The Attractiveness and Fair Value of a Growth Stock

(A Case Study of Fingerprint Cards)

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Executive Summary

The purpose of this paper is to determine the attractiveness of the stock of high growth company dealing in a newly developed market segment. The goal is to disclose the future perspective of firm and estimate a fair and justified value while combining both the traditional approaches and those used by recent literatures for the analysis of high growth and high tech firms.

In order to achieve the desired target this paper has been given the shape of case study of Fingerprint cards. A high growth firm with an extremely volatile past, dealing in a newly developed market segment.

The paper is divided into different segments consisting of the background, fundamental analysis, forecasts and valuation. With the link of different segments and the market conditions, the future prospect of the firm has been disclosed in a fairly justified manner. Some of the ratios, activities and so transformations may differ from traditional theories and literature. This is solely because of the fact that companies used in the analysis of this paper are high growth companies in a newly developed market segment which is also offering vast growth potential with numerous ongoing transformations. It makes a lot of uncertainty and so vast fluctuations in the expected traditional results. This correspondingly fulfils the main purpose of this paper 'valuing high growth companies' and reaching a justified value while experiencing the differences and difficulties of the process.

Furthermore, the process also attempts to elaborate the fact that how investors are willing to pay more for high growth companies which they might not be willing to do following traditional theories of valuation.

Along with other differences one of major variances is the extreme dependence of vale on future prospect. Therefore, more part of this paper looks at the future and current strategic aspects of the firms rather than historical financial performances.

With all the considerations in the analysis Fingerprint Cards (FPC) is finally valued using the discounted cash flow (DCF) and economic value added (EVA) models and a conclusion is made on the variations between the traded value and value estimated from the perspective of this paper.

Contents

1 Introduction

Fingerprint cards AB (FPC), is a high-tech company "which develops produces and markets fingerprint sensors with software that through the analysis and matching of an individual's unique fingerprint verify the person's identity and permits secure and comfortable handling by the user".[1]

FPC is a listed Swedish company, based in Gothenburg, Sweden. It was founded in 1997 and was first listed on the "Nya Marknaden" (New Markets) list of Stockholm Stock Exchange on 8th May, 1998.

The products offered by the company include touch fingerprint sensors, swipe fingerprint sensors and area fingerprint sensors. First are used in smartphones and tablets, later for integration into portable devices and the last are used as a part of reading modules connected to computers.

FPC was able to develop its first sensor before a couple of years to 21st century but it had to wait for a long time to get significant response from the market. The biometrics industry, in which the company deals, has been there for quite a long time but was to some extent limited to governments, security agencies and border controls etc. With the time and security concern it was adapted by firms to give secure access to employees.

The big game changer of the recent times was the acquisition of AuthenTec, by high-tech giant Apple. A company focused on fingerprint reading and identification management software, for 365million dollars.[2] The acquisition was a sign of the introduction of technology in the smartphones on a large scale as apple was the leading manufacturer and seller of smartphones. Apple's Vice President of marketing, Phil Schiller, announced the feature at Apple's media event on September 10, 2013.[3]

After the introduction of fingerprints in the smartphones by apple, there was not a doubt that the move will be followed by other player of the market. Samsung, Hawaii and other smartphone producers started using this technology. The biometric industry boomed and the result was huge increase in the revenues of the companies developing the fingerprints.

[1] FPC Annual Report 2014
[2] https://en.wikipedia.org/wiki/Touch_ID
[3] https://en.wikipedia.org/wiki/Touch_ID

1.1 Motivation

"The Stock you've Never Heard of but Wish You'd Bought Last Year"[4], is headline of one of the articles representing Fingerprint Cards AB in the end of 2015. With an increase of 1391 percent through 2015, it is considered as the biggest gainer among 1000 companies on the Bloomberg World EMEA Index.

With the use of biometric technology in the smartphones, biometric industry is experiencing big developments. Management of FPC is aiming for more growth and market share. "Following an intensive year of development, we now see the start of broad-based industrial roll-out, notably for touch sensors. We are ready to meet a sharp increase in demand"[5] are the words of FPC's CEO.

Where Fingerprint Cards have been ranked as one of the biggest winner of 2015 and management is forecasting more future growth, investors are also having the opinion, "we have chosen not to invest in Fingerprint as we think Valuation in way too high" and "To think they can keep such market share, that just about never happens, I have experienced that so many time before".[6]

Soaring biometric technology market is not only limited to the growth of Fingerprint Cards. Competitors have also shown growth and are expecting for more market share in the near future. "We will ramp up significantly next year" and "In 2016 we expect to start having significant market share"[7] are the statement of IDEX CFO Henrik Knudtzon, a Norwegian biometric firm and one of the competitors of Fingerprints.

The motivation behind this paper is to analyse fingerprints as a high tech growth company, identify the key aspects responsible for it recent performance, understand the strategy of management to achieve future growth and finally conclude if it is a stable and profitable option for the investors. Development of overall biometric industry, its growth potential and the role of other big players of the industry will also be analysed through the case.

1.2 Problem statement

The aim of this thesis is to value the Fingerprint cards AB (FPC) stock. Valuation will be used as a tool to answer the following problem statement:

[4] (Ewing, 2015)
[5] FPC Annual Report (2014)
[6] (SWAHNBERG, 2015)
[7] (SWAHNBERG, 2015)

Based on public information, what is the estimated value of one Fingerprint Cards AB (FPC stock as of 4th May 2016?

Estimated stock price should help to disclose the attractiveness of Fingerprint Cards FPC stock for both potentially new and existing investors. It should remove the uncertainty regarding the FPC stock and indicate them whether to keep, sell or buy the stock.

In order to address the problem statement, the thesis is categorized into different sections. These sections will include the analysis and partial conclusions. In the end all the results from the partial conclusions will be pooled to answer the problem statement.

Company description and the Biometric industry

- How has the FPC performed historically?
- What are the key economic features of Biometric Industry?

Strategic analysis

- What are the challenges in Biometric Industry?
- How capable FPC is to seize potential market?
- How exposed FPC is to the challenges in the industry?

Financial Analysis

- How successful FPC has been in managing its capital into profits during recent half-decade?

Forecasts

- Given the developments of industry and position of FPC, what are the estimated appropriate growth rates for FPC?

Valuation

- What is an appropriate cost of capital for FPC?
- What is the estimated value of FPC, in view of DCF and EVA models?
- In what way is the estimated value affected by fluctuating sensitivity and scenarios?

Limitations

- What are the omitted factors, which could possibly influence the estimated value of FPC?

1.3 Delimitations

The purpose of this thesis will be to analyse the Fingerprint Cards AB (FPC), from the perspective of an external analyst. A company which is the focus of attention of investors with a stunning increase of more than 1000 percent in the share value and forecasts of 1000 percent increase in the revenues and occupying of half of market share in the near future.

In the light of most recent performance figures, growth potential of the industry, presence of strong competitors and arrival of new entrants; this thesis is designed to answer the uncertainty in the mind of investors, if the company is overpriced and will come back to normal in future? Consequently facilitating investors to decide whether to hold buy or sell FPC stock, to get the most out of it.

Valuation with the strategic analysis will be used as a tool to estimate the value of company. Moreover the reality of general tendency of the investor to pay more for the growth firm and its influence on the current value of Fingerprint Cards AB will also be considered while valuing the stock.

The information used in the analysis will only be public and without any contact with Fingerprint Cards. Therefore the estimated value will neglect the effect of any potential investment, buy-out offer or any speculation regarding the company's future.

All the data used in the analysis is based upon the information released before 5th of MAY 2016, as this the most recent annual report of the company. Any information released by the company after the date will be overlooked and therefore, will not affect the investigation of this case.

1.4 Methodology and structure

For the thorough analysis of each and every possible factor, case has been divided into different categories. This will allow addressing the problem by the detailed and best possible breakdown of all aspects. The categories will include introduction and history of the firm, introduction and analysis of the Industry, Strategic analysis, Financial analysis, SWOT, Forecasts, Valuation, Sensitivity, Scenarios and Conclusions respectively.

In the first part the introduction of the company and its journey with major events will be highlighted. This will be followed by the identification of the key economic characteristics of

industry. Analysis of industry will be helpful in understanding its development through the years and the future perspective.

In order to uncover the micro and macro factors affecting the FPC and the strategy of the firm to deal with them, following models are used:

- PEST
- Porter's Five Forces
- Value Chain

Furthermore the outputs from these analyses will be summed up in SWOT-matrix with the purpose of highlighting there factors affecting FPC and its strategy to deal with them.

Strategic analysis will be followed by financial analysis where the economic development and financial value drivers of FPC will be examined. This section will include the reformulation of the income statement and balance sheet. Analysis of key financial ratios will be done using DuPont model, with the purpose of discovering whether FPC has been creating or destroying value in the recent years.

With deep understanding of the future perspective and the past performance of FPC, this section will link both and future pro forma statement will be produced. In order to have a best possible forecast and suitable horizon for estimating value of the firm, a forecast of 5 years will be made.

In the next section, forecasted estimated will be used to carry out valuation of FPC. For the purpose of valuation, following models have been chosen:

- Discounted Cash Flow (DCF)
- Economic Value Added (EVA)

DFC is considered as an archaic method of valuation but study shows it is one of the most used methods for valuation. As DCF estimates the value which is highly dependent upon the future estimates, it leaves the factor of uncertainty. As a result small changes in the estimates can result in big fluctuations in the valuation. In order to limit the uncertainty and examine the impact of changes in the forecast parameters, sensitivity analysis and scenario analysis will be used.

Although Scenario based DCF techniques can help bound quantify uncertainty, they will not make it completely disappear.[8]

Finally all the partial forecasts will be used to generate an overall conclusion and final word.

2 Company description and introduction to biometrics industry

2.1 History

Fingerprint Cards (FPC) was founded in 1997 by Lennart Carlson, in Gothenburg, Sweden. Lennart Carlson dreamed of a huge technology market based upon old Swedish fingerprint patent.[9] It was first traded on "New Markets" list of the Stockholm stock exchange in 1998 under the ticker FING B.[10]

The dream of founder was nowhere close to becoming a reality as company kept on spending money on research and development without any notable sales and profits. In 2005 the board was even considering of closing the company. The company was kept alive by the funding of a Japanese investor. The company has also suffered and survived form the share issues totalling around 700 million Swedish crowns, ample of which were tied in product development with few sensors and marginal number of clients.[11]

As FPC was able to develop a sensor even a couple of years before 21st century, the only thing it needed was demand. The long wait was over and the dream of Lennart Carlson started to look reality when in 2012 Apple bought mobile security firm called Authen Tec. Acquisition of a mobile security firm by one of the top manufacturer of smartphones was a clear signal that the technology is going to be introduced in the smartphones.

Long wait and development of a competitive product surely gave the firm an edge over its competitors. "FPC was early out with a good touch sensor technology", was the statement by Carnegie analyst Havard Nielsen, while admitting the competitive position of the firm in the market.[12]

8 Koller, Tim; Goedhart, Marc; Wessels, David, Measuring and Managing the Value of companies(2015)
[9] (SWAHNBERG, 2015)
[10] (Fingerprint Cards, 2016)
[11] (SWAHNBERG, 2015)
[12] (SWAHNBERG, 2015)

In December 2012 FPC won its first design win in China for its FPC1080A by China Design House.[13] This design win was followed by two more design wins in the same year. China being one of the biggest markets, it started to show a very bright future for FPC and its shareholders.

Benefitting from its advanced technology, FPC focused specifically on smartphone industry and introduced its first touch sensor for smartphone/ tablet industry. With the introduction of their sensor investors started buying the shares giving its stock a rise of 11 percent.

FPC was once again talk of the town when a press release claimed that Samsung one of the leading manufacturer and competitor of Apple was going to acquire FPC, later the news was denied.

Beginning of year 2012 also saw FPC receiving an order worth 44million SEK, the largest order since its foundation in 1997. Customer being one of the biggest companies of market called hardware and software technology (HST), it look promising for further sales in future.

In the year 2013 a lot of phones in Asia, specifically China, were launched with FPC's sensor. In the same year FPC disclosed the details of an order worth 11 million crowns. It was also disclosed that shares of FPC will be assigned from small-cap to mid-cap list in Nasdaq OMX Stockholm exchange.

With all going good in recent couple of years, FPC kept getting orders from a lot of Chinese firms. In September of 2014 Huawei, the biggest smartphone manufacturer of China launched its device with FPC's sensor. News gave 11% increase in a day to the stocks. But the very next day stock was hit by a blow of 42% decrease when FPC announced the suspension of CEO Johan Carlstrom for being accused of inside trading. Johan Carlstrom was kept under investigation by Swedish economic crime authority (SECA), Stockholm exchange suspended all trades of FPC for one day.[14]

In the years onwards FPC was able to gain contracts from many Chinese smartphones including Huawei, which is considered the third largest after Samsung and Apple. Other than Chinese market, FPC was also able to grab some orders from LG, Sony and Google.

With sales growing surprisingly FPC broke many records including one of the highest growths by a Swedish company in a year. On the other hand in the end of 2015, former CEO Johan Carlstrom was charged for inside trading by Swedish Economic Crime Authority. According to

[13] (Fingerprints, 2012)
[14] (planetbiometrics, 2014)

SECA, CEO was involved in trading worth 70 million SEK of instruments with a profit of over 10 million SEK.[15]

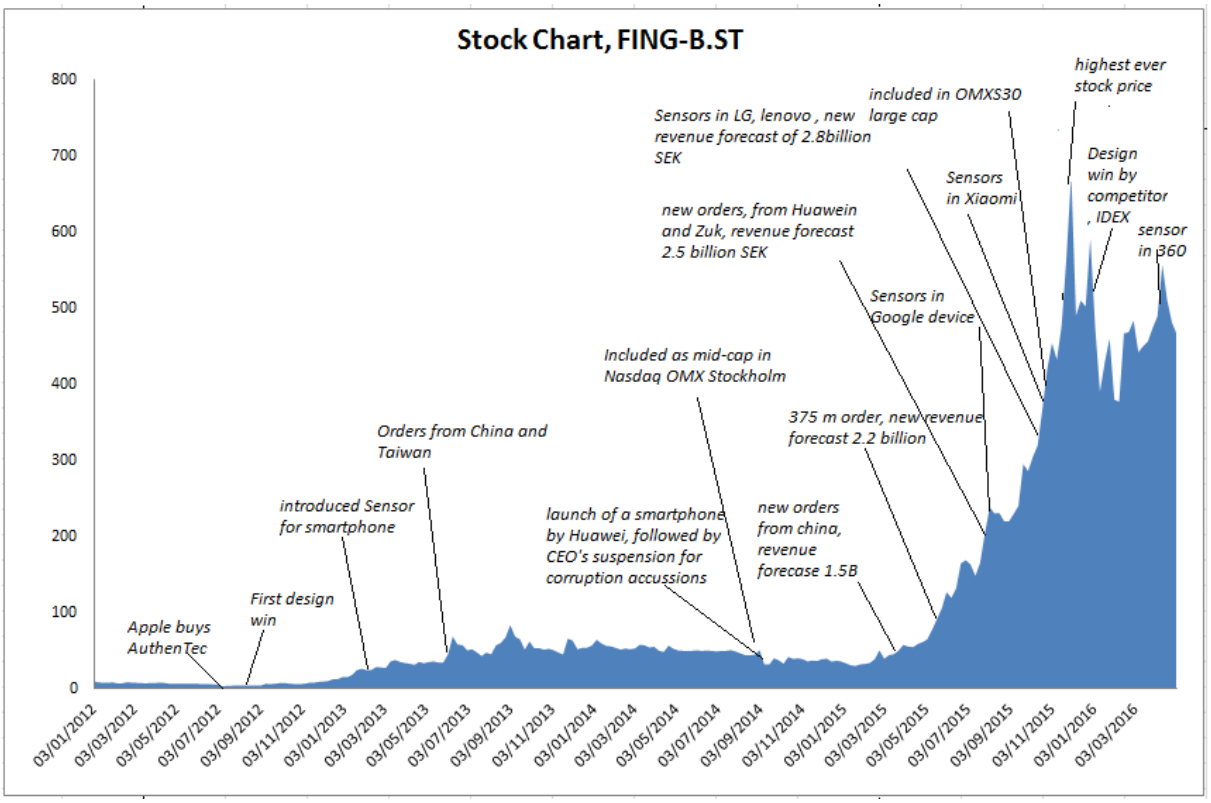
Holding a strong position in the market and big ambitions for future growth, FPC holds a risky position in the market. Many investors still think that FPC stands on a shaky ground and might not be able to achieve the future forecasts of sales and growth. Whereas FPC holds its ground on its success present and forecasts for bright future. In the beginning of May 2016 FPC presented its long term financial targets. Strategy is based to touch three main parts; growth, profitability and capital structure.[16] Policy is to achieve 35% profitability margin, 60% annual compounded growth rate and possible dividends and share buyback for excess cash.[17] CEO Jorgen Lantto seems very grave in accomplishing these targets and he considers them to be understood as "reasonable long-term expectations" instead of future ambitions.[18]

2.1.1 Share price development

Share price development will describe the historical stock price performance of the company. Changes in the stock price and the factors responsible for fluctuations will be highlighted in order to understand the volatility of stock. It will also disclose the ability of company to carry its value in the eyes of investors.

Share price with major events is described in following figure.

[15] (Dickson & Pollard, 2015)
[16] (Fingerprints, 2016)
[17] (Fingerprints, 2016)
[18] (Fingerprints, 2016)



Source: compiled by author/ NASDAQ

For the first and half decade of the firm, stock price was calm and company did not have any notable incidences. Company profile became notable in the year 2012. It is visible that in 2012 stock was traded less than 10 SEK a share. Whereas the in the following year company was able to grab a huge market in china, it was first included in mid-size and then large-cap of NASDAQ Stockholm. Stock price climbed from two figures to as high as 675 SEK per share. With other incidents responsible for change in stocks, it is also visible that stock price hi highly volatile with big fluctuations on frequent intervals. Volatility of stock exposes the status of FPC as a high-tech growth company.

2.2 Corporate strategy and business model

FPC is based on the mission of making the solutions such that people are identified on any device by just a simple touch[19]. Company is one of the leaders in development of solutions allowing individual's ease and confidentiality. As mentioned before, FPC's business is developing and selling biometric solutions

[19] (fingerprints)

2.3 Ownership structure

The ownership structure of FPC as of May 2016 consists of:

Institutional holdings: 31.2% Other/Non-Institutional holdings: 68.8%

Total Shares holdings: 20,129,882 Total Share Holdings: 44,409,253

Of which Class A-shares: 1,200,000 Of which Class A-shares: none

Voting rights A-shares 16.21% Voting rights B-shares 83.79%

Total number of shares outstanding: 64,539,135

Total number of shareholders: 42,900

Top ten shareholders of FPC are enlisted in the following table:

Name	A-shares	B-shares	% Votes
	(10 votes)		
FORSAKRINGSAKTIEBOLAGET, AVANZA PENSION		6375727	8.46
DANIZA PENSIO		3337215	4.43
OPPENHEIMER GLOB OPPORTUNITY FUND		2500000	3.32
Handelsbanken fonder		1814345	2.41
NORDNET PENSIONSFORSAKRING AB		1410890	1.87
SUNFLORO AB	1200000		15.93
CLEARSTREAM BANKING S.A.,W8IMY		1009303	1.34
Jorgen, Lantto CEO		927300	1.23
UNGER, MAGNUS		831730	1.10
REX, THOMAS		800000	1.06
Total		20206510	41.15

Source: compiled by author / fingerprints.com/Corporate/Owner structure

SUNFLORO AB, is holder of all the A-shares outstanding. As one A-share is having the right of 10 votes, SUNFLORO AB, holds highest voting rights of almost 16%. CEO Jorgen Lantto holds class B-shares with total voting right of 1.23%.

2.4 Business segments

FPC offers patented fundamental biometric system solutions based upon fingerprint verification. [20] Key value generator is the development of exclusive software solution that can support very small sensors. Another important value driver is the versatility of solutions to be applicable in number of applications including smartcards, physical access and login devices.

2.4.1 Embedded system solutions

Other than the development of biometric solutions depending upon the specific requirement of customers, FPC also develops embedded system solutions. This segment deals in the development of a complete prepacked system solution module. Embedded system solutions modules (ESSMs) work as plug-and-play, so they are easy to apply without any special customization.

2.4.1.1 FPC-BM

This module has a sensor along with a processing unit. It carries a built in memory capacity enabling storage of identities within the module.

2.4.1.2 FPC-BEP

FPC-BEP is a biometric software platform for quick integration and connection purpose specifically, cutting customer's time to reach market.[21]

The ability of these systems to be ready to use make them a potential candidate for many markets where customers need simple solutions which could keep them away from complicated customizations and costs related. Plug and play part cuts the costs and time of original equipment manufacturers (OEMs) to launch their final product into the market.

