1 Strengths 58
4.2 Weakness 58
4.3 Opportunities 58
4.4 Threats 59

5. Business Model 60

5.1 Business Model 60
5.2 Business Model Canvas 60

6. Operations 67

7. Marketing and Sales 69

Chapter three: Network Analysis **71**

1. Network Analysis 72

1.1 The Social Network Analysis (SNA) *72*

1.2 The origin of SNA *72*

1.3 Application *76*

2. Evidences from the company MIRROR 79
2.1 Research purpose *79*
2.2 Sample *79*
2.3 MIRROR's Network *81*
2.4 Limitations and next steps *87*
Conclusions **89**
APPENDIX I: Artificial Intelligence Systems and their impact on the Patent System **91**
1. Artificial Intelligence Systems *92*
2. Artificial Intelligence Patentability *94*
3. The impacts of AIs on Patentability requirements *97*
4. AI-Generated Inventions Patentability *99*
5. Patent Infringement by AI *101*
6. Final considerations *102*
Bibliography **104**

Start-ups are recently founded organizations characterised by the search of a sustainable and scalable business model. They fuel employment and growth rates of many advanced and developing countries and are the main driver of innovation and of productivity's increases. In fact, star-ups have already revolutionised many sectors, from urban transport to retail and hospitality, reaching huge dimensions in terms of revenues and employees and adding value to economies for billion dollars. However, the pathway toward start-ups' success is difficult and characterised by huge initial losses, difficulty in accessing traditional way of funding, dependence on private equity and high failure rates. Only the ones with very innovative ideas, which can solve a market problem, with smart teams, and with a great execution will be able to grow and thrive in the modern highly competitive economy.

This work will focus on the early stages of start-ups, which are the most critical and riskiest phases of a start-up lifecycle. Firstly, an overview of what start-ups are is presented, providing a definition and listing their common attributes. Then, their huge impact on the overall economy is demonstrated through some

statistics and the current trends on start-ups are explored, in this context, an interesting analysis of the effects that the development in Artificial Intelligence start-ups may have on the patent system is provided of the Appendix of this text. Furthermore, lifecycle of start-ups is examined, and the different stages of their growth are distinguished. Finally, the results of the involvement of Venture Capital firms in the funding of start-ups is evaluated and an overview of one of the most controversial start-ups' aspects, namely the enterprise valuation, is explored.

Then, the focus shifts to the analysis of the evidences from MIRROR, a new company, founded and run by the author of this work, operating in the sector of the luxury fashion e-commerce. The aim is to explore the first steps of a start-up, from the foundation to the go-to-market. In particular, this work is going to examine the preliminary analyses performed in order to assess the market profitability of the business and then to build the business model, highlighting the underlying market problem which is solved by the company. Then, the execution of the business model and the first results are exhibited.

Finally, the first data on users' actions on the platform are analysed through the use of the Social Network Analysis (SNA), a useful tool which allow to analyse the relationships between actors of networks of social interactions. This instrument has been used to assess the centrality of the brands on sale on the platform, and consequently to use the evidences resulting from the analysis to boost the future growth of the company through the improvement of the supply of the most central brands.

As mentioned above, start-up is an organization formed to search for a repeatable and scalable business model (Blank, S. 2013). More specifically, a start-up is a young, innovative, growth–oriented business in search of a sustainable and scalable business model (Dee, N. et al. 2015) which is going to solve a market need or problem. Start-ups face a high level of uncertainty, the bulk of them fail, however the minority which become a successful company have good probabilities to become large and influential. As of January 2019, more than

300 start-ups have become unicorns, which means that their valuation exceeds $1 billion. However, it should be noticed that the bulk of unicorns comes from USA and China. (Cbinsights 2019)

Start-ups companies have common attributes. All of them, at early stage, have small revenues or even losses, are dependent on private equity, have no history, have a high risk and constitute an illiquid investment (Damodaran, A. 2009).

6. No revenues or operating losses: during early stages, the bulk of start-ups financial efforts are invested for establishing the business rather than generating revenues. As a result, they have small or no revenues, and more often huge operating losses.
7. Dependent on private equity: start-ups rely mainly on equity from private equity source. At the beginning, the equity is provided by the founders or their families or friends. As the company grows, Venture Capital firms are the main source of funding in exchange for a share of the ownership of the start-up.
8. No history: most of start-ups have just one of two years of data available. This has a big impact on valuation, since it makes difficult to forecast future earnings and identify comparable firms.
9. High risk: start-ups constitute a risky investment, in fact a large proportion of new companies fail during the first years of life. However, the failure rate depends on the sector in which the start-up operates. Illiquid investments: investing in a private firm is always more illiquid than investing in a public one.

Start-ups are small in respect to the overall economy, but they have a disproportionately large impact on the economy. Studies have shown that almost all net new job creation of the last years in USA has come from the growth of young companies and that technology-based start-ups continue to make an enormous contribution to the economy once they reach maturity. Start-ups boost

employment rate, about two-thirds of the new jobs created in the recent years have been created by small businesses, of which a large share of these new jobs was generated by start-ups (Damodaran, A. 2009). Start-ups are also a driver for innovation. They have already revolutionised many traditional businesses, transportation and the hospitality industries have been totally innovated by Uber and Airbnb respectively. Other start-ups are going to drastically change many other sectors, such as Fintech, Blockchain or Artificial Intelligence. Finally, start-ups boost economic growth, in fact the most growing economies of the last decades were those which enjoy also higher rate of new business formation. In fact, in 1990s, the US grew much more rapidly than Europe, mainly as a consequence of the growth of small new technological companies. The same for India, whose growth is strongly associated with the growth of new small technological companies. (Damodaran, A. 2009)

