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Master of Science Thesis
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Abstract

Financial markets have been subjected to numerous regulations during the last two decades. MiFID2/MiFIR and MAD2/MAR are two extensive regulations that will apply on European level during 2016 - 2018. Both these regulations stress areas that are of relevance to trade surveillance. Trade surveillance systems are IT systems applied to the market for financial instruments to identify market abuse or other harmful patterns in participants' trading activity. The purpose of this report is to map the market of trade surveillance technology in Stockholm, Sweden, and examine the impact on these actors in conjunction with the regulations. Since MiFID2/MiFIR and MAD2/MAR are extensive regulations, these were condensed to key points that were considered as relevant for surveillance.

This research is a qualitative study and data was gathered by interviews with market actors. A pre-study and a literature study were made. These were used as basis to construct an analytical framework for market dynamics, which was used as a descriptive concept to design interview questions, structure data and analyze results. The framework was named Market Dynamics Framework and considered the macro-environmental factors: Technology, Actors' preferences, Market structure and Regulations.

The market was segmented in order to more accurately examine regulatory impact. Market actors were divided into four groups. The results were analyzed according to the framework and for each of the segmented market actor groups. Preference of surveillance solution was shown to be one distinct difference between every segment. A purchased surveillance system from a vendor was most common, and actors of smaller scale preferred to outsource.

The market is concluded to be prepared in terms of having systems and arrangement for monitoring trades in place. Expected impact is mostly related to new market structures and more detailed data of larger amounts. Increased capacity need for surveillance departments is expected in combination with a need for more advanced technologies; e.g. automatic screening of social media, efficient minimization of false positives, functionality coverage for a broader range of financial instruments.

This research introduces two concepts as descriptive frames, Market Dynamics Framework and a segmentation. These are proposed as methods when conducting a market analysis. A validation study for these methods is suggested as a possible topic for future studies.

Key-words: Financial market, trade surveillance, MiFID2, MiFIR, MAD2, MAR, market dynamics, segmentation

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Sammanfattning

Finansmarknaden har utsatts för ett flertal regleringar under de senaste två decennierna. MiFID2/MiFIR och MAD2/MAR är två omfattande regelverk som påverkar marknaden för finansiella instrument och kommer träda i kraft på EU-nivå under 2016 - 2018. Dessa regelverk betonar områden som är av betydelse för handelsövervakning. Vid handelsövervakning för finansiella instrument tillämpas system för att identifiera marknadsmissbruk eller andra skadliga mönster i handeln. Syftet med denna rapport är att kartlägga marknaden för potentiella användare av övervakningssystem i Stockholm, Sverige, och undersöka påverkan på dessa aktörer i samband med regleringarna.

Data samlades in genom en kvalitativ studie där marknadsaktörer blev intervjuade. En förstudie och en litteraturstudie genomfördes för att identifiera regeländringar av relevans, identifiera marknadsaktörer och kartlägga marknaden, samt att lägga en teoretisk grund för de metoder som används. Ett ramverk utvecklades och användes som ram för att utforma intervjufrågor, strukturera data och analysera resultat. Ramverket namngavs Market Dynamics Framework och tar hänsyn till makrofaktorerna; Teknologi, Aktörernas preferenser, Marknadsstruktur och Regleringar.

En segmentering genomfördes i syfte att mer noggrant undersöka påverkan från regleringarna. Marknadsaktörerna delades in i fyra segment. Resultaten analyserades i enlighet med ramverket för var och en av de segmenterade aktörsgrupperna. Val av övervakningslösning visade sig vara en tydlig skillnad mellan varje segment. Ett köpt övervakningssystem från leverantör var den vanligaste lösningen, medan mindre aktörer föredrog att ha övervakningen outsourcad eller som extern tjänst.

Marknaden är väl förberedd när det gäller att ha system och processer för övervakning. Förväntade effekter är främst relaterade till nya marknadsstrukturer och större mängder handelsdata. Ett behov av ökad kapacitet för övervakningsavdelningar väntas i kombination med ett behov av mer avancerad teknik; t.ex. automatisk screening av sociala medier, effektiv minimering av “falska positiva” och funktionalitet för ett bredare spektrum av finansiella instrument.

Två konceptuella metoder introduceras, Market Dynamics Framework och en segmenteringsmetod. Författarma föreslår dessa som giltiga metoder vid utförandet av en marknadsanalys och utredning av påverkan från olika makrofaktorer på övervakningsmarkanden.

Nyckelord: Värdepappersmarknaden, handelsövervakning, MiFID2, MiFIR, MAD2, MAR, marknadsdynamik, segmentering

Foreword

This master thesis is conducted at the department of Industrial Engineering and Management at KTH - Royal Institute of Technology - in Stockholm, Sweden, during the spring of 2016.

The report is sponsored by the FinTech company Scila AB, which is a developer and vendor of trade surveillance systems. We want to specially thank Lars-Ivar Sellberg, Executive Chairman, and Lars Gräns, Head of Sales, for giving us this opportunity, introducing us to the subject and for their advice and knowledge. Also, thanks to all employees for our time at the company.

This research strives to provide an overview of the landscape for trade surveillance and the regulatory impact from MiFID2/MiFIR and MAD2/MAR. We hope that industry professionals, especially the people who have participated in the study, can find use of the content in this report. Thank you for your time during the interviews and for your contribution to the research.

We want to express our gratitude to our supervisor at KTH, Docent Henrik Uggla, for his valuable advice in the research process.

Lastly, thanks to our friends and families for their helpfulness and taking time to discuss issues regarding this thesis.

Many thanks to all involved for taking your time and to support this research!

Mattias Mogard and Gustav von Heijne

Stockholm, June 2016

Abbreviations

CCP	Counter Clearing Parties
DMA	Direct Market Access
ESMA	European Securities and Markets Authority
EU	European Union
FI	Finansinspektionen
FinTech	Financial Technology
HFT	High Frequency Trading
MiFID2	Market in Financial Instruments Directive 2
MiFIR	Market in Financial Instruments Regulation
MAD2	Market Abuse Directive 2
MAR	Market Abuse Regulation
MTF	Multilateral Trading Facility
OTC	Over-The-Counter
OTF	Organized Trading Facility
SA	Sponsored Access

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1 Introduction

This chapter gives a brief background to the research field and introduces a formulation of the investigated problem. Research question and purpose, including objectives, are presented. The chapter concludes with contributions of the study.

1.1 Background

A plethora of new circumstances awaits the financial markets of tomorrow. In the aftermath of the financial crises, several regulations have been introduced and tightened the conditions for market actors in the landscape of trading with financial instruments. Furthermore, numerous more specific incidents have driven the demand for more control within financial markets. An example is the Flash Crash in 2010 that caused a 1000 points drop for the Dow Jones Industrial Average index, which resulted in a new regulation in U.S. (Weinberg, 2015). There are new regulations approaching for markets in financial instruments in EU. The European Parliament has formulated Market in Financial Instruments Directive 2/Market in Financial Instruments Regulation, MiFID2/MiFIR, and Market Abuse Directive 2/Market Abuse Regulation, MAD2/MAR. These are enforced in January 2018 and respectively January 2017/July 2016, with a purpose to increase integrity and stability of the financial markets within EU.

Financial markets with high integrity and stability should be seen as a strong social interest. High trust for the financial system can be considered to have positive effects for a country's economy as a whole. The European Commission tried to come up with a number for revenues acquired by market abuse in Europe 2011. The estimate was calculated to 13 billion euro a year. This can be seen as the societal cost caused by market abuse. (SEC, 2011)

The regulatory changes point toward more transparent, documented and monitored financial markets. The scope is expanding to cover all types of financial instruments and trading venues. Some of the new requirements are firmer regulations on trading facilities beyond regulated exchanges, such as Multilateral Trading Facilities, MTFs, and Organized Trading Facilities, OTFs.

Trade surveillance technology can be a tool to sufficiently monitor trading, especially in the case of firms with high trading activity and large number of transactions and orders. The purpose is to monitor trading data and alert for patterns of suspected market abuse. A system within this area automates the process for detecting these patterns. As digitization continues to spread across financial markets, the interest and demand for modern trade surveillance have been increasing during the past years. There are several factors that determine the need, demand and drives the development of new solutions for surveillance. Regulations, fragmented markets and new technologies are a few. This research tries to conceptualize and frame the determining factors on the market for trade surveillance as the market dynamics. The concept is then used in order to investigate how the regulations will impact the market for trade surveillance.

1.2 The problem

As mentioned in the background, MiFID2/MiFIR and MAD2/MAR are approaching by the time of this study. The aim was to investigate how market actors on the financial market are affected within trade surveillance in conjunction with the regulations. Formulating frames for market dynamics is the first problem addressed. Examining effects from the regulations, according to the dynamics, is the second.

The first is the theoretical or academic problem, which is related to methodologies. There is a gap in previous research of methodologies for investigating changes in market dynamics, e.g. the entrance of a regulatory change. The entrance of a regulation is a unique event, which is hard to compare to other studies. The research is also dependent on the timeframe. Depending on when in time the study is conducted the impact will probably differ. Methodologies from other studies are hard to apply to this particular case which is why new models have been created for the addressed research problem.

The second is an industrial problem for this specific case. This problem constitutes of the gap between formulating regulations and the actual implementation. It is a gap of knowledge for how the implementation will impact its target. In this case, the target is the financial market, which also comprises

the market for potential users of trade surveillance technology. The regulations and new market conditions require further technical specifications on surveillance. The aim is to investigate implications from the regulations and define the need created on the market.

1.3 Purpose

The purpose is to provide an indication for how the market will be affected and what needs that will arise as a consequence of the regulations. It is also to provide stakeholders of trade surveillance systems with insights and conceptual tools for investigations on changes in market dynamics factors, such as new regulations entering into force.

The following objectives for the study have been formulated:

- Create a conceptual framework for market dynamics affecting the trade surveillance market
- Use the framework to examine effects from the regulations MiFID2/MiFIR and MAD2/MAR
- Segment the market and extensively discuss effects from the regulations on each segment

1.4 Research question

Completing all objectives address a range of issues related to the problem that this research intends to investigate. The overall purpose is achieved by answering the following research questions:

RQ1: *How can market dynamics on the trade surveillance market be conceptually described?*

RQ2: *How does the entrance of MiFID2/MiFIR & MAD2/MAR impact the Swedish trade surveillance market?*

RQ3: *How do the changes in market dynamics, from RQ2, affect technological demand of systems used for trade surveillance?*

The contributions of this study to the theoretical body of knowledge are mainly based on the answer of the first research question. The second research question is based on the Market Dynamics Framework and its underlying factors as units of analysis. The answer of the third research question is an expanded investigation of the consequences from the regulations with respect to the demand in technology within trade surveillance. The second and third questions are ore oriented towards industrial contribution.

1.5 Delimitations

MiFID2/MiFIR and MAD2/MAR will impact the financial industry in numerous areas. The research is delimited to the legal provisions that are considered to affect trade surveillance. The time frame of the study is placed during a period of five months before MAR enter into force and approximately one year before MAD2 and two years before MiFID2/MiFIR. The scope is geographically restricted to the Stockholm area in Sweden and it will only take account for Swedish firms acting on the Swedish market.

The framework, Market Dynamics Framework, frames theoretical delimitations and the segmentation method introduced in chapter 2, *Method*. It is a qualitative study and gathered data is restricted to the four dimensions; Technology, Actors' preferences, Market structure and Regulations. Data is primarily qualitative and gathered from interviews as primary sources.

1.6 Contribution

The study contributes by examining the impact of regulations and introducing a framework for market analysis and a segmentation approach for the targeted market. Methods used, framework and segmentation, are expected to contribute to literature while empirical results and conclusions are more focused towards market stakeholders. The outcome of an impact assessment is useful knowledge for regulators and legislative implementers, and for all market stakeholders involved in decisions regarding surveillance, including vendors and users of the systems. The introduced framework is a product of the pre-study and illustrates four dimensions of analysis. This tool can be applied, if validated, to other geographical markets as well. The study will also contribute by using the aspect of trade surveillance at an analysis of the regulations. The outcome will provide stakeholders with transparency and awareness of the current state on the market regarding surveillance and indications for future demand.

As a summary, contributions to knowledge are:

- A conceptual framework for market dynamics on the the trade surveillance market
- A suggestion for segmenting the market with respect of surveillance solution characteristics

And contributions to industry are:

- An investigation of effects from MiFID2/MiFIR and MAD2/MAR on the trade surveillance market. The conceptual framework, constructed during this study is used as base for the analysis during this investigation.
- Identified needs for technical aspects within trade surveillance are also identified which can contribute to stakeholders of the technology.

2 Method

This chapter explains the methodology, usage of research process, its partial structure, and also how it is developed. Literature for business research is applied to motivate and discuss why certain methods are chosen. Finally, validity and reliability are discussed.

2.1 Methodological approach

Since the research field is rarely investigated and touches upon an interdisciplinary area, an abductive research approach was chosen. An abductive approach means that theories and ideas from literature are mixed with empirical data that is collected during the research process. In this manner understanding of the empirical material influence the comprehension of the literature and vice versa. As a consequence, the process has been iterating between empirical data gathering and synthesis of the gathered data. An abductive approach has been the basis for development of the method. (Blomkvist & Hallin, 2015)

The empirical data collection is a qualitative process and consists of interviews, spanning from semi-structured to structured disposition. Since the research question aims to investigate how the market is impacted and reacts to the regulations, a qualitative study where stakeholders were interviewed is seen as a suitable method. Thereby, it is desirable to have rich data that can be continuously summarized in the iterative synthesis process. The iterative process is beneficial to preserve unexpected findings and to update and improve the interview questions. Most regulations are unique in terms of specific circumstances for each market, regulation and stakeholders, which is a reason to use a versatile and flexible research approach and data collection in order to cover as many implications as possible. (Blomkvist & Hallin, 2015)

2.2 Research process

The research process illustrated in figure 1 is introduced below and is described further in depth in the following sub-chapters.

The first step, Pre-study, mainly concerned research of the legal elements and collection of information and data from the market. This step was done in order to describe and understand the regulations and the financial market in Stockholm, in relation to trade surveillance.

The second step was a Literature study. Previous research and theoretical concepts were investigated in order to support an appropriate methodology for the other steps in the study.

The Pre-study and the Literature study was used as basis to design a framework, Market Dynamics Framework. The framework includes the four major dynamic factors affecting the market, which determines the need for trade surveillance technology. The framework is the base and constitutes the structure for Data gathering, Synthesis and Analysis.

The third and fourth steps, Data gathering and Synthesis, were combined in an iterative process between interviews and summarizing results. The interviews were divided into four categories, according to the market actor types, that thereby led to four iterations in the data collection process. The categories are regulator, market operators, brokers/dealers and professional clients. These are all potential users of trade surveillance systems and are thereby defined as market actors on the trade surveillance market.

The fifth step, Analysis, comprised segmentation of the market, and characteristics and impact were examined for each segment. The Market Dynamics Framework was the underlying main tool to structure and analyze data.

The final outcome and conclusions from the Analysis are presented in the chapter 9, *Conclusions*. The research question is answered and impact defined within each aspect of the Market Dynamics Framework for each market segment.