One more useful feature of these modules is their capability to be integrated into external processors. FPC provides modules with drives which can be used for integration with external computer units.[22] Furthermore these embedded system solutions carry the versatility of being used in vast variety of applications.

[20] (fingerprints)
[21] (fingerprints)
[22] (fingerprints)

2.4.2 Application specific circuits and algorithm system solutions

One of the major fragments of FPC's business is the development of sophisticated algorithms and application-specific integrated circuits. The applications include high-end to mass quantity productions. This segment is the biggest market of FPC which is consumer electronics.

2.4.2.1 Application-Specific Integration Circuit (ASIC) processor

Application-Specific Integration Circuit (ASIC) is based upon the core technology of FPC. The concept is to bring most sophisticated form of available technology on a micro-scale, making it a very useful tool to satisfy the demands of OEMs of consumer electronics.

ASIC consists of a silicon chip with the main objective of fingerprint measurement. An advanced matrix of pixels with tremendous capabilities for image capture and contrast lie on the top of silicon chip.[23]The sensor is capacitive, meaning it holds the ability to collect and hold a charge of electricity.[24] This property makes it not only able to recognize but also read 3D image preventing manipulation of FPC by optical image etc.[25]

2.4.2.2 Sophisticated algorithm

It is another core technology provided by FPC to its customers. It is based upon the optimization of image from sensor and processing in order to identify the unique information in every fingerprint.[26]

These system solutions hold key market competitiveness in the consumer electronics market as they are further developed to consume less power and less time to authenticate the identity.

Both above are big business segments of current time as well as of future. Currently FPC target smartphone and tablet segment of its business with these competitive solutions. The first is more advanced and high end customers are targeted through it. In the comping years FPC expects that ASIC will increase profit margins from 40 to 45 percent as compared to other sensors. Whereas later is more focused on mass production and targeting less expensive products of OEMs.

Furthermore FPC's extensive strategy on research and development is focused on addressing the markets for automotive, healthcare, public sector, and internet of things.

[23] (fingerprints)
[24] (dictionary)
[25] (fingerprints)
[26] (fingerprints)

2.4.3 Geographical segments

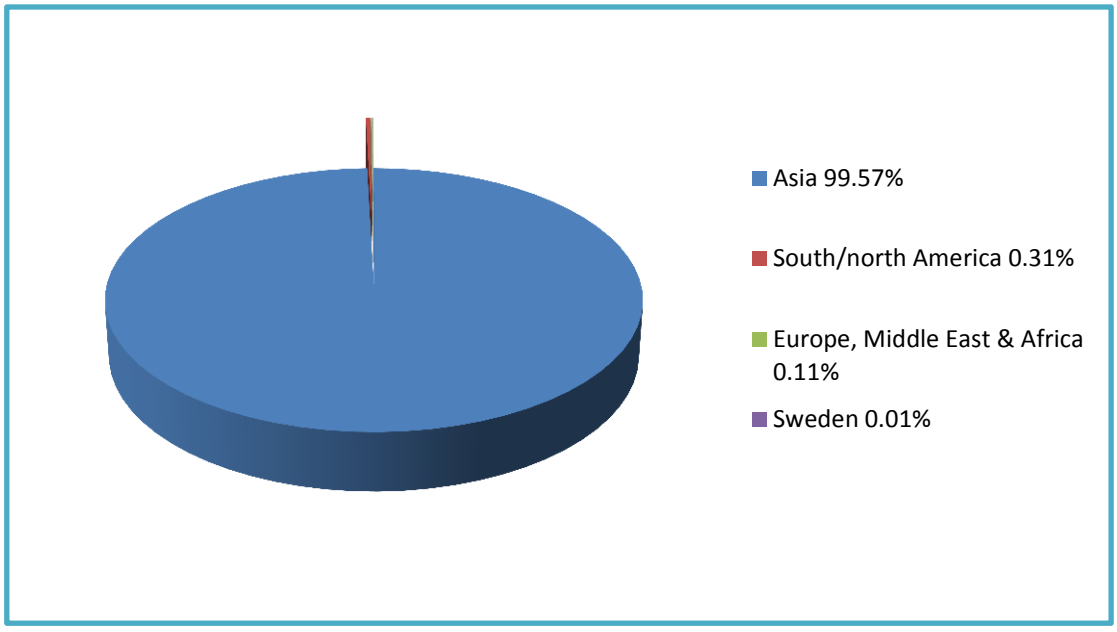
By analysing the figure below, it is clear that Asia is the biggest market for FPC. In the year 2015 FPC's revenues were 2900.5 million SEK, out of which only Asia was responsible for 2887.9 million SEK and 99.57% of total revenues.

South and North America was the second largest revenue generator in 2015. Revenues generated from this region were work 9 million SEK followed by Europe, Middle East and Africa 3.3 million SEK and home (Sweden) 0.3 million SEK.

Even though America is the second largest revenue generator in 2015 but the percentage is only 0.31% of total revenues, which is very minor. In the same way Europe, Middle East and home (Sweden) were responsible for only 0.11% and 0.01% of total revenues respectively.

By looking at the geographic segments it is clear that FPC needs to explore more markets and needs to increase its share in them.

Geographical share of FPC



Source: Compiled by Author / FPC annual report 2015

2.5 The Biometrics industry

2.5.1 History

The term "biometrics" is derived from the Greek words "bio" meaning life and "metrics" means to measure.[27] The term has Biometrics has a long history and refers to the measurement and identification of a human being through physical traits. Automated biometric systems have only been introduced for a couple of decades ago, due to the significant improvement in the field of computer sciences.[28] But the use of biometrics has been found to be hundreds of years ago. The old biometric techniques include the recognition through palms, length of arms and hands, feet, facial recognition and fingerprints.

The first ever official and systematic capture of hand image for the purpose of identification is linked to Sir William Herschel in 1858, where he recorded handprints of the workers to distinguish employees from others.[29] Another method was the use of complete body measurements of an individual. It was called as "Bertillonage" and was collapsed when it was unable to distinguish between two prisoners having identical body measurements.

First ever use of fingerprints is dated to 1903 in the New York state prisons, later in 1969 Federal Bureau of Investigation (FBI) began emphasis on the automation of fingerprint recognition.[30]

Looking at the history of biometrics industry it is found that it was used by governments and law enforcement agencies in order to keep the record of employees and prisoners in the latter case. Reliability, accuracy and ability to store large amount of data in no time made the technology famous in authentication and identification tasks.

2.5.2 The biometric solutions

Extensive development in the computer technology has also brought improvement in biometric solutions. Numerous kinds of biometric solutions are being used for diverse purposes. Some of the biometric solutions of recent times include:

Iris biometric solutions, process of identification and authentication through infrared picture of a person's eye

[27] (Mayhew, History of Biometrics, 2015)
[28] (Mayhew, History of Biometrics, 2015)
[29] (Mayhew, History of Biometrics, 2015)
[30] (Mayhew, History of Biometrics, 2015)

Face recognition, identification through face features with the help of a low-resolution camera

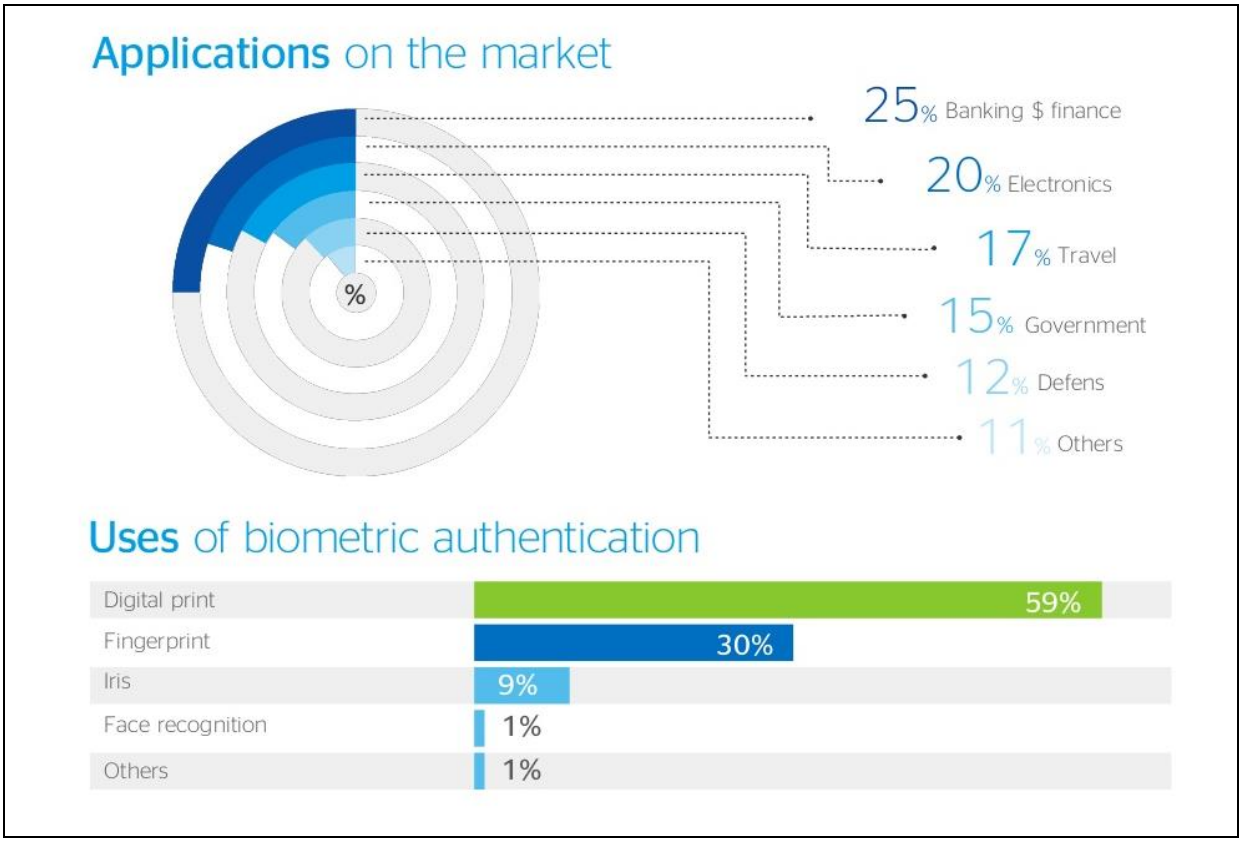
Voice recognition, identification based upon the voice

Fingerprints, use of terminal, ultrasound and high image technologies to get an impression of friction ridges of a human finger

Signature, recording the act of signing on a piece of paper or tablet, and the last but not the least **Vascular** biometric solutions use the infrared image of skin to use veins structure of identification purposes.[31]

2.5.3 Market development

Development in the industry has shifted the use from only defence to commercial, including electronics, travel, government and financial sectors. The following figure by BBVA INNOVATION CENTER shows the use of biometric technology in different sectors in 2016.[32]



Source: BBVA INNOVATION CENTER

[31] (BBA Innovation CENTER, 2016)
[32] (BBA Innovation CENTER, 2016)

The above figures describe banking and finance sector holding the biggest share in the market followed by electronics. Furthermore finance, electronics and travel hold 62% of the total market for biometrics. It clearly shows the development and change in the way biometrics industry had been dealt.

2.5.4 Driving forces for biometrics

The recent penetration of biometrics in smartphone market was highly influenced by the factor of convenience and security. Security linked to the protection of individual's personal data and convenience linked to an immediate access without the fuss of pin codes and passwords. With further development a more mature market for the biometrics is swiftly emerging in the form of biometrics verifications for payments and big players like Alipay (China), Apple Pay, Android Pay, PayPal, Microsoft and FIDO (Fast Identity Online) are approving the technology.[33]

Smartphone payment systems which are current getting very famous in china also hold a bright future. On the other hand smartphones with biometric technology hold an abundant long term potential in an "unbanked" world, where most of the population does not have bank accounts or bank infrastructure is scarce.[34]

Slower growth in tablets due to less innovation and more number of users per device does not pose much of a threat to the overall smartphone market for biometrics, as comparatively steady growth in smartphones, adaptation of technology by more vendors and inclusion of biometrics in relatively basic versions of devices keep a health future growth rate for the industry.

Embedded system solutions also hold a vast potential for the market and according to FPC, embedded system solutions like smartcards and internet of things have the potential to be as big as smartphone industry for the biometrics in the coming couple of years.[35]

A big threat to financial sector in terms of theft, fraud and increase in cases of cybercrimes carry a health growth potential for access solutions. According to an American consulting firm Technavio, the market for biometric access solutions in Europe, America, Middle East and Africa is expected to grow at annual growth rate of 18% in the coming four years.[36]

[33] http://www.fingerprints.com/corporate/en/about-fpc/the-market/
[34] http://www.fingerprints.com/corporate/en/about-fpc/the-market/
[35] http://www.fingerprints.com/corporate/en/about-fpc/the-market/
[36] http://www.fingerprints.com/corporate/en/about-fpc/the-market/

Furthermore, the solutions for the automotive industry have also been developed by many firms in the industry. Even though automotive industry requires a lot of refinement and so costs related to technology, it carries a potential for mass market for biometrics.

Overall as biometrics is enjoying a healthy growth and smartphone/ tablet market has proven to be one of the biggest game changer of the industry in the recent times. Other segments like smartcards, the automotive industry, wearables, health sector, public sector and internet of things hold reasonable possibility for growth and development in the industry.

3 Strategic Analysis

The objective of Strategic Analysis in this paper is to

- Detect the macro economic factors which can affect Fingerprint Cards
- Identify the factors which affects the Industry in which Fingerprint Cards deals
- Discover the internal factors and the strategies used by Fingerprint Cards to gain competitive advantage and sustain it for longer period

3.1 Macro Analysis (PEST)

PEST is used as a tool for the external analysis. It will help us identify entire sum of factors which may affect Fingerprint Cards as a firm. It will make us understand the strategic considerations and course for future actions by identifying possible external risks and threats and their impact on the company.

PEST is based upon four factors including: Political, Economic, Social and last but not least Technological factors.

3.1.1 Political Factors

Political risk was not given much of importance around a couple of decades ago. One of the main reasons behind it were the approach hat firms can not directly influence the politics and so cannot minimize the risk. With the reduction of trade barriers and free movement of goods through different boarders with different rules and regulations, firms started realizing the importance of political risk and the intensity of its damages.

With the changing times and regulations firms have started spending more on the department of political risk and how it can affect the firm.

Some of the political factors which may influence the business of Fingerprint Cards are political instability, trade barriers and taxes.

One of the major markets for the products of Fingerprint Cards is Asia and specifically China. Political instability in china can affect the marketing, sales and growth for Fingerprint Cards. As major customers are Chinese firms producing smartphones, therefore, political instability in china exposes Fingerprint Cards to a medium to high risk exposure.

Recent tensions between china and United States over the South China Sea lead to serious dispute and may lead to trade sanctions on china. That will also affect the firm's sales as china being the biggest market.

FPC is only a tax subject in Sweden at present but in future, however, through possible establishment in other countries, FPC may become tax subject with consequent taxation and be required to pay tax in those countries.[37]

Keeping these factors in mind and the intensity of loss, political risks have low probability but medium to high exposure to impact.

3.1.2 Economic Factors

Economic environment plays a huge role in almost all kind of business and FPC is not immune to the impact of it. The investment of current and potential customers of FPC is affected by the global economic trends and so the business of FPC.

A weak economic trend in all parts of the world could result in lower than expected growth in the biometrics market.[38] Accordingly there is a risk that FPC's expected sales could be adversely impacted by a weak economic trend, which could have a negative impact on company's operations, earnings and financial position.[39] As most of the customer base of FPC is based in Asia so the economic trends and growth in Asia, especially China can have a huge impact. Whereas in the Europe and

North America, the current impact does not pose much risk but it can change in future.

Some of the other economic factors which can impact the revenues and profits are the Exchange rates and Raw material prices.

[37] (FPC annual report , 2014, p 29.)
[38] (FPC annual report , 2014, p 29.)
[39] (FPC annual report , 2014, p 29.)

From purchasing to sales the operations are essentially done in US dollar. Otherwise FPC follows the strategy to hedge 90% of exposure in US dollars. Therefore the main currency risk is the exchange rate between US dollar and Swedish krone.

Change in prices of raw material also leaves FPC venerable to reduction in profits. The main components are gold and silicon, where later poses risk of higher impact. Historically prices of silicon have not fluctuated to a significant degree and supply is favourable.[40] But in the case of a decrease in the supply of silicon in the world or increase in the price, the production cost will increase and thus leaving less profit margins.

3.1.3 Social Factors

The need for biometric technology has been there for long time but was limited to security agencies and border controls. But with the passage of time it started becoming more famous and was adapted by firm to give access to employees.

After 911 attacks, the need for security increased and more emphasis was given to keep records for personal identity. Requirement for the identity documents has always been a must but with more possibility of faking. There has always been a need for more easy and reliable way of personal identification. This problem is met by the technology of fingerprints. Just a couple of seconds and the individual's identity are recognized.

Norms and values in a society shape the individual person, which in turn affects businesses. Sociocultural factors include income levels, education levels and trends. The extent to which sociocultural factors are affecting a business varies from country to country.[41]

Increasing trends of social media, online shopping, use of cards and most importantly link of daily activities with smartphones all these leave a big mark for personal privacy and the risk of theft. The quick, easy and reliable part of fingerprint technology made it very useful in daily activities. Security and privacy part has generated huge demands for FPC.

Use of biometrics in smartcards and potential use in automobile and internet of things have more growth potential for the industry and so FPC.

Even though the technology is considered to be more easy and secure and seem to be removing pins and passwords, there is a very minimum but potential risk of hack and theft. A data hack or

[40] (FPC annual report , 2014, p 29.)
[41] (Kotler & Keller, 2006, p 87)

theft will hit the industry with a huge blow as once the fingerprints are stolen there is no way of changing them like passwords and pins.

3.1.4 Technological Factors

Fingerprint Cards deals in high-technology industry with rapid rate of change. Biometrics industry its self has been developing quickly with more advanced, secured, dynamic and competitive products. Copying with the industry requires being innovative while excelling all these fields.

There was a time where the need was developing restricted hardware with capacity to store large data. Whereas now the needs are development, production and delivery on large scale, which requires innovation in more aspects like quality and cost control and ability of mass delivery in short time.

With the introduction of biometrics in smartphone and tablet market the growth potential has touched masses. The need of constant development and mass production has also touched new levels. In order to meet new market requirements there is a constant need for new development and extensive innovation.

Fingerprint Cards' strategy for the market challenges are dependent upon continuous product development and expanded investment in product development.[42]

It is also important to focus on the potential inclusion of automotive industry and internet of things. Once biometrics is introduced in these segments it will open a huge opportunity in the market. In order to stay on the top FPC will need to be on the top of the game in terms of technology and innovation.

For the future of FPC, technological factors carry a high risk of impact while medium to high probability of occurrence.[43]

3.1.5 Summary

Above (PEST) analysis disclose that FPC is exposed to external factors to a certain point and there are some factors which could serious affect business by reducing expected growth in sales, increase production costs and minimize the profits.

[42] (FPC annual report, 2015, p 48)
[43] (FPC annual report, 2015, p 48)

One of the standout factors is technological. Advancement in technology was one of the reasons FPC was able to grab more market share as compared to its competitors like IDEX. In order to stay in the lead FPC needs to be on the top of the game in technology and development. FPC is enjoying more revenues and has a lot of cash to spend on new development projects, technology still stay very important factor to pay attention to.

Economic could also be considered as one of the main important factors for the future business. Slow growth in Asia, especially in China can be very harmful for FPC. There is a constant need for exploring business opportunities outside china to diversify risk connected to economic growth.

Political and social factors carry less risk as compared to the above two and also limited actions are available to handle them.

3.2 Industry Analysis (Porter's Five Forces)

The purpose of Porter's five forces model is to identify and analyse the industry structure, and the long-term profit potential of both the industry and the firm.[44] It's a model based upon microeconomic theory and is précised in figure below.