The start-up lifecycle usually starts with the idea generation of the entrepreneur. Then, the entrepreneur initiates a set of activities to turn its idea into a profitable business. In particular this phase is characterised by the business planning and product development. This phase, which is the riskiest, is usually financed by the entrepreneur or by its family or friends. Once the product has been developed, the company starts operating on the market, trying to get market shares and moving towards the break-even point. This is called Development Stage. Then, once a market position is formed, the company tries to expand its market shares selling more products and investing in marketing. This stage requires high investments, however a start-up may have problems in obtaining conventional source of funding such as bank debt. The reasons are that initially start-ups may not generate cash flows to repay the debt and may not have the collaterals needed in order to obtain the loan. As a result, equity constitute the most important source of financing for start-up companies.

Venture Capital (VC) represents the most important source of funding for young start-ups. VC firms provide equity capital to early-stage and high-growth potential

start-up companies that develop a new technology or a new business model in high-tech industries. The aim of VC firms is to make returns by selling the start-up's shares, which they get from the investment, through an acquisition or an IPO. The expected return is usually significant due to the higher risk of the investment. In order to increase the returns, VCs use an active form of financing: they sit on the board of directors and provide entrepreneurs with advices and contacts. Specifically, VCs are funds which invest money raised during the fundraising in young, innovative and risky companies. Main investors are Pension Funds, Insurance and banks and they constitutes the limited partners of a VC funds.

Previously discussed start-ups' characteristics make more difficult to evaluate their value. On the one hand, for what concerns valuation based on Discounted Cash Flows, there are problems related to existing assets, the growth of the assets, the discounted rate applied and the Terminal Value. On the other hand, valuation based on Comparable companies is also difficult for many reasons such as, what are the comparable companies (competitors are often not publicly traded and have no market price and if competitors are publicly traded they have very different risk and structures), which multiple it is best to use (because common multiples are often negative in early stages), which is the best proxy for risk (most of the proxies used are market based, as beta or standard deviation of equity returns, as a result they cannot be computed for young companies that are privately held), how to adjust for survival and illiquidity. (Damodaran, A. 2009).

The common approach used in valuing start-ups is called Venture Capital Method. It works as following:

5. Estimation of the expected earnings or revenues in the future.
6. The value at the end of the forecast period is assessed by multiplying the expected earnings in the future in the future year by the multiple of earnings (PE ratio) of comparable public firms or of companies recently sold or gone public.

7. The estimated value at the end of the forecast period is discounted at a target rate of return. This discount rate is usually set high enough to include both the risk that the company will to survive and the risk of the business.
8. Finally, to calculate the percentage of the company that the VC is entitled to in exchange for the investment, a Post-Money Valuation is calculated by adding to the Pre-Money Valuation the new capital infusion.

However, the VC Method presents many imperfections. The problems are that it focuses on the short term, rather than the long term; it ignores operating expenses and it mixes relative with intrinsic valuation and use only the discount rate as the vehicle for all uncertainty. In order to overcome these problems, A. Damodaran (NYU) suggested some modifications to the Venture Capital Method, in order to estimate the intrinsic value of start-up more reliably.

According to him, to estimate future cash flows a “top down” approach, which goes beyond earnings and focus also on operating expenses, must be used. This approach consists in estimating the total market for a product or service and derive the rest of the numbers from the top line. In practise, it is an estimation of the capital needed to sustain a level of revenues calculated starting from the estimation of the total market.

Then, in estimating the cost of equity and debt, the problems are that start-ups are often held by undiversified owners or by partially diversified venture capital funds. Consequently, the cost of equity cannot incorporate only the market risk, but also the firm specific risk. So, the discount rate is calculated using a beta that captures all the risk of being in a specific business (rather than just the market risk). It is obtained by dividing the market beta of publicly traded firms operating in the business to the correlation of the publicly traded firms with the market. The resulting cost of equity obtained using the total beta, which is higher than the market beta, will be the cost of equity of an investor who is completely invested only in this business. For what concerns the cost of debt, start-ups have not outstanding bonds which measure the default risk. However, an interest coverage ratio can be computed and used to obtain a synthetic rating and a pre-tax cost of

debt, by adding the spread of the rating obtained to the risk-free rate. Finally, a spread must be added to capture the small size of the business.

Moreover, the terminal value of the company, which represent a big part of the value of a start-up, must be calculated as a function of the perpetual growth rate and the excess returns (difference between returns on invested capital and the cost of capital) associated to the growth rate. Then, to taken into account the risk of failure the value of the firm can be calculated as an expected value of the two scenarios: the intrinsic value (from the discounted cash flows) under the going concern scenario and the distress value under the failure scenario.

Finally, the effect of illiquidity has to be taken into account, a fixed illiquidity discount, which studies have identified in the 25-35%, must be applied for all firms.