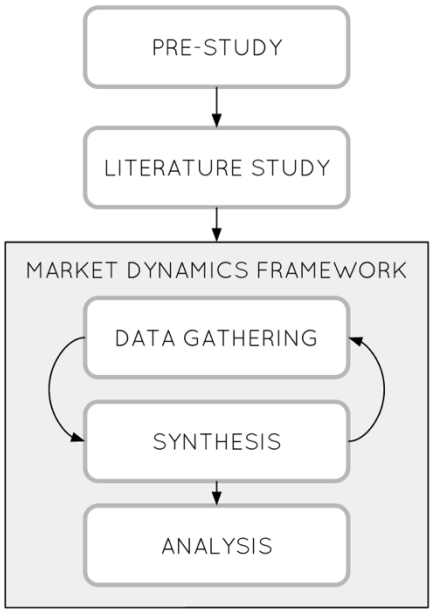

Figure 1. *Research process of study*

2.2.1 Pre-study

A pre-study, method supported by Collis & Hussey (2013), was conducted to gain a holistic understanding of the research topic that spans over an interdisciplinary field of law, financial markets and the technology behind trade surveillance. Previous and approaching regulations were examined. Content of significance for the surveillance market were extracted and summarized. The financial market was examined, as a result market actors and infrastructure were identified. Descriptive data of the market was retrieved in order to understand and describe the current situation for the financial markets and its actors. Collected information was mainly located at the regulator's and the market operators' websites, where they concretely describe the market and their activity.

Ann-Christine Lindeblad (2016), Judge from the Swedish Supreme Court, including her secretary Johan Lycke, were interviewed. Judge Lindeblad was the special investigator for MAD2/MAR and MiFID2/MiFIR, with responsibility to implement the European legal agreements into Swedish law.

Several interviews were also made with the industry professional Lars Gräns (2016), Head of Sales, at Scila. He gave an introduction to the technical functionality of surveillance technology and the industry in general.

2.2.2 Literature study

The literature study was used to construct and strengthen used methods. Literature regarding regulated markets was examined but few studies with applicable methods for this particular case could be found. The literature was, instead concentrated towards theoretical concepts that could support applied methods, market analysis and segmentation. Literature on regulated markets was investigated to gain a deeper understanding on implications when a market becomes regulated, in order to anticipate areas of importance.

Literature on market analysis was focused on frameworks and methods for describing macro-environmental and determining factors on markets. The literature was investigated as a part of the construction of the Market Dynamics Framework. Findings are used as basis for the framework and strengthen the validity. The segmentation method, which was the foundation for the analysis, was also strengthened with literature.

2.2.3 Market Dynamics Framework

The framework is a product from the pre-study and the Literature study, which provides four dimensions of analysis. These dimensions are factors that determine the demand on the trade surveillance market. It was used as an analytical framework with macro-environmental factors and is the source of structure throughout the thesis. The processes regarding Data gathering, Synthesis and Analysis are developed and structured according to the framework.

The data gathering consists of interviews with a number of market actors with different character. The four dimensions of the framework are used as a model to formulate interview questions and to structure gathered information afterwards. The interview questions are developed through the research process and adapted to the character of the different types of market actors. This process is the iterative cycle between Data gathering and Synthesis, where the framework has been vital.

The framework is also important for the Analysis, where it is used for structuring and comparing gathered data. The dimensions are used as aspects in the analysis. The factors of the framework are Technology, Market structure, Actors' preferences and Regulations; which is illustrated in figure 2. The framework and its dimensions are presented in depth under chapter 6, *The creation of Market Dynamics Framework*.

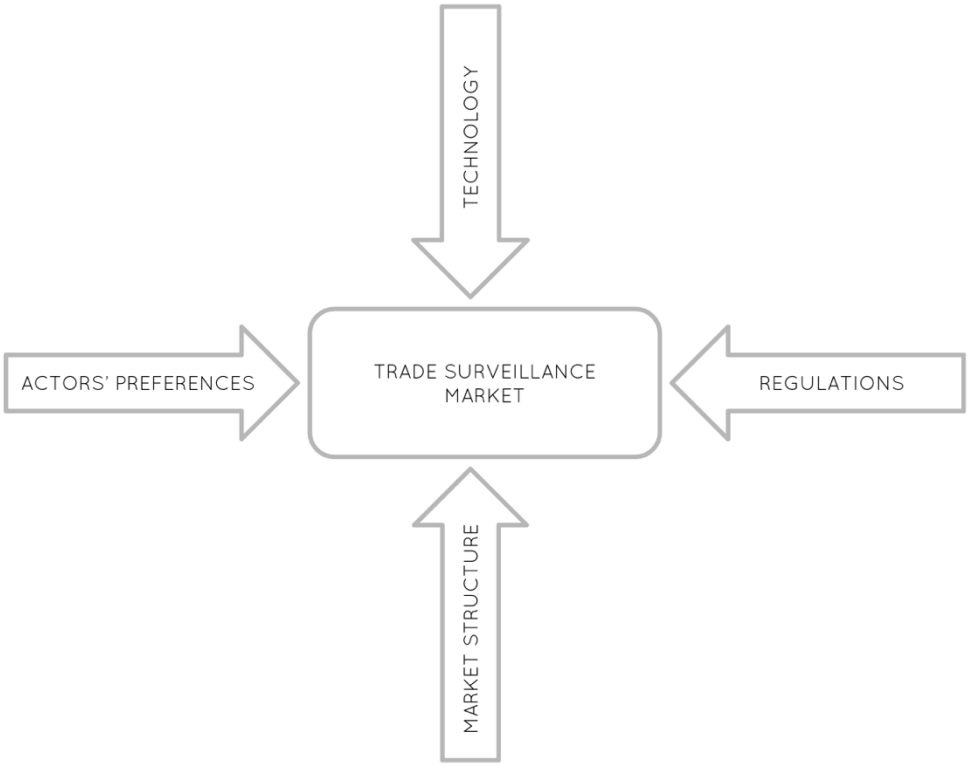

Figure 2. *Market Dynamics Framework*

2.2.4 Data gathering & Synthesis

The interview process was the main activity for collecting empirical data. The objective was to create a versatile and comprehensive picture of the market's and the legal implementer's view on the coming regulations and on surveillance. The process is designed to cover most categories of stakeholders that are involved in the implementation and the impacted market in Stockholm. Market actors were interviewed in the following order:

1. Regulators
2. Market operators
3. Brokers/dealers
4. Professional clients

The order is chosen to have a top-to-bottom sequence according to the infrastructural hierarchy; described in chapter 3, *Introduction to trade surveillance technology*. Initially, semi-structured interviews were applied, and gradually interviews shifted towards a more structured character along with the data gathering process. Methodology is chosen depending on the category of interviewee and time in the study. Interview methodology for each actor type:

1. The interviews with the **regulator**, FI, were semi-structured with open-ended questions. These were the most unstructured interviews. The approach enabled to collect rich data and obtain unexpected findings.
2. **Market operators** are highly involved in both regulatory issues and usage of surveillance technology. Semi-structured interviews with open-ended questions were applied, but with more aspects on technology and the regulatory implementation.
3. The information from **brokers/dealers** were gathered with semi-structured interviews but with more closed questions, compared to earlier interviews. The questions also focused more on brokers/dealers' activity, rather than holistic discussions of the regulations
4. **Professional clients** were interviewed with structured interviews, focusing on surveillance and their operations and activity.

The gradual change in interview methodology and the chronological order is illustrated in figure 3. *Number of actors on the market* (figure 3) illustrates the amount of actors, within each actor type, that exist on the market.

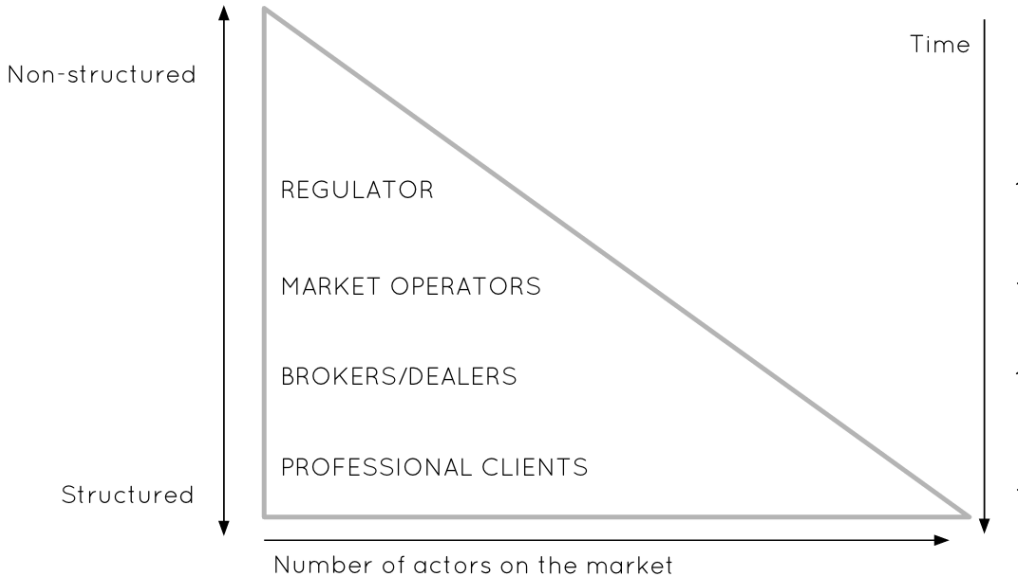

Figure 3. *Interview methodology, describing characteristic for interviews, timeline and how the number of actors is divided*

Non-professional investors are not affected by regulations in the same extent as professionals and are not relevant in the area of surveillance technology, which is why they are excluded from this study.

A synthesis is done in every cycle of interviews, which resulted in an iterative process. This process is necessary to structure information gathered from the interview, and also to adapt and update the interview questions for the next iteration. The synthesis is a part of the qualitative data analysis, where the Market Dynamics Framework is applied as a tool for restructuring the data. This is a way of achieving data reduction which is a form of data analysis that sharpens, sorts, focuses, discards and reorganizes data (Collis & Hussey, 2013).

Collected data from market operators, brokers/dealers and professional clients is presented as anonymous. This was to let the interviewees speak freely and to increase the response rate, but it will in the same time lower the repeatability of the study.

During the interviews one of the researchers handled the questioning and took keywords as notes while the other one was focusing on writing exact notes for documentation. In this way, the interviewees could be given full attention as the same time as the interview was accurate documented. Dividing the tasks was a method to avoid bias in notes and increase the ability for immediate analysis, which are possible problematics enlightened by Collis & Hussey (2013) if the interviewers keep notes and interview at the same time.

The population excluding professional clients measure to approximately 20 actors. The total population is estimated to approximately 60 actors who are potential users of trade surveillance. This is motivated by the assumption that there are a bigger number of professional clients than brokers/dealers. The exact number to market population including professional client was roughly estimated. The criteria for actors included in the sample are that they are involved in a substantial volume of securities trading and are potential or hypothetical users of a trade surveillance system. The data sample amounted to 17 actors in total, and 14 if professional clients are excluded from the sample. Descriptive numbers of sample are seen in table 1.

Table 1. *Market population, sample size and sample ratio*

Population (excluding professional clients)	Total population (approximately; inclusive professional clients)	Sample size (exclusive/inclusive professional clients)	Data sample ratio (exclusive/inclusive professional clients)
20	~60	14/17	70%/28%

2.2.5 Analysis

The Analysis is the chapter when the gathered data is scrutinized and used in order to examine impact for the different types of market actors. The framework was used in order to organize areas of impact and segmentation was used as a tool to divide the market actors into more specific groups, due to their operational variables and mainly to their surveillance solution characteristic. The combination of segmentation and the framework connect impact from findings to the different market actor groups.

2.3 Validity and reliability

Validity and reliability are used to measure and explain the level of the scientific quality of the research (Blomkvist & Hallin, 2015). Validity is to optimize the reflection of the intended research area and to choose the right method to collect the information. Reliability is the level of repeatability of the research, thus the ability to redo it in a future state. (Blomkvist & Hallin, 2015)

The interview methods, used in the information gathering, are of different character and adapted to the type of actor that is interviewed. From semi-structured interviews with open questions to structured interview where the issues are straight on with clear answers to the questions.

In the pre-study many different information gathering methods were used to get maximum understanding of the market and the regulation. The information gathering was in the form of scientific papers, regulatory proposals and from interviews with industry professionals, this to strengthen the validity with a spread of different information sources. The information taken from company websites was market descriptive. The companies are seen as credible sources.

As the result from the interviews is presented as anonymous it decreases the reliability because it is impossible to repeat the study with the exact same interview sample. The study cannot be repeated with the exact same circumstances since it investigates regulatory changes, which is a unique scenario for these particular regulations. Using an interviewing method in the information gathering can affect the validity because there are risks that the interviewees' opinions are not fully coherent and reflect with the company's (Collis & Hussey, 2013).

3 Introduction to trade surveillance

This chapter explains what trade surveillance technology is, its functionality and also what is included within monitoring. Then the infrastructure of the trade surveillance market is described, including market actors. Market actors have previously been defined in this study as regulator, market operators, brokers/dealers and professional clients, which are all potential users of a trade surveillance system. This chapter is based on pre-study interviews and secondary sources from press releases and corporate web pages.

3.1 The technology

Trade surveillance technology is a niche within Financial Technology, FinTech. The technology is a combination of monitoring for both market manipulation and insider trading. This is executed by monitoring trading data and information about the market. A single surveillance system can examine several million transactions per second and monitor both orders and transactions. A system can have alarms to detect hundreds of different illegal patterns for market abuse, some methods for market abuse that can be detected with these alarms and some of them are described in chapter 4.1 *Market abuse.* The following subchapter is based on an interview with Lars Gräns (2016).

Detecting insider trading is a combination of monitoring trade patterns, price-sensitive information (e.g. press releases) and the list of people who possess insider information. Both transactions and information gathered are synced with the list of people who possess insider information, including their relatives. This is to find any suspicious trading patterns and if the information is illegally used.

There are several different ways to manage the surveillance and it can be performed either manually or automatically. When having a manual surveillance system, the number of trades needs to be low enough to be manually manageable. The alternatives for automated surveillance solutions are:

- Vendor's solution
- In-house developed
- External/outsourced service

Automated IT systems for trade surveillance is a way for monitoring a market. An illustration for how the surveillance workflow can look like is described in figure 4. Different types of data, most relevant are transaction and order data, are imported into the trade surveillance platform. The data gets normalized and standardized in order to be compatible with the system. Parameters and alerts are set and tuned to meet a desired level of sensitivity. When an alert is triggered, it is sent to a team of compliance analysts as a case. If any suspected violation of law is detected, the case will be further investigated and ultimately sent to the regulator. Data is stored for long-term purposes and historical analyzes. Recreation of data and scenarios is an important feature for surveillance systems; enabling proofs for legal processes, post trade investigations, etc.