Source: Michael Porter / Compiled by author

[44] (Porter, Five competitive forces that shape the strategy, 2008, p 86)

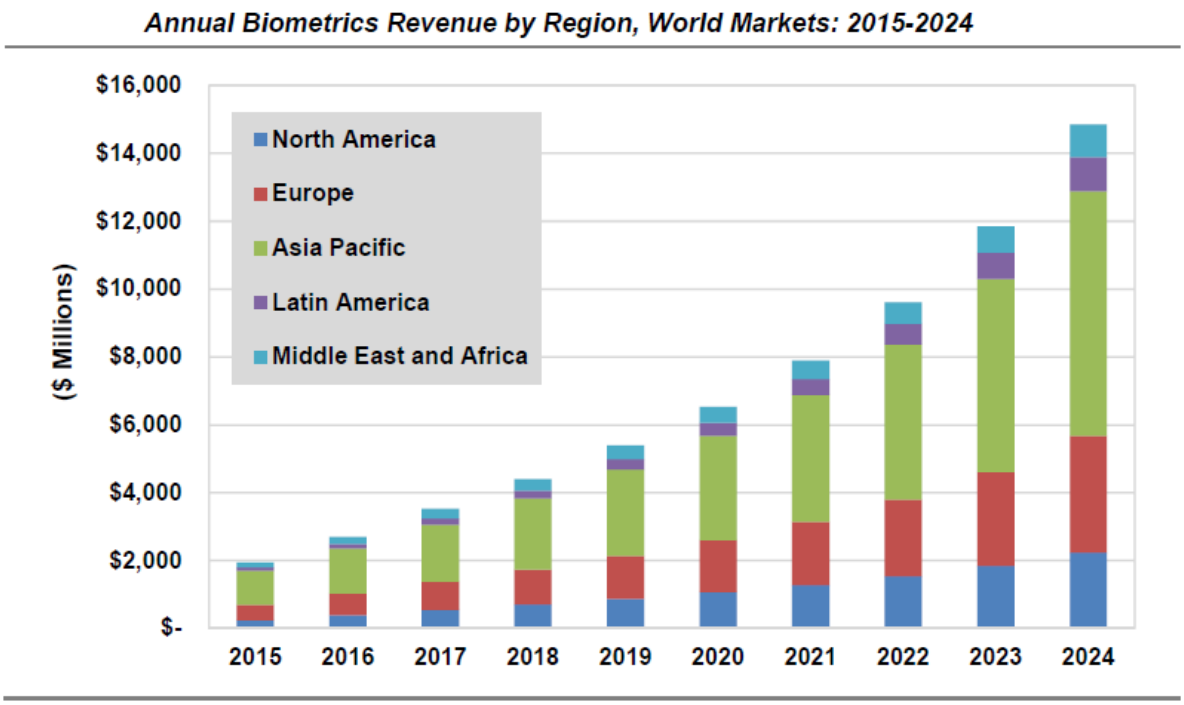
3.2.1 Rivalry among existing competitors

The presences of competitors in an industry, along with other factors, significantly affect the profitability in that industry. It is especially destructive to profitability if it gravitates solely to price, as price competition transfers profit directly to consumers.[45]

According to Michael Porter, the important factors that affect the rivalry in an industry are: Industry growth, existing companies' product mix and size and exit barriers.[46]

3.2.2 Industry growth

According to Tractica a cumulative biometric revenues for ten year period are forecasted at 68.7 billion dollars, which makes it a compound annual growth rate (CAGR) of 25.3%.[47]



Source: Tractica

[45] (porter, The five competitive forces that shape the strategy, 2008, p 85)
[46] (porter, The five competitive forces that shape the strategy, 2008, p 85)
[47] (Tractica, 2015)

From the above chart, it is clear that the Asia Pacific is the largest market followed by Europe. According to the report the global revenues in the last year are reaching the figure of almost 15 billion and Asia pacific holds more than half of the share.

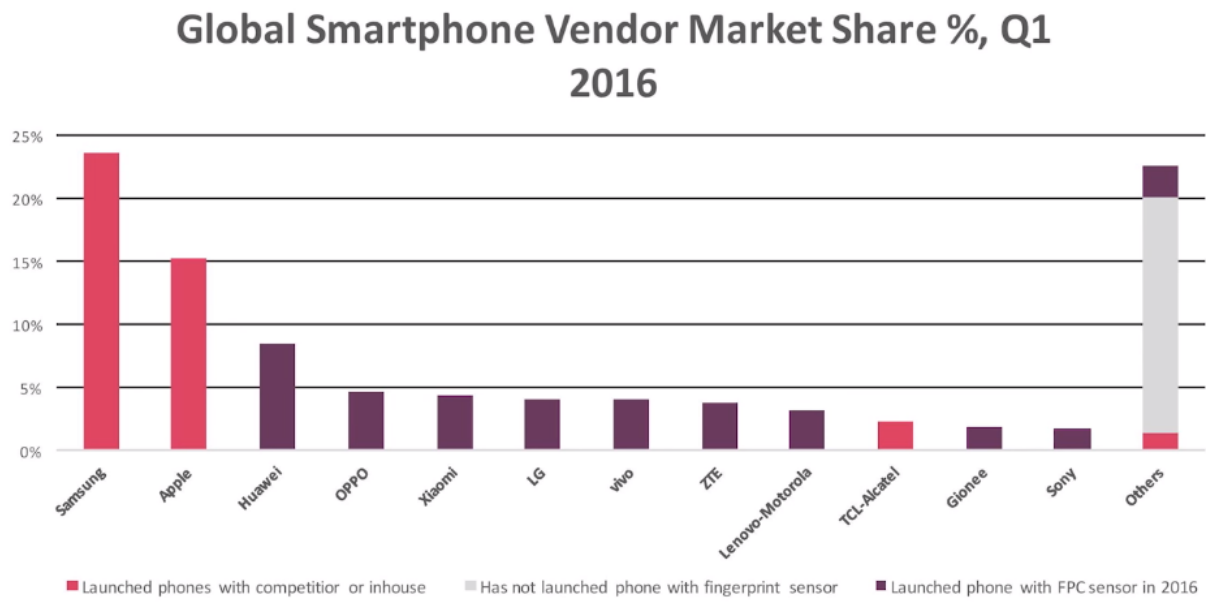
Another report specifically addressing smartphone and tablet sector, forecasts revenues at 3.5 billion in the last year, out of which 2 billion belongs to Asia Pacific region. This looks healthy for the ongoing strategy of FPC, as they have strong foot in the Asian market in the smartphone and tablet sector.

FPC's strategy for growth in progress does not leave other sectors untouched. Automotive design win has been announced in first quarter of 2016, whereas commercial launch for smart card solutions has been planned in 2016 with the cooperation of Zwipe.[48]

Overall, the industry growth is expected to be quite healthy which will have room for new and smaller players to get into market and also the existing player to get more share.

3.2.3 Existing companies' size and product mix

The smartphone and tablet market which happens to be the biggest for biometrics at the recent times, has Samsung and Apple as the two major players. Almost 62% of the market is being shared by other players including Huawei, Oppo, LG and Sony.



Source: FPC AGM 2016

[48] (Fingerprints, 2016)

Above diagram shows that even though FPC is not a provider to the biggest players but still enjoys around 45% of all the Mobile biometrics market.

The product mix and differentiation of the industry is not very wide. The competition is on similar product and in in similar segments. So the rivals are to face tough competition in the fields of technology, advancement, costs and the ability to deliver in short spans of time.

3.2.4 Exit barriers

There are always costs connected to the decision of regretting an investment. Industries conned with low costs of withdrawing can make it relatively easy for the firms to withdraw. In case of biometrics industry, the situation does not seem to help the decision of regretting. It requires high skill, big upfront investment, and lifetime research and development costs. Lifetime of the products is also very short and the existing technology can become obsolete within a year, giving nothing much while sold in case of exit.

High development costs are associated with continuous losses before even companies start making profits. Therefore it is clear that biometrics industry has high exit barriers and high exit barriers are associated with higher level of competition in the industry.[49]

3.2.5 Bargaining power of suppliers

Buyers enjoy strong bargaining power in mostly two cases, one is when there are a few or none substitute products available and the other is when their products are essential elements of the buyer's business.

FPC's hardware- the silicon chip is mainly manufactured through the Chinese company called SMIC (Semiconductor Manufacturing International Corporation), one of the five largest semiconductor manufacturers in the world.[50] Due to the increased number of orders and customer demands, FPC has also involved with another manufacturer to ensure the production demand are fulfilled accordingly.

In the sector of smart cards, the business model gives FPC more control and power. They are responsible for the distribution of final product. FPC accounts for the distribution of packed sensors via sub suppliers, bypassing the wholesale level.[51]

[49] (porter, The five competitive forces that shape the strategy, 2008, p 85)
[50] (FPC annual report, 2015, p 14-15)
[51] (FPC annual report, 2015, p 14-15)

FPC carries forwards the strategy of maintaining numerous suppliers of materials used in the production process, called BCP (Business Continuity Plans). Maintaining several suppliers, safeguard and monitor suppliers to ensure that a plan exists to safeguard delivery capacity.[52]

Active monitoring of suppliers and partnership with several suppliers makes FPC more authoritative in maintaining its supplies safe. In the sector of smart cards, the business model makes it more in control of production. Overall suppliers of FPC hold moderate to low bargaining power.

3.2.6 Bargaining power of customers

Situations where bargaining power lies with the customers can put a lot of pressure upon the prices, demand, quality and so tough competition between the manufacturers/suppliers.

Given that FPC provides a competent biometric system solution for smartphone and tablet manufacturers.[53] It gives the firm the prospect to enjoy a long-term partnership with its customers. Whenever the smartphone/tablet manufacturers develop new product, it requires the services of FPC in developing the biometric solution for the new product and so the partnership continues leaving FPC in a position to enjoy continuous demand.

In response to the existing number of customers that the company has business with, among its many end customer contacts, FPC works closely with 10 or so module suppliers, notable among which are Crucial Tec and O-film.[54]

Presence of a lot of experienced players in the market, easy access, not much hurdles and risks in worldwide deliveries of the products, all these factors make it easier for customers to switch manufacturers. Continuous advancement in technology and competition for low costs also are also responsible for shifting bargaining power to customers.

In the case of smartphone/tablet manufacturers, the development of new products is completely based upon the previous platform. This gives advantage to the FPC to stay in collaboration with existing customer in developing the new solutions and so distressing the decision of switching suppliers on frequent basis. Whereas in the case of smartcard, customers less concerns in implementation of new technology, thus making it easier to switch suppliers.

[52] (FPC annual report, 2015, p 48)
[53] (FPC annual report, 2015, p 14-15)
[54] (FPC annual report, 2015, p 14-15)

In the case of overall markets FPC deals in, customers enjoy a relatively medium bargaining power.

3.2.7 Threat of substitute product

As a substitute is a product performing the same task but using some other method/technology or means. In the case of biometric identification and authentication solutions, the main substitute products will the use of traditional pins and passwords.

In the recent times the quick, easy and secure part of biometric identification systems has gained a lot of success and fame in the user's mind. But there are still concerns amongst many users in regards to the data related to their identity being transferred to government and other agencies.

Even though use of biometric solutions is considered more reliable and is being used from smartphones to financial institutions and government agencies. It does not mean that this system is flawless. In a blog by Tom in Dashlane blog, the drawback of the use of biometric authentication systems are highlighted. These downsides include the factor that biometrics once stolen, cannot be changed, neither they can be copied for the use of multiple individuals.[55] Another issue highlighted in the blog is the incident when hackers were able to bypass the fingerprint security sensor on a Samsung s5 smartphone device.

Keeping all these factors it might be possible that a lack in biometric security solutions could lead to the replacement of traditional passwords and pins, which have the ability to be changed when stolen.

Overall by examining the market and technology trends, the traditional substitute to biometrics does not pose big threat and so it can be concluded that the threat of substitute product is low.

3.2.8 Threat of new entrants

Presence of profits and growth potential of a market accounts a lot for new players in that market. Whereas there are a number of factors which can make it difficult for the new entrants and limit the penetration. The later are known as the entry barriers. In order for a market to leave entry door open, its crucial to have higher profits and growth potential whereas the entry barriers needs to be on the lower side.

[55] (Tom, 2015)

Market analysts have forecasts for huge potential for growth in the biometric market. According to a research report made by a research analyst Bob Lockhart, "The biometrics market is finally here to stay". The author also forecasts that global biometrics market will increase from 2 billion dollars in 2015 to 14.9 billion dollars by 2024, with a compound annual growth rate (CAGR) of 25.3 percent and cumulative revenue for 10 year period totalling 67.8 billion dollars.[56]

One of the prerequisite for low entry barriers is low costs. Other factors which make the entry easy are not much needed experience, easy availability of training, economies of scale, time and cost benefit and no technology protection.[57]

Biometrics industry requires a big upfront investment and fulltime Research and Development costs, which are two major entry barriers restricting new entrants in the market.[58] Along with high costs there is a technological and patent protection factor and rapid change in the technology, making it difficult for new entrants to come and enjoy big profits.

Looking onto the big benefits of profits and growth potential of the market but even bigger costs and restrictions of the market, the existing and well established players face low threat from new entrants.

3.2.9 Partial conclusion, Porter's five forces

Biometrics industry as a whole is characterised by high level of competition between the companies. In smartphone sector, other than Apple which uses its own biometrics solutions, the rest of the market is there to compete.

Even though there is a huge growth potential in the market but barriers of entry and exit does not make it easy for new entrants. But the growth and presence of a lot of experienced player like IDEX and NEXT BIOMETRICS, which are yet to get benefit from their competitive products, the competition stays strong.

The nature of material used in the production does not give much bargaining power to all suppliers whereas presence of a lot of players and fast moving technology does give customers the bargaining power.

[56] (Tractica, 2015)
[57] (Porter, Porter's Five Forces, 2008)
[58] (Research and Markets, 2015)

3.3 Internal Analysis

With the help of external analysis the overall market potential can be understood. They give the idea for market size, growth and the availability of present opportunities. But a sense of achievable margins or returns cannot be obtained without an analysis of company's competences relative to its peers.[59] For this purpose, a value chain analysis is used which describes the activities within and around the company. These activities are also labelled as primary and supporting activities.

3.3.1 Value chain analysis

By using value chain, the efficiency of FPC in managing its primary and supporting activities can be assessed and the overall competitive advantage of firm can be determined.[60]

Porter's primary activities are described as following

Source: Porter's value chain/ compiled by author

The above primary activities are supported by the firm's infrastructure, human resource management, technology development and procurement.[61]

3.3.1.1 Inbound logistics

Inbound logistics lie in the beginning of value chain. It addresses receiving and warehousing of input/raw materials.

FPC is a fabless manufacturer, which means that they do not manufacturer hardware by themselves but own the crucial links to research and development, sales, marketing as well as production management in its own value chain.[62] This reduces their costs related to owning a

[59] (Petersen & Plenborg, 2012, p. 191)
[60] (Petersen & Plenborg, 2012, p. 191)
[61] (Porter, porter's Generic Value Chain, 2008)
[62] (FPC annual report, 2015, p.12)

plant. As fabrication needs to be done in clean rooms requiring equipment worth millions, it looks a good policy to outsource.[63]

The methods used in the process are constantly improving leaving the costly equipment to become obsolete very frequently. As a matter of fact obsolesces are generally 50% to 80% of the costs.[64]

On the other hand the costs related to fab enable companies to be quicker and advanced by constant upgradation, giving them an advantage over competitors.

Overall looking at the benefits and costs of having a fabless manufacturing, it's better to be outsourced or fabless when your end products are not very expensive. Therefore, by analysing their products it is clear that FPC is following the right policy in inbound logistics.

3.3.1.2 Operations

Inbound logistics are followed by the operations in the value chain. It is the process of converting received inputs into finished product and services. In other worlds it is the process of development and manufacturing.

FPC's process for biometric systems solutions is summed in following diagram.

Source: FPC annual Report 2015 / compiled by author

In the case of FPC the main part of operations consists of research and development. Development is currently being conducted at four different locations including Gothenburg, Linkoping, Malmo and Copenhagen.[65]

FPC spends huge amounts of cash flows on its research and development projects. In order to stay in the leading position and meet the industry demands, company has significantly extended

[63] (Franco, 2015)
[64] (Franco, 2015)
[65] FPC annual Report, 2014, p.20

its research and development department. During the period of 2014 company acquired Anacatum Design AB; a company specialized in technology licensing and ASIC development.[66] Another factor depicting focus on research and development is increase in number of employees in department. As of 2014 the employees active in R&D were increased to 80.

Company also stays in collaboration with its partners, key suppliers, distributors and customers in order to be aware of the needs and demands. It customises products in complete collaboration with the customer to ensure the high quality of products.

As the production is outsourced and takes place in different factories on the basis of forecasts, FPC keeps continuous on its production partners to make sure the quality and deliver requirements are met. FPC uses the production services of one of top five companies in the world, whereas contracts with more partners are under consideration in order to meet high demand.

One of the dominant factors in the recent success of PFC was the upper hand in technology and possession of developed product at the time of demand. But biometrics technology is under continuous development and in order to stay in the leading role, PFC needs to keep its technology one step ahead of its competitors.

Strategy of FPC to focus on R&D, continuous development of new technology, collaboration suppliers, customers and OEMs is keeping the company in a good position to stay ahead of its competitors in future.

3.3.1.3 Outbound logistics

Outbound logistics comes in the middle of chain and refers to warehousing and distribution of finished products.

In smartcard sector, FPC hold firm control of process as it shortens the supply process by direct distribution of final product through sub suppliers.[67] Due to this FPC is able to bypass wholesale level.

As the firm heavily relies on its partners for its production and distribution, it keeps close contact with its partners to ensure quality and demand is met in time. For this purpose

[66] FPC annual Report, 2014, p.20
[67] FPC, annual report, 2015

company works in collaboration with more than 10 partners/ module suppliers, notable among which are Crucial Tec and O-film.[68]

Collaboration with leading players and multiple suppliers gives a benefit to FPC but in order to keep with growing future demand it will be crucial for company to keep its outbound logistics in safe hands.

3.3.1.4 Marketing and Sales

Even after the successful development of a patent, it is important to market it in the right way to be able to get contracts and generate sales. In terms of marketing FPC mainly target original equipment manufacturers (OEMs), module developers and primarily product developers/ system integrators.[69]

A lot of different channels of marketing are used by the firm, in which company's website is used as a key channel. Marketing of technical specifications of the products and ordering of free test kits are done through it.

Another important channel of marketing used by the firm is trade exhibitions. Distributors participate in these trade shows where personnel and marketing material of the firms in exhibited.[70]

FPC has been following the strategy to increase direct sales of the products. A big part of sales is already been conducted on own accounts and also combined with distributors. Distributors are kept in constant contact throughout the year by meetings and joint customer visits. As of the figures of 2014 the current number of marketing and sales personnel is around 20.

Geographically FPC's strategy for marketing and sales is targeting mainly the region of United States and Asia. In Asia the focus is mainly on china and then Taiwan and South Korea. It also plans to reach India.

Overall the use of website, active participation in trade fairs and constant contact with distributors and customers keep the marketing and sales strategy on a competitive level. The geographic focus on United States and China also makes sense as in case of China the biometrics market is forecasted highest. Where as in case of United States a market share will not only give access to one of the big markets but will also bring in diversity in the portfolio of firm.

[68] FPC annual report 2015, p.14
[69] FPC annual report 2014, p.18
[70] FPC annual report 2014, p.18

3.3.1.5 Service

In order to provide better service to its customers, FPC tries to be close to its customers in all parts of its market. FPC has established subsidiaries in China, South Korea, Taiwan and United States. Factor of local presence does not only boost the customer satisfaction but also helps a lot in better understanding customer needs and satisfying them.

3.3.1.6 Partial conclusions, Value chain analysis

From the value chain analysis, it can be concluded that FPC creates from most of its phases in its value chain. The biggest value creator is the innovation in developing safe and reliable technology for use of governments, law enforcement agencies and also a common man.

Their huge development cost has been responsible for long term losses and still decreasing their profits in short run, but it will make them able to work on new and refined technology which will be beneficial both for shareholders and stakeholders in long run.

4 Financial Analysis

In order to understand the overall economic well-being of the firm, it is important to measure its performance by looking at its different aspects of performance. By the help of financial analysis analysts are able to measure the historical performance of firm, compare it to its peers/ competitors and conclude if firm has been creating or destroying value for its shareholders.

Another important use of financial analysis is that it not only holds the past and present of the firm but it can also lead to clues which could help to understand the future aspects and performance of the firm.

The past and present performance of firm can be measure by analysing it profitability, growth and risks. Financial ratios also unveil the level and trend in performance which can ultimately be used to track the factors behind better or worse performance, for example a positive trend in profitability can be attributed to improved profit margins.[71]

Before analysing the financial performance of the firm it is prerequisite to transform some of the values.

[71] Petersen & Plenborg (2012) p. 63

4.1 Transformation of Income statement and Balance sheet

Before analysis of performance it is important to transform income statement and balance sheet for analytical purposes. Furthermore ratios require a benchmark for the ultimate comparison of value creation or destruction.

In this paper, transformation will be based on **Petersen & Plenborg (2012)**. In order to tackle benchmarking issue, a relative peer group comparison will be made. For this purpose Norwegian Biometric firm IDEX and Synaptics from United States are used. Furthermore a six year period from 2010-2015 is used for thorough analysis.