Shifting the focus on the analysis on empirical data, the start-up MIRROR has been analysed from the foundation to the first results. Mirror is the e-commerce platform through which users can shop the trendiest fashion items directly from influencers' and models' outfits' photos. Photos of the outfits are uploaded on the Mirror App and just by tapping on the look in the screen, it is possible to see the details of each item, add to the cart, buy and receive it within 72 hours worldwide. Mirror adopts a flexible business model, known as Marketplace (or Online Boutique) model. Operating as marketplace for multi-brand physical boutiques and designers, Mirror gives to them an additional distribution channel in order to offset the drop in their sales due to the consumers' shift towards ecommerce. The main advantage of this model is that it avoids inventory risk since no inventory is kept by Mirror. However, the drawback is that the stocks could be finished also by physical stores. Items, being provided by Mirror's partner boutiques and emerging designers, are luxury and premium products with a price range from few hundreds to thousands of euros. Actually, five of the ten "hottest brand Q1 2018" according to Lyst are available on Mirror (Gucci, Dolce & Gabbana, Valentino, Givenchy, Moncler) (Murray, G. 2018) and an expansion of the supply

is scheduled for the 2019 in order to satisfy an increasingly demanding global audience.

From a front-end point of view, Mirror enjoys an innovative users experience. Intuitiveness and simplicity are the main drivers of the revolution that Mirror will conduct in the online fashion industry aiming at making the shopping experience smarter and much more excited. In fact, through the apps for iOS and Android, Mirror allows users to both being inspired by hundreds different looks carefully styled by fashion influencers and purchase products by simply tapping on the look. Once the item is added to the cart, the user has just to type its shipping address and choose the payment method. The payment can be made using PayPal or credit cards. Users can monitor the shipping and ask for the return within 14 days directly in the dedicated section of the app. Since Mirror can not still compete for diversity and quantity of supply, it focuses on the exclusivity of the products and on fashionableness of matches as well as the careful selection of influencers and fashionistas which make the looks. Mirror aims at becoming a space of daily inspiration for fashion lovers which can get inspiration from hundreds of different outfits and styles.

The industry in which Mirror operates is the online global personal luxury goods market. The overall luxury market is worth €1,160 billions (2017) with a 5% growth in respect to the previous year. The global personal luxury goods market has been showing a sustained growth since 1996 with a compound annual growth rate of 6%. In 2017 it exhibits a growth of 5% reaching a market value of €262 billion. This growth is mainly due to a generational shift, with 85% of luxury growth in 2017 fuelled by Millennials and Z. The most growing region is Asia which grew by 9% from 2016 to 2017, then Europe, Japan and Americas which grew by 6%, 4% and 2% respectively. More than 60% of the sales comes from Europe and Americas (D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017).

Online sales have grown at a compound annual growth rate of 26% since 2003. They represented the 9% of the total market, for a market value of €24 billions in 2017. This share is going to increase to the 25% by 2025 for a market value of

about €90 billions (assuming a total market growth of 3% compound annual growth rate).

For what concerns consumers' nationality, 47% of the online sales come from American customers, 28% by Asian, 25% by Europeans. Accessories and Apparel are the most purchased categories online, together they account for the 67% of the market, followed by Beauty and Others which account for 18% and 4% respectively. For what concerns business model, e-tailers are the predominant business model in the online sales market.

The market problem that Mirror aims at solving is that since it has been invented, online sales have been made in the same way: photos of the product are displayed in cold backgrounds on the websites of the sellers. Even if the logistic of the traditional ecommerce providers have been improved more and more, the shopping experience is still slow and not intuitive. Furthermore, the traditional experience does not match with the new customers' preferences. In fact, nowadays the market is dominated by which have tastes and preferences much more different by previous generations (D'Arpizio, C. Levato, F. Kamel, M. & De Montgolfier, J. 2017). They look for an immersive shopping experience, different from the traditional one, more excited and smarter. They spend many hours of the day on social networks and are very affected in their shopping decisions by personalities such as fashion bloggers and influencers. In particular, the last characteristic is the most significant, in fact many studies have shown how much personalities such as influencer can affect customers' shopping decisions. The 72% of consumers is affected in their shopping decisions by influencers (El Qudsy, I. 2018), 92% of them trust more on influencers advices than in traditional marketing forms such as advertising or celebrities' endorsements (Chiang, J. 2018). Thanks to this relationship of trust between consumers and influencer, the influencer marketing can be associated to the word-of-mouth marketing which generates twice the sales of traditional marketing forms (Bughin, J., Doogan, J., & Vetvik, O. 2010) and has a retention rate which is the 37% higher (Wong, K. 2014). Moreover, taking into consideration just "Micro-influencer", namely

influencers which focused in a particular market niche and have a range of followers between 10,000 and 50,000, the influencer marketing has a ROI much higher (Wissman, B 2018). Furthermore, an average person spends about 6 hours a day online, and 116 minutes just on social network platforms (Asano, E. 2017) which equals to 5.3 years in a lifetime. In particular, Millennials and Z Generation spend about 3 hours a day on social network platform (Young, K. 2018). Mirror's idea is creating a virtual space in which an e-commerce and a "social network" can cohabit, a platform for the sales of luxury fashion products which may become a space of daily inspiration for fashion lovers which can get inspiration from hundreds of different outfits and styles carefully created by influencers. The e-commerce platform is mobile oriented, able to exploit the consumers' shift toward mobile purchases, which reached 40% of the total online sales in 2018 (from the 35% of the 2017) (Finkelstein, H. 2018). All these features in an intuitive mobile application in which it is possible to experience a fast shopping experience as well as a relaxed discover of new trends and looks.

Then, the Porter's Five Forces have been analysed.

There are many firms that act as e-tailers in the Luxury and Premium space. It is possible to identify two different business models, Multi-brand Online Retailer Model and Marketplace model. On the one hand, Multi-brand Online Retailer Model firms act as traditional e-retailer in the sense that they buy selected fashion items among brand collections and then they resell them on their platform. On the other hand, Online Boutique/Marketplace Model firms act as a marketplace for multi-brand physical boutiques and designers giving them an additional distribution channel. The main advantage is that they do not bear inventory risk because no inventory is kept by the distributor (the platform).