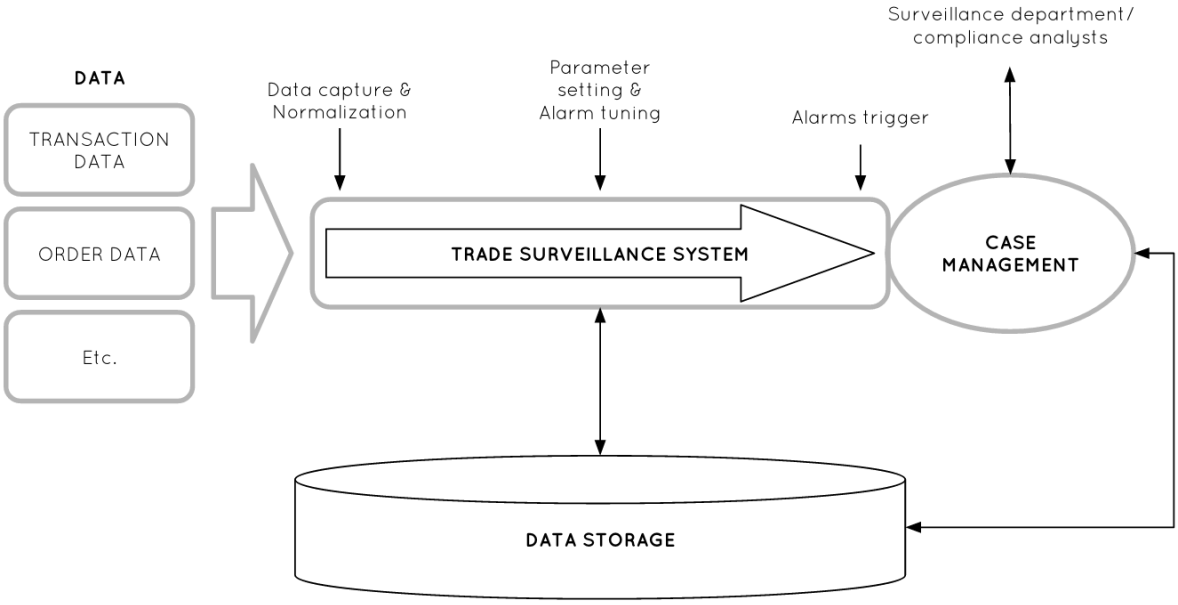

Figure 4. *Overview of trade surveillance system*

3.2 Infrastructure of market actors

Market actors in the financial trade market that are involved by surveillance technology can be divided into four different types of users; regulator, market operators, brokers/dealers and clients. When referring to all these in the report they are named with the common term market actors. The market infrastructure is compiled and presented as an illustration, in figure 5 below. The figure provides an overview of all market actors, the trading flow and the transactions reporting to the regulator. Below comes an introduction of the actors' roles and in the sub-chapters are all presented in detail.

The regulator has responsibility for regulatory compliance and to ensure that the market participants are compliant. They receive compulsory transaction reports from all market participants after the trading day. Thereby, they have a full overview of the whole market.

The market operators operate exchanges and marketplaces. The market operators have full responsibility for the monitoring of their marketplace and to report rule violation to the regulator. The Swedish market consists of several exchanges and marketplaces. The market operators also have internal trading rules that is controlled, this to ensure that trading is taking place in a proper manner.

The brokers/dealers, with membership on the marketplace, match the sell side and buy side on the marketplace. In figure 5 is the transaction flow mirrored and the boxes represent both sides, and the trading flow is in two directions. The brokers/dealers can trade for their own account or for a retail client; see the bottom of figure 5. All transactions go through the brokers/dealers trading system, which contains a pre-trade filter that checks if transactions and orders are issued correctly. They are obliged to send transaction reports to the regulator.

The last category consisting of eligible clients, professional clients and retail clients. The client's trades via a brokers/dealers to get access to the marketplace. This category has obligation to send transaction reports to the regulator. As mentioned before, retail clients are not included in the study since they are not a potential user of trade surveillance systems.

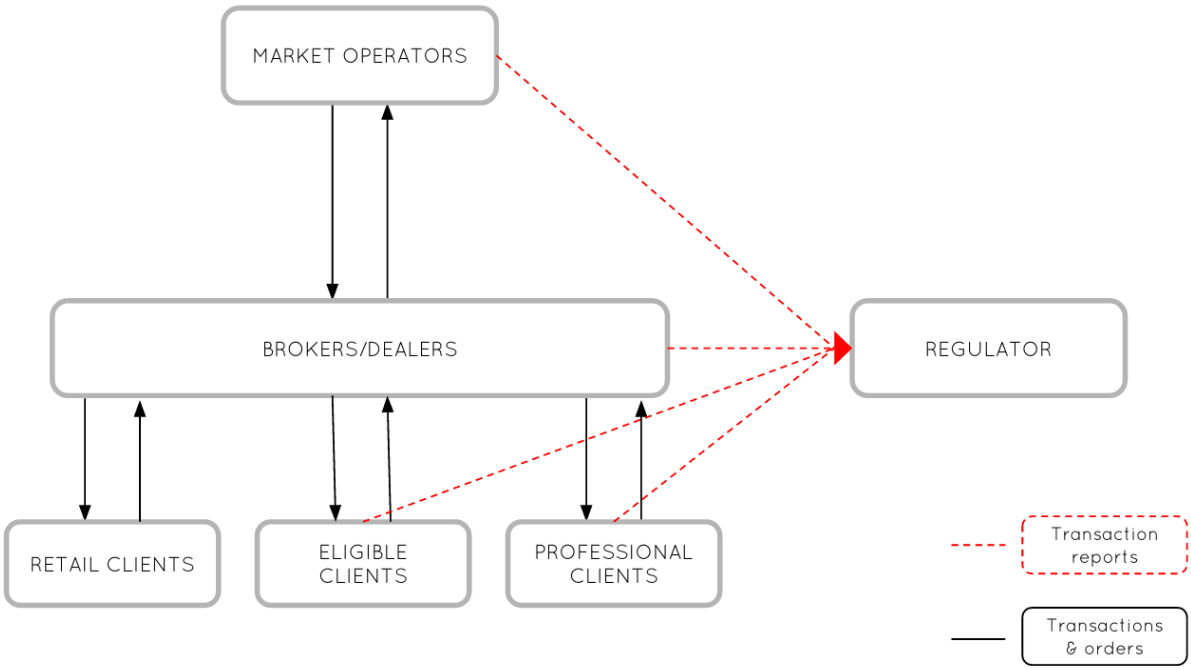

Figure 5. *Trading infrastructure of market actors*

3.2.1 Regulator - Finansinspektionen

This chapter is about the Swedish government's financial supervisory authority, Finansinspektionen (FI), which in this report is referred to regulator in figure 5. FI is responsible for market oversight and monitoring, regulation and authorization on the financial market and has the responsibility to control if the financial regulation is met. Their assignment is to contribute to a stable financial system that is characterized by high level of confidence with well-functioning markets. The goal of financial regulations and supervision is to ensure a safe and efficient financial system, in order to counteract on risks that can affect the national economy and thereby consumers. The regulator puts responsibility on the companies to be compliant, where their boards have the ultimate responsibility. (Finansinspektionen, 2014)

Their operations include several different activities as regulatory setting, licensing, supervision, dialogue, action and analysis. Supervision is a part of their work and the supervision area consists of several information gathering sources; prospectuses, financial reports, transaction reporting and insider trading lists. Event-driven actions funded from tips is also included, e.g. whistleblowers and reports from media. (Finansinspektionen, 2014)

FI has a supervision strategy for the surveillance activities that consist of three different supervisory practices; continuous supervision, investigations and event-driven supervision. The supervision has the mottos forward-looking, clear and decisive. They focus on a risk-based supervision, which is a proactive forward-looking strategy that is divided into a risk assessment process and a risk classification. The risk assessment process identifies and ranks the biggest risks while the risk classification ranks companies based on where problems are expected to have the greatest negative impact on consumers and on the national economy. They have a risk-based supervision to minimize cost and focus on the participants that have most influence on the market. (Finansinspektionen, 2014)

The regulatory work is organizationally divided into four different areas; Banking, Insurance, Market and Consumer. This report will focus on the regulator's work within the market area. Their purpose of the supervision is to ensure trusted, well-functioning and efficient securities markets with full transparency and also promote a financially stable and operationally secure infrastructure. The supervision involves all financial companies that are under supervision, but also some non-financial companies and individuals operating in the financial market. Focus is on those who are central for the infrastructure. For that reason, the regulator has a close cooperation with these actors. (Finansinspektionen, 2014) FI have full market oversight and insight in the whole value chain. In the first line of analysis, they have access to monitor trade transactions, they also have the possibility to request for trade orders to conduct deeper analyses (Mild, 2016). FI has no real time surveillance but receives transaction data from all market operators and market participants after every trading day (Hagman Falkner, 2016). The input of data comes from transactions reports, see figure 5, from every market participant, thereby they have control of all layers in the market. The regulator has more extensive information and overview of the entire market and use analysis tools to track and identify market abuse. (ESMA, 2012; ESMA, 2015; European Parliament & Council of the European Union, 2014a)

3.2.2 Market operators

The market operators' role is to have a platform to match buyers and sellers. They have access to all orders and transactions from their members on their marketplace and have full responsibility to monitor everything in real time. One of the reasons is that they are obliged to impose trading halt of a specific stock if needed, e.g. if it is traded in an abusive way or if undisclosed information has leaked.

Market operators have reporting obligation to the regulator and the responsibility to ensure that no market abuse occur on the market place. For the market operator it is of high importance to detect all form of market abuse and put high effort to find it. It is important to maintain a reputation of safe marketplaces for market operators. Both the traders and the issuers are of high interest for markets of high integrity and stability. Market surveillance is close to core activity for market operators in order to ensure these attributes.

A market operator can operate several different type of marketplaces, both regulated and unregulated. For example, it can be a stock exchange, MTF and OTF. In Sweden there are two stock exchanges and several MTFs. (Finansinspektionen, 2016a) The market operators have their own rules for the marketplace and put requirements on the stakeholders. Cases can be raised to an impartial disciplinary committee with authority to give warnings, fines, withdrawal of membership from the marketplace. (Englund, 2014; Nasdaqomxnordic, 2015)

3.2.3 Brokers/dealers

A person or an institute who executes transactions for others on a securities exchange is a broker. Dealers are any person engaging in the business of buying and selling securities for his or her own account. Bigger institutes often do both and the common term is used for this group in this thesis. Brokers/dealers have membership and permission to trade directly on a marketplace. They match the sell side and buy side on the marketplace. This group of market actors is also obliged to monitor their trading as well as sending transaction reports to the regulator. Brokers/dealers are responsible for their clients' trading. (U.S. Securities and Exchange Commission, 2008)

The services DMA allow a market participant to directly access a marketplace without being member on it. Brokers/dealers are both users and providers of the service. They use it to allow their clients to trade directly on marketplaces through their membership, vice versa they use it themselves to access other marketplaces beyond their memberships, often on marketplaces abroad. Brokers/dealers are responsible for all trading that goes through their systems and memberships, meaning that DMA puts higher requirements on control monitoring over their clients' trading. There are many different categories of brokers/dealers, e.g. retail brokers, institutional brokers, and buy-side firms.

3.2.4 Clients

The client classification is divided into three different types:

- Retail clients
- Eligible clients
- Professional clients

This client classification originally comes from the MiFID(1) act (Finansdepartementet, 2007). The different clients have increasing level of protection. All clients can voluntary demand to change category. (European Parliament & Council of the European Union, 2014b)

The majority of private individuals are categorized as retail clients. Small businesses and associations are usually seen as non-professional customers.

Eligible clients are brokers/dealers in a client position. For example, if a broker wants to trade in a market where they are not members, they must carry out their trade through a broker who is a member of that particular trading venue, they are thereby classified as eligible counterparties. This client category are expected to have the highest understanding of the market and access to information to take investment decisions and have understanding of the related risks.

Professional clients are clients who possess the experience, knowledge and expertise to make their own investment decisions and are aware of the risks. Professional clients are banks and other financial institutions, large companies and other institutional investors whose main activity is trading with financial instruments. Some of the professional clients are classified as eligible counterparties.

4 Regulations

The coming regulations, condensed into key points are presented in this chapter. Included is also a section a detailed description of market abuse and its meaning. Information is based on pre-study interviews, secondary sources and regulatory enactments.

Market Abuse Directive 2/Market Abuse Regulation (MAD2/MAR) and Market in Financial Instrument Directive 2/Market in Financial Instruments Regulation (MiFID2/MiFIR) are two somewhat overlapping directives/regulations, which will affect financial markets in several aspects. ESMA Technical standards are related to MAR and is the guideline that technical aspects of being compliant to the regulation. That determinate appropriate arrangement, systems and procedures for detecting market abuse. The purpose is to ensure consistent harmonization of MAR Article 16, described in detail in the sub chapter. ESMA Technical standards are released the same date as MAR. An overview timeline of the enforcement can be seen in figure 6.

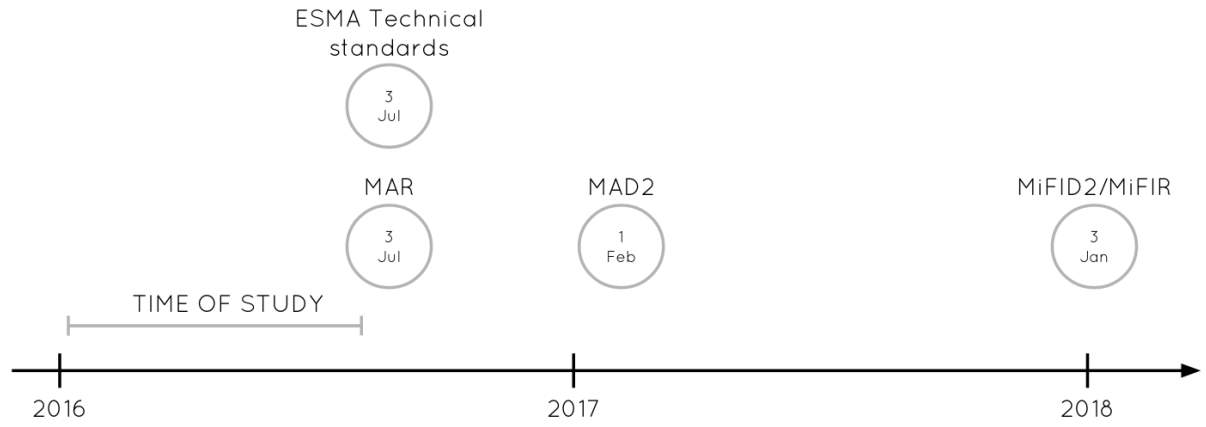

Figure 6. *Timeline for enforcement of regulations, release date of technical standards and time period for this study (Regeringen, 2016)*

4.1 Market abuse

Surveillance technology is used to sustain reliable and sufficient markets by counteracting on market abuse. Market abuse consists of two pillars:

- Insider trading
- Market manipulation

Insider trading appears when classified or non-disclosed information is used as basis for trading decisions. Market manipulation has many forms but can generally be described as all types of actions which intend to move a stock price in a certain, beneficial direction. Statistics for *Suspected insider trading* and *Suspected market manipulation* reported to FI are displayed in table 2. (Ekobrottsmyndigheten, 2016)

Table 2. *Cases of suspected insider trading and suspected market manipulation reported to FI (Finansinspektionen, 2016b)*

Violation	2013	2014	2015
Suspected insider trading	164	201	199
Suspected market manipulation	164	115	144

Market manipulation is an activity that is intended to improperly influence pricing or in other ways mislead trading. There are many types of activities that can be considered as market manipulation. The method of using trading and order patterns in different strategies, e.g. putting orders without the intent to execute them, is a common way of stock price manipulation. Misguiding other sellers and buyers of financial instruments is also a behavior included under market manipulation.