4.1.1 The analytical Income Statements

Analytical income is the company's income statement, transformed in a way that 'operating' and 'financial' activities are separated. This separation of different accounting activities allows us to unveil the main driving force behind the value creation. As operations of a firm are the key driving force behind the value generation making it unique, isolating them from financing activities unveil the fundamental performance.[72]

4.1.1.1 Fingerprints

Following reclassifications have been made in FPC's income statements:

- Cost of Goods Sold (COGS) : Depreciation and amortization has been deducted from COGS in order to get Gross Profit
- Operating profit : In order to get true operating profit; depreciation, amortization and impairment losses have been deducted from selling costs such as selling costs, administrative costs and development costs. These are later added back separately.
- Furthermore exchange rate gains have been deducted from other revenues and made a part of financial income. Exchange rate differences may be hedged by firms which could lead them to favourable future due to its financial policy and not the operations. In this sense it is reasonable to classify exchange rate gains and losses as a part of financing activity.[73]
- Tax shield, Net financial expenses: Effective tax rate has been used to calculate tax on 'Net financial expenses', later this is added back to NOPAT in order to separate it from operational and financial activities.

[72] Petersen & Plenborg (2012) p. 68
[73] Petersen & Plenborg (2012) p. 77

Effective tax rate has been calculated as:
Income tax as a percentage as a percentage of EBIT

4.1.1.2 IDEX

- Revenues: IDEX gets grants from Norwegian government due to it being a part of research and development firm and meeting other criteria. This state grant is considered as revenue, which has been altered and treated as other income in the analytical transformation.
- Development Costs: state's grants have been added back into development costs in order to get the real expenditures on development. These also treaded as other income.
- Exchange rate and capital gains: Any gains due to fluctuations in the FX changes have been made a part of financial and not operating income and losses.
- Taxes: Due to negative profits and fluctuations in the yearly tax payments, taxes have been treated as of the case of Fingerprints.

Synaptics

- Revenues: Revenues consists of PC applications and products and digital/ mobile phone applications and products. Total revenue of some of revenue is used as relative costs were not separated.
- Research and development costs: R&D costs include depreciation and amortization. It has been deducted and later added back in order to get EBITDA.
- Special Items: change in contingent consideration has been treated as special item in the transformation.
- Taxes: Effective tax rate has been used as described in the previous two cases.

4.1.2 The analytical Balance Sheet

The accumulated sum of all the investments made in the operating activities of a firm is labelled as the 'net operating assets' or '**invested capital'** and can also be calculated by deducting operating liabilities from operating assets

- Intangible assets and tangible assets have been classified as non-current assets.
- Inventories, trade receivable, other short-term receivables and prepaid expenses have been grouped under current assets
- Pensions, long-term liabilities and lease have been classified as long-term, interest bearing debt.

Furthermore, transformations of some of the activities like 'cash and cash equivalents' might seem to be arguable. Cash and cash equivalents are often considered as excess cash which might be used to repay debt or pay back to shareholders in the form of dividends or share buybacks.[74] In this case it is not considered as something which effects the operations and labelled so not included in operating activities.

Cash can also be treated as both operating and financing if the firm has been using it day to day activities. But it is very difficult to separates them if firm does not specifically mentions it. In dealing with cash, Petersen & Plenborg suggest the overall understanding of the analyst to differentiate between both.

In this paper excess cash has been treated as a source to perform day to day activates. The reasons behind this include no history of companies paying it out to shareholders, dependency of companies on only equity and not debt, high research and development costs, constant negative profits and inconsistency in the cash balances; which does not support the fair treatment of cash as excess or financing activity.[75]

Another notable transformation in the statements is the treatment of investment is subsidiaries. Where most of the literature suggests this to be considered as financial part of a firm's activities, it is clear from the accounts that many subsidiaries of these firms are fully owned and are responsible for development of core technology and in case of fingerprints, even working as a sub-contractor and core developer. For this reasons subsidiaries are considered as core operational part of firm and not treated as financial, which is also supported by Peterson & Plenborg.[76]

4.2 Historical profitability analysis

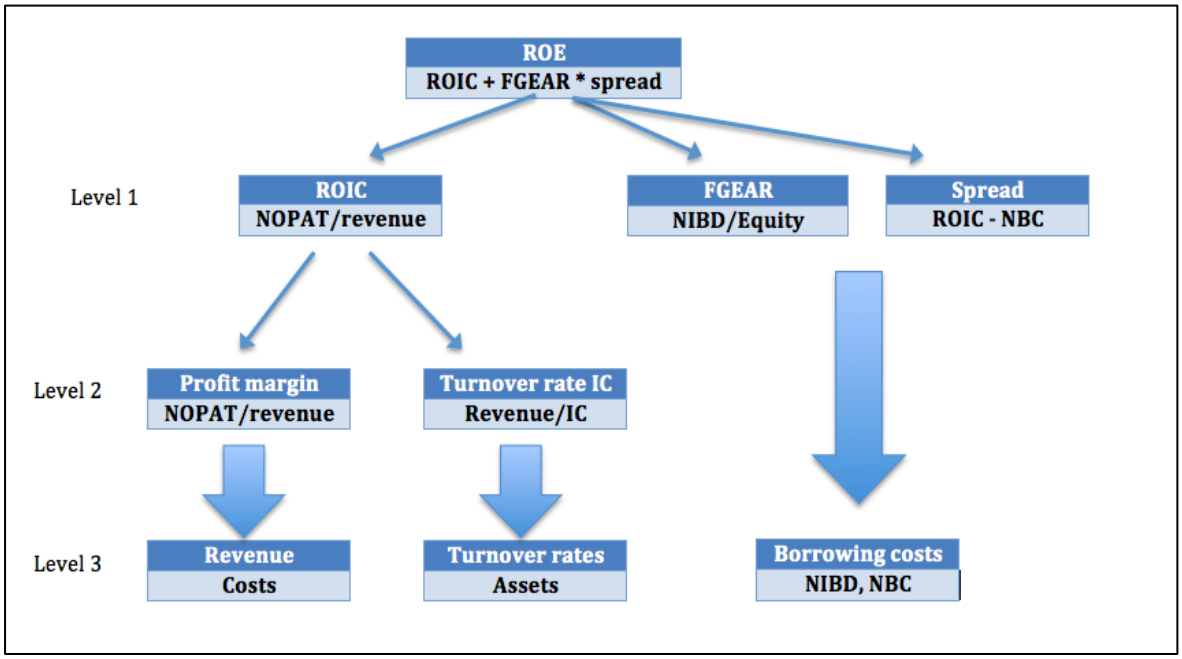
Measuring the profitability of a firm is one of the major objectives of financial analysis. Profitability is the key purpose of any business which makes investors aware of firms past performance, current strengths and the competitive advantage for the future survival. Even though profitability is based upon the past performance analysis and the current actions but it does help to understand and forecast the future to some extent.

In this part of the paper historical profitability of FPC will be measured based upon the financial figures from the analytical income statements and balance sheets. As a bench mark these figures

[74] Petersen & Plenborg (2012) p. 76
[75] Petersen & Plenborg (2012) p. 77
[76] Petersen & Plenborg (2012) p. 76

will be compared with the competitors in order to evaluate the relative performance of FPC. For the

The structure of profitability analysis will be based upon Du Pont Model.



Source: Petersen & Plenborg / compiled by author

4.2.1 Return on Invested Capital (ROIC)

Return on invested Capital is considered as one of the key profitability measures of a firm's operations as it measures the return on capital invested in the firm's operations.[77] One of the reasons ROIC is considered a key ratio in financial analysis is that it measures the returns for all the stake holders in the firm, which is both equity and debt.

ROIC can be calculated as:

$$ROIC = \frac{Net\ Operating\ Profit\ After\ Tax\ (NOPAT)}{Invested\ Capital}$$

Or

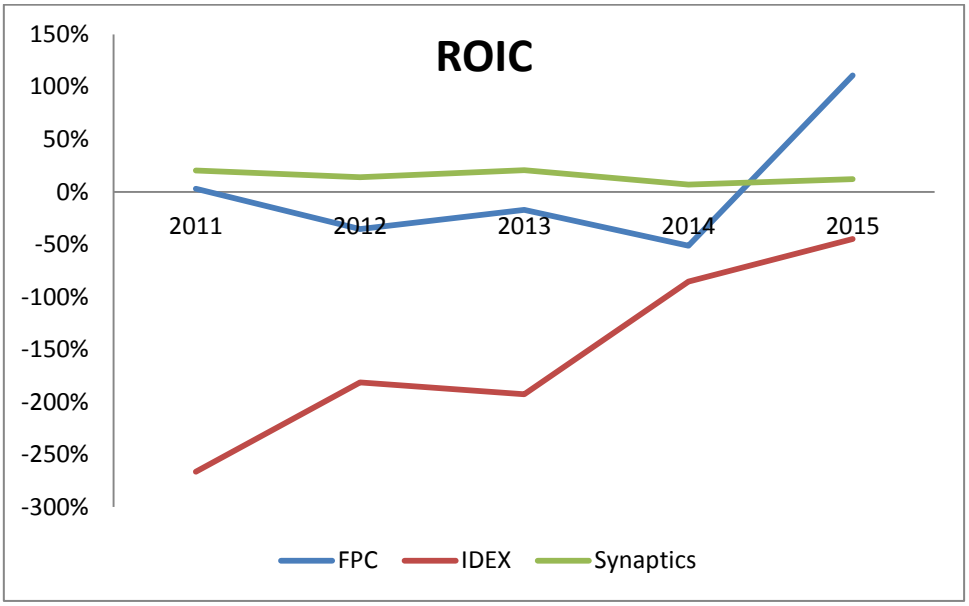
$$ROIC = Profit\ margin \times \text{Turnover rate of invested Capital}$$

[77] Petersen & Plenborg (2012) p. 94

As being a ratio it is measured in percentage.

In valuation context it is considered substantial factor as a higher rate will lead to a higher value of firm which can be conclusive as attractive to debtors and so availability of favourable financing to the firm.[78]

For the bench marking and relative performance measures, ROIC of FPC, IDEX and Synaptics are elaborated below.



Source: Compiled by Author / Annual Reports

From the graph it is clear that IDEX's ROIC does follow an improving trend but it is yet to achieve any positive ROIC. In the case of Synaptics, things are pretty different as in all five years the ROIC is positive and following a consistent trend. Fingerprint cards is a case different from both peers, in the case year ROIC is just above zero followed by negative pattern in next three years. But the year 2014/2015 is the period where FPC's ROIC is way better than both peers.

[78] Petersen & Plenborg (2012) p. 94

ROIC PEERS

year	2010	2011	2012	2013	2014	2015	WMA
FPC	.	3%	-36%	-17%	-51%	111%	22%
IDEX	.	-266%	-181%	-193%	-85%	-45%	-100%
Synaptics	.	20%	14%	21%	7%	12%	13%

Source: Compiled by author / Annual Reports

The last column of table represents Weighted Moving Average of invested capital as more advantage is taken from the most recent performance numbers. The WMA of FPC is as almost as twice as of Synaptics making its recent performance more prominent in the group.

It is clearer from the table that in the year 2014/2015 performance of FPC is remarkable. It was able to improve its ROIC from negative 55% to remarkable 111%. Furthermore Synaptics is the most consistent of the group.

4.2.1.1 Driving force behind ROIC

Well it is clear that ratio measures the return on capital invested in the operations, but it does not explain whether the profitability is because of better revenue and expense relation or improved capital utilization.[79]

In order to dig deep into ROIC, ROIC is decomposed into following two ratios:

- Turnover rate of invested Capital
- Profit margin

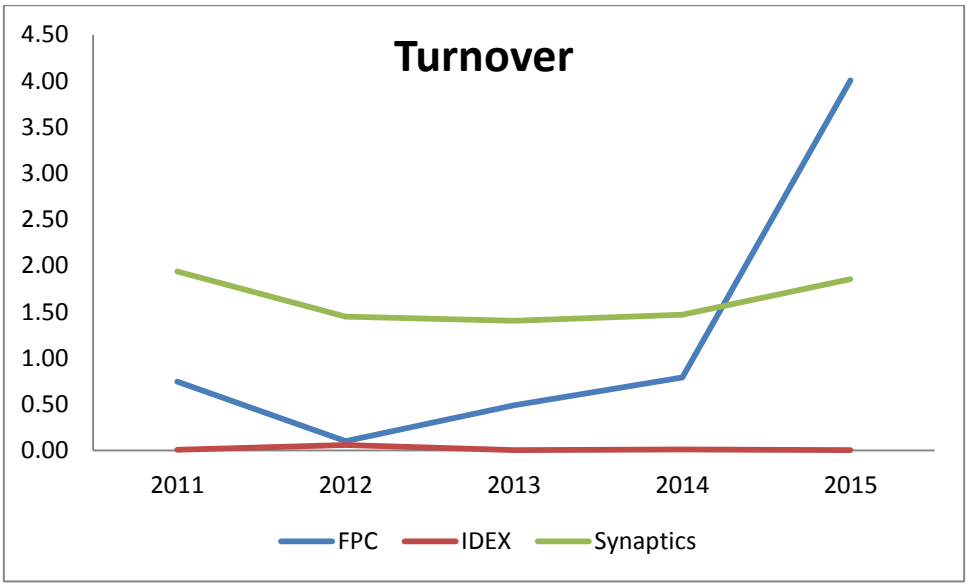
4.2.2 Turnover rate of invested capital (TO)

Turnover rate exposes the capability of a company to employ its invested capital. For example in case of FPC turnover rate will explain how much revenue is generated by each SEK of invested capital. It is a ratio of revenues and invested capital and therefore defined as:

$$Turnover\ rate = \frac{Revenues}{Invested\ capital}$$

[79] Petersen & Plenborg (2012) p. 107

In the analysis of this paper invested capital used is the average of current and previous year. This is because of the fact that using the capital invested for the same year might not be able to address all investments being responsible for generation of same year's revenues.



Source: Compiled by author/ annual reports

In the graph red line belonging to IDEX clearly shows that it has not been able to utilize its invested capital and in the last five year company has not been able to generate noticeable sales.

Synaptics on the other hand has more stable turnover rate. It fall slightly and in the middle years and then goes back towards previous high.

In the past four year FPC clearly stands out with a continuous increase in its turnover. In the year 2014 it was able to cross the turnover of Synaptics.

Turnover rate

year	2010	2011	2012	2013	2014	2015	WMA
FPC	.	0.74	0.10	0.49	0.79	4.01	1.946
IDEX	.	0.007	0.056	0.000	0.009	0.001	0.009
Synaptics	.	1.94	1.45	1.40	1.47	1.85	1.607

Source: compiled by author

The analysis elaborates the superior performance of FPC in utilization of its Invested capital when it comes to generation of sales. Specifically in the context of this paper FPC is able to

generate more sales and was able to benefit a lot more from the growth in the industry as compared to peers.

Another noticeable factor is the level of the improvement in turnover. Figures show that FPC not only improved its turnover but in the last year it was improved from 0.79 to 4, which is more than twice of which a consistent Synaptics could achieve.

Another indication by turnover is that it tells how many days invested capital is tied up, higher turnover means less days and better utilization.[80] It means that in year 2015 FPCs invested capital is tied up for only 91 days (365/4.01), as compared to that of Synaptics which is 197 days approximately.

Furthermore a weighted moving average of turnover rates elaborates that even on average the turnover rate of FPC is better than Synaptics.

Finally it can be concluded that one of the driving force behind improved ROIC of FPC is their improvement in utilization of invested capital as compared to Synaptics and IDEX. FPC has been able to generate more sales form its capital invested in operations as compared to its peers. As a couple of recent years represent the growth in industry due to penetration of Mobile and smartphone market, FPC has been able to utilize this opportunity in the most reasonable way amongst peers.

4.2.3 Profit margin

As turnover rate is able to illustrate the reason of increase in ROIC in the form of better revenue utilization. Profit margin tells analysts if the increase in ROIC is driven by a better revenue and expense relation.[81]

Profit margin reveals how much the company keeps from its sales. Performance of company's operations is measured by comparing its operating profit with the total sales.

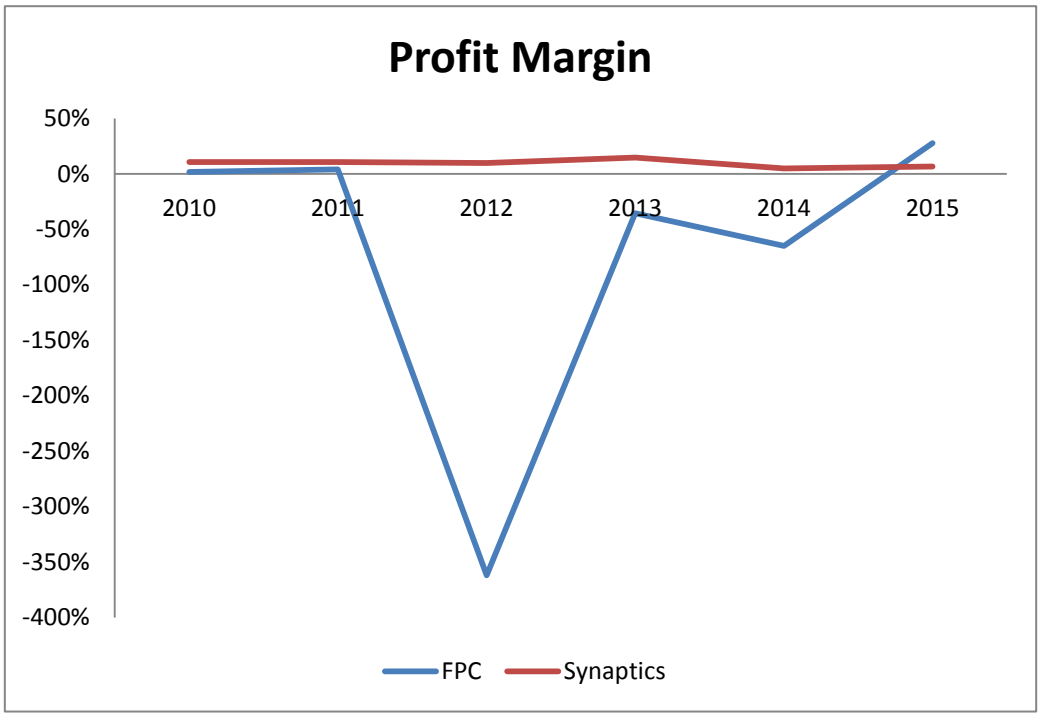
Profit margin can be calculated by using the following equation:

$$Profit\ Margin = \frac{Net\ Operating\ Profit\ After\ Tax\ (NOPAT)}{Revenues}$$

[80] Petersen & Plenborg (2012) p. 108
[81] Petersen & Plenborg (2012) p. 107

Following the equation and using the numbers from analytical income statements, profit margin form year 2010 until 2015 is measured and represented as below:

Profit margin FPC and Synaptics



Source: compiled by author

The red line in the graph representing the margins for Synaptics show the consistency of company in keeping its profit margins positive in last six years on the other hand the performance of FPC is full of ups and downs.

Profit margin

years	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**WMA**
FPC	2%	4%	-362%	-35%	-65%	28%	-52%
Synaptics	11%	11%	10%	15%	5%	7%	8%

Source: compiled by author

The profit margin for FPC is not very stable and in 2012 it as low as negative 362%. Overall in the past 5 years it's negative. Only 2010 and 2011 are the years with positive profit margins but still under 5%. In case of Synaptics the margin is more stable, positive in all five years ranging from 5 and 15 percent.

In the year 2015, numbers changed dramatically for FPC, profit margin was as 28% which makes is four times greater than that of Synaptics which was 7% in the same year.

Profit margins for IDEX are immensely negative and firm was unable to achieve positive margins in the last five years. With no improvements and highly negative numbers they have not been considered in the graph. Profit margin can be seen in the appendix A.7.

The figures show that overall in the last six years, Synaptics have been able to manager their costs better than FPC as their average profit margin is way more than that of FPC. On the other hand FPC has improved their efficiency in the last year and its profit margin was 28% but huge negative profits in the previous years do not help much and the average profit margin for six years stays negative.

Although the decomposition of ROIC into profit margin and turnover rate has given the clues about the driving force behind ROIC, they have not yet answered the question that why have the ratios evolved the way they are? In order to answer this question it is important to go further in debt and understand the trends and relations between different relations.

4.2.4 Decomposition of profit margin and turnover rate

In order to get deep understanding of profit margin and turnover rate, they are further decomposed by using trend analysis and common size analysis.

4.2.4.1 Trend analysis

Indexing or trend analysis can is used to quickly identify trends between revenue and expense items.[82] Following are the trends of revenues and different costs items of FPC, whereas the numbers of peers can be reached in Appendix A.8 and A.9.

Trend analysis FPC

	2010	2011	2012	2013	2014	2015	WMA
Revenues	100%	113%	17%	157%	383%	4760%	2052%
COGs	100%	99%	19%	150%	452%	5366%	2314%
Gross Profit	100%	126%	15%	163%	316%	4169%	1797%
Selling & general	100%	161%	146%	303%	540%	1066%	664%
R&D	100%	59%	108%	308%	1311%	2022%	1275%
EBITDA in %	100	104	-358	-287	-1237	12995	4734

[82] Petersen & Plenborg (2012) p. 112

Dep amr & imp	100%	77%	169%	197%	942%	680%	611%
EBIT in %	100	279	-3789	-3441	-15427	93180	31577
NOPAT in %	100	279	-3789	-3441	-15472	81743	26989

Source: compiled by author

From year 2010 until year 2014 revenues of FPC increased by 383% on the other hand only the cost of sales increased to 452%. Another major cost was research and development, in 2014 it had grown to around 1300%. High costs were the main reason behind the negative profits of FPC throughout the period.