The Rivalry among the industry is characterised by low concentration (HHI = 0.008), high attempt of differentiation (concerning the user experience or the delivery), low exit barriers, and high excess capacity (only in case of Multibrand

Online Retailer Model). Consequently, the intensity of the Industry Rivalry can be considered medium.

In the case of the online fashion luxury industry, the main substitutes are physical fashion luxury retailers. They offer the same product but offering a different service, since customers need the physical proximity to the store and the time to visit it. Consequently, the force of the Substitute competition can be valuated as medium

In the online fashion luxury industry, despite the set-up costs need to start e-commerce business is relatively low, the capital requirement needed to constitute a wide choice of products of luxury brands and the large investments in advertising needed to create a user base, constitute a notable barrier to entry. As a result, the threat of entry can be considered of medium intensity.

For what concerns supplier power, it can be considered of medium intensity, while the buyer power can be considered high.

Finally, the industry exhibits a medium-to-high intensity level of competition.

At an institutional level, the benefits deriving from being a “Start-up Innovativa” (i.e. innovative start-up) must be analysed. It should be also noticed the fiscal rules to comply with. In fact, invoices must be created differentiating for kind (B2C or B2B) and nationality, in order to apply the right VAT. Finally, contracts signed between Mirror and the commercial partners contains all duties for both the actors.

According to the Resources-based view, key resources can be divided into physical, intellectual, human and financial.

Given the marketplace model, which avoid owning a warehouse, adopted by Mirror, physical resources are mainly technological (apps, CMS, API, landing page). The main intellectual resources are customers’ database, commercial partners and influencers partnerships and the artistic content of the outfits’ photos displayed in the platform. For what concerns human resources, the company

presents a flexible structure, the majority of the activities are automatized or outsourced. Mirror's team is composed by young graduates in finance, management, fashion marketing and engineering, moreover consultants experienced in this field provide daily advise on strategic and operating choices. Its tasks involve the creation of the commercial network, exploiting team's personal connections, the management of the contents and the customer care and financial and marketing tasks. Finally, As start-up, Mirror's financials resources are limited, the company is fully financed by the owners and is currently looking for a funding round.

According to the VRIO model developed, the main resources are the Platform, the customised experience, the contents and the partnerships with commercial partners and fashion influencers. All the resources are valuable and rare. However, despite the complexity, the platform is imitable. Instead, imitability is for the experience customization, contents and partnerships, since the artistic content (i.e. unique outfits/matches) of the photos, the customised shopping experience provided by the algorithms (currently under development) which suggest the most suitable products for each client, and the partnerships which include exclusivity agreements, are not imitable. Finally, excluding the experience customization, whose development is not currently accomplished, all the resources are well organised.

To visualise the internal strengths and weakness and the external opportunities and threats of the company a SWOT analysis has been performed:

Mirror's strengths are its flexible marketplace model which allow to avoid building an expensive warehouse; the influencers involvement which affect the shopping decisions of the 72% of consumers; and the revolutionary and intuitive user experience.

The main weaknesses of the company derive from being a start-up. It can currently offer only few products, because the commercial partners network is limited, and has few users, since it started operating very recently (December 2018), nevertheless metrics on new users and conversion rate are encouraging.

Marketing efforts may have a positive impact in boosting the growth, however they will be significant.

Online fashion luxury sector is one of the most growing and dynamic sectors, this market trends are a big opportunity for an e-commerce platform tailored for Millennials, the generation which buy most online. Moreover, the mobile orientation of Mirror represents another opportunity in a context in which mobile purchasing are growing more and more, reaching the 40% of the total online sales in 2018. (D'Arpizio, C., Levato, F., Kamel, M., & De Montgolfier, J. 2017)

Despite the efforts to differentiate itself, Mirror may face competitors' imitation in providing ready-to-buy outfits and the collaboration with fashion influencers. Moreover, despite the high expected growth rate, competition may become fiercer for both new entrants and competitors' consolidation.

Then, to describes the rationale of how an organisation creates, delivers and capture value. (Osterwalder, A. 2010) the business model has been explained through the use of the Business Model Canvas. It is composed by nine blocks which represents the main components of a company's business model. It permits to visualise the main activities, resources and relationships with the main firm's stakeholders in a map which is designed taking inspiration from the human brain. In fact, as the right part of the brain represents logic, the right part is devoted to efficiency and as the right part of the brain represents emotions, the right side of the model involves value creation

Operatively, the process is composed by the following steps:

4. Photo production: Influencers and Fashionistas go to the commercial partners' stores at the beginning of each season. They make the looks and then take the photos.
5. Photos upload: once the photos are taken, they are sent to Mirror together the product codes of each product photographed. Photos are uploaded on the platform using the Mirror's back-office. Then, using the product code, each product is linked to the photos.

6. Once orders are placed, commercial partners receive the communication of the order, the invoice and the transportation document by email or by logging-in the section of the back-office dedicated to commercial partners in which it is possible to download them. Finally, they prepare the orders with the packaging provided by Mirror and give them to the Mirror's shipping partners which will collect the packages in the stores and deliver them to the customers worldwide within 48 hours.
7. From a technical point of view, Mirror, through API, links itself with physical boutiques' software for the management of their inventory. Thanks to this, it can check in real time the availability of each product and place the order. In fact, when a customer purchases a product, a notification containing all order details is sent to the commercial partner, the boutique prepares the order using the packaging provided by Mirror and gives it to the Mirror's shipping partner, DHL, which will collect the package in the boutique and deliver it to the customer within 48 hours. The boutique receives also the transportation document and the Mirror's invoice to the customer that must be attached to the package. These documents are automatically generated thanks to the integration with the shipping partner's software and thanks to a billing system created ad hoc, which will generate different invoices according to the nationality and kind of customers.