Some market manipulation examples are wash trades, order book layering, social media and investor recommendations and cross-market manipulation. These examples are described in the paragraphs below and are based on information from Nasdaq (2015). Referring back to chapter 3.1 *The technology*, the alarms in surveillance systems are designed to detect this kind of activities.

- **Wash trades** are when trades are executed without any real exchange in ownership of the underlying security. It is more or less a person who is trading with him- or herself. This gives a misleading impression about trading in general or it is intended for a specific transaction. The purpose can be to influence the share price or creating a momentum around the traded security, which is also a driver for pricing.

- **Order book layering** is a way to create the impression of interest to buy or sell a security, but the intent is to trade the same security in the opposite direction. In this case, orders that are entered on a security do not represent a genuine intent to buy or sell the security, but to mislead other actors. Orders are then cancelled before transaction and the real trade is executed, benefitting from the mispriced security.

- **Social media and investor recommendations** are a particular form of spreading misleading information. As mentioned, market manipulation does not have to be limited to orders and transactions. The information relates to when investment recommendations are issued with the intent that investors who follow the recommendations create an opportunity for the issuer to trade in an opposite direction.

- **Cross-market manipulation** is a consequence of market fragmentation when the same type of security is traded on different venues and platforms. The practice involves trading in one market with the intent to influence the price of the same security in another market.

4.2 MAD2/MAR

This chapter concludes some effects of Market Abuse Directive 2, MAD2, and Market Abuse Regulation, MAR, that concerns the subject of this thesis and are expected to impact the area of market monitoring and trade surveillance. The regulations are based to some extent on the definitions in MiFID2. The same time as MAR enters into force is also the required technical standards by European Securities and Markets Authority (ESMA) released (ESMA, 2015). They are highly related, since the release from ESMA defines standards of technical solutions required from MAR. Information regarding MAD2/MAR is retrieved directly from the directive and regulation, published in Official Journal of the European Union. (European Parliament and Council of the European Union, 2014a; European Parliament & Council of the European Union, 2014c).

The key points from both MAD2/MAR that are addressed in this report are:

- Changes in the terminology and sanctions of the laws as well as increased responsibility for FI.
- Prohibition to cancel or modify a placed trading order with possessed insider information as basis of decision.
- Extend the rules to cover all financial instruments traded on a regulated market, MTF or OTF.
- Market operators and investment firms that operate a trading venue and any person professionally arranging or executing transactions shall establish and maintain effective arrangements, systems and procedures to detect and report suspicious orders and transactions.

MAD2/MAR will bring significant changes in market abuse regulation, the changing definitions of key terms to the practical handling of questions about insiders and market surveillance. There will be changes in the drafting and execution of punishments in the law execution. Adapted terminology of market manipulation to Swedish law that facilitate to convict for market abuse. MAR establish administrative sanctions as a criminal penalty. Introduction of the administrative measures and penalties that must be effective, proportionate and dissuasive. FI is appointed as the competent authority under MAR and is therefore granted the powers derived directly from the regulation. FI gets a new independent role. A role having the authority to manage the whole process from identifying a violation of provisions to executing sanctions. They are thereby able to take action against those who have breached the provisions on reporting obligations for transactions. They will have more resources to accumulate a larger amount and more distinct evidence, thus increasing the ability to get people convicted for crimes committed. (Lindeblad & Lycke, 2016; Fondhandlarförreningen, 2016)

The MAR regulation introduce new prohibition to cancel or change a placed trading order with possessed insider information as basis of the decision, if the order was placed before the person possessed inside information. It is also introduced that attempt to insider trading and attempt to market manipulation is prohibited. (Fondhandlarförreningen, 2016; Finansdepartementet, 2014, p 444)

MAR widens the scope and extends the rules to cover all financial instruments traded on regulated markets, MTFs or OTFs. The scope is expanded to include commodity derivatives and emission allowances. Reporting requirements for suspicious transactions is extended to apply to so-called Over-The-Counter, OTC, trading. (Fondhandlarförreningen, 2016; Finansdepartementet, 2014, p 444)

An extract of Article 16, which is published in MAR, is presented below:

> 1. Market operators and investment firms that operate a trading venue shall establish and maintain effective arrangements, systems and procedures aimed at preventing and detecting insider dealing, market manipulation and attempted insider dealing and market manipulation, in [...]
>
> A person referred to in the first subparagraph shall report orders and transactions, including any cancellation or modification thereof, that could constitute insider dealing, market manipulation or attempted insider dealing or market manipulation to the competent authority of the trading venue without delay.
>
> 2. Any person professionally arranging or executing transactions shall establish and maintain effective arrangements, systems and procedures to detect and report suspicious orders and transactions. Where [...] (European Parliament & Council of the European Union, 2014c, p. 33)

Actors applied by the definition in point 1 and 2, are obliged to report transactions to the competent authority, whether placed or executed on or outside a trading venue, without delay. If they do not report their negligence can be sentenced to fines. (Lindeblad & Lycke, 2016)

According to SOU 2014:46:

> The change means that more companies will be affected by the regulation, such as market operators and investment firms operating MTFs and OTFs, persons professionally arranging or executing transactions (financial instruments), participants in the emission allowance market, as well as issuers. According to information from the FI, the number of companies under supervision will increase from approximately 250 to approximately 500. All affected companies (whether they are legal or physical persons) who fall within the scope will incur administrative costs through the requirement to develop, transmit and store information, as well as obligations to maintain systems and procedures for market surveillance […] (Finansdepartementet, 2014, p. 444)

The number of actors under supervision will be radically increased. The amount of new resources will be financed by fees to the regulator. Newly included actors are expected to incur administrative costs through implementation of new requirements.

4.3 MiFID2/MiFIR

This chapter concludes some effects of Market in Financial Instruments Directive 2, MiFID2, and Market in Financial Instruments Regulation, MiFIR, that concerns the subject of this thesis and is expected to impact the area of trade surveillance. Information regarding MiFID2/MiFIR is retrieved directly from the directive and regulation, published in Official Journal of the European Union. (Finansdepartementet, 2015; European Parliament & Council of the European Union, 2014b; European Parliament & Council of the European Union, 2014d).

The key points from both MiFID2/MiFIR that are addressed in this report are:

- Establishment of Organized Trading Facility, OTF.
- Recording and documentation requirements to cover communication via mobile phones and other electronic devices.
- Information requirement for securities firms using algorithms.
- OTC trading is put on regulated venues and shall be fully transparent.
- Marketplaces must make pre- and post-trade data available.
- Transaction reporting to FI will be expanded and contain more detailed information.
- New requirements regarding best execution and client order handling.

Establishment of Organized Trading Facility, OTF, is a new type of marketplace for trading in non-equity instruments such as bonds and derivatives. The same transparency rules are applicable to trading on an OTF as on a regulated market and MTF.

The recording and documentation requirements of telephone calls are extended and will include more employees and also cover communication via mobile phones and other electronic devices.

Requirements are introduced to mark and document trades executed by algorithms. Securities firms using computer based trading must inform FI and the marketplaces of trades executed by algorithms. High Frequency Trading, HFT, firms must be licensed as a securities institution and if they are engaged in trading similar to a market making strategy they must include a market making agreement with the market operators.

The transaction reporting to FI will be expanded and contain more detailed information. Additional demands to contain information of the customer ID and the person or computer algorithm that made the investment decision. Similar to algorithm disclosure obligation mentioned above.

OTC trading shall be put on regulated venues and be fully transparent. OTC transactions will be restricted for securities institutions that carry out transactions in stocks admitted to trading or traded on regulated markets, MTF or equivalent or through a systematic internaliser. Exceptions for OTC transactions are if the transactions are non-systematic, ad-hoc or between professional counterparties. The transactions may not contribute to the price formation process, which the technical standards will define. Some OTC derivatives that are sufficiently liquid and cleared must be traded on a regulated market. ESMA Technical standards will determine which ones that are sufficiently liquid. (ESMA, 2015)

The marketplaces will be obliged, on commercially reasonable terms, to make pre- and post-trade data available to the public including public bid and offer prices.

New requirements regarding best execution and client order handling are introduced. These will probably not affect the surveillance landscape but have great importance for the regulation. Firms will be required to take all sufficient steps to find best possible way of executing their clients' orders. They also have to publish data on the top five venues where they executed client orders and information on the quality of performed execution. Regarding client order handling, investment firms have to take measures to facilitate the earliest possible execution of that order. The order should be made public immediately in a manner that is easily accessible to other marketplaces.

5 Literature study

The research area of this report is not frequently mentioned in academic literature. It is hard to identify studies that investigate a similar case and use validated and reproducible methods. There are some studies evaluating the impact of MiFID(1), but with different angle of incidence. There is a gap in the existing body of knowledge for methodologies to analyze impact on the trade surveillance market in conjunction with changes in market dynamics, e.g. regulatory changes. The literature that has been studied is therefore mainly focused on theoretical methods for analyzing and segmenting a market. The literature is used to embed the Market Dynamics Framework and the segmentation in academic theory.

5.1 Market analysis

This chapter intends to investigate the literature on the topic market analysis. A market analysis is advantageous carried out with an analytical framework as backbone. A framework can be used to organize information in comparable sections, in order to create structure of gathered data. In this study, used in synthesis of data and analysis. The literature on market analysis was used to design a framework adapted to this particular case, which resulted in the Market Dynamics Framework.

One study examined the impact of MiFID(1), but not in the context of trade surveillance. When MiFID(1) was introduced in 2004, applied in Sweden 2007, it changed the market structure extensively. There is a clear link between the regulation and higher demands on a more open and transparent market structure. When regulations put transparency requirements on the market and openness between the market participants it increase the clarity on the market and improves the chances that the market is handled correctly. The importance of transparency in all stages of the market is essential for oversight should be controllable. A transparent market structure increasing the competitiveness and the requirements of stakeholders. Regulations strive that everything should be visible and the consequence is that market structures must constantly evolve to become more transparent. (Preece, 2011) Preece's findings support that changes in market structure is an important aspect when analyzing regulatory implications on financial markets.

Porter's five forces and the PESTLE framework are two common methods for analyzing a market but with different approaches. Porter's five forces addresses strategic issues by analyzing competitive forces on a market, while PESTLE is a framework for evaluating macro-environmental factors in order to determine the current state on a market. Porter's five forces and PESTLE were studied, to then choose to converge towards the PESTLE analysis as the backbone of the framework designed for this study. Porter (2008) argues that fleeting factors are short-term effects on a market while forces have a long-term horizon. Thereby, the dimensions chosen in Market Dynamics Framework are named factors instead of forces.

Porter's five forces is a framework that attempts to analyze the competitive environment of a market and develop business strategies. Porter means that competition goes beyond established industry rivals to include four other competitive forces as well: customer's bargaining power, suppliers bargaining power, threat of new entrants and threat of substitute products. This extended rivalry beyond the existing is called the micro environment, which differs from the more general term macro environment. Porter says that industries might appear different on the surface, but the underlying factors, micro environment, are the same. (Porter, 2008)

This study aims to investigate the existing market on a macro level. The PESTLE approach is thereby more accurate on this case than Porter's model, even though the five forces model contribute by its approach of illustrating external effects on a market. Examining impact by evaluating different factors is the purpose of this research rather than perspectives of the current state, which is more similar to the PESTLE analysis. The design of the framework used in this study has contributed from both types of analysis but mainly from PESTLE analysis.

The PESTLE analysis is developed for use to conduct an analysis of the macro business environment and the factors have a qualitative structure, which means that the analysis cannot be generalized (Yüksel, 2012). The PESTLE framework investigates external factors that cannot be directly influenced by the actor and therefore it is a framework that gives a fair view of the surrounding environment and its effects (Bensoussan & Fleisher, 2013). The PESTLE analysis is used to identify and analyze external environmental factors in which the organization is interested to operate in and to find opportunities and risks, which is comparable with the purpose of the study (Issa, Chang & Issa, 2010).

PESTLE analysis, created by Harvard professor Francis Aguilar in 1967, is used to do an external analysis to evaluate the possibility of entering a new market and analyze the current situation on it. It is constructed of the following six factors: Political, Economical, Social, Technological, Legal and Environmental. The factors vary in importance depending on the specific situation in the operating environment. The factors and their influence are explained in the list below:

- Political - Effects of government decisions and regulations issues.
- Economical - Outside economic issues and trends such as economic growth, inflation and economic stability.
- Social - Demographic and cultural aspects of the market.
- Technological - Impact of technological development and changes.
- Legal - Effects on market from current and implementing legislation, to determine requirements of compliance.
- Environmental - Environmental impact, consequences and the protection of it.

(Crossan, Fry & Killing, 2004; Kotler & Keller, 2011)

5.2 Segmentation

The market for trade surveillance systems is diverse across different kinds of potential users. The new regulations that require monitoring include a wider range of market actors, which increase the diversity further. Segmentation is thereby a relevant tool since actors are assumed to have different needs and characteristics related to trade surveillance. Segmentation can be defined as dividing a market into distinct groups, with different behaviors, characteristics or needs, who might require different products (Kotler & Armstrong, 1999). The groups are also assumed to have similarities related to surveillance and the regulatory changes that are brought up in the scope of this study.

Some variables that may be used as basis for segmentation are geographic, demographic, psychographic or behavioral. These are mainly applicable to consumer markets, which might differ from the topic of this study. Business markets should be managed slightly different. These markets can be segmented with a reference to operating variables, purchasing approaches, situational factors or personal characteristics. (Kotler & Keller, 2011)

Kotler and Keller (2011) suggest five criteria for effective market segmentation. Segments should be measurable, substantial, accessible, differentiable and actionable. Another suggestion to evaluate segmentations is given by the consultancy firm Circle research. They suggest that a segment should be meaningful, distinct, sizeable and identifiable in real-life (Circle research, 2016). Kotler and Keller's (2011) suggestion is considered as most credible and cited in academic papers and is thereby chosen as frame for evaluating the segmentation in this study.

Segmentation preferences can be homogeneous, diffuse or clustered. Homogeneous preferences exist when market actors want the same thing. Diffuse preferences exist when market actors want very different things. Clustered preferences reveal natural segments from groups with shared preferences. (Kotler & Keller, 2011) This study considers a clustering procedure, which is not based on an explicit statistical method. This is among the primary methods used in post hoc descriptive studies. (Cooil, Aksoy & Keiningham, 2008)

6 The creation of Market Dynamics Framework

This is a chapter for describing how the analytical framework, Market Dynamics Framework, have been constructed (figure 7). The design is motivated by findings from the pre-study and the literature study.