On the other hand Synaptics had grown its revenue by 184% and selling costs around 160%. The trends show that Synaptics have controlled its costs much better than FPC during this period. There development costs had reach more than 200% but being in the industry, high development costs are expected.

After the inclusion of year 2015, things look pretty different for companies. Synaptics kept steady growth with same trend in costs, whereas FPC's revenue growth only in year 2014 to 2015 was around 1142%. It was huge as compared to that of Synaptics 80% in the same period. Selling costs followed the same trend whereas development costs were reduced, making FPC able to enjoy remarkable operating profits.

Going forward, indexing shows that a high growth in revenue seems to playing a role for improved profits for FPC. Synaptics have been able to follow a positive trend by the growth difference is notable in case of FPC. Recent year show FPC was able to grab more market share, whereas high costs reveal the reason of them being new in fulfilling high demands. Decreased costs in the last year show them being more mature and stable than before while holding a competitive position in the market.

Furthermore in the case of IDEX not much movement in revenues and high costs reveal the reality of IDEX lacking behind. A healthy investment in research and development do make their operating income negative but it is a good sign for them being in the race of development which might change their position notably in the years ahead.

4.2.4.2 Common size analysis

Index analysis indication important trends in a lot of operating items but they do not reveal the relative size of each item.[83] For this purpose common size analysis plays a useful role. Common size analysis scales each item as a percentage of revenue revealing the true relationship between the revenues and the efficiency of operations in generating those revenues.[84]

Common size analysis of Fingerprints is shown below.

Common size analysis FPC

	2010	2011	2012	2013	2014	2015
Revenues	100%	100%	100%	100%	100%	100%
COGs	-49%	-44%	-54%	-47%	-58%	-56%
Gross Profit	51%	56%	46%	53%	42%	44%
Selling &general	-25%	-36%	-218%	-49%	-35%	-6%
R&D	-13%	-7%	-85%	-26%	-45%	-6%
EBITDA	12%	11%	-257%	-22%	-39%	33%
Dep amr& imp	-10%	-7%	-105%	-13%	-26%	-1%
EBIT	2%	4%	-362%	-35%	-65%	32%
NOPAT	2%	4%	-362%	-35%	-65%	28%

Source: compiled by author/annual reports

Looking at the above figures, things look clearer now, one of the main reasons behind the low/ negative profit margins of FPC is high costs. Cost of goods sold is on average ranging between 44 to 58% whereas other key costs are selling and administrative costs and last but not least depreciation and amortization. Being a high tech growth company in a growth industry make sense of having high development costs but COGS and selling and administrative costs have not been well managed by FPC until year 2014. In the year followed FPC was able to reduce its selling and depreciation expenses which lead to positive NOPAT.

It seems like FPC has not yet been able to control its COGS. One reason behind high COGS is that FPC was facing huge demands and in order to fulfil the deadlines and production volumes there might have been miss management of costs. Another reason might have been the sudden need for increase in capacity and short time to achieve economies of scale.

[83] Petersen & Plenborg (2012) p. 112
[84] Petersen & Plenborg (2012) p. 112

Furthermore low development cost in the last year has also played a role in the positive operating profits. In the current year it looked good but lower development costs in such an advanced and research and development dependant industry might make FPC less competitive in future.

As far as IDEX is concerned, the reason for negative profits is clearly high costs. IDEX's policy for investing in development might be painful in term of profits but can help in grabbing market share in future. (See appendix A.10)

In the case of Synaptics, the selling costs are much less and consistent as compared to those of FPC. Development costs are also managed well by Synaptics. Overall operating costs are well managed by Synaptics as compared to FPC this also show the fact of FPC being new in the segment. (See appendix A.11) FPC has spent much more on development and operations and now they are moving towards maturity where they are able to achieve high demands while managing their costs well.

4.3 Partial Conclusions

Analysis of profitability reveal that Synaptics has more stable ROIC and has been able to control costs while managing growth. In both revenue to cost and revenue to profit relationship, return on invested capital shows an upward pattern. It shows their strong presence in the market and stability in the operations.

Even though the neighbor and competitor of FPC the Norwegian IDEX has been in the existence before FPC, over the time IDEX has not been able to achieve positive ROIC, company has neither been able to improve revenue to capital relation nor profitability to a competitive level. High costs reveal them being still in the process of development and poor revenues show that they have not been able to benefit from the growth in the market.

Profitability analysis of FPC show that company was able to achieve an exceptional return on invested capital. Drivers behind ROIC were outstanding revenue to capital relationship as well as improved costs and so profitability. But before 2015 the case was not the same, FPC was not able to achieve satisfactory profits and also the costs were huge. Overall the performance of FPC shows that they have been able to take good advantage of penetration of mobile biometrics in the industry. Over the period the costs were high due to research and development and investments to meet the enormous growth in demand. Recently company cashed in on their development and investment costs in previous year. FPC looks more mature now with a competitive position in the market.

4.4 Pitfalls

In the context of this paper some of the factors which might be affecting the profitability and its interpretations are discussed below.

4.4.1 Product lifecycle

Just as a product goes through different stages from its development introduction growth and decline, a company can be summed in the similar categories. As the costs are high in the development process, revenues are low and low profit margins in the introduction and growth phase due to high costs and investments, maturity brings the time to cash on investments made in the previous phases.[85] In case of companies it is rare to find one exactly at the same level, going through same lifecycle and when analysis are made of companies during different lifecycles, the ratios does not seem to be making much sense. In this case it is beneficiary to rely on the assessment of older companies in order to assess the companies at earlier stages of their lifecycle.[86]

4.4.2 Difference in accounting policies

For a relative comparison of ROIC it is also very important that the firms use the same accounting policies such that their policies and treatment of activities does not affect the operating profitability.[87] One example is the treatment of average age of asset and the depreciation method used for it, using different techniques might result in conflicting numbers.

4.4.3 Difference in operational risk

Another important explanation of unusual interpretation of return on invested capital is the differences in the operational risk of firms, as following economic theory investors require more return on relatively risky investment.[88]

Last but not the least, profitability ratios can help analysts understand past and current performance and can help in identifying some trends going forward but they do not guarantee any future performance. There are so many firms and businesses which had unsatisfactory profitability in the past but performed brilliantly in the following years. One example of such firm is FPC, it had poor ratios in the previous year and was unable to achieve positive profits whereas in the above analysis of 2015 show that FPC was able to achieve ROIC of more than

[85] Petersen & Plenborg (2011), p.106
[86] Petersen & Plenborg (2011), p. 107
[87] Petersen & Plenborg (2011), p 100
[88] Petersen & Plenborg (2011), p.101

100%. On the other hand there are firms which showed extremely healthy profitability and consistent ROIC but went bankrupt in the following years.

Historical ROIC IT Factory

Year	2003	2004	2005	2006	2007
ROIC	43%	141%	67%	104%	85%

Source compiled by author/ IT Factory Annual Report 2007

After enjoying healthy and attractive profit for five years, IT Factory went bankrupt in the very next year.

Furthermore peers used in the analysis of paper might not be going through the same product life cycle and facing different operational risk. But the analysis does give some clues to understand the past performance, current position and the most importantly the strategy of FPC in going forward.

5 SWOT

SWOT analysis deeply describes what market offers to the firm and what firm has got to get competitive advantage. Based upon the strategic and financial analysis as well as the company and market description, SWOT of FPC is structured.

5.1 Internal factors

The factors over which FPC has more control include:

5.1.1 Strengths

- Strong delivery capacity
- Scalable business model
- Fabless production leading to low/ variable costs
- No debt obligations
- Affiliations with Chinese companies hide the tag of being foreign and enables them deal with market as domestic player. This makes them more competitive both for Chinese as well as foreign rivals.

- Dynamic portfolio with versatility of customization at different levels, this increases the target market for FPC from OEMs to distributors, subcontractors and even small customers who do not want to spend much on customization and require a plug and play products.
- Strong product in mobile biometrics market which consumes less battery making it a priority for manufacturers of smartphone and tablet manufacturers.
- Huge market share in China, which is currently the biggest market for industry with healthy growth opportunities.
- Economies of Scale
- Healthy cash balance of more than a billion SEK
- Strong investment in research and development in mobile biometrics as well as affordability to invest in other sectors like automotive, smartcard and internet of things.
- Highly qualified manpower with related field experience including previous employees of Siemens and Nokia

5.1.2 Weaknesses

- Lack of diversity in the market share (geographic) as FPC has almost 99% of its total market in china
- Lack of diversity in the market segment as FPC's revenues rely highly on mobile biometrics only
- Fabless production, making them depend more on others. Furthermore, less room for innovation in development as compared to those owning the production plants
- Weak measures to stop workplace corruption

5.2 External factors

Factors which offered by the market are explained below:

5.2.1 Opportunities

- High expected future growth in mobile biometrics
- Expectation of the penetration biometrics industry into automobile and Internet of things
- Strong position in china one of the biggest market with healthy future growth expectations
- Increasing trust of financial institutions on biometrics instead of traditional pins and passwords
- Infrastructure-less systems of banking in underdeveloped countries
- Adaptation of biometrics systems in voting/ elections in underdeveloped countries

- Security thefts, cybercrimes and privacy issues linked to traditional pins used for authentication

5.2.2 Threats

- Slow economic growth in Asia, Specifically China
- Political instability in China
- War or sanctions on cine, the probability is low but recent tensions between China and USA on South-China Sea could lead to sanctions on china
- Default or bankruptcy of customers
- Exchange rate fluctuations between USD and SEK
- Leak of corporate secrets, technology and information
- High supplier costs, weak performance of suppliers and subcontractors
- Development of superior technology by competitors
- Corruption, company has suffered it before in form for a previous CEO's conviction
- Product defects
- Inability to generate enough funds to support operations

6 Forecasting

One of the major purposes of this paper is estimating the value of FPC and discounted cash flow (DCF) and economic value added (EVA) models will be used for this purpose. As both these models rely on expected future performance of the firm, it is prerequisite to generate a pro forma income statement and balance sheet.

In this section a pro forma income statement and balance sheet will be generated. The forecasts will based upon the industry trends, previous and current performance of the firm, the current standing and most importantly the competitive advantage of the company in going forward. In short the forecasts will be the combination of all the previous sections of this paper.

Following up with the previous methodology of this paper, this section will also be highly influenced by the future prospect of the firm and industry. Less weightage will be given to the previous performance of the firm and only most recent performance trends will be picked up in order to forecast the future of firm.

6.1 Forecasting Period

As discussed earlier both DCF and EVA depend upon the future forecasts, therefore the value will highly be influenced by those numbers. Therefore it is important to make efforts to bring forecasts close to precisions. According to Investopedia a company's position and market could be a good factor to relate its forecasting period for excess returns. A reasonable forecast for excess returns for a company with strong marketing channels and high growth is suggested as of five years as compared to a 1 year for a slow-growing company in a highly competitive market.[89]

Following the literature and considering the competitive position of FPC, this paper will base the value on a five year forecast period. Limitation of forecast to 5 year period is also an effort to minimize the level of uncertainty in future and so its impact on the valuation.

6.2 Identification of key value drivers

Generation of pro forma income statement and balance sheet will initiated by splitting the value drivers such as growth, cost and investment drivers.

6.2.1 Revenue growth

Historical revenue growth for Synaptics, IDEX and FPC is highlighted in the table below.

Year	2011	2012	2013	2014	2015	Average	WMA
Synaptics	116%	106%	129%	184%	331%	173%	224%
IDEX	150%	1585%	11%	2156%	529%	886%	1019%
FPC	113%	17%	157%	383%	4760%	1086%	2052%

Source: compiled by Author/ annual Reports

Revenue growth from the table highlights the position of Synaptics as more mature player where growth is relatively stable and averages at 173%. On the other hand FPC's average growth is close to 1100%. Weighted moving average and the numbers from recent couple of years show the penetration of biometrics in the smartphone industry with high growth for both top players.

According to Koller et. al (2015), it is a bigger challenge to value high growth, high uncertainty companies where the high growth companies are defined as the companies with organic

[89] (Ben McClure, 2016)

revenue growth more than 15% annually.[90] In the paper they argue that a discounted-cash-flow (DCF) valuation based on sales approach is still the standout procedure to value such companies while emphasizing upon the treatment of historic data more carefully as compared to mature companies.

Following the literature there will be less emphasis on the historical revenues and forecasts will be more focused upon most recent performance of FPC and the future outlook of both firm and the industry.

One of the widely used tools for forecast is use of expected GDP growth of the region a firm operates. According to Statista forecasts for China's GDP, it ranges from 6.4% in 2016 to 6% in the year 2021.[91] As China is almost 99% of the total FPC's market it could be useful for the forecasts to relate with Chinese GDP by using traditional method. But in this case where the competitive position of FPC is a high-tech, high growth company dealing in more complex and uncertain market, it might not be fair to rely solely on the GDP forecasts especially in the coming few years.

Forecasts in the papers are influenced by the estimated forecasts for overall biometrics industry growth forecasts, only mobile segment and specifically region of Asia which is the main market for FPC.[92]

Annual Mobile Biometrics Revenues (2015-2024) M Dollars

Year	2015	2016	2017	2018	2019	2020	CAGR* 2024
Asia	125	175	400	600	800	1000	
Change		40%	129%	50%	33%	25%	
Rest world	100	125	300	500	600	750	
Change		25%	140%	67%	20%	25%	
Total	225	300	700	1100	1400	1750	20%

Source: compiled by author/ Tractica

The above estimates of only mobile sector of biometrics industry show a very healthy CAGR of 20% with 2024 as ending year. A split has been made between the world and Asia, as Asia and

[90] Koller et. Al (2015), p.731
[91] (the statista portal, 2016)
[92] (Tractica, Biometrics, 2016)

Especially China is the current major market for FPC. The noticeable trends and CAGR will be used for the forecasts of revenues of FPC.

By analyzing competitive position of FPC in the market, the trends in the forecasts for biometrics, and the forward going industry and company, the revenue growth of FPC has been forecasted as below.

Year	2015	2016	2017	2018	2019	2020
Growth		94%	15%	12%	6%	4%
Revenues	2900.5	5614.3	6456.4	7231.2	7665.1	7971.7
CAGR				36%		
FPC's Expected CAGR				60%		

Source: compiled by author/ annual reports

In order to combine market forecasts by reliable sources, understanding of market by analysis of this paper, company's competitiveness and recent performance of the company for the best possible forecasts, forecast period has been divided into segments such as base, structure, peak and terminal.

6.2.1.1 Base (2016)

From last quarter 2015 until first quarter of 2016 the number of devices with FPC's fingerprints increased from 39 to 83. This number crossed 100 in May. Forecasts for year 2016 are based on the assumption that the rest of the year fill follow the same trend as of first quarter.

Period	2015	q-2	q-3	q-4	2016	q-2*	q-3*	q-4*	Y-2016*
Revenue (M SEK)	139.9	445.2	964	1351.5	1492.2				
Change		218%	117%	40%	10%				
		Peak							
			-47%	-66%	-74%				
	WMA				-66%				
Revenue Growth					10%	3.4%	1.2%	0.4%	94%
						1397.421	1367.1131	1357.0105	5614

Source: compiled by Author

It is clear from revenue change figures that revenue growth has been following declining trend since q-2 2015. With a weighted moving average of -66% for the recent three quarters, it has been expected to follow the same trend in the next three quarters and reach overall yearly growth of 94%.

6.2.1.2 Structure (2017-2018)

Revenue growth for FPC has been following a declining trend since second Quarter 2015. For years 2017-2018 this trend is expected to follow on almost same level. Form year 2015 to 2016 the number of devices with FPC's sensors has increased to almost 60 units and still a 74% decline in sales as compared to recent quarter. Moreover for the year 2016 this number is not looking to increase more than 30 to 40 devices. Following estimates the expected revenue growth rate is estimated at 15% and 12% respectively. These estimates might look high looking at the level but the development of 4G and 5G technologies, cheap smartphone OEMs as customers of FPC, healthy growth rate estimates for China and Asia, reasonable market share of OEMs and last but not least a 20% CAGR estimate for mobile biometrics market by Tractica, are enough to support the current growth pattern for FPC.

Over the period market for smartphone has slowed down but for FPC it has not been very brutal as customers of FPC have gained more share of the market. FPC's main customers are Chinese manufacturer which have been gaining a lot of fame because of their competitive prices.

Another important market for smartphones and so mobile biometrics is India. As Chinese Manufacturers like Huawei and Vivo are providing smartphones in than 100 dollars, they can the potential to gain a lot of market share. Furthermore a recent request by Apple to import and sell refurbished smartphones on cheaper prices has been declined by Indian government.[93] Not good news for Apple but that is definitely very positive for OEMs and customers of FPC as they can grab huge competitive price market which could have been targeted by apple.

Development of 5G technology in China also holds a key to growth in the revenues for smartphones and so FPC.

Following this growth potential and strong positon in FPC the estimated CAGR for three year is expected to be 36% which is less than expectation of FPC at 60%.

FPCs estimates of 60% CAGR for 2016-2018 might be a bit too optimistic, as FPC also considers smartcard cart market which might be engaged by competitors like IDEX and NEXT BIOMETRICS.

[93] (Saritha Rai, 2016)

6.2.1.3 Peak (2019-2020)

Years 2019-2020 have been considered as much more stable for the industry especially mobile biometrics segment. The growth is estimated to decline following the pattern forecasted by Tractica and has been estimated to be 6% and 4% respectively.

Specifically the main customers of FPC which are currently new and fighting for market share are expected to stable down at their positions in the market. Current development in the and competition in the market is improving the lifetime of devices and in coming year that mean less number of new devices sold per year. Moreover the factor of innovation is slowing down and expected to follow the trend leading users to hold on a device for longer periods of time.

6.2.1.4 Terminal

The terminal growth is traditionally linked to the expected GDP growth in the region, for this segment linking terminal growth rate to GDP will be estimates of 6% as expected GDP growth of China is 6%.[94] The reason for linking terminal growth to GDP is clear; company, market and customers are expected to be much more mature. But in the case of FPC considering the company to be mature and all of its customers as well does bring some doubts. Currently almost all of the big customers of FPC including Huawei and VIVO are considered new to the market and are looking for their position in their market. Furthermore these firms are competing with each other as well. An increase in the market share of one is result of decrease in the share of other. The overall industry is highly dependent on new technology, innovation and so volatility. Therefore keeping these factors in consideration the terminal growth rate for FPC has been set less than 6% and a rate of 4% is considered to be fair.

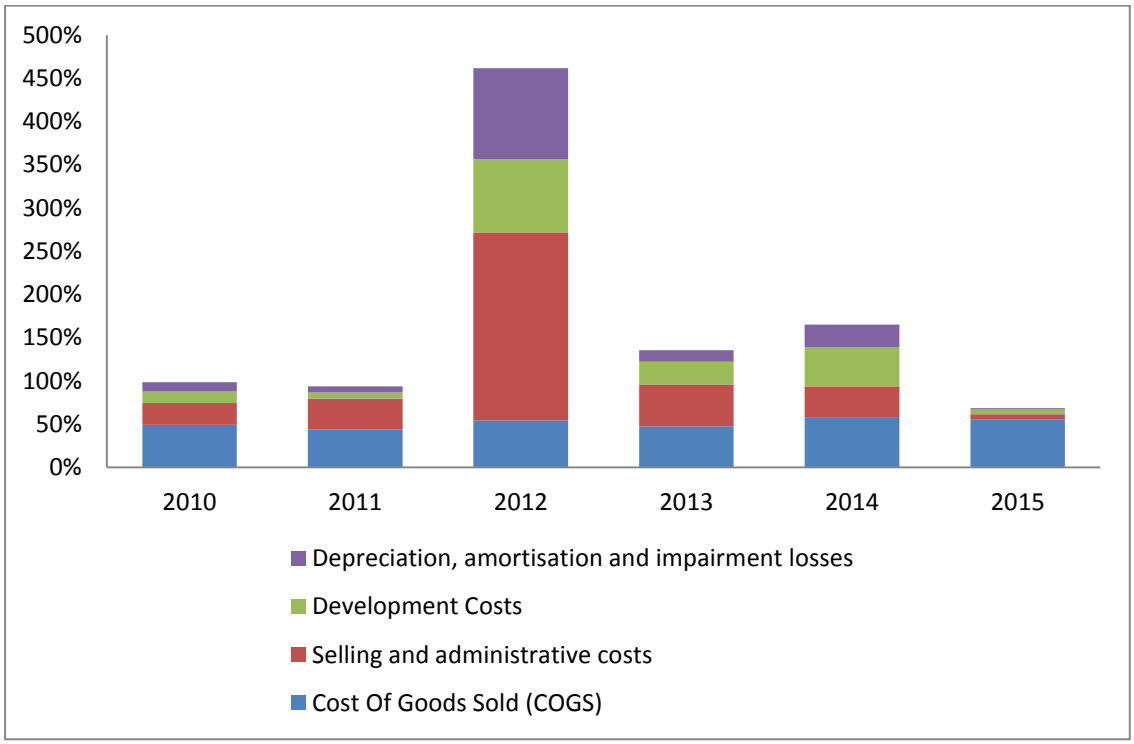
6.2.1.5 Conclusion

An important factor in forecasting revenues is the current R & D investment of FPC in segments like automotive and internet of tings. There is a potential of use of biometrics technology in automobiles. This could be a mass market for FPC. Furthermore the developments of technology in the form of other identification solutions like IRIS can put a challenge to FPC. Once a major OEM takes this technology into use it might be the new trend and so less market for fingerprint solutions.