Looking at marketing and sales, is can be stated that the traffic is the key of success of every e-commerce platform. More traffic generates more orders thus more revenues. Consequently, it is critical to carefully choose the best way through which focus the marketing efforts. The Marketing strategy chosen rely on Social Media Marketing and Influencer Marketing. Social Media Marketing consists in the sponsorship of the platform through social networks ads. Facebook e Instagram are the best channel in terms of audience and engagements. From 12 December 2018 to 31 December 2018 the strategy consisting in a 15-seconds video promoted on Instagram and Facebook gave quite good results, with a conversion rate of 2.1%. For what concerns influencer marketing, it consists in the sponsorship of the platform on influencers' social

networks accounts. It is the most effective form of marketing on a long-term view. Data related to Mirror's use of influencers are not available yet since the tracking of their involvement in the marketing strategy has been delayed to March 2019.

Trying to extrapolate useful evidences from the data on users' actions, a network analysis has been performed. The Social Network Analysis (NSA) which breakdown a social structure in terms of "nodes", which are the actors of the network and "ties" which are the relationships or the interactions which connect the actors.

It has born in 1932 with Jacob Moreno works on girls' runaways from a school. He that was the girls' location in the social network that determined whether and when they ran away, consequently the links in this social network provided channels for the flow of social influence and ideas among the girls which ended up in the runaways (Borgatti, S. et al. 2009).

During the following years many other studies in a number of fields, including psychology, political science, and economics were made in the following years. Then, by the 1980s, social network analysis had become an established field within the social sciences. It has a professional organization, International Network for Social Network Analysis (INSNA), an annual conference (Sunbelt), a specialized software (UCINET), and its journal (Social Networks) and its used in a number of fields, including physics, biology, management consulting, public health, and crime fighting.

As previously discussed, the Social Network theory analyses social structures in terms of "nodes" or actors and "ties", which are the relationships or the interactions which connect the actors. A node's position in a network determines in part the nodes' outcomes and their future characteristics. So, social network research focuses on assessing if an individual outcome is obtained through influence processes (i.e. individuals adopting their friends' choices) or leveraging processes (i.e. results obtained exploiting connections or a position of power).

For example, the popular social capital theory states that the rate of return on an actor's investment in human capital (i.e. knowledge, skills, abilities) is determined by its social capital (i.e. its network location). This is the main difference with traditional social research, which instead explains an individual's outcomes or characteristics as a function of other characteristics such as income education or gender.

The primary focus of network research is to explain differences in outcomes through variation in structure across different groups or contexts. These outcomes can be categorised into two groups: homogeneity or performance.

The most common theoretical mechanisms which explain the consequences of social network variables are the direct transmission from node to node; the adaptation mechanism, the binding mechanism; and the exclusion mechanism.

Network Analysis has been applied to the company Mirror in order to understand what brand is the most significant for the company and which variable can affect the sales of a certain brand.

The sample of this analysis are the first 531 users of the platform registered between December 14th, 2018 and January 14th, 2019. The group is composed by 352 female users and 179 male users, the main nationality is Italian, followed by Russian, American, French and English, while the main generation is Millennials (44%), followed by Z Generation (28%).

During the period analysed, among 39 brands available, those whose items have been purchased were only 11 on 39. Of these only 5 brands were purchased by more than one user. These brands are: Gucci, Valentino, Saint Laurent, Givenchy, Alberta Ferretti

The expectations from these data are that users will be more affected by a brand which perform better and for which MIRROR has involved more influencers.

Users which have purchased items of the same brands have been grouped using the UCINET software.

There two larger groups and three smaller group in the networks built using UCINET and starting by the data provided by the company:

6. The top-left group (Group 1) is composed by 6 users which purchased items of the brand Gucci. Of these 5 are Males and 1 is Female; 2 are Italian, 1 American, 1 French, 1 British and 1 Russian; 4 are aged between 25 and 35 and 2 between 16 and 24 years old.
7. The top-right group (Group 2) is composed by 6 users which purchased items of the brand Valentino. Of these 2 are Males and 4 are Females; 3 are Italian, 2 British and 1 Japanese; 4 are aged between 25 and 35, 1 between 16 and 24 and 1 more than 50 years old.
8. The central group (Group 3) is composed by 2 users which purchased items of the brand Givenchy. Of these 1 is Male and 1 is Female; 1 Italian and 1 British; 2 aged between 25 and 34 years old.
9. The bottom left group (Group 4) is composed by 3 users which purchased items of the brand Saint Laurent. Of these 1 is Male and 2 are Females; 1 is Italian, 1 American and 1 French; 3 are aged between 25 and 35 years old.
10. The bottom right group (Group 5) is composed by 2 users which purchased items of the brand Alberta Ferretti. Of these are 2 Females; 2 are Italian; 2 are aged between 24 and 34 years old.

Looking at the MIRROR's networks by Gender, by Nationality, and by Age, it can be observed that, considering the two most significant group, there are many similarities among the nodes of each group. Such high similarities among users could be explained through a mechanism called "homophily". It states that a contact between similar people occurs at a higher rate than among dissimilar people (McPherson, M., Smith-Lovin, L., Cook, J. 2001). In fact, as can be noted analysing the network, users among a same group have similar gender, nationality and age. In particular, under 35 dominate the network, probably because they are the generation more oriented towards online shopping.