Market Dynamics Framework was created in order to facilitate the market analysis conducted in this research. The PESTLE analysis was applied and adapted to the conditions and the driving factors for change in this case. From that knowledge has the major factors that influence the market been chosen to create the framework. The factors are:

- Actors' preferences
- Technology
- Market structure
- Regulations

All factors are described in detail within the sub-chapters below. The own developed framework was used as there was no earlier framework that could be applied for the situation, because there has been little research done on the topic.

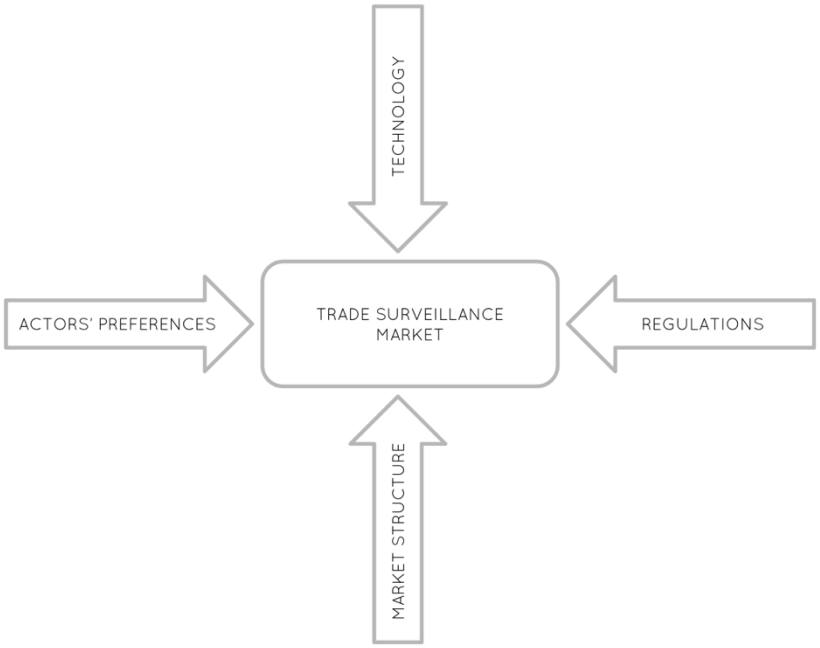

Figure 7. *Market Dynamics Framework, used to determine changes in demand on the trade surveillance market*

The starting point for the conceptual Market Dynamics Framework is developed from how a market analysis is formed but with adoption to this specific case, as no suitable analysis tools for this purpose have been made earlier. The PESTLE factors were evaluated to structure and understand what factors that are important when examining a market. The PESTLE analysis was applied with qualitative information from the pre-study identifying and customizing factors to be descriptive for this specific case, the framework is therefore not generalizable for other markets and cases. The conceptual framework was developed by using abduction, mixing theory with empirical material collected during the pre-study.

The factors are all related to each other and are affecting each other in an indirect or direct way, e.g. new technologies might provoke new regulations and vice versa; new regulation might lead to usage of new technologies. One factor can pull the others under long time and indirect provoke a change. A factor can also push one, or all factors, in a direct change.

The focus market in this framework is the trade surveillance market. The study refers to analyze the impact from the upcoming regulations on the trade surveillance market. Therefore, was the trade surveillance market set to the target market and Regulations was a given factor.

6.1 Actors' preferences

Market actors is the clientele in the market population and the demand from market actors is one of the most driving factors for development on the market. Actors' preferences are a factor that is supposed to describe actors' preference of product in terms of e.g. price and functionality. This factor was found from the pre-study and it was considered to have change impact, which outweighs that it has no support from the PESTLE analysis. It is similar to the customer bargaining power described in Porter's five forces. It is an external factor that is constantly evolving and drives change.

Actors' preferences consist of explicit requirements on surveillance systems with user opinions on usability and functionality. The primary requirement is that a system should ensure that the company is compliant. Another explicit strength, market actors can control is the construction of payment model and the configuration of the execution of the surveillance. For some actors is the cost the priority when purchasing a system and for others it is functionality. The configuration of execution may differ from own developed systems and the entire range to outsourced surveillance solutions. The factor Actors' preferences may differ and create different needs for surveillance because all stakeholders have different conditions and different solutions on the problem.

The firm-specific needs and requirements affect what kind of surveillance product that is needed for an actor at the financial market, e.g. firm size, the purpose of surveillance or how close to core activity trading is for an actor. The firm-specific needs determine surveillance type that is most appropriate or that is demanded. The behavior of market and the execution of market manipulation pushing how the market has to be monitored. The surveillance system can also be used to ensure that trade patterns and price on the market is correct. Market making and algorithmic trading is a selected behavior that increases the requirements on surveillance. The Actors' preferences implicit create changes in other factors, e.g. use of algorithms creates increased regulatory requirements and restrictions. Financial institutes are often dependent on a brand that mirrors safety and of a good reputation of the firm. Thereby, it is comforting for their customers to see that the institute has a well working and functioning compliance department with high quality surveillance systems. The market actors' strategy for presence, thus which instrument should be traded and which market, create change of how and where to act in the Market structure.

6.2 Technology

Digitalization has affected the financial industry a lot. New Technology is a driving factor for both the trading industry, but also for developing new and more efficient surveillance systems. Depending on what technologies that are used in trading, surveillance has to be adapted to that environment. Algorithmic trading and all possibilities and consequences it causes is a big aspect within this factor. Also, access to real-time data, which is enabled by new technologies, is a fundamental driver for surveillance. The technological development on the market combined with the weight of technology in the PESTLE analysis, stand as a basis for the Technology factor in the Market Dynamics Framework. Technology is seen as a factor that drives change and develops the market, with support from both the pre-study and literature study. The increasing development of technology and its direct impact on trade surveillance made it an obvious choice to be an examined factor in the study.

The entrance of algorithmic trading and real-time data are historical examples of technologies that have had direct impact on how surveillance systems are designed. Indirect impact from this factor can be exemplified from the two well-known events The Flash Crash in 2010 (Weinberg, 2015) and the Knight Capital incident in 2012 (Mehta, 2012). These were both caused by errors using algorithmic and HFT trading. They caused abnormal pricing behavior of a significant magnitude, which has led to regulatory discussions and penalty fees for firms involved (SEC, 2013). This is an incitement for algorithmic trading firms to have sufficient monitoring of their trading.

During the past years, the accessibility to the securities market has been simplified, for instance the availability for private retail actors and the use of online trading platforms. Private persons can now trade and follow the exchanges in almost real time. There are clear trends in the market of faster connections for trading and development of tools to support it, this applies in all levels of the market. The availability has increased the interest for private investors to be active in their trading (Dickson & Bränström, 2015). Increased number of trade turnover in combination with increased speed and access to the exchanges creates a higher demand of trade surveillance.

6.3 Market structure

Depending on type of financial instrument, market structures and value chains for constructing them differ. The Market structure determines in what position surveillance is necessary. As market structures change, there are new flows of information that need to have automated surveillance systems. Regulations control the architecture of market structures in order to be transparent and give equal opportunities for every stakeholder. The pre-study has shown that the Market structure to a large extent affect the market for trade surveillance because it determines the market share traded on regulated markets. The Market structure has no connection to the PESTLE analysis but strong linkages to the Regulations factor was seen as enough support.

According to the literature study, since the first implementation of MiFID(1) there has been a development of the Market structure. This is driven by regulatory changes and technology, which have increased competition on the market. (Preece, 2011) The upcoming regulation creates a new trading venue, OTF, which will explicitly create a new landscape in the Market structure. Major changes, e.g. introduction of OTFs, in regulations affect the structure and the constitution of the market. The Market structure factor has historically affected the market and will probably drive change in the future. The Actors' preferences motivate an ongoing change in Market structure and the development of it. Continuous changes and movements in the Market structure create a need for updated regulations.

The fragmentation of the trading and the ability to trade an instrument on one market that is primarily listed on another one. Fragmented markets is a growing technical term which simplified, describes how the same kind of security is traded on multiple venues. Fragmented market structures possibly create new challenges for surveillance technologies in order prevent cross-market manipulation.

6.4 Regulations

MiFID2/MiFIR and MAD2/MAR are expected to affect the market for trade surveillance in a direct way. Regulations are the basis of the study and are the driving factor for change. The thesis is about changes and surrounds changes from the regulations, therefore Regulations is a given factor in this framework. PESTLE analysis contains Regulations (Legal) as a factor, which supports to include it in the Market Dynamics Framework.

Markets are often highly affected by regulations. Financial markets have faced several events of abuse and inappropriate behavior from actors during history. A high frequency of regulations entering to force is a consequence, which affecting the other factors in the framework. The rules changes and affect all other factors in the framework both in an explicit and implicit way. The regulations are directed against the financial market and will directly influence the perception of and the use of surveillance technology. The regulations can require direct requirements and also create a pull on the market with a growing demand. The regulations strive for higher transparency and force trading into regulated markets. A demand is created for trade surveillance technology from actors who are not already prepared.

7 Synthesis of data gathering

This chapter presents findings from the empirical investigation with the applied framework. Information and data has been gathered from 17 actors, participating on or acting towards financial markets in Sweden. Semi-structured and structured interviews are primary sources for this investigation. In addition to the interviews, data has been retrieved from public information and press releases. The empirics illustrate the current state of trade surveillance solutions and investigate areas exposed to trade surveillance according to the Market Dynamics Framework. Findings within these areas constitute a foundation for the analysis and to answer research question 2.

7.1 Findings within Actors' preferences

All interviewed actors have been asked about their current solution for surveilling the trading that they are exposed to and obliged to monitor. The answers spanned over four different solutions (figure 8). The most frequent solution was to have a purchased system from a vendor. Commonly an integrated IT system with automated alert rules, as earlier described in this report. An in-house developed solution was a rare answer among the interviewees. This is a solution that allows high customization of the surveillance function after the actor's own needs. Some actors have chosen to put the surveillance function as an external or outsourced service. These were brokers/dealers with a relative small business within securities trading. The motivation for the decision was mainly a concern of the costs for developing and maintaining a surveillance department. Market actors without any solution were either proprietary trading firms with internal trading only, meaning that they had full control over their trading, or firms that meant that they did not fall under any regulation that gave them the obligation to monitor their trading.

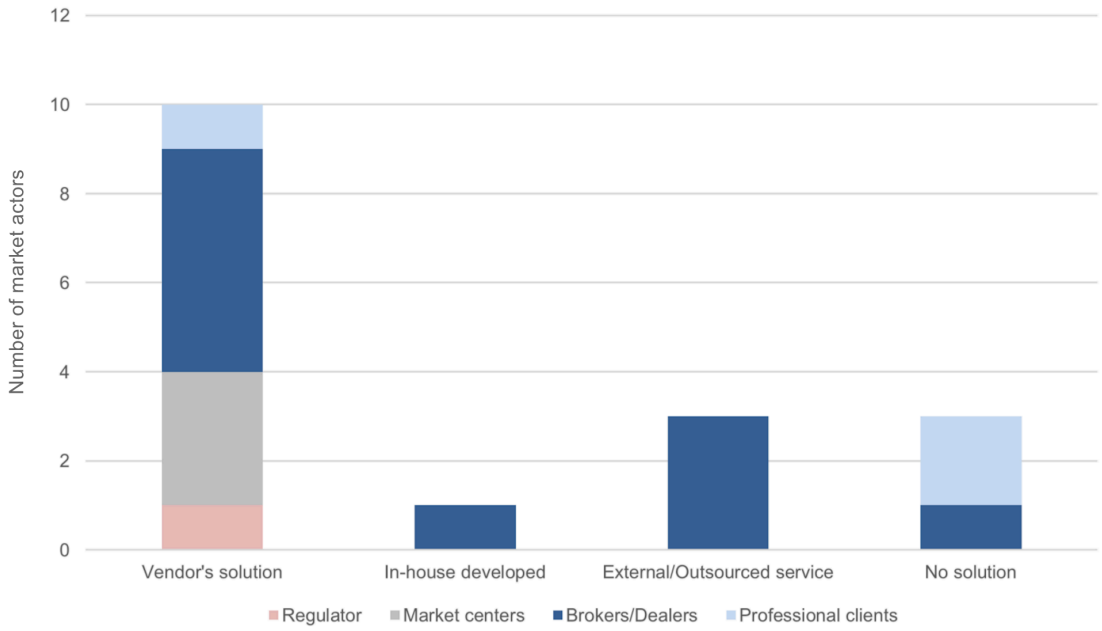

Figure 8. *Results from Actors' preferences regarding surveillance solution*

Results presented above show that brokers/dealers are the most diverse market actor type regarding choice of surveillance solution. Although, brokers/dealers constitute the biggest part of interviewed sample this is a considerable fact. Segmentation according to market actor type would have been ideal, but these findings advocate that it is not a proper way. It motivates a segmentation and further classification than market actor type.

Key findings within Actors' preferences from the data gathering was identified as:

- New trend of surveillance as external/outsourced service
- Price sensitivity
- Request for simple and user-friendly systems
- Minimization of false positives
- Demand for automated information surveillance

Price and pricing model has been important for most interviewees when choosing surveillance solutions, but also functionality and features for documentation, data storage, data visualization and how user friendly the solution is. The organizational structure for actors regarding the surveillance department has been found to be structured in three ways;

- Centralized
- Decentralized
- External/outsourced service

A decentralized surveillance organization may have different surveillance solutions depending on what country the company are operating in. The information was an unexpected finding, because of the semi-structured interviews, which is why it was not obtained for all actors. The outsourced surveillance department is responsible to provide surveillance and identify cases of suspected market abuse. The actor who is buying the service is though responsible to report suspected cases to the regulator for further investigation.

The interviewees have commented on desired features that could be addressed beyond hygiene features for surveillance systems. A number of actors have expressed that the systems have an abundance of alert features. They perceive that the system is more advanced than necessary for their purpose. The systems are designed with functionality that the actor on topic does not use in their current surveillance. They ask for simpler and less expensive surveillance solution. The actors claim that there is a tendency that the systems are designed for equity trading and has limited support for other instruments, which creates more alarms and increased workload.

Some actors comment on a high workload for parameter setting and tuning alerts to a desired level. The systems are also generating a high number of, so-called, false positives. These are triggered alarms, which are not classified as violation of provisions. Surveillance systems generate alerts when detecting certain patterns that could be suspected for market abuse. Each case is managed individually and classified for further investigation or as a false positive. Minimizing the instances of false positives alerts leads to a decreasing occurrence of manual work for compliance analysts. This could increase the efficiency in utilizing internal resources and allowing compliance analysts to put higher attention to find issues of market abuse.

Information surveillance is an activity that is closely related to trade surveillance. Information from news, press releases and recently also blogs, forums, twitter and other types of alternative media, are being monitored in parallel to trade surveillance. Illegal activity can be done by spreading information through this kind of media to move a stock price and then trading with a strategy based on that. 3 of the interviewees answered that they regularly monitored information and alternative medias (figure 9) and one actor explicitly expressed a need for an automated solution for the activity. Today, screening information is done manually.