[94] (statista, 2016)

6.2.2 Cost Drivers

Following the forecasts of revenues, this segment is designed to forecast the cost drivers in the journey towards the estimates of free cash flows FCF.



Source: compiled by author/ Annual Reports

Evolution of costs as a percentage of revenues helps in understanding the trend as well as the level of it. On this is for sure that negative profits in the previous years were due to huge costs. Although FPC has reduced its costs in the recent year, it is the only year when FPC's costs were less than its revenues resulting in positive EBIT.

6.2.2.1 Cost of Goods Sold (COGS)

From the graph it is clear that COGS has been the most consistent of all other costs and it shows a relationship with revenues. Over the period of past six year, COGS have fluctuated from 44% to 58%. A range of 14% makes it smallest and most consistent relative to other factors.

Going forward COGS have been estimated to be consistent following the same trend. One reason behind is the outsourcing strategy of FPC, it does not let the costs to raise very quickly in case of high demand for production but it also brings in the disadvantage of not owing the production which might reduce variable costs in the future.

Weighted moving average of recent four year for Gross profit is 45% whereas a normal average of around 50%. In forecasting the COGS an important factor to mention is the recent humongous growth in demand and so more than average costs related to fulfill it. This factor is expected to improve at least 4% going forward. Furthermore it will be a fair to estimate it between recent estimates for developing market condition of 2017 and 2018. In the long run GOGs is expected to stay at its average at 50% leaving gross profit to be half of total revenues.

6.2.2.2 Selling General and Administrative Costs

FPC has been following versatile approach when it comes to selling. It has coordination with sub-contractors as well as original equipment manufacturers. Sales are also done through direct channels without middleman.

Selling costs have been lowered down to 6% form 35% in 2014. The huge column in the graph for selling costs in the year 2012 is one in decade factor as in that year a lot of rumors were around for a potential mobile biometrics market and FPC was well in the game for having a competitive product. An important needed thing was looking for a customer for those products, therefore 2012 was a year well spent in advertising and looking for potential customers. But there were not enough revenues in the same year leading to huge selling and admin costs.

As FPC has already improved its selling costs a lot, in the forecasts these are not much be changed in future. These costs have been estimated to be around 8% in year 2016. Keeping in mind the coming market for smartcards, Internet of things and automotive market, selling costs are expected to be around double in year 2017 and 2018 and come back to normal in the years later.

6.2.2.3 Development Costs

Analysts will not mind if research and development is called as the back bone of a firm like FPC. In a gradually changing market with intense technological advancements, it is important for FPC to spend on research and development in order to stay on the top.

Over the past year FPC has spent a lot on research and development. In year 2012 its R&D was highest at 85% of total revenues. It improved gradually over time and in the last year it was down to 6% only, letting FPC to enjoy some healthy free cash flows.

Looking at the future of the market and potential segments of automobiles and internet of things, research and development costs are expected to increase. Looking at the relatively mature peer Synaptics, research and development costs range between 10 and 20 percent

throughout the period Average R&D costs for FPC have also been 20% with the exclusion of 2012 as exceptional year. For going forward these costs have been set up at 16% in the terminal. Whereas for year 2016 these are estimated to be 8% and increase at 14% where there is more need of development for other markets.

6.2.2.4 TAX

Tax for FPC has been very insignificant as they did not pay significant profits to pay taxes. Effective tax rate for the last 6 years rangers from 3% to 12%, the highest in the year 2015 because of the first ever disclosure of significant profit.

For the years going forward FPC holds a strong position to show profits and so there will also be significant taxes. Other than change in exchange rates, FPC does not deal with significant financial income and expenses. This factor takes the advantage out of their hands when it comes to tax benefits.

As tax rate remains 0% when firms are losing money or have net operating losses to shelter their income, it increases to marginal rate in the years they make money or do not have operating losses to shelter their income.[95] Therefore the tax rate for FPC is expected to move towards marginal tax rate for Sweden at 22%.

6.2.2.5 Depreciation Amortization and Impairment

Like the forecast of revenues, forecast for depreciation amortization and impairment losses is a big challenge. This segment also highlights the factor of a new high growth firm and different from other businesses. Most of the production of FPC is outsourced, in term of their property plant and equipment they do not hold much of a value. The notable factor is the impairment losses and the constant development and short life span of products.

Over the period of last 7 years intangible and tangible assets averaged to be 45% of revenues, omitting the extraordinary year of 2012. But the revenues have also been sluggish. In the recent year intangible and tangible fixed assets were only over 2% of total revenues.

In the case of depreciation and impairment costs, the average is around 43% of intangible and tangible assets. One big reason behind high depreciation costs is having not enough revenues and obsoleteness of products.

[95] Damodaran 2001, The dark side of Valuation, p. 128

While going forward both assets as a percentage of revenues and the impairment costs linked to the obsoleteness are expected to take effect when the company is stepping towards maturity.

Comparison with a more mature peer Synaptics the expected intangible and tangible assets are going to be 18% and with more technology being sold in good time depreciation and amortization is expected to be around 8 percent of total intangible and tangible fixed assets.

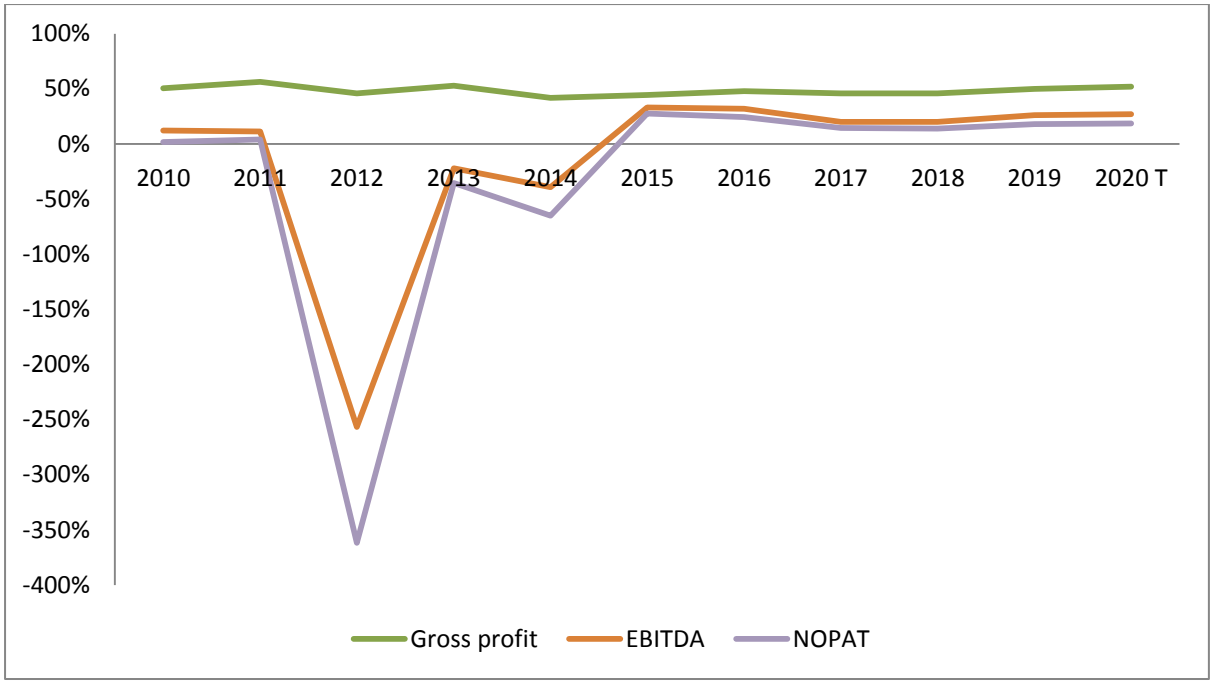
After all the best efforts to target possible factors which could affect future cost structure, the costs of FPC going forward are estimated as following:

Year	2015	2016	2017	2018	2019
COGS	-56%	-52%	-54%	-54%	-50%
Selling costs	-6%	-8%	-12%	-12%	-8%
R & D	-6%	-8%	12%	12%	16%
Dep, amr & imp	-61%	-8%	-8%	-8%	-8%
TAX as of EBIT	12%	22%	22%	22%	22%

Source: compiled by author / annual reports

6.2.3 Gross profit EBITDA and NOPAT Margins

After the estimation of revenues, costs and taxes related to them, the expected picture of FPC's financials is presented below:



Source compiled by author / annual reports

6.2.4 Investment Drivers

6.2.4.1 Non-current Assets

As discussed in the section of depreciation, amortization and impairment as a percentage of non-current assets; it is clear that the relation of intangible and tangible assets with the revenues have been variable. This is due to the type of business as well as the sudden growth in the market and increase in the revenues. With a path full of fluctuations, non-current assets were averaging around 43% with only 2% in the most recent year. With a relative comparison with mature peer and company going forward towards that phase, non-current assets as a percentage of revenues have been predictable to move towards their average and estimated to reach 30% in year 2019.

A precise figure might be arguable but the estimation is based upon the fact that company does not hold much of property plant and equipment PPE. Most of the production is outsourced and big. The recent comparison with the revenues might not stay very long as the company's revenues increased to a percentage more than three figures. So the best possible estimate has been made with a combination of peer comparison, company's average and the company's outlook.

6.2.4.2 Net Working Capital (NWC)

As discussed earlier in the transformation of balance sheet into analytical balance sheet, cash was not treated as a financial item. The reason behind was that company's complete dependency on equity and absence of debt, also the investment made in company in the same sort of business which is acting like the core part of business rather than providing a general services. It could be arguable that some part of the total cash might be treated as financial item rather than operating. But form the accounts disclosed by the firm it is not possible to separate how much portion of the cash should be treated as operating and how much as financing. Therefore, in the perspective of this paper all cash has been treated as operating item.

Company's performance and so margins changed completely over the course of 5 years. Before NOPAT were negative, not much revenues and no debt. In the last year revenue growth was in four figures and huge profits. Going forward it will be a poor estimate to treat the cash in the same was it was treated before. Looking at current position of firm with healthy revenues and revenue growth, controlled operating costs and much more stable position in the market a healthy cash balance in the bank can be used in paying dividends or share buybacks. In the context of this paper, going forward more weightage is given to cash as excess cash and being treated as financing item. In this case NWC is the last year is 2% whereas currently cash being treated as a source of firm to fulfil daily obligations NWC is 37%. In the coming year NWC is estimated to reach at 30% where it is difficult to draw a fine line between which part of cash should be treated as excess cash and which as operating cash. But it will be unfair to treat all cash as excess cash and in the same way it will also be unfair to treat all cash as operating cash.

6.3 Pro forma Income statement

See appendix A.1

6.4 Pro forma Balance sheet

See appendix A.4

6.4.1 Pro forma cash flow statement

Pro forma cash flow statement for FPC can be seen below.

Estimated Cash flows	2016	2017	2018	2019	2020T
NOPAT	1366290	936697	1015259	1375111	1430116
Depreciation amortization & impairment	44914	90390	144624	229952	239150
NWC change	496497	364928	377055	-14462	91981
CF operations	914707	662159	782828	1619525	1577285
Investments	422756	545146	686963	1083232	331130
FCF	**491951**	**117013**	**95865**	**536294**	**1246154**

Source: compiled by author

7 Valuation

Valuation will be the conclusive part of this paper. With all the forecasts made this section will evaluate the company by using previously discussed tools.

7.1 Weighted average cost of capital (WACC)

The weighted average cost of capital WACC is the weighted average of required rate of return for each type of investor.[96] WACC can be measured by using the following formula

$$WACC = \frac{NIBD}{NIBD + E} rd(1 - t) + \frac{E}{(NIBD + E)} re$$

Where

NIBD = Market Value of interest bearing debt

E = Market value of equity

r*d* = Required rate of return on debt

r*e* = Required rate of return on equity

t = Corporate tax rate

[96] Petersen & Plenborg (2011), p.309

In the case of FPC where the capital structure does not have NIBD and all capital is equity as there are no borrowings, WACC becomes equal to r*e*.

7.1.1 Cost of equity, r*e*

Cost of equity r*e* is the estimation of owner's required rate of return and it can be calculated by using the capital asset pricing model CAPM, formula for CAPM is[97]

$$re = rf + \beta \times (rm - rf)$$

Where

rf = Risk-free rate

β = Systematic risk

(rm – *rf)* = Risk premium of the market portfolio

In order to find required rate of return on equity r*e;* systematic risk, risk-free rate and market risk premium need to be estimated.

7.1.2 Risk-free Rate

Risk-free rate is the return an investor can get without taking any risks with his/her investments. Some of the methods for the estimation of risk-free rate include the use of yield on bonds issued by the government and estimation of the returns on a zero beta portfolio. Because of the problematic nature and the costs related in the estimation, construction of a zero-beta portfolio has not proved to be useful in practise.[98]

The first method has been used for the estimation of risk-free rate in the analysis of this paper and a yield on 25 year Swedish government bond has been used. Even though government bonds have sometimes proved to be risky, using this method is still supported by literature.[99]

According to the most recent figures 25-year Swedish government bond yield was 1.680 in MAY 2016, 1.411 in MAY 2015, 2.538 in MAY 2014, 2.748 in MAY 2013 and 1.7 in MAY 2012.[100] In

[97] Petersen & Plenborg (2014), p.249
[98] Petersen & Plenborg (2014), p.249
[99] Petersen & Plenborg (2014), p.249

order to remove more volatility connected to recent figures, an average of five year has been taken. Therefore, the risk-free rate (*rf)* has been estimated at 2.02%.

7.1.3 Systematic risk, β

Beta is the measure of the systematic risk of FPC compared to the market as a whole. By looking at the CAPM, it is noticeable that required rate of return increases with increase in the beta. This is because higher the risk more the investors want in return to be compensated for the risk.[101]

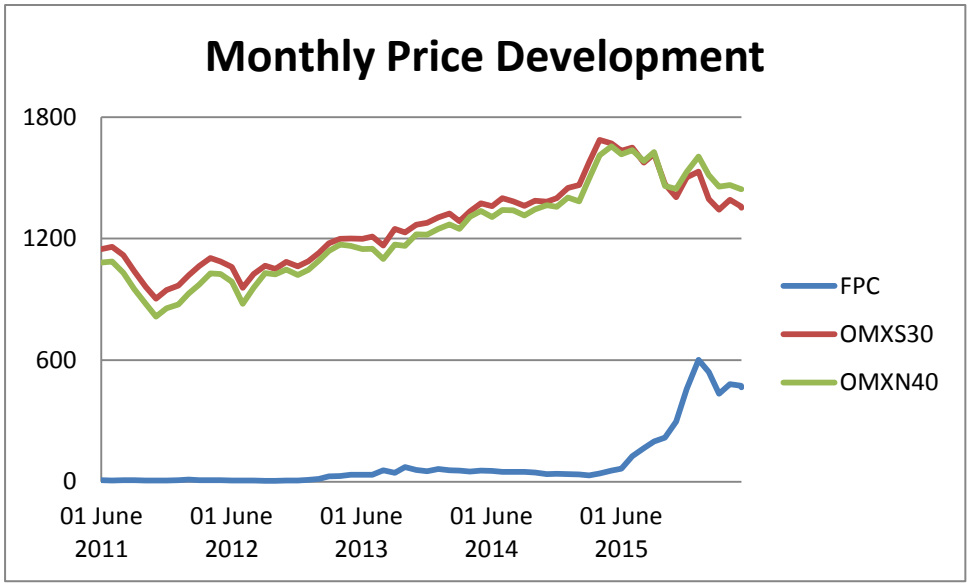
Following the literature FPC's beta can be measured by using historical stock returns, where beta measures the covariation between FPC's returns and market portfolios stock returns. A beta value less than one indicates that company's volatility is less as compared to market, above 1 means volatility is more than market's volatility and beta equal to 1 tells that the volatility of company is equal to the volatility of market.[102]

One of the major assumptions used in the estimation of beta is that the company's risk will remain stable over time. This might not be completely true, especially in the case of FPC where the firm is a high growth dealing in high growth industry. Contrary to that CAPM requires the estimation on the future stock prices, which are not available in this case, so beta has been used following the historic stock prices.

In the context of this paper beta for FPC has been calculated by using 6 years daily and monthly returns of two indexes. The purpose of using daily and monthly returns was to cover for any left voids and variations.

Chart below shows the historic returns of FPC relative to the performance of OMXS30 and OMXN40 indexes.

[100] (Investing , 2016)
[101] Petersen & Plenborg (2011), p.313
[102] Petersen & Plenborg (2011), p.314



Source: Compiled by author/ NASDAQ

The reason for using more than one INDEX was influenced by the literature Koller et al. (2010), which supports the regression of historical returns of a firm against a diversified market portfolio instead of a country specific portfolio in order to protect data against industry bias or undiversified indexes.

In the estimation of beta for FPC the historic returns have been regressed against OMXS30 Stockholm and a more diversified index of OMXN40 Nordic. The daily and monthly results from both indexes are simplified in the following table.

Beta estimation FPC

	INDEX	**β**	**Adjusted β**
Daily	OMXS30	0.82702	0.88468
	OMXN40	0.832481	0.888321
Monthly	OMXS30	0.659509	0.773006
	OMXN40	0.568379	0.712253
Average			0.814565

Source: compiled by author/ NASDAQ

Where adjusted beta is based upon the formula by Bloomberg[103]

$$Adjusted\ \beta = \frac{2}{3} raw\ \beta + \frac{1}{3}$$

This is due to the tendency of companies to move towards the market average beta over time.

The average of both monthly and daily regressions is approximately 0.82, whereas the daily average of both indexes is 0.887. In the most recent beta calculations for beta by sector by Damodaran, the beta for consumer electronics is calculated at 0.88 and for telecom equipment at 1.04.[104] Therefore, for further analysis the beta for FPC is estimated as the daily average of both indexes at 0.89, as it is also the most closest to the estimates of Damodaran.

As beta plays a vital role in the stock analysis. High beta is an indicator of high risk and so high cost of capital to compensate for the risk. Furthermore in the valuation process higher beta results in higher discount rate and so lower estimated present value of a firm.

Even though beta calculations based upon the regressions of stocks with indexes does capture the volatility but this volatility/ beta does not say much about the future and so is considered as a poor estimate for future.[105] It can be considered reliable in the short time spams but in the longer run it does not prove to be a good indicator. Furthermore beta is considered more as a rear view mirror and following a company with low volatility when it enters a new market which is more risky, beta based upon previous stock returns fails to consider the new risk the company has taken.[106]

Calculations can be seen in the Appendix A.13 and A.14.

7.1.4 Risk premium

Where risk free rate is the return investors get by investments in risk-free investments like government bonds, market risk premium is the difference between the market returns and the returns from risk-free investments. In short risk premium is that extra return investors want as a compensation for the risk they take.

The risk premium has been estimated by scholars by using ex-post or ex-ante approach. Where the first is based upon measuring the difference on historical stock returns and risk-free returns

[103] (Bloomberg Professional Service)
[104] http://www.damodaran.com
[105] (McClure, 2014)
[106] (McClure, 2014)

in periods as large as 100 years second is the measurement based upon the understanding of market portfolio's risk premium based upon analysts' earnings forecast.[107]

In the context of this paper, risk premium is based on Damodaran (2016), where Aswath Damodaran calculates risk premium for Sweden at 6% in January 2016.[108]

Having estimated all the parts, required rate of return on equity (r*e*) can be calculated as

$$Re = Risk\ free\ rate + \beta \times \text{Risk premium}$$

$$Re = 2.02\% + 0.89 \times 6\%$$

$$Re = 7.36\%$$

As discussed before FPC is a company with not debt and in the absence of rd in the equation of WACC the overall weighted average cost of capital becomes none other than r*e*, which in this case is 7.36%.

A combination of the estimates of pro forma statements and the calculations in this segment, the future cash flows and cost of capital for FPC has the following appearance, where all the numbers are in thousands of SEK.