Despite the attempt to provide in this work an explanation for the users' brand choices, there are limitations that make a deeper analysis not significant:

- The number of the data collected is not enough to obtain significant results.
- The longitudinal extension of the readings does not allow to map the networks dynamics.
- Relationships and interactions among the different actors (users, influencers, suppliers) can not be tracked.

These limitations are mainly due to the fact that the data collection was limited to a short period of time and to the initial phase of the business, which means that the data are biased by being in a phase characterised by low traffic and users.

Nevertheless, the previous work is a stepping stone towards further future analyses and researches. In fact, having started monitoring the network since the very beginning represents both an important opportunity to study the evolution of a network from the foundation and to see how different kind of actors interact on a platform.

Moreover, platform businesses are currently an “hot” topic in management literature, in fact there are many academic calls for contributions in this field in order to better understand the interrelationship between business networks and innovation and creativity (Cliquet, G. et al. 2019)

Finally, pursuing this research by monitoring and analysing the evolution of the actors’ interaction, will help the management of the company MIRROR to take better choices and growing the business more rapidly.

This work aimed at providing a wide overview of start-ups’ early stages of their lifecycle, through both theoretical and practical tools.

After having defined start-ups as a young, innovative, growth–oriented business in search of a sustainable and scalable business model which is going to solve a market need or problem, the common characteristics of start-ups, namely, initial

negative cash flows, lack of historical data, dependence on private equity, high failure rates and illiquidity of the investment has been listed.

As demonstrated by empirical evidences, start-ups significantly contribute to the overall economy, the most growing economies of the last decades were those which enjoy also higher rate of new business formation, moreover evidences show that a very important share of new jobs created in the economy and the bulk of R&D investments have been generated by new businesses.

Looking at the start-up lifecycle it is possible to distinguish the idea generation, the business planning and product development, the development Stage and then the maturity. During the initial stages, the most important problem for start-ups is funding. Venture Capital (VC) represents the most important source of funding for young start-ups. In this context, company valuation is crucial in order to obtain a fair deal. The most common valuation method, namely the venture capital method has been discussed as well as some modification proposed by the NYU professor A. Damodaran to get a fairer valuation.

In the second chapter, evidences from the company MIRROR has been studied. After a company overview, the analysis starts with the strategic tripod analysis. Then, the business model has been depicted through a business model canvas. Finally, the execution of the business model and the first results are exhibited.

Lastly, the first data on users' actions on the platform have been analysed through the use of the Social Network Analysis (SNA). Despite the attempt to run a deep analysis of the reasons behind a user's brand choice, the results are not significant because of the lack of more data. However, this analysis will be continued in the future and will provide useful information for the management of the company and for the management literature about the evolution of the actors' relations.

Bibliography

Adegeest, D. (2018). Luisa Via Roma report record sales of 130 million euros. Fashion United. Available at: https://fashionunited.uk/news/fashion/luisa-via-roma-reports-record-sales-of-130m-euro/2018073131032

Asano, E. (2017). *How much time do people spend on Social Media.* Social Media Today. Available at: https://www.socialmediatoday.com/marketing/how-much-time-do-people-spend-social-media-infographic

Biotechnology Innovation Organization (2019). *Encouraging Innovation and Job Creation by Supporting Start-ups, Entrepreneurs, and Innovative Small Businesses*. Available at: https://www.bio.org/sites/default/files/Encouraging_Innovation_and_Job_Creation_by_Supporting_Start-ups_Entrepreneurs_and_Innovative%20Small%20Businesses.pdf

Blank, S. (2013). *Why the Lean Start-Up Changes Everything?* Harvard Business Review. Available at: https://hbr.org/2013/05/why-the-lean-start-up-changes-everything

Borgatti, S., Mehra, A., Brass, D., & Labianca G. (2009). *Network Analysis in the Social Science*. Science. Available at: http://science.sciencemag.org/content/323/5916/892.full

Bronzini, R., Caramellino, G., & Magri S. (2017). *Venture Capitalists at work: what are the effects on the firms they finance?*. Banca D'Italia. Available at: https://www.bancaditalia.it/pubblicazioni/temi-discussione/2017/2017-1131/en_tema_1131.pdf

Bughin, J., Doogan, J., & Vetvik, O. (2010). *A new wat to measure Word-of-mouth marketing.* McKinsey. Available at: https://www.mckinsey.com/business-

functions/marketing-and-sales/our-insights/a-new-way-to-measure-word-of-mouth-marketing

Burt, R. (2000). *Structural Holes versus Network Closure as Social Capital*. University of Chicago. Available at: https://snap.stanford.edu/class/cs224w-readings/burt00capital.pdf

Cbinsights (2019). *The Global Unicorn Club.* Available at: https://www.cbinsights.com/research-unicorn-companies

Cbinsights (2019). *The top 20 reasons Startups fail*. Available at: https://www.cbinsights.com/research/startup-failure-reasons-top/

Cereda, F. (2017). Yoox Net-A-Porter. Jefferies. Available at: https://www.jefferies.com/CMSFiles/Jefferies.com/files/Insights/YooxNetAPorter.pdf

Clarckson, N. (2016). *UK Start-ups add £196 billion to the economy*. Virgin StartUp. Available at: https://www.virgin.com/entrepreneur/uk-start-ups-add-ps196-billion-economy