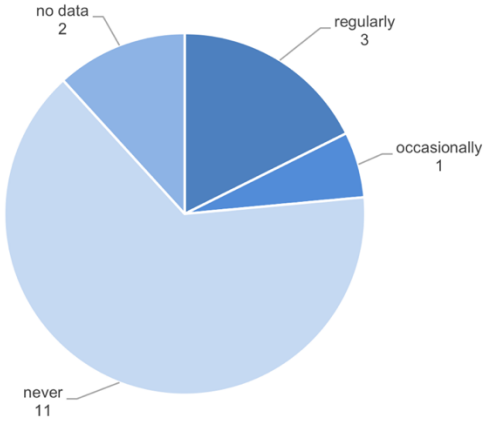

Figure 9. *How often actors screen media for market manipulation by dissemination of information. The activity within information surveillance of e.g. forums and blogs*

7.2 Findings within Technology

Technology intensive areas are driving new scenarios that can be critical for trade surveillance. Direct market access, DMA, and sponsored access, SA, are both services that enables clients to digitally and directly access a marketplace without being a member. Providing such a service puts higher risks on the issuing broker, which increases the requirements on efficient surveillance. None of the interviewees in this study provided SA to their clients. 3 out of 10 brokers/dealers responded that they provide DMA (figure 10). The service of providing DMA does not apply to professional clients, regulator or marketplaces. 7 out of 13 brokers/dealers and professional clients responded that they use of DMA (figure 11). Brokers/dealers use DMA to access markets beyond their own memberships, usually on markets abroad. The activity of using DMA does not apply to marketplaces and regulator since they are not market participants. The percentage of not applicable answers is due to the position on the market or the absence of answer from interview.

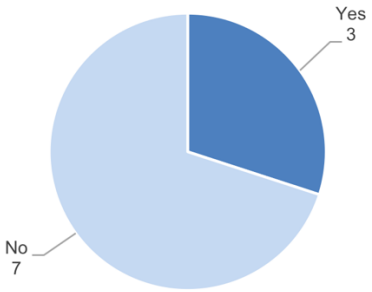

Figure 10. *Brokers/dealers that provide DMA*

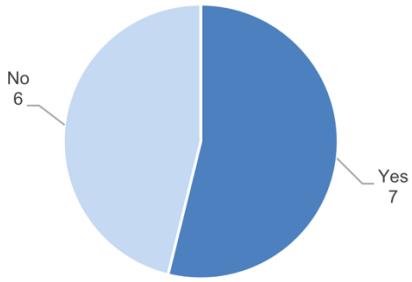

Figure 11. *Brokers/dealers and professional clients that use DMA*

DMA to trading venues and marketplaces is a necessity for actors using algorithms in their trading. Algorithmic trading and HFT have been some of the most obvious drivers for regulations. The large amount of publicity and a sequence of controversial events, e.g. the Flash Crash that is earlier mentioned in the report, have resulted in higher requirements from the regulator in this area; which is relevant for trade surveillance. One of the changes mentioned in MiFID2, require that all trades executed by an algorithm shall be marked. The implementation of this change is confirmed by several actors interviewed.

An outcome is that new data will be generated, which will allow traceability of algorithmic trading. A technology aspect that can affect trade surveillance by richer data. From the interviews, 7 brokers/dealers and professional clients answered that they allowed their clients to use algorithmic trading or they were using algorithms themselves (figure 12). Both these cases require high degree of control over the trading. Either in terms of trade surveillance systems or other barriers and limitations. All interviewed actors involved in this area comments on certain arrangements to control algorithmic trading with high security. For example, one broker/dealer allow their clients to use algorithms, but with a service limited to its own algorithms and interfaces.

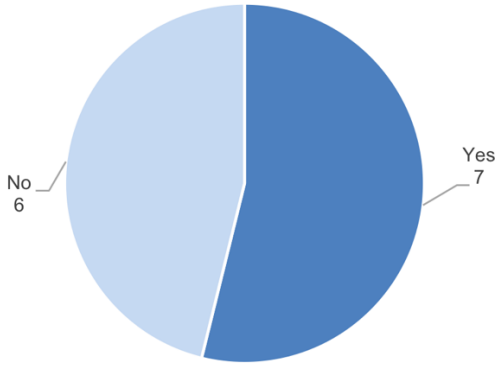

Figure 12. *Brokers/dealers and professional clients who use or allow clients to use algorithmic trading*

The liquidity providing service, market making, is bought by listed companies, performed by companies themselves on their own shares or contracted by exchanges and other trading venues. The incitement is often discounted trading on the marketplace. Discounted trading is an attractive offer to actors with high trading turnover, since they have high trading costs. The coming regulations in MiFID2 will introduce an obligation to enter market making agreements for firms with trading strategies similar to market making. Algorithmic trading is an essential tool to enable efficient market making. The percentage of firms involved in algorithmic trading (figure 12) is almost the same as the percentage of firms providing market making (figure 13). A consequence of the market making obligation could provoke more market making activity, but this effect is not likely to be significant according to figure 12 and figure 13. The consequence market making in terms of surveillance is more transactions and orders data as a result of increased liquidity. Following, more workload on surveillance systems and departments is expected.

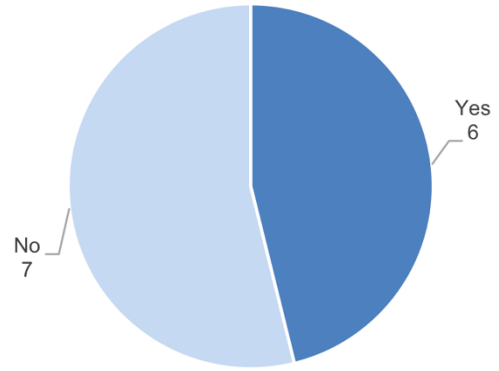

Figure 13. *Brokers/dealers who provide the service market making*

Several interviewees have observed increased interest in stock trading among retail clients. This is also an indication of more data load to surveillance department caused by increased amount of transactions and orders on the market.

7.3 Findings within Market structure

Key findings identified to changes in Market structure,

- More trading venues will be introduced handling OTC derivatives (MTFs and OTFs)
- Implementation of a broader range of financial instruments to surveillance systems, affecting 4 out of 13 market participants
- Cross-market manipulation, enabled by fragmented markets, is hard to detect

Market structure for different securities defines how surveillance is positioned. Depending on the type of security different patterns that are desired to detect. The regulatory scope is expanded to cover all financial instruments and all organized trading shall be put on regulated venues. This will have impact on current market structures and create new structures. Many types of OTC trading must be put on transparent and regulated platforms. In the aspect of surveillance, these changes cause new flows of structured data that should be run through available surveillance systems. If more venues are created, these are new positions to place systems on. New MTFs and OTFs are expected venues to be created for OTC trading. Some bilateral trading that was settled outside the market will be put within Counter Clearing Parties, CCPs. The CCP takes on the risk for clearing trades instead of exposing two parties conducting them. The CCP could also correspond to a venue that is in need of careful monitoring, because of the high-risk load.

Four of the interviewees answered that their business included significant parts within OTC securities that will be affected of the regulation (figure 14). The regulator and market operators are not applicable to this question as they are not participants on the market. Nevertheless, they will be affected by regulatory changes concerning OTC securities, which will generate new streams of trading that some of them will be obliged to monitor. Some commented that big parts of their business within OTC trading were non-systematic, or ad hoc, and thereby not possible to standardize and monitor with automatic systems. There were also comments of OTC instruments that was going to be implemented on regulated platforms. There are challenges and costs with implementing these into the surveillance systems. Some systems are designed for equity trading and will thereby work in another way when used on former OTC derivatives, thereby long processes for implementation and tuning of the systems are expected.

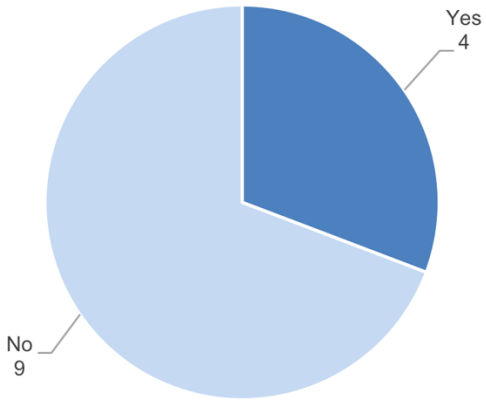

Figure 14. *Brokers/dealers and professional clients with considerable business within OTC markets*

In addition to formal structures there is a phenomenon of fragmented markets. Shares are not only traded on their primary listing market place, but on multiple marketplaces and OTC. Fragmentation causes the opportunity for cross-market manipulations, meaning that several trading venues are used to manipulate the price of a security. This case is hard to detect with trade surveillance today because of the complicity of analyzing and obtain data from numerous platforms. Market actors commented that they were unable to monitor this kind of market manipulation continually. Though, if a suspected pattern is detected it is possible to analyze the case with data from other venues.

7.4 Findings within Regulations

When investigating if there are many actors who will start to monitor their trading, it was found that most actors had a surveillance solution. Thereby, the direct effect from regulations, regarding trade surveillance obligation, is not expected to be of significance after the investigation. Regulations require market actors to have efficient arrangements, systems and procedures to monitor their trading, which most actors within the investigated sample already have. According to the sample the market is prepared for regulatory requirements on arrangements and processes for trade surveillance. The indirect impact of expanded scope to new instruments that shall be implemented in existing systems is a bigger challenge, which has not been fully achieved by all actors concerned.

According to empirical findings, the majority of professional clients perceive themselves to not be applicable to the regulatory requirements of automated monitoring systems. This is mostly gathered from fund companies interviewed in the study, as a broker manages the trading for them. Increased documentation and transparency obligations are expected consequences from the regulations. For most actors there will be a need for more capacity and increased number of employees. Detailed documentation of transactions is problematic for some actors. Partly because of high costs, but also for business strategies. Patterns in transactions and orders are sensitive information for these firms' competitive advantage, since it can reveal their trading strategies.

As a consequence of the regulations FI will have more influence and authority in the process of finding evidence of market abuse. In practice they will have access to more tools and will have a greater responsibility in the process. As a result, they have expert knowledge in one place in the process of finding evidence of market abuse. The outcome will result in the authority to accumulate a larger amount and more distinct evidence, thus increasing the ability to accuse for crimes committed. (Lindeblad & Lycke, 2016)

An overview on the positioning of trade surveillance in the trading infrastructure is presented in this chapter, based on findings from the empirical investigation. A transaction is ideally monitored four times in total, from professional clients, brokers/dealers, market operator to regulator. This has proven to be a rare case since 2 of 3 Professional clients has answered that they are not in need or obliged. One answered that they performed continuous surveillance of market manipulation in the same system as they monitor for risk limits and anti-money laundering. According to these results, the judgment has been made that the most realistic illustration of the trade surveillance infrastructure is the one described in figure 15. Market operators and market participants who conduct surveillance do it in real time, or close to real time. The regulator receives transaction reports, and order data if requested, and thereby does post trade surveillance.

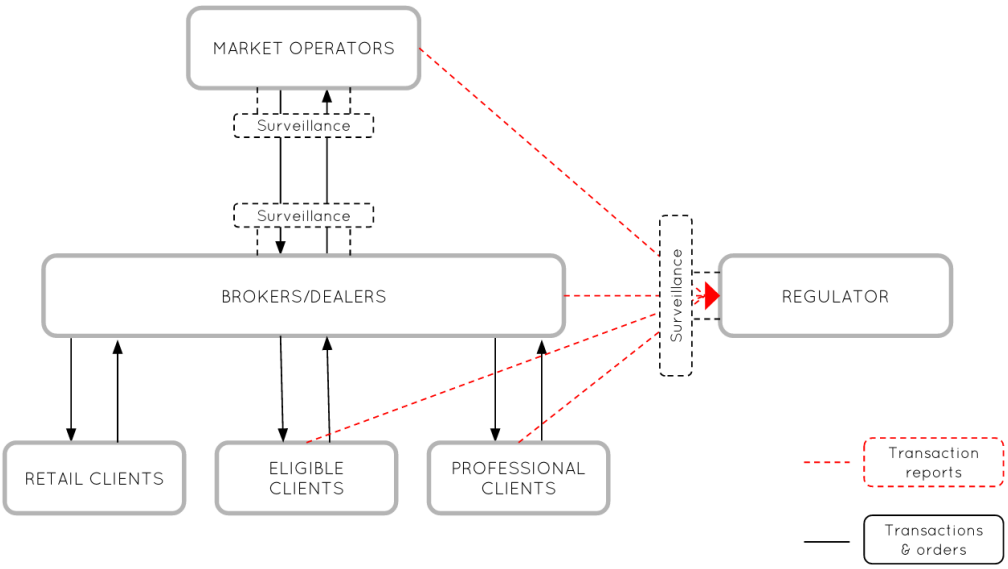

Figure 15. *Trading and surveillance infrastructure of market actors*

7.5 Summary of data gathering

Data gathered from interviews and public data on company websites is presented in table 3, which constitutes the basis to divide actors into groups in chapter 8, *Analysis*. All data could not be retrieved from all actors in the whole sample. These cases are marked with *no data.* Some characteristics or questions do not apply to all actors, which is marked with *not applicable (N/A).*

Table 3. *Summary of data gathering from all actors in the sample.*

ID	Actor types	Provide/ Use DMA	Allow or use algorithmic trading	Market making	Significant business within OTC	Information surveillance	No. of marketplaces accessed*	No. of trades/ month** (x1000)	Surveillance solution
1	Regulator	N/A / N/A	N/A	N/A	N/A	Regularly	N/A	N/A	Vendor's solution
2	Market operator	N/A / N/A	N/A	N/A	N/A	No data	N/A	N/A	Vendor's solution
3	Market operator	N/A / N/A	N/A	N/A	N/A	Occasionally	N/A	N/A	Vendor's solution
4	Market operator	N/A / N/A	N/A	N/A	N/A	Regularly	N/A	N/A	Vendor's solution
5	Broker/dealer	No data	No data	No data	No data	No data	6 ≤	~ 1 500	Vendor's solution
6	Broker/dealer	Yes / Yes	Yes	No	No	Never	6 ≤	~ 1 500	Vendor's solution
7	Broker/dealer	Yes / Yes	Yes	Yes	Yes	Never	15 ≤	~ 1 000	In-house developed
8	Broker/dealer	Yes / Yes	Yes	Yes	Yes	Regularly	9 ≤	~ 350	Vendor's solution
9	Broker/dealer	No / No	No	Yes	Yes	Never	11 ≤	~ 350	Vendor's solution
10	Broker/dealer	No / No	No	No	No	Never	6 ≤	~ 50	External/outsourced service
11	Broker/dealer	No / No	No	No	No	Never	2 ≤	~ 20	External/outsourced service
12	Broker/dealer	No / Yes	Yes	Yes	No	Never	5 ≤	~ 10	External/outsourced service
13	Broker/dealer	No / Yes	Yes	Yes	No	Never	6 ≤	~ 130	Vendor's solution
14	Broker/dealer	No / Yes	Yes	Yes	No	Never	4 ≤	~ 80	No solution
15	Professional clients	N/A / Yes	Yes	No	No	Never	2 ≤	No data	Vendor's solution
16	Professional clients	N/A / No	No	No	Yes	Never	No data	No data	No solution
17	Professional clients	N/A / No data	No data	No data	No data	No data	No data	No data	No solution

**No. of market places accessed by brokers/dealers. Values are retrieved from interviews and public data. Values do not represent the exact number in all cases and is not guaranteed to do so, but are used to roughly compare actors.*

***No. of trades/month on Nasdaq cash markets. Values are retrieved from Nasdaqomx (2016). Number of trades executed on Nasdaq cash markets is not representative for the actors' total number of trades, but can be used to roughly compare trading activity between actors.*

8 Analysis

This chapter presents the analysis of findings from the investigation. The segmentation methodology is applied on the market to divide it into groups with shared characteristics and interest. The framework is applied to each segment in order to structure information and define characteristics of the different groups of actors. The same procedure is conducted to analyze impact on each group in conjunction with the regulations and findings from the data gathering.