WACC for FPC

Estimated Cash flows	**2016**	**2017**	**2018**	**2019**	**2020**
NOPAT	1366290	936697	1015259	1375111	1430116
Depreciation amortization & impairment	44914	90390	144624	229952	239150
NWC	496497	364928	377055	-14462	91981
CF operations	914707	662159	782828	1619525	1577285
Investments	422756	545146	686963	1083232	331130
FCF	491951	117013	95865	536294	1246154
Cost of Capital					
Debt	0%	0%	0%	0%	0%
Equity	100%	100%	100%	100%	100%
Tax rate	22%	22%	22%	22%	22%
Required rate of return on equity	7.36%	7.36%	7.36%	7.36%	7.36%

[107] Petersen & Plenborg (2011), p.327
[108] (Damodaran, 2016)

WACC	7.36%	7.36%	7.36%	7.36%	7.36%

Source: compiled by author

With all the estimates ready, FPC's stock can now be evaluated by using the discussed methods for valuation.

7.2 Discounted cash flow model (DCF)

Discounted cash flow (DCF) model estimates the value of a firm as

$$Enterprise\ Value_0 = \sum_{t=1}^{n} \frac{FCFF_t}{(1+WACC)^t} + \frac{FCFF_{n+1}}{(WACC-g)} \times \frac{1}{(1+WACC)^n}$$

Where

FCFF = Free Cash Flow to Firm

g = Terminal growth

Based upon the prognoses in the pro forma statements, assessed WACC and a growth rate of 4%, FPC's value is estimated as

SEK 000s	**2016E**	**2017E**	**2018E**	**2019E**	**2020E**
FCF	491951	117013	95865	536294	1246154
WACC	7.36%	7.36%	7.36%	7.36%	7.36%
Discount factor	0.93	0.87	0.81	0.75	
PV FCF	458226	101519	77470	403676	
PV, Horizon	1040890				
PV Terminal	27916602				
Estimated EV	28957492				
NIBD	0				
Estimated Equity	28957492				
Estimated Price/share	**0.449**				

Source: compiled by author

DCF measures the value at 28.9 billion SEK. In the absence of debt the value for the equity stays the same and with 64539145 shares outstanding, the value per stock is estimated to be **449 SEK** per share.

7.3 Economic value added (EVA)

The EVA or economic value added model is constructed on future EVAs which can be defined as following

$$EVA_t = NOPAT_t \times WACC \times Invested\ capital_{t-1}$$

Then the Enterprise value is estimated as

$$EV_0 = Invested\ capital_0 + \sum_{t=1}^{n} \frac{EVA_t}{(1+WACC)^t} + \frac{EVA_{n+1}}{(WACC-g)} \times \frac{1}{(1+WACC)^n}$$

Where

EVA = Economic value added

g = Terminal growth

Invested capital_0 = Invested capital in the beginning of forecasted period.

By using all the estimates, Economic value added models estimates the value of firm as follows

SEK 000s	2016E	2017E	2018E	2019E	2020E
NOPAT	1366290	936697	1015259	1375111	1430116
Invested capital, beginning	1146800	2021139	2840823.15	3760216.824	4599034.423
WACC	7.36%	7.36%	7.36%	7.36%	7.36%
Cost of capital	84404	148756	209085	276752	338489
EVA	1281885	787941	806174	1098359	1091627
Discount factor	0.93	0.87	0.81	0.75	
Present value EVA	1194007	683610	651480	826750	
Invested cap, beginning	1146800				

PV EVA, Horizon	3355848
PV EVA, Terminal	24454844
Estimated EV	28957492
NIBD	0
Estimated Equity	28957492
Estimated Price/ share	**0.449**

Source: compiled by author

Following the previous procedures, all the numbers are in the thousands of SEK. EVA model estimates the price for equity at 28.9 billion SEK and with 64539145 outstanding shares the price per share is calculated at **449 SEK** per share. The stock prices estimated by both DCF and EVA models are identical.

As of 4th may 2016, one stock of FPC was traded at 496 SEK. In the same week it was being traded at 468 SEK per week.

By comparisons of the estimates of this paper to the real stock price of FPC on 4th of May 2016, it is concluded that FPC's stock was overvalued by 47 SEK per share.

7.4 Scenario analysis

Following the analysis and the discussions of this paper up till now it has been understood that FPC is a high growth firm dealing in a newly developed market segment. It is also clear that the historical performance of FPC has been very volatile, and year 2015 was the only year when FPC delivered positive profits and cash flows.

Furthermore value of FPC measured in this paper is calculated tools which are highly dependants upon the forecasts and the future expectations of the company. Although a lot of considerations has been while estimating the growth rates but removing uncertainty completely was not possible. So any ambiguities in the estimates can affect the value of company both in positive and negative ways. In order to inspect the impact of chosen growth rates on valuations, as scenario analysis has been conducted which will estimate the value on the basis of alternative growth rates.

Two different scenarios have been assumed consisting on a worst-case and best-case.

7.4.1 Best case scenario

Best case scenario is dependent upon the very optimistic assumptions about the future of both firm and the market and is very close to the forecasts made by the firm for 2016 to 2018 year. Therefore a growth rate of 25% more than the forecast made in the paper is estimated, this will take the forecasts close to the expectations of a very optimistic ambitions of the management.

Furthermore the terminal growth rate in the best case is estimated to be the same for GDP for china, which is expected to be at 6%.

The best case scenario represents an ideal situation where FPC will keep on gaining more market and the competitors like IDEX, NEXT Biometrics and Chinese rivals will not be able to get more market share. In the same way the highly volatile and new OEM's of Chinese smartphone manufacturers are expected to maintain a very reasonable place in the market in the coming years.

FPC is expected to gain valuable market in the segment of smartcards as well.

Following the new assumptions the price per share becomes 1235 SEK which is almost 274% higher than that of originally estimated. The result is not very surprising as a change of 2% in the terminal period has notable effect on the overall worth; furthermore an increase of 25% in the estimates also increases the value.

Another interesting finding of the base case in the scenario analysis is if the forecast horizon is estimated using a 25% increase and the terminal is kept at original estimates of this paper (4%), the estimated price becomes 535SEK, which does fall in the range FPC had been traded during that period.

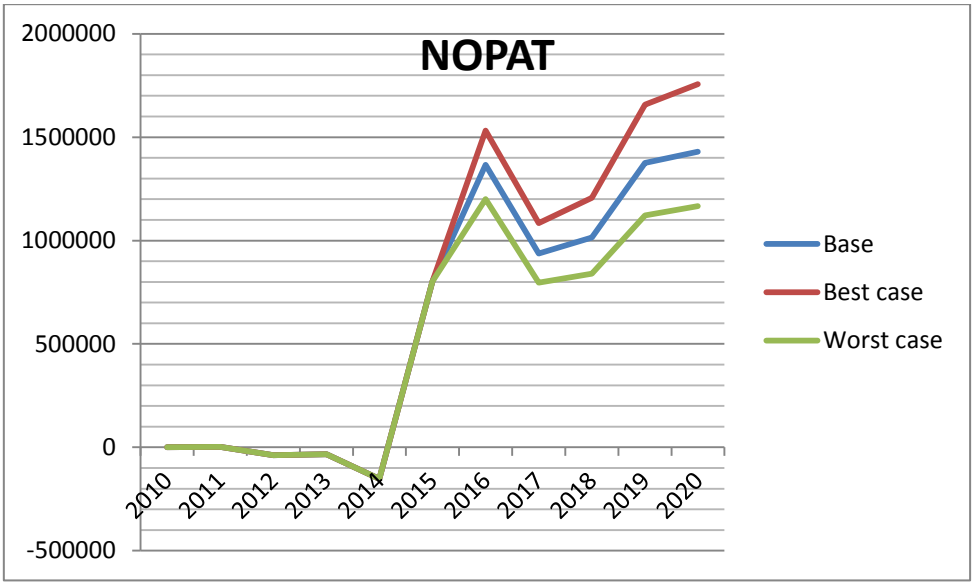
Calculations can be seen in the Appendix A.15.

7.4.2 Worst case scenario

In the worst case scenario a growth rate of less than 25% has been assumed for the forecasted horizon, furthermore a terminal growth rate of less than 2% of base case has been anticipated. In this case FPC's stock has been presumed to be affected by a very reasonable risk of competitors gaining more market share. Another reason is the less diversity in the market and relatively small and new customers in the form of Huawei, VIVOV and other Chinese OEMs. Internal problems of the FPC like corruption can also lead to a bad impression leaving the revenues to fall.

Applying the new changes to the valuation estimates FPC is valued at 250SEK per stock. This estimate is less than 55% of the original value estimates of this paper. Furthermore keeping the original forecasts for terminal and new for forecasted horizon a value of FPC becomes 370SEK.

NOPAT after the modifications is affected as below.



Source: Compiled by Author

For calculations see Appendix A.16.

7.5 Sensitivity analysis

As discusses above the fluctuations made in the assumptions for growth estimates can affect the total estimated value of the firm. But it is not only the growth which can affect the estimated value; there are other factors as well which can affect the value. In this section those factors and the effect on the value will be discussed.

7.5.1 Effect of risk free rate and beta

The estimated WACC or r*e* of 7.36% depends a lot on the risk free rate and the beta. In the case of risk free rate the estimation are less volatile as it is dependent upon the yield of long term government bonds. As for beta, the volatility can be very high as discussed in the earlier segments of this paper, finding an appropriate beta can be very tricky task. Therefore, it is vital to understand the overall effect of beta on the WACC/r*e* which is used as a discount rate and holds a strong role in the estimates of value.

beta	0.5	0.75	0.89	1	1.25
r-free rate	**Re**				
1.25%	4.25%	5.75%	6.59%	7.25%	8.75%
1.50%	4.50%	6.00%	6.84%	7.50%	9.00%
1.75%	4.75%	6.25%	7.09%	7.75%	9.25%
2.02%	5.02%	6.52%	7.36%	8.02%	9.52%
2.25%	5.25%	6.75%	7.59%	8.25%	9.75%
2.50%	5.50%	7.00%	7.84%	8.50%	10.00%
2.75%	5.75%	7.25%	8.09%	8.75%	10.25%
3.00%	6.00%	7.50%	8.34%	9.00%	10.50%

Source: compiled by author

The above figure differentiates between the effect of risk free rate and beta fluctuations on required return on equity. Fluctuations in beta cause a lot more fluctuations on the overall r*e* as compared to those of the fluctuation in the risk free rate. Narrowing the fluctuation of both the beta and risk free rate, a relatively more reasonable range of r*e* has been estimated to be 6.25-8.25%.

7.5.2 Share price sensitivity to the fluctuations in r*e*

Having estimated a range for r*e* a further analysis of the effects on the company's estimated stock price/estimated value is needed.

The estimated range for r*e* is further compared with a range of growth rates in orders to analyse the effect of fluctuations in detail.

Re	6.25%	6.5%	6.75%	7.00%	7.36%	7.75%	8.00%	8.25%
G	*price per Share*							
2.0%	391	367	346	326	301	278	265	252
2.5%	436	406	380	356	327	299	284	270
3.0%	495	456	423	394	358	325	307	291
3.5%	574	523	480	443	398	357	335	316
4.0%	690	617	557	507	449	398	371	347
4.5%	871	757	669	598	518	451	416	386
5.0%	1197	991	844	734	616	523	477	437
5.5%	1958	1459	1160	960	767	628	562	507

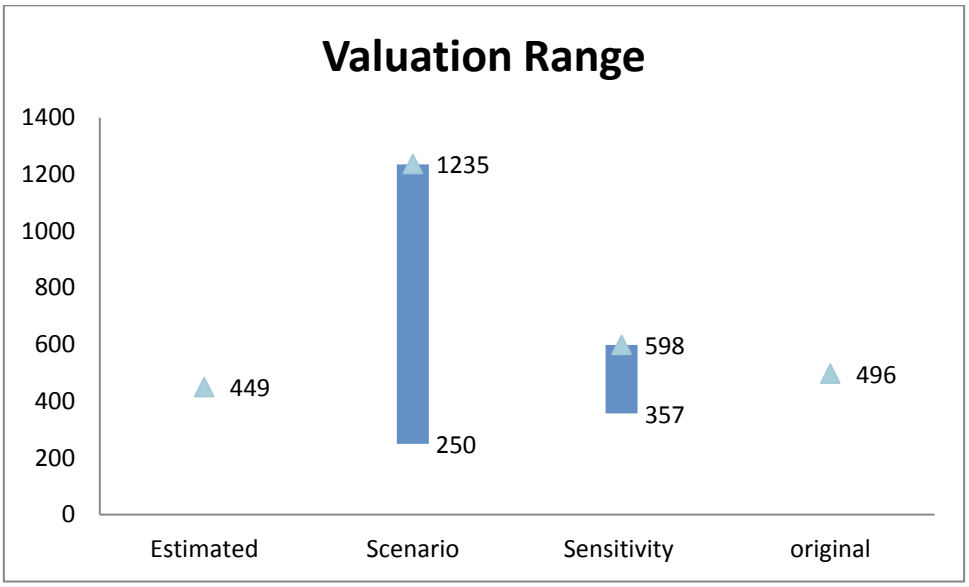
6.0%	5763	2863	1896	1413	1029	792	689	608

Source: compiled by author

The above analysis confirms the sensitivity of variations on the stock price. Following the estimates of this paper in the measurement of r*e,* a more fair estimation of the r*e* is suggested to be a range between 7 and 7.75%. Furthermore at a terminal growth of 4% the estimated range of FPC's stock lies between 398 to 506 SEK per share.

7.6 Valuation range

Scenario analysis and sensitivity analysis have increased the margin for the range of a more filtered value of FPC. Following the results of scenario analysis a valuation range of 250- 1235 SEK is concluded whereas sensitivity analysis results in a range of 357- 598 SEK per share.



Source: compiled by author

Conclusion

The objective of this paper was to analyse the stock of a high growth company and find its attractiveness for potential investors by revealing its future prospect and determining whether it is over or undervalued. Fingerprint Cards being used as the company for the analysis was analysed and the attractiveness of its stock has been determined. Discounted cash flow (DCF) and (EVA) models have been used as tools to estimates the value of stock as of 4th May 2016.

The initial look at the Fingerprint Cards and its stock performance shows and increase of almost 1000% in the past three years and stock price has increased from 2 SEK to 682 SEK in the last five years. Despite such a huge increase last year was the only year when FPC was able to achieve notable operating profits. This indicates that major part of the company's value is linked to its rapid growth which has been 1142% in recent year's revenues and a whopping 556% CAGR of recent three year.

The biometrics industry in which FPC is operating goes back to centuries with most of it being limited to security agencies and governments. But the mobile biometrics was the segment which gave a new shape to industry and brought a huge growth potential. This was the segment which was solely responsible for converting the dream of founder of FPC into a reality. Before the boom of mobile segment FPC had a bumpy ride and even in 2005 the company was close of being shut down because of not being able to generate sufficient business. The recent boom of segment does not seem to slow down soon as the industry is under intense advancement and new technologies like internet of things use of biometrics in financial sectors and a possible inclusion in automobiles holds a key to even a brighter future for biometrics industry.

By the analysis of market and company's strategy to gain competitive advantage, a comprehensive sketch of company's past, present and a possible future have been drawn. The analysis reveals the presence of enormous growth opportunities along with the exposure of FPC to external threats. Where technological advancements, social factors and financial factors are leading to growth opportunities continuous advancements in technology also require a constant need for development and extensive competition. Extensive research and development are leading to low entry barriers in the meantime presence of presence of current players does pose the threat of a future divide in the market share. In the same way where FPC has succeeded in gaining and delivering a huge chunk of Chinese market it is also at a risk of less diversity which might be a potential threat in the future. Constant R&D, exploration for new markets and strong current position puts FPC in a decent overall position in the market.

Furthermore the examination of historical profitability and performance has been conducted on the basis of Du Pont model. Revenue growth of almost 1142% also brought positive profit margins for the company after a period of 4 years. Where profit margins improved from -65% to 28% the overall return on invested capital was also 111% as compared to 55% in the previous year. Looking at the recent years financials the company looks very attractive but the question of for how long will it be able to sustain this performance still needs to be addressed considering a strong growth in the overall industry and the only year of FPC's history with such performance.

Using the strategic and financial analysis of the firm a five year forecast of future cash flows of FPC was generated. Pro forma statements were generated based upon the future prospect of sales, costs and investments. Growth in revenues was based upon the future forecasts of the overall industry, segment, current outlook of FPC and the economic forecasts of Asia specially China. As currently china is the biggest market for FPC.

Finally Fingerprint Cards was valued using discounted cash flow (DCF) and economic value added (EVA) models. As cost of capital being the major requirement of both models, WACC of 7.36% was calculated using best possible estimates of market and systematic risks. A fair value for FPC was finally estimated at 28.9 billion SEK with a price per share of 449 SEK.

A comparison to the real stock price for the same day revels that the stock is overpriced for 47 SEK. Difference might look big but looking at the fact that the fluctuations in FPC's stock have been big and a comparison to specific day might not reveal same value even if the variation in the estimates is minimal.

Furthermore in order to get more versatile perspective and grab more variations, a valuation range has been estimated by combination of estimated growth, scenario and sensitivity analysis. The value range estimated in the paper lies between 398- 506 SEK per stock of FPC.

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Appendix

AppendixA.1) FPC analytical income statement

SEK 000s	.	2015	2014	2013	2012	2011	2010	2009
Revenue		2900500	233600	95405	10276	68621	60929	38517
Cost Of Goods Sold (COGS)		-1615500	-136179	-45087	-5576	-29885	-30107	-28743
Gross profit	**0**	**1285000**	**97421**	**50318**	**4700**	**38736**	**30822**	**9774**
Selling Costs		-107200	-54195	-29157	-10020	-13556	-5889	-5412
Administration costs etc.		-56500	-28686	-17403	-12332	-11151	-9466	-9504
Development Costs		-163800	-106209	-24917	-8714	-4794	-8099	-8668
other operating Revenues			491					
other operating expenses						-1556		
Results of investments in associates after tax								
Operating profit before special items	**0**	**957500**	**-91178**	**-21159**	**-26366**	**7679**	**7368**	**-13810**
Special items, income							0	
Special items, costs							0	
EBITDA	**0**	**957500**	**-91178**	**-21159**	**-26366**	**7679**	**7368**	**-13810**
Depreciation, amortisation and impairment losses		-43400	-60162	-12599	-10806	-4942	-6387	-10051
EBIT	**0**	**914100**	**-151340**	**-33758**	**-37172**	**2737**	**981**	**-23861**
Tax on the result for the year		-111700	-462	0	0	0	0	0
Effective Tax Rate		12%	0.3%	0%	0%	0%	0%	0%
Tax shield, net financial expenses		-501	24	0	0	0	0	0
NOPAT	**0**	**801899**	**-151778**	**-33758**	**-37172**	**2737**	**981**	**-23861**
Financial Income								
exchange rate gains			6083				623	
capital gains							188	
Financial/other interest income		100	2174	1535	633	681	224	143
Financial expenses								
Return from investments(sub) impairment loss								
interest expense/ loss items		-400	-503	-445	-117	-58	-6	-2
exchange rate losses		-3800		-278	-1527			-844
Tax on net finanial expenses		501	-24	0	0	0	0	0
Net financial expenses after tax	**0**	**-3599**	**7730**	**812**	**-1011**	**623**	**1029**	**-703**
Net Income/loss	**0**	**798300**	**-144048**	**-32946**	**-38183**	**3360**	**2010**	**-24564**

AppendixA.2) Analytical Income statement IDEX

NOK 000s	2015	2014	2013	2012	2011	2010
Revenue	349	1423	7	1046	99	66
Cost Of Goods Sold (COGS)	-137	-852				
Gross profit	**212**	**571**	**7**	**1046**	**99**	**66**
Selling Costs						
Administration costs etc.	-98226	-56194	-38029	-17778	-17696	-13739
Development Costs	-105597	-52927	-18589	-11847	-14664	-7318
other operating Revenues/income	3029	1720	3768	4560	2407	1117
other operating expenses	-18972	-19234	-11146	-9233	-7632	-7912
Results of investments in associates after tax						
Operating profit before special items	**-219554**	**-126064**	**-63989**	**-33252**	**-37486**	**-27786**
Special items, income						
Special items, costs						
EBITDA	**-219554**	**-126064**	**-63989**	**-33252**	**-37486**	**-27786**
Depreciation, amortisation and impairment losses	-6834	-2307	-929	-313	-245	-134
EBIT	**-226388**	**-128371**	**-64918**	**-33565**	**-37731**	**-27920**
Tax on the result for the year	-541	-563	0	0	0	0
Effective Tax Rate	0.24%	0.44%	0.00%	0.00%	0.00%	0.00%
Tax shield, net financial expenses	-4.55	25.56	0.00	0.00	0.00	0.00
NOPAT	-226934	-128908	-64918	-33565	-37731	-27920
Financial Income						
exchange rate gains	3312	2096	47	65	66	69
grants						
Financial/other interest income	2810	5667	391	208	348	221
Financial expenses						
Return from investments(sub) impairment loss						
interest expense/ loss items	-1	-4	-6	0	0	-271
exchange rate losses	-8023	-1932	-519	-73	-38	-27
Tax on net finanial expenses	4.55	-25.56	0.00	0.00	0.00	0.00
Net financial expenses after tax	-1897.45	5801.444	-87	200	376	-8
Net Income/loss	-228831	-123107	-65005	-33365	-37355	-27928