Cliquet, G. et al. (2019). *Interfirm Networks and Innovation.* Elsevier. Available at: https://www.journals.elsevier.com/industrial-marketing-management/calls-for-papers/interfirm-networks-and-innovation

Columbus, L. (2018). *10 charts that will change your perspective on Artificial Intelligence's growth*. Forbes. Available at: https://www.forbes.com/sites/louiscolumbus/2018/01/12/10-charts-that-will-change-your-perspective-on-artificial-intelligences-growth/#237456264758

Columbus, L. (2018). *Roundup of Machine Learning*. Forbes. Available at: https://www.forbes.com/sites/louiscolumbus/2018/02/18/roundup-of-machine-learning-forecasts-and-market-estimates-2018/#4899c43d2225

Cuccinello, H., & Bergstein, R. (2018). *Retail & Ecommerce.* Forbes. Available at: https://www.forbes.com/30-under-30-europe/2018/retail-ecommerce/#5900555c4188

D'Arpizio, C., Levato, F., Kamel, M., & De Montgolfier, J. (2017). *Luxury Goods Worldwide Market Study.* Bain & Company. Available at: https://www.bain.com/insights/luxury-goods-worldwide-market-study-fall-winter-2017/

Damodaran, A. (2009). *Valuing Your, Start-up and Growth Companies: Estimation Issues and Valuation Challenges*. New York University. Available at: http://people.stern.nyu.edu/adamodar/pdfiles/papers/younggrowth.pdf

Dee, N., Gill, D., Weinsberg, C., & McTavish, S. (2015). *Startup Support Program: What's the Difference*. Nesta. Available at: https://media.nesta.org.uk/documents/whats_the_diff_wv.pdf

DHL (n.a.) *About Us*. Available at: https://www.logistics.dhl/lu-en/home/about-us/global-network.html

El Qudsy, I. (2018). *Micro-Influencer marketing: What's all the Buzz about?*. Forbes. Available at: https://www.forbes.com/sites/forbesagencycouncil/2018/12/28/micro-influencer-marketing-whats-all-the-buzz-about/#34f027a17bd4

Encyclopedia Britannica (n.a.). *Turing Test*. Available at: https://www.britannica.com/technology/Turing-test

Failory (2018). *Start-up Failure Rate*. Available at: https://www.failory.com/blog/startup-failure-rate

Fernandez, C. (2017). Moda Operandi Looks Beyond the Runways. Business of Fashion. Available at: https://www.businessoffashion.com/articles/bof-exclusive/moda-operandi-looks-beyond-the-runway

Finkelstein, H (2018). *5 trends that will change the way your customers shop in 2018.* Forbes. Available at: https://www.forbes.com/sites/harleyfinkelstein/2018/01/10/5-trends-that-will-change-the-way-your-customers-shop-in-2018/#47af053e4d62

Fraser, E. (2016). *Computers as Inventors – Legal and Policy Implications of Artificial Intelligence on Patent Law*. Available at: https://script-ed.org/article/computers-as-inventors-legal-and-policy-implications-of-artificial-intelligence-on-patent-law/

Hattenbach, B., Glucoft, J. (2015). *Patents in an Era of Infinite Monkeys and Artificial Intelligence*. Available at: https://law.stanford.edu/publications/patents-in-an-era-of-infinite-monkeys-and-artificial-intelligence/

Gompers, P., Lerner, J. (2001). *The Venture Capital Revolution*. Journal of Economic Perspectives. Available at: https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.15.2.145

Gornall, W., Strebulaev, I. (2015). *The Economic Impact of Venture Capital: Evidence from Public Companies.* Stanford University. Available at: https://www.gsb.stanford.edu/gsb-box/gsb-box-get-box-doc/406981/notcase

Granieri, M. (2014). *Intellectual Property for Managers*. LUISS University Press

Hellmann, T., & Puri, M., (2000). *The Interaction between Product Market and Financing Strategy: The Role of Venture Capital.* The review of Financial Study.

Available at: https://academic.oup.com/rfs/article-abstract/13/4/959/1586347?redirectedFrom=fulltext

Italian Ministry of Economic Development (2016). *The Italian legislation in support of innovative startups*. Available at: https://www.mise.gov.it/images/stories/documenti/Executive-Summary-of-Italy-s-Startup-Act-new-format-23_02_2017.pdf

Johnson, I. (2018). *EU Patent Law in the Future of AI and ML.* CPA Global. Available at: https://www.cpaglobal.com/cpa-global-blog/eu-patent-law-in-the-future-of-ai-and-ml

Kansara, V. (2018). *LVMH leads $60 million Lyst injection*. Business of Fashion. Available at: https://www.businessoffashion.com/articles/bof-exclusive/lvmh-pumps-over-60-million-into-lyst

Lewandowski, K. (2018). *2018 Outlook: Machine Learning and Artificial Intelligence*. Available at: https://www.memsql.com/blog/how-machine-learning-artificial-intelligence-affects-workplace/

Li Chiang, J. (2018). *Influencer Marketing Latest Trends& Best practice: 2018 Report.* Musefind. Available at: https://blog.musefind.com/influencer-marketing-latest-trends-best-practices-2018-report-a508540ad625

Machine Intelligence Research institute (2013). *What is AGI*. Available at: https://intelligence.org/2013/08/11/what-is-agi/

Mau, D. (2018). *Millennials Bought a lot of Gucci in 2018.* Fashionista. Available at: https://fashionista.com/2019/02/gucci-kering-revenue-profits-fy-2018