8.1 Segmentation of market actors

Because of the diverse character of the actor types, especially brokers/dealers, it is necessary to segment the market into groups that are more homogenous in terms of surveillance solution characteristics. The reason is to determine regulatory impact based on these groups instead of actor type. The impact estimation is thereby expected to be more accurate for the different actor groups. The segmentation analysis is described in the sub-chapter below as well as the characteristic of each actor group that is the outcome from it.

The division of the actors is due to the Surveillance solution characteristic. The other data gathered of the actors determine how important surveillance is for respective actor. Surveillance is seen as more important for their core activity for some actors than for others. These are expected to have high requirements and put more resources on surveillance systems. The different market actors are exposed to different amount of transactions, which also varies a lot within each actor type. The market is diffuse and this is the justification of that it needs to be segmented in order to better be able to claim the impact.

- **The regulator's** main mission is to monitor and control the market and have thereby high relevance for a high-end surveillance solution. The regulator is exposed to all transactions on the financial markets.
- **Market operators** are responsible for real-time monitoring of all trading activity on their marketplaces and platforms. They have requirements for a high-end solution to cover their needs and extensive surveillance. Surveillance is close to the core activity of market operators.
- **The brokers/dealers** group is the largest segment and constitutes of different type of company characteristic and different scope and extent. They are obliged to monitor their own trading as well as their (if any) clients' trading. Broker/dealers have high number of transactions as they execute transactions on the behalf of their clients. The differences in this group is a part of why the market actors is segmented into actor groups.
- **Proprietary trading firms (brokers/dealers)** have been found to strongly deviate from the other brokers/dealers group because their businesses are restricted to internal trading with no clients trading through them. Their business model is based on algorithmic trading and they are self-executing all transactions. The surveillance solution is integrated in the trading system and the actors have a lack of a separate surveillance solution, which also separates them from the other brokers/dealers.
- **Professional clients** have low requirements on a surveillance solution, if they have one, as the brokers/dealers act as an intermediator for their trading. This group only trading for their own account and have limited access and limited in their execution of transaction.

8.1.1 Segmentation into four actor groups

In this chapter the appearance of the segmentation analysis is described. The results of the segmentation and the breakdown of the market actors is seen in table 4. The analysis conducted in table 4 is based on data founded on the empirical investigation. The analysis is meant to be descriptive and to roughly categorize the different groups of market actors in term of the Surveillance solution characteristic. Further development and explanation of the choice of segmentation variable and why the surveillance solution characteristic was divided is explained in in the characteristic chapters below.

It is hard to identify a distinct connection between type of actor and chosen surveillance solution; therefore, a segmentation is carried out by dividing the market actors into four actor groups. The diversity of the actor types motivates a segmentation of the actors into groups based on factors critical to surveillance. This division is seen as more accurate in grouping of the actors with common trait and in particularly within the aspect of chosen surveillance solution. The motivation is partly based on the characteristics identified from the data gathering.

The segmentation displays four actor groups with different characteristics that are presented and analyzed later on in this chapter. Segmentation of actors is carried out in order to accurately examine the impact from regulations, but also to map and analyze the market with higher precision. The segmentation is carried out with consideration of the surveillance solution characteristic. The segmented groups distinctly reflect the different relationships to surveillance solutions, supported by the analysis and results of the empirical investigation. The gathered data is combined and analyzed and constitutes the motivation for the four actor groups, described in the sub-chapters below. The segmented groups are categorized by following surveillance solution characteristic:

- Actor group 1 - External/outsourced service or no solution
- Actor group 2 - Standard solution
- Actor group 3 - High-end and customized solution
- Actor group 4 - Internal control

Table 4. *Segmentation of market actors into four groups, according to chosen surveillance solution*

Actor group	Surveillance solution characteristic	Actor types	Use/ Provide DMA	Algorithmic trading	Market making	Significant business within OTC	Information surveillance	No. of marketplaces accessed*	Transactions/ month** [x1000]
1	External /outsourced service or no solution	Broker/dealers, Professional clients	No / No	No	No	No	Never	~ 2 – 6	~ 10 - 50
2	Standard solution	Brokers/dealers	Yes / No	Yes (limited) or No	Yes	Yes	Regularly, Never	~ 9 – 11	~ 130 - 350
3	High-end and customized solution	(Regulators, Market operators) Brokers/dealers	(N/A / N/A) Yes / Yes	(N/A) Yes	(N/A) Yes	(N/A) Yes	Regularly, occasionally, never	(N/A) ~ 6 – 15	(N/A) ~ 1000 - 1 500
4	Internal control	Broker/dealers	Yes / No	Yes	Yes	No	Never	~ 4	~ 100

**No. of market places accessed by brokers/dealers. Values are retrieved from interviews and public data. Values do not represent the exact number in all cases and is not guaranteed to do so, but are used to roughly compare actors.*

***No. of trades/month on Nasdaq cash markets. Values are retrieved from Nasdaqomx (2016). Number of trades executed on Nasdaq cash markets is not representative for the actors' total number of trades, but can be used to roughly compare trading activity between actors.*

8.1.2 Characteristics of actors groups

Characteristics of each actor group are described in this chapter, which is the outcome from the segmentation.

Characteristics of Actor group 1

Actor group 1 is categorized to have an external/outsourced surveillance service or no solution. Actors in Actor group 1 have in common that they generally have low complexity of their business with limited operating range, therefore they have lower requirements of control. The actor types in this group are either brokers/dealers, with only retail customers or smaller institutional investors, and professional clients, e.g. fund companies. The brokers/dealers within this group has chosen to put their surveillance as an external/outsourced service. Professional clients, especially fund companies, perceived themselves be outside the regulatory requirement to monitor their trading with automated systems. All the following factors underlying the brokers/dealers choice of surveillance solution within this group, which characterize the group.

Almost no market actor within this group use DMA. This limits and restricts the scope of the trading. This provides greater security and reduces the need for an advanced surveillance solution. No brokers/dealers in this group provide DMA as a service. Clients are highly controlled and only have limited use via the broker's trading system.

No market actor in this group is involved in any algorithmic trading activity. As their trading are not as technologically advanced it reduces the need for a high expertise surveillance department. The task can instead be forwarded to an external part. As no actor have algorithmic trading entails that no one is involved in any market making activity. No actor in this group has extensive OTC trading, if any at all. This makes the structure and scale of their trading more perspicuous and more controllable. No actor in Actor group 1 is doing any extensive information surveillance in addition to basic monitoring of press releases.

The number of market places accessed is limited. This is linked to simpler structure of their surveillance that is more perspicuous and reduces the total flow of transaction that needs to be monitored. The number of transactions on one market place is also lowest of all market actors, which make it easier to control and monitor.

It is clear that actors in this group are price sensitive, which most of them have commented during the investigation. The price sensitiveness leads to low investment in employee knowledge within the field of surveillance, which is why outsourcing or putting the surveillance as an external service has been a common solution for this actor group. The low complexity of the business with limited operating range only requires limited use of the features in the existing systems. This actor group forms the basis with requirement for a new type of solution that is simpler and therefore cheaper.

Characteristics of Actor group 2

Actors in Actor group 2 are categorized to have a standard surveillance solution, provided by a vendor. The monitoring is executed in-house at a surveillance department. Actors have more extensive trading in this group. The actors within this group are brokers/dealers and they mainly constitute of universal banks with most customer types. The monitoring is executed in-house, but with a centralized or decentralized organizational structure, into the different countries they operate in. The operating range of actors in this group reach a higher degree of complexity than actor group 1, which places greater demands on their surveillance departments.

On actor provide DMA service to their customers, which facilitate more extensive trading. The actor is also a user of DMA to gain access to more market places and thus be able to execute more transactions. DMA is a precondition for the usage of algorithmic trading for their customers. The algorithmic usage is controlled and limited with several parameters. Active information surveillance is also a part of the daily operations, but this is done manually and not with any automated system. The other part of the group does not provide those services. This differ the actors within this group, but the extent of the services is limited. From the qualitative interviews it emerged that the actors choice of solution is very similar. All brokers/dealers interviewed act as market maker for both issuers and marketplaces.

All actors have OTC trading. At present it does not affect and is not related to their surveillance. However, it increases the total number of transactions.

The brokers/dealers also act in many different marketplaces. The broker/dealer with limited services described above has trading on more platforms, which evens out the differences between them. This group's number of transaction is in a middle range between group 1 and 3, which distinctly separates them from the others. The higher number of transaction consists of higher flow in a wide range of products on more venues and the combination influence the extent of the surveillance. The consequence of this is higher pressure on the surveillance department, which provides an increased number of alarms.

This group is aware of their specifications and requirements of a surveillance system. They require the system to be user friendly, easy to operate and with the opportunity to visualize for easy and comprehensive analysis. Their systems are not adapted for all their operations, which create an abundance of alerts and high need of alarm calibration.

Characteristics of Actor group 3

Actors in Actor group 3 is categorized to have a high-end and customized surveillance solution, provided by either a vendor or self-developed. The level of trading surveillance in this group is high, but with varying degrees of resources spent on it. Different monitoring solutions are included which are; vendor solutions, with different levels of complexity, and in-house developed solution. This group is characterized by high demands and requirements of high-end and customized solutions. Actor group 3 has a centralized organizational structure to have the competence and expertise gathered into one place. The centralized structure shortens decision making processes and enable the organization to be adaptive to change.

This actor group consists of a mix of market actors that all have different relationships to the aspects investigated. Although, the regulator and the market operators are not using the specifications, are they exposed to them and their consequences. The surveillance relationship is equal for all market actors and they have great responsibility of control.

All data gathered from brokers/dealers clarifies that they both use and provide DMA services. The market operators are of course exposed to DMA access from others than their members at their trading venues, which increase the requirements on surveillance, as there are more users with access to the venue.

Only brokers/dealers, in this group, use algorithmic trading, but all the others are exposed to high activity of trading including algorithms and market making. The extent and the high frequency trading, HFT, with algorithms increases dramatically the level of the surveillance, especially for the market operators. This because the market operators have a requirement that monitoring should be done in real time, this in order to have the ability to act immediately, e.g. to do trading halts for specific instruments.

The brokers/dealers in this group have completely different levels of use of OTC. The major market operators providing platforms for OTC, e.g. a CCP, and have therefore need for functionality in their systems.

For the regulator and the market operators are it very important with information surveillance and its impact, this belonging to a standard part of their business. This after pressure from regulations and information surveillance is a part of their daily operations. The brokers/dealers are more focused on technological aspects and trading patterns

The brokers/dealers in this group has membership on a high number of market places. They have particularly a very high number of transactions, which is outstanding from the other brokers/dealers. Market operators and regulator are subjected to extensive number of transactions, which is the sum of all transactions on the market place or the market. Therefore, they get a more comprehensive monitoring function on the market and surveillance is one of their core business activities.

The time interval of the monitoring differs significantly in this group. Some brokers/dealers and the regulator do among other things the analysis of the total amount of data after each trading day, this for more detailed analysis. Every actor in this group has special requirements for their system, but there are similarities as demands for high functionality, documentation and reporting and direct consequence action.

Characteristics of Actor group 4

Actor group 4 is categorized by having an internal surveillance function that is integrated in their own developed trading system. The actor group has no specific and separate system for detection of market abuse. The actors within this group consists of brokers/dealers, but differs from the others by having a niched trading strategy and operating range only consisting of algorithmic proprietary trading.

The system is strongly related to how their business is structured. It is integrated and structured with full control of their type of trading. As a part of there strategy is high degree usage of market making, which is a part of their business approach and the use of algorithms. An agreement on market making with the market place also reduces their costs related to the number of transactions. The basis for full control and the use of a built-in internal systems and no external system for market abuse is that the group only have proprietary trading and no external clients who trades through them. As part of the strategy, which contributes to the high control, is no OTC trading and the actors also acting on few markets.

The strategy of that only computers trading with the use of algorithms makes that information surveillance becomes redundant, when they do not forecast and speculate on information. The extensive usage of algorithms contributes to the high number of transactions even though no clients trading via their system. The requirements they impose on their system is integrated solutions and having full control.

8.2 Impact analysis

In this chapter the impact is analyzed with application of the Market Dynamics Framework. The outcome of the impact presented for each individual actor group, from the segmentation in the previous chapter. Finally, a summary of the impact is presented with a more general character for all market actors.

8.2.1 Impact on actor groups

In this chapter, impact on each actor group from the segmentation is analyzed and described.

Impact on Actor group 1

From a Market structure perspective, and the group's limited operating range especially considering OTC, will this group be affected barely noticeable. This group will probably have low impact as the group has low complexity of their business and limited operating range.

The brokers/dealers in this group are well prepared and will not be affected significantly, but they have undergone big technical changes the past years to get where they are today. Brokers/dealers in this group choose the solution external/outsource service. They are thereby less affected and do not need to keep themselves updated for changes, as the company they are purchasing the service of performs it for them. However, the companies can have consequences from major changes in a long-term perspective, when lacking knowledge in-house.

The majority of professional clients are not affected by the regulatory requirements to have technical monitoring systems, as a broker manages the trading for them. This especially applies to fund companies, which considers that they will not be affected by the regulations.

Some actors operating range may be changed in a long-term perspective, this due to increased demands and costs due to the requirements from the regulations. Some actors may change their strategies as stock trading is not their primary business and it is subject to regulatory activity. They may need to ask themselves if they need to offer the full product range or if they can niche to their core business. The group is exposed to competition from actors with trading as core business, with higher availability and bigger product range. There is a possibility in the future that actors will disappear from the market and thereby in turn affect the trade surveillance market.

Impact on Actor group 2

This actor group is impacted by new market structures and surveillance obligation for OTC trading. The implementation process is followed by big challenges. This leads to increased costs, workload and time spent on surveillance. All interviewed actors in this group has a surveillance solution will thereby not be impacted by the regulatory obligation for monitoring.

Actor group 2 is involved in activities related to algorithmic trading, DMA and market making. They will be impacted by regulations, putting firmer requirements and trades executed by algorithms. The market making obligation and risks related to DMA are evaluated as non-impacting factor to this group. Actors do not conduct trading activity of that nature, which is targeted by these impacting factors.

Information surveillance occurred as a response during interviews with actors in this group. Regulations, stressing prohibitions for market manipulation through media and spreading of rumors might impact and induce a demand for information surveillance within this group of actors.