AppendixA.3) Analytical income statement Synaptics

M dollars	2015	2014	2013	2012	2011	2010
total Revenue	1703	947.5	663.6	548.2	598.5	514.9
mobile product/applications	1442.1	689.8	424.1	270.1	309.2	209.2
Cost Of Goods Sold (COGS)	-1124.3	-511.4	-337.8	-292.7	-352.5	-306.2
Gross profit	**578.7**	**436.1**	**325.8**	**255.5**	**246.0**	**208.7**
Selling, general and administrative costs	-127.9	-100	-79.6	-70	-68.5	-60.0
Administration costs etc.						
Development Costs	-268.4	-178.5	-134.9	-107.6	-93.8	-77.9
other operating Revenues/income						
other operating expenses						
Results of investments in associates after tax						
Operating profit before special items	**182.4**	**157.6**	**111.3**	**77.9**	**83.669**	**70.8**
Special items, income	18.8		1.5			
Special items, costs		-69.9	-1.3			
EBITDA	**201.2**	**87.7**	**111.5**	**77.9**	**83.669**	**70.79**
Depreciation, amortisation and impairment loss	-39	-15.2	-10.8	-10.4	-11.169	-8.667
EBIT	**162.2**	**72.5**	**100.7**	**67.5**	**72.5**	**62.123**
Tax on the result for the year	-49.8	-27.8	-2.8	-14.4	-9.7	-7.292
Effective Tax Rate	31%	38%	3%	21%	13%	12%
Tax shield, net financial expenses	-0.61	0.77	0.03	0.21	0.13	-0.22
NOPAT	**111.8**	**45.5**	**97.9**	**53.3**	**62.9**	**54.611969**
Financial Income						
exchange rate gains						
grants						
Financial/other interest income	1.6	2	1	0.9	0.9	0
Financial expenses						
Return from investments(sub) impairment loss/	0.2	0	0	0.1	0.1	0
interest expense/ loss items	-3.8	0	0	0	0	-1.9
exchange rate losses						
Tax on net finanial expenses	0.61	-0.77	-0.03	-0.21	-0.13	0.22
Net financial expenses after tax	**-1.39**	**1.23**	**0.97**	**0.79**	**0.87**	**-1.65**
Net Income/loss	110.4	46.7	98.9	54.1	63.8	52.965

AppendixA.4) Analytical Balance Sheet FPC

SEK 000s	.	2015	2014	2013	2012	2011	2010	2009
Operating Assets								
Intangible assets		49700	69817	54331	29145	28220	22877	12275
Tangible		21600	18819	5364	4802	4177	3740	328
total non current assets	**0**	**71300**	**88636**	**59695**	**33947**	**32397**	**26617**	**12603**
Inventories		153000	98770	19902	11440	4346	7907	9055
Accounts Receivables		617900	115793	31062	6167	52998	17224	9682
Other Receivables		28600	15868	7709	2293	821	989	1732
cash and bank balance		1031300	101898	211713	60596	23032	30846	6006
Prepaid Expenses		8000	3663	2402	832	2272	2746	542
Total current assets	**0**	**1838800**	**335992**	**272788**	**81328**	**83469**	**59712**	**27017**
operating Liabilities								
Advance Payments from Customers								
Accounts Payable		548500	66138	25674	4588	3323	4098	5861
Liabilities to group companies								
other current Liabilities		113600	35677	1482	574	348	254	229
deferred/accured expenses		101200	21536	15160	7525	5680	3931	3382
total current liabilities	**0**	**763300**	**123351**	**42316**	**12687**	**9351**	**8283**	**9472**
Net Invested Capital(net operating assets)	**0**	**1146800**	**301277**	**290167**	**102588**	**106515**	**78046**	**30148**
equity								
share Capital		12600	11684	10832	9562	8722	7934	7933
other contributed capital		757700	711100	556646	337125	304151	280060	278282
Share Premium Reserves								
Retained earnings/Loss brought forward		-421600	-277732	-244771	-206588	-209948	-211958	-187396
Net Loss/gain For the Year		798100	-143958	-32963	-38183	3360	2010	-24564
Total Shareholder's Equity	**0**	**1146800**	**301094**	**289744**	**101916**	**106285**	**78046**	**74255**
Total Shareholder's Equity and Liabilities	**0**	**1910100**	**424628**	**332483**	**115275**	**116813**	**86329**	**83727**
Interest bearing debt								
other provisions						1177		
other long-term liabilities			183	423	672			
Toal	**0**	**0**	**183**	**423**	**672**	**1177**		
Net interest bearing debt		**0**	**183**	**423**	**672**	**230**	**0**	**-44107**
Financial/Interest bearing Assets								
cash and cash eqv						947		44107
total	**0**	**0**	**0**	**0**	**0**	**947**	**0**	**44107**
Total Assets	**0**	**1910100**	**424628**	**332483**	**115275**	**116813**	**86329**	**83727**
Invested Capital	**0**	**1146800**	**301277**	**290167**	**102588**	**106515**	**78046**	**30148**

AppendixA.5) Analytical Balance Sheet IDEX

NOK 000s	2015	2014	2013	2012	2011	2010
Operating Assets						
Intangible assets	47432	51065	23197	0	0	
Tangible	6576	5588	1178	626	939	*632*
total non current assets	**54008**	**56653**	**24375**	**626**	**939**	**632**
Inventories	2281	7944	0	0		
Accounts Receivables	254	1070	0	17	19	32
Other Receivables	4319	2498	3445	3715	3161	1572
cash and bank balance	763716	227961	46475	19833	21462	12649
Prepaid Expenses	2531	2044	1303	512	343	318
Total current assets	**773101**	**241517**	**51223**	**24077**	**24985**	**14571**
operating Liabilities						
Advance Payments from Customers						
Accounts Payable	17755	8997	4245	2561	2230	1553
other payables	4012	2207	2123	874	471	840
Liabilities to group companies						
other current Liabilities	32449	31796	10081	3250	4182	3526
deferred/accured expenses	14919	2883	9711	32		
total current liabilities	**69135**	**45883**	**26160**	**6717**	**6883**	**5919**
Net Invested Capital(net operating assets)	**757974**	**252287**	**49438**	**17986**	**19041**	**9284**
equity						
share Capital	79651	61948	51706	46422	40794	32240
other contributed capital	44566	32787	20183	11235	7409	3000
Share Premium Reserves	1170454	463766	168631	86292	63429	29274
Retained earnings/Loss brought forward	-315150	-190636	-125631	-92266	-54911	-26983
Net Loss/gain For the Year	-229837	-124514	-65005	-33365	-37355	-27928
Total Shareholder's Equity	**749684**	**243351**	**49884**	**18318**	**19366**	**9603**
Total Shareholder's Equity and Liabilities	**828264**	**299313**	**76044**	**25035**	**26249**	**15522**
Interest bearing debt						
other provisions						
other long-term liabilities	9445	10079	0	0	0	0
Toal	9445	10079	0	0	0	0
Net interest bearing debt	8290	8936	-446	-332	-325	-319
Financial/Interest bearing Assets						
longterm receivables	1155	1143	446	332	325	319
total	1155	1143	446	332	325	319
Total Assets	**828264**	**299313**	**76044**	**25035**	**26249**	**15522**
Invested Capital	**757974**	**252287**	**49438**	**17986**	**19041**	**9284**

AppendixA.6) Analytical Balance Sheet Synaptics

M dollars	2015	2014	2013	2012	2011	2010
Operating Assets						
property plant and equipment	123	81	58	25	26	26
Good will	207	61	21	19	2	2
other intangible assets	235	82	13	13		
other assets	38	54	22	23	28	24
total non current assets	**603**	**278**	**114**	**80**	**56**	**52**
Inventories	140	82	50	32	29	19
Accounts Receivables	325	195	148	104	94	102
Other Receivables						
Cash & Cash eqv	400	447	355	305	247	210
Prepaid Expenses	51	18	7	5	4	4
Total current assets	**916**	**743**	**560**	**446**	**374**	**335**
operating Liabilities						
accured payable/expenses	110	87	55	39	36	30
Accounts Payable	189	97	84	55	45	66
Liabilities to group companies						
current aquisition and debt expense	114	57				
taxes/ other payables	35	13	11	11	12	10
total current liabilities	**447**	**254**	**150**	**106**	**93**	**106**
Net Invested Capital(net operating assets)	**1073**	**766**	**525**	**421**	**338**	**281**
equity						
share Capital	0	0	0	0	0	0
other contributed capital	844	740	539	472	407	348
Share Premium Reserves						
treasury stock at costs	-652	-530	-460	-414	-352	-282
Retained earnings net of income for year	593	483	436	337	283	219
other comphrensive income	8	9	7	2	3	2
Total Shareholder's Equity	**793**	**701**	**522**	**397**	**340**	**287**
Total Shareholder's Equity and Liabilities	**1519**	**1020**	**691**	**542**	**456**	**415**
Interest bearing debt						
long term debt, net of issuance cost	231	**0**				
payables			2	2	2	2
other long-term liabilities	15	**53**	17	37	21	20
deferred tax liability	34	**12**				
Toal	**280**	**65**	**20**	**39**	**23**	**22**
Net interest bearing debt	**280**	**65**	**3**	**24**	**-2**	**-6**
Financial/Interest bearing Assets						
cash and cash eqv						
investments			17	15	26	28
total	**0**	**0**	**17**	**15**	**26**	**28**
Total Assets	**1519**	**1020**	**691**	**542**	**456**	**415**
Invested Capital	**1073**	**766**	**525**	**421**	**338**	**281**

AppendixA.7) Profit Margin IDEX

years	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Revenues	66	99	1046	7	1423	349
NOPAT	-27920	-37731	-33565	-64918	-128908	-226934
Profit Margin	-42303%	-38112%	-3209%	-927400%	-9059%	-65024%

AppendixA.8) Trend Analysis IDEX

year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**WMA**
Revenue	100%	150%	1585%	11%	2156%	529%	1019%
Cost Of Goods Sold (COGS)							0%
Gross profit	100%	150%	1585%	11%	865%	321%	549%
Selling and administrative costs	100%	129%	129%	277%	409%	715%	477%
Development Costs	100%	200%	162%	254%	723%	1443%	861%
EBITDA	100%	135%	120%	230%	454%	790%	510%
Depreciation, amortisation and impairment losses	100%	183%	234%	693%	1722%	5100%	2719%
EBIT	100%	135%	120%	233%	460%	811%	521%
NOPAT	100%	135%	120%	233%	462%	813%	522%

AppendixA.9) Trend Analysis Synaptics

year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**WMA**
Revenue	100%	116%	106%	129%	184%	331%	224%
Cost Of Goods Sold (COGS)	100%	115%	96%	110%	167%	367%	229%
Gross profit	100%	118%	122%	156%	209%	277%	217%
Selling and administrative costs	100%	114%	117%	133%	167%	213%	173%
Development Costs	100%	120%	138%	173%	229%	345%	255%
EBITDA	100%	118%	110%	158%	124%	284%	193%
Depreciation, amortisation and impairment losses	100%	129%	120%	125%	175%	450%	270%
EBIT	100%	117%	109%	162%	117%	261%	183%
NOPAT	100%	115%	98%	179%	83%	205%	152%

AppendixA.10) Common size Analysis IDEX

year	2010	2011	2012	2013	2014	2015
Revenue	100%	100%	100%	100%	100%	100%
Cost Of Goods Sold (COGS)	0%	0%	0%	1%	-60%	-39%
Gross profit	100%	100%	100%	100%	40%	61%
Selling and administrative costs	-20817%	-17875%	-1700%	-543271%	-3949%	-28145%
Development Costs	-11088%	-14812%	-1133%	-265557%	-3719%	-30257%
EBITDA	-42100%	-37865%	-3179%	-914129%	-8859%	-62909%
Depreciation, amortisation and impairment losses	-203%	-247%	-30%	-13271%	-162%	-1958%
EBIT	-42303%	-38112%	-3209%	-927400%	-9021%	-64868%
NOPAT	-42303%	-38112%	-3209%	-927400%	-9059%	-65024%

AppendixA.11) Common size Analysis Synaptics

year	2010	2011	2012	2013	2014	2015
Revenue	100%	100%	100%	100%	100%	100%
Cost Of Goods Sold (COGS)	-59%	-59%	-53%	-51%	-54%	-66%
Gross profit	41%	41%	47%	49%	46%	34%
Selling and administrative costs	-12%	-11%	-13%	-12%	-11%	-8%
Development Costs	-15%	-16%	-20%	-20%	-19%	-16%
EBITDA	14%	14%	14%	17%	9%	12%
Depreciation, amortisation and impairment losses	-2%	-2%	-2%	-2%	-2%	-2%
EBIT	12%	12%	12%	15%	8%	10%
NOPAT	11%	11%	10%	15%	5%	7%

AppendixA.12) Pro forma Statement & FCF

Period	Historical	2016	2017	2018	2019	2020
Revenues	2900500	5614275	6456416	7231186	7665057	7971660
COGS	-1615500	-2919423	-3486465	-3904841	-3832529	-3985830
Gross profit	1285000	2694852	2969951	3326346	3832529	3985830
Selling General & adminis	-163700	-449142	-774770	-867742	-613205	-637733
Research & Development	-163800	-449142	-903898	-1012366	-1226409	-1275466
EBITDA	957500	1796568	1291283	1446237	1992915	2072632
Depreciation amortizatior	-43400	-44914.2	-90389.8	-144624	-229952	-239150
EBIT	914100	1751653.8	1200893	1301614	1762963	1833482
Tax	-109692	-385363.836	-264197	-286355	-387852	-403366
NOPAT	**801899.116**	**1366289.964**	**936696.9**	**1015259**	**1375111**	**1430116**
Cash flow						
NOPAT	801899.116	1366289.964	936696.9	1015259	1375111	1430116
Depreciation amortizatior	43400	44914.2	90389.83	144623.7	229951.7	239149.8
NWC	-168441	496497	364927.9	377054.7	-14462.4	91980.69
CF operations		914707.164	662158.8	782827.6	1619525	1577285
Investments	26064	422756.2	545146.1	686962.7	1083232	331130.5
FCF	**987676.116**	**491950.964**	**117012.7**	**95864.87**	**536293.7**	**1246154**

AppendixA.13) Beta Estimations OMXS30 Regression

SUMMARY OUTPUT

Regression Statistics	
Multiple F	0.189874
R Square	0.036052
Adjusted I	0.035289
Standard E	0.054477
Observati	1265

ANOVA

	df	*SS*	*MS*	*F*	*gnificance F*
Regressio	1	0.140188	0.140188	47.23664	9.86E-12
Residual	1263	3.748301	0.002968		
Total	1264	3.888489			

	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	0.004773	0.001532	3.115671	0.001877	0.001768	0.007778	0.001768	0.007778
X Variable	0.82702	0.120331	6.872891	9.86E-12	0.59095	1.06309	0.59095	1.06309

AppendixA.14) Beta Estimation OMXN40 Regression

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.196653
R Square	0.038672
Adjusted I	0.037911
Standard E	0.054403
Observati	1265

ANOVA

	df	*SS*	*MS*	*F*	*gnificance F*
Regressio	1	0.150377	0.150377	50.80814	1.71E-12
Residual	1263	3.738112	0.00296		
Total	1264	3.888489			

	Coefficients	*ndard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	0.004687	0.00153	3.063182	0.002236	0.001685	0.007688	0.001685	0.007688
X Variable	0.836111	0.1173	7.127983	1.71E-12	0.605987	1.066234	0.605987	1.066234

AppendixA.15) Best Case Scenario

year	2015	2016	2017	2018	2019	2020
Revenues	2900500	6292718.75	7472603.52	8593494.04	9238006.1	9792286.46
COGS	-1615500	-3272213.8	-4035205.9	-4640486.8	-4619003	-4896143.2
Gross profit	1285000	3020505	3437397.62	3953007.26	4619003.05	4896143.23
Selling General & administrative costs	-163700	-503417.5	-896712.42	-1031219.3	-739040.49	-783382.92
Research & Development	-163800	-503417.5	-1046164.5	-1203089.2	-1478081	-1566765.8
EBITDA	957500	2013670	1494520.7	1718698.81	2401881.59	2545994.48
Depreciation amortization & impairment	-43400	-50341.75	-104616.45	-171869.88	-277140.18	-293768.59
EBIT	914100	1963328.25	1389904.25	1546828.93	2124741.4	2252225.89
Tax	-109692	-431932.22	-305778.94	-340302.36	-467443.11	-495489.69
NOPAT	801899.116	1531396.04	1084125.32	1206526.56	1657298.29	1756736.19
Cash flow		1	2	3	4	5
NOPAT	801899.116	1531396.04	1084125.32	1206526.56	1657298.29	1756736.19
Depreciation amortization & impairment	43400	50341.75	104616.449	171869.881	277140.183	293768.594
nwc	44200	686461.25	479819.805	508137.039	21483.7351	166284.11
cf operations		895276.535	708921.963	870259.405	1912954.74	1884220.68
		482459.25	647363.441	844404.197	1329843.2	460052.704
FCF	801099.116	412817.285	61558.5212	25855.2082	583111.538	1424167.97
7.36%		0.9314456	0.86759091	0.80811374	0.75271399	
6%		384516.845	53407.6136	20893.949	438916.213	
64539135		897734.621				
		78822879.3				
		79720613.9				
		1.23522904				
		1235.22904				
	NOPAT	1531396.04	1084125.32	1206526.56	1657298.29	1756736.19
		1146800	2265378.75	3287945.55	4468616.9	5542803.66
		0.0736	0.0736	0.0736	0.0736	0.0736
	COC	84404.48	166731.876	241992.792	328890.204	407950.349
	RI	1446991.56	917393.442	964533.771	1328408.09	1348785.84
		0.9314456	0.86759091	0.80811374	0.75271399	
	PV EVA	1347793.92	795922.213	779452.994	999911.355	
	PV horizon	3923080.49				
		74650733.4				
		78573813.9	-1146800			
		79720613.9				
Price Per Share		1.23522904	**1235**			

AppendixA.16) Worst case Scenario

year	2015	2016	2017	2018	2019	2020
Revenues	2900500	4935831.25	5491112.27	5985312.37	6254651.43	6379744
COGS	-1615500	-2566632.3	-2965200.6	-3232068.7	-3127325.7	-3189872
Gross profit	1285000	2369199	2525911.64	2753243.69	3127325.71	3189872
Selling General & administrative costs	-163700	-394866.5	-658933.47	-718237.48	-500372.11	-510380
Research & Development	-163800	-394866.5	-768755.72	-837943.73	-1000744.2	-1020759
EBITDA	957500	1579466	1098222.45	1197062.47	1626209.37	1658734
Depreciation amortization & impairment	-43400	-39486.65	-76875.572	-119706.25	-187639.54	-191392
EBIT	914100	1539979.35	1021346.88	1077356.23	1438569.83	1467341
Tax	-109692	-338795.46	-224696.31	-237018.37	-316485.36	-322815
NOPAT	801899.1157	1201183.89	796650.567	840337.857	1122084.47	1144526
Cash flow		1	2	3	4	5
NOPAT	801899.1157	1201183.89	796650.567	840337.857	1122084.47	1144526.155
Depreciation amortization & impairment	43400	39486.65	76875.5717	119706.247	187639.543	191392.3336
nwc	44200	308847.75	265300.93	267966.279	-38904.53	37527.90856
cf operations		931822.793	608225.21	692077.826	1348628.54	1298390.58
		363053.15	450764.789	548013.004	866972.497	228920.2422
FCF	801099.1157	568769.643	157460.421	144064.821	481656.042	1069470.338
0.0736		0.9314456	0.86759091	0.80811374	0.75271399	
2%		529777.983	136611.23	116420.762	362549.242	
64539135		1145359.22				
		15018755.3				
		16164114.6				
		0.25045447				
		250.454466				
	NOPAT	1201183.89	796650.567	840337.857	1122084.47	1144526.155
		1144485	1776899.25	2416089.4	3112362.43	3752790.856
		0.0736	0.0736	0.0736	0.0736	0.0736
	COC	84234.096	130779.785	177824.18	229069.875	276205.407
	RI	1116949.8	665870.783	662513.677	893014.591	868320.7482
		0.9314456	0.86759091	0.80811374	0.75271399	
	PV EVA	1040377.98	577703.44	535386.406	672184.577	
	PV horizon	2825652.4				
		12193977.2				
		15019629.6	-1144485			
		16164114.6				
Price per share		0.25045447	**250**			