McPherson, M., Smith-Lovin, L., Cook, J. (2001). *Birds of a Feather: Homophily in Social Networks.* Annual Review of Sociology. Available at: https://www.jstor.org/stable/2678628?seq=1#page_scan_tab_contents

Menon, C., DeStefano, T., Manaresi, F., Soggia, G., & Santoleri, P. (2018). *The evaluation of the Italian "Start-up Act"*. OECD. Available at: https://www.oecd-ilibrary.org/industry-and-services/the-evaluation-of-the-italian-start-up-act_02ab0eb7-en;jsessionid=9g8LdvgyWiCoYhBlJJFyM4Hj.ip-10-240-5-157

Merrill, S., Levin, R., Myers, M. (2004). *A Patent System for the 21st Century.* National Research Council, Available at: http://www.consultstanton.com/wp-content/uploads/2015/02/A-Patent-System-for-the-21st-Century.pdf

Murray, G (2018). *The best-selling Fashion Brands*. Refinery. Available at: https://www.refinery29.com/en-us/2018/04/197258/most-popular-fashion-2018

Nicoletti, B. (2017). *The Future of Fintech*. Palgrave Studies in Financial Services Technology. Available at: https://icpf.ir/wp-content/uploads/2018/05/The-future-of-fintech.pdf

Nielsen, M. (2018). *Can AI inventions be patented in Europe?*. Carpmaels & Randsford LLP, UK. Available at: https://www.iam-media.com/can-ai-inventions-be-patented-europe

Nilsson, N. (2005). *Human-level Artificial Intelligence? Be Serious!, Stanford University. Available at:* http://ai.stanford.edu/~nilsson/OnlinePubs-Nils/General%20Essays/AIMag26-04-HLAI.pdf

Osborne Clarke (2018). *Artificial Intelligence - Who owns the invention*. Available at: http://www.osborneclarke.com/insights/artificial-intelligence-who-owns-the-invention/

Osterwalder, A. & Pigneur, Y. (2010). *Business Model Generation*.

Pennachin, C. and Goertzel, B. (2007). *Artificial General Intelligence. Available at:* https://pdfs.semanticscholar.org/782a/ceec18dd97923ea8d1eb93c326133ba980c2.pdf

Pennachin, C. and Goertzel, B. (2007). *Contemporary Approaches to Artificial General Intelligence*. Artificial General Intelligence Research Institute. Available at: https://www.springer.com/cda/content/document/cda_downloaddocument/9783540237334-c1.pdf?SGWID=0-0-45-330089-p43950079

Pymnts (2017). The Increasingly Global Luxury Game. https://www.pymnts.com/news/retail/2017/moda-operandis-global-luxury-ecommerce-gamble/

Ramalho, A. (2018). *Patentability of AI-Generated Inventions: Is a Reform of the Patent System Needed?.* Maastricht University. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3168703

ShopStyle (n.a.). *About Us*. Available at: https://www.shopstyle.com/about

Stanford University (2016). *Artificial Intelligence and Life in 2030*. Available at: https://ai100.stanford.edu/sites/default/files/ai100report10032016fnl_singles.pdf

Statista (2019). *The 100 largest companies in the world by market value in 2018*. Available at: https://www.statista.com/statistics/263264/top-companies-in-the-world-by-market-value/

Statista (2019). *Distribution of Startups worldwide in 2017, by industry*. Available at: https://www.statista.com/statistics/882615/startups-worldwide-by-industry/

Statista (2019). *Revenues from the artificial intelligence (AI) market worldwide from 2016 to 2025*. Available at: https://www.statista.com/statistics/607716/worldwide-artificial-intelligence-market-revenues/

The Economist (2015). *Time to Fix Patents.* Available at: https://www.economist.com/leaders/2015/08/08/time-to-fix-patents

Tse, C., Chen, L., Chan, V. (2019). *World's largest AI startup readies $2 billion Fundraising*. Bloomberg. Available at: https://www.bloomberg.com/news/articles/2019-01-10/world-s-largest-ai-startup-said-to-ready-2-billion-fundraising-jqq7odu4

Venture Scanner (2016) *Fintech Q1 update in 15* visuals. Available at: https://venturescannerinsights.wordpress.com/2016/03/04/fintech-q1-update-in-15-visuals/

Wahba, P. (2018). *Farfetch Files for an IPO on New York Stock Exchange*. Available at: http://fortune.com/2018/08/20/farfetch-ipo/

Weiß, M. (2017). *The #NOAH17 pitches from Farfetch and Lyst compared*. Early Moves. Available at: https://earlymoves.com/2017/07/17/the-noah17-pitches-from-farfetch-and-lyst-compared/

Wissman, B. (2018). *Micro-influencer: the marketing force of the future.* Forbes. Available at: https://www.forbes.com/sites/barrettwissman/2018/03/02/micro-influencers-the-marketing-force-of-the-future/#3933cceb6707

Wong, K. (2014). *The Explosive Growth Of Influencer Marketing And What It Means For You.* Forbes. Available at:

https://www.forbes.com/sites/kylewong/2014/09/10/the-explosive-growth-of-influencer-marketing-and-what-it-means-for-you/#547f668352ac

World Economic Forum (2018). *Artificial Intelligence Collides with Patent Law.* Available at: http://www3.weforum.org/docs/WEF_48540_WP_End_of_Innovation_Protecting_Patent_Law.pdf

Young, K. (2018). *Three differences in how Z Generation and Millennials use social media.* We Are Social. Available at: https://wearesocial.com/uk/blog/2018/03/three-differences-gen-z-millennials-use-social-media