One actor has decentralized surveillance departments in each country they operate in. This goes against the norm that all other companies have chosen as organizational solution. Regulations may create increased cost requirements which can drive the actors to create a as lean organization as possible to keep costs under control. This market actor may be forced to change to be cost effective.

Impact on Actor group 3

This group is well prepared, especially technically with the advanced systems, which are needed in their area. The group needs to have sophisticated systems to monitor all data, which they have today. This actor group is operating with exposure towards all kinds of instruments. The challenges within this group is to adapt their existing systems to extended scope of instruments and venues. Implementation of the scope will lead to increased flow of data for surveillance.

The regulator has great changes in their working structure, as it is the one who must apply the regulations and get increased power and authority. It will increase the scope of their work and therefore increase the responsibility to monitor the market. This may create increased requirements for how they would carry out their monitoring and the need for high-end surveillance technology. Since they will have increased responsibility and increased flow of transactions the consequences will be that more resources must be put on monitoring to match the higher requirements. Generally, market structure and supervision of OTC affect most market operators. Market actors' range for monitoring will be expanded, which means a greater flow of transactions. New types of instruments will come under supervision and thus must the technical systems be developed and adapted.

As market operators are responsible for monitoring in real time, they must constantly evolve to stay ahead technically for discovering new patterns. Larger flow will provide more false positives and this will drive the technological development of the systems to make them more customized and user-friendly for new instruments.

Some brokers/dealers have no OTC trading and minimal algorithmic trading, but they have a high flow of transactions that are less technologically advanced. It makes them separated from the rest of the group and will be less affected. Brokers/dealers also have less responsibility and will be less affected than the market operators and regulator. Information surveillance will in long term drive both a technical and regulatory development that in particular will affect this group. The market believes in great development in this area. This is specifically for new easier availability and special products that have a low volume, which can be particularly affected by this.

Impact on Actor group 4

The group has low surveillance related impact but instead impact on increased transparency and documentation of algorithms. The consequence can be a threat towards their trading strategy, which is crucial for their core activity. One difference is that they are under the supervision of FI as a result of the regulation. It is their type of operations that will be affected instead of that they get an increased transaction flow, as the other groups, as they do not have OTC trading. The low surveillance related impact is due to the high internal control because no externals are involved and they only have internal systems with boundaries to control risk and limitations.

In the long term this group may be influenced as it contains few and niched actors. As this group consists of a few number of actors, one actor's characteristics and impact affect the whole group significantly. In the future, this group could easily be influenced by other actors or technological and regulatory changes. The actors in the group are very price sensitive and therefore can they be influence of enhanced market competition.

This actor group will most likely never have a need for a system. They are very price sensitive to invest in one and if there should be a requirement for a system it would create changes in the group. It is unlikely of an increase of actors within in this group since it is very niched.

9 Conclusions

In this chapter, conclusions are presented in order to answer the three research questions. The conceptual Market Dynamic Framework is constructed in order to answer the first research question. The underlying factors of the framework were used to structure the different types of impact. Conclusion of effects within each dimension within the framework, and used framework and segmentation are presented as propositions. The market dynamics concept and a suggestion for segmentation of the market was used to conduct this study, with the idea to provide frames for examine changes on the market, e.g. an impact assessment from new regulations.

The study can conclude a suggestion for segmenting the trade surveillance market into four actor groups. The market has been segmented with respect to their surveillance solution characteristic, i.e. what kind of solution they have chosen and how the complexity of its operational range. The segmentation is also based on results from investigating the underlying factors in Market Dynamics Framework. The results show common characteristics within each segment beyond chosen surveillance solution. The segmentation is mainly used to investigate RQ2 and RQ3 more accurately.

9.1 Answering the research questions

Research questions are answered below with conclusions based on the study.

9.1.1 Research question 1

RQ1: How can market dynamics on the trade surveillance market be conceptually described?

Market dynamics on the trade surveillance market are suggested to be described with the following factors:

- **Actors' preference**
  Refers to the actors' opinion and view on what surveillance solution they need and prefer. This factor differs between segments of the market, e.g. actors prefer different surveillance solution (referring back to figure 8) and characteristic of solution (referring back to table 4). Activity of actors can also affect the preference of the segments; e.g. some actors regularly screen media for dissemination of information that could be market manipulation (referring back to figure 9). Screening media is a possible process for automation that could be implemented into a surveillance system.

- **Technology**
  Since trade surveillance is affected by technological aspects, since it often involves an automated IT system and operates towards a highly technological industry, the finance industry. Access to various technologies affect behavior of market participants, e.g. algorithmic trading or mobile trading platform for retail trading, but it also enables possibilities for trade surveillance stakeholders; e.g. access to real-time trading data, machine learning for efficient case management.

- **Market structure**
  The market structure refers to the often complex structures of financial markets. Depending on the structures, surveillance systems can and should be positioned on different places. Referring back to figure 15, which is a simplified illustration, it can clearly be seen that market structures, or infrastructures, are a determining factor for the positioning of surveillance. One of the regulatory changes addressed in RQ2, to put more instruments on regulated trading venues, is seen as a change in market structure that will affect the market dynamics of trade surveillance.

- **Regulations**
  The financial industry is very regulated, and is periodically subjected to new regulatory requirements. The legal aspect is also appearing in the PESTLE-framework, and is a commonly discussed factor within market dynamics. It is thereby an obvious choice to include the Market Dynamics Framework, especially because of the extent of regulations on the financial market.

Market dynamics are factors changing over time that affect the demand from the market. They can either have a direct impact on the market, e.g. regulations put requirements to have surveillance system, or an indirect impact through other dynamics; e.g. regulations require OTC to be put on regulated venues, which will affect the market structure.

The concept Market Dynamics Framework has been used to investigate changes in *Regulations*, to answer RQ2. From the investigation, all factors can be concluded to be of importance, but can not be support that the framework is complete in any sense. There is a possibility that factors should be added or existing should renamed to cover larger or more precise areas.

9.1.2 Research question 2

RQ2: How does the entrance of MiFID2/MiFIR & MAD2/MAR impact the Swedish trade surveillance market?

An overall summary of impacts related to the entrance of MiFID2/MiFIR and MAD2/MAR are presented in this chapter and it is linked to the Market Dynamics Framework. The overall impact from the examined parts of the regulations is summed up and presented in the list below.

- **Market is technically prepared with surveillance solutions in place**
  Few new entrants to the market, and thereby users of surveillance systems, are expected. Those who are obliged to monitor their trading have established surveillance solutions. The regulations claim that market operators and investment firms that operate a trading venue and any person professionally arranging or executing transactions shall establish and maintain effective arrangements, systems and procedures to detect and report suspicious orders and transactions. The result from empirics clarifies that there are non-increased need for systems among actors at the market, because the market is well prepared for the regulations in terms of systems to monitor transactions. The requirements to have automated monitoring systems in the regulations do not affect the majority of professional clients as a broker manages the trading for them. Trading through a broker, e.g. for professional clients, will not be affected to a high extent by the regulations.

- **Increased need of capacity and resources for surveillance departments**
  The change places increased demand, knowledge and capacity of the surveillance department, which is a combination of the understanding of an advanced legislation and a constantly evolving market. The sum of the impact mention below is also higher capacity requirements for surveillance systems and requirements on adoption for new conditions. Some of the actors are price sensitive and increased cost will affect their business.

- **Market segments are affected by varying degrees**
  The market will have different direct impact, which forms the basis for the segmentation. The segmentation divides the impact on the different market actors. Market actor types was segmented and divided into groups in order to define market need and impact more accurately. The segmented groups were categorized with the following surveillance solution characteristic:

  Actor group 1 - External/outsourced service or no solution
  Actor group 2 - Standard solution
  Actor group 3 - High-end and customized solution
  Actor group 4 - Internal control

- **Big challenges for actors within documentation and transparency requirements**
  The disclosure and documentation requirements for the use of algorithms create increased transparency on the market. It will increase the administrative work with richer data for surveillance departments and enable new opportunities to detect hazard trading patterns from algorithms. For the actors who use algorithms it will require appending actions and extended systems to cope with the increased volume of documentation. Actors with algorithmic trading strategies similar to market making must sign market making contracts with the market operators. The agreement means an obligation to trade and set prices at all times.

- **Increased data load and richer data cause higher requirements and capacity need**
  The regulatory scope is expanded to cover all financial instruments and widen the scope of reporting requirement. The scope is expanded and OTC trading shall be put on regulated venues. The changes in the market structure are a direct consequence of the regulations. This creates new flows of instruments that should be monitored and an increased flow of the existing types. The increased flow provides great impact and requirements of adaptation on the surveillance systems and an increased flow of data to analyze. The number of false positives is expected to increase due to the increased and new flow. Most brokers/dealers in actor group 3 have significant business within trading of OTC instruments. Therefore, will it primarily increase the flow and thereafter create a demand for functionality and adoption for new structures.

- **Challenges for FI in its new more independent and influential role**
  The transaction reporting will be increased in extent, added with expanded reporting obligations to contain more detailed information. The sum will provide increased workload on the authority. FI will have greater responsibility with a bigger scope to investigate and access to more information, tools and methods to investigate a suspected case.

- **Need of monitoring trading on order level**
  As the regulation claims that it is forbidden to cancel or change a placed order if there is knowledge of insider information. The consequence is that the orders need to be monitored and examined, which creates abundant data and a demand to more detailed monitoring. For the market operators and broker are there no practical difference, but FI need to change and examine on the order level.

9.1.3 Research question 3

RQ3: *How do changes in market dynamics, from RQ2, affect technological demand of systems used for trade surveillance?*

An overall summary of the technical demand of systems and how it is affected are described in the list below.

- **Automated information surveillance**
  Dissemination of information in alternative media and how it affects the market will drive need for automated information surveillance, from actors with surveillance close to their core activity. This to increase the possibility to be able to detect market manipulation and insider trading.

- **Simple and user friendly systems**
  Many market actors perceive that their technical systems are more advanced than necessary for their purpose, with an abundance of alert features. This drives the need for simpler systems, because regulations increase the scope for small operators and the demands on them. Since the requirements are that they must be simpler the consequence are also that they should be cheaper.

- **Functionality for new instruments**
  There will be an increased flow of new data due to the expanded scope of surveillance and OTC shall be put on regulated venues. This will entail more data with new instruments for the surveillance systems. There is a demand for functionality to implement new instruments into the technical systems. The systems also have to be adapted to the increased flow of data and new trading patterns for the new instruments.

- **Minimization of false positives**
  The increased flow of new data due to the expanded scope, including OTC, will have the consequence of an increased number of alarms and false positives. Accessing triggered alarms is a manual task, carried out by personnel at surveillance departments. Increased number of false positives will cause more workload for the departments. This induces the demand for technologies that minimize the false positives. Example of smart solutions to improve the surveillance and to minimize the false positives are; machine learning so that the systems can improve themselves, benchmarking to other cases to tune the alarms and usage of statistical models to automate case management.

- **Expanded scope of surveillance to other technical areas**
  The systems have a direct need from the regulations to be extended and adopted to cover surveillance of other technical areas than transactions; the marking and documentation of algorithmic trading, and increased volume of personnel and communication documentation. Effect of personnel documentation obligation is development of coherent systems with another focus area.

10 Discussion, implications and future research

This chapter will discuss results and trends related to trade surveillance and compliance that has been observed during the study. The validity and reliability are discussed earlier in the study; this chapter will elaborate further on those arguments in order to find areas of improvements to future studies. Industrial and research implications are also discussed.

The first subchapter consists of discussions regarding findings from the study. The purpose is to further elaborate and find aspects of these findings. There are also some obtained findings that cannot be proved with this research, but is necessary to discuss because of their possible impact on surveillance and counteracting on market abuse. The second subchapter discusses used methodology, the analytical framework and the segmentation. The following chapter handles implications and future research.

10.1 Discussion of some effects from regulations

Almost all market actors interviewed were found to be prepared for the regulations by having a surveillance solution in place, which is a preparation that the market has gone through during recent years. Actors without solution had no intent or did not perceive themselves as obliged to acquire one. Thereby there is no direct impact to expect from MAR that has not occurred yet; referring to MAR requirements of systems for efficient monitoring of trading. Impact from regulations on trade surveillance is mainly expected from indirect through changed market structures, demand for new technologies and actors, having new types of demand. The impact of new actors entering the market by establishing surveillance department and trade surveillance systems have probably occurred during a time period before the study.

Detailed and rich data is a consequence from the regulations, which will allow the regulator and market operators to scrutinize trading on a new level. Though, it is also more information to manage which is demanding more resources. Expanded regulations means that the regulator has a bigger scope of issues to investigate. At some point, the scope might exceed a level where it becomes too large to manage effectively. The regulator might need more resources to handle the new level of regulations entering into force the coming years.

Firmer regulations create inequality on the financial market. Large and established banks and firms can easily navigate through the regulatory landscape with large deposits of resources while smaller firms might get pushed outside the market. Smaller firms are often more price sensitive, which has been shown in the study as well. At the same time, large banks or firms are also applicable to larger scopes of the regulations, implying that more compliance investments need to be made. Regulations also create higher entry barriers to the market for small actors. The initial investment for entering the market can exceed to a level where it harms the market rather than benefits it. On the other hand, it contributes to a financial market with serious actors.

10.2 Discussion of methods applied and developed

In this chapter is a discussion raised about the methods used during this research process including the data gathering, the Market Dynamics Framework and about the segmentation method that have been used in this study. The discussion will be about whether it was right methods chosen and used with the purpose to find and analyze the information. The discussion also handles how these methods affect the results and findings and the validity and reliability of it.

10.2.1 Data gathering

The use of semi-structured interviews in most of the empirical data gathering was overall seen as a successful method at the finalization of the study, but the method is discussed whether it was right way to gather information.

All respondents were aware of that the information gathered from the interview will be used as anonymous data and that the interviewed companies would be kept secret. Thus that the people and companies cannot be tied to a particular view, but instead will their answers be grouped to which market actor they represent. The decision to present the information anonymous had more advantages that outweighing the disadvantages. This gave good feedback and they told openly about their business even thought that the subject of matter might be sensitive information. The interviewees did not have to be worried about being quoted and interpreted in the wrong way. A decision took place that the validity does not reduces if it is not possible to trace the information to the specific source.

The choice to have longer interviews face to face gave space to gain understanding, ability to ask supplementary questions and the ability to build up trust to the respondent. This was seen as a good method in this case, which gave fair and sympathetic responses. Preparations were done that there could be a gap in the understanding and also have less opportunity to develop the responses, therefore a decision took place that the interviews should be designed more structured. The questions were designed to find out the main points and gave less space for discussion and development of the answers. By using shorter telephone interviews, it increased the chances to get more responses than using face to face interviews, as several of them had limited time.

The method that one interviews and takes support notes and the other takes more extensive notes, contributed to well-documented interviews with two slightly different perspectives. This contributed to greater understanding and that both could focus on the decided task.

Through preparation and by pitching the subject, the company referred to the right person with the right knowledge for the subject. The answers of questions gave a fair view of how the company acts on the market. The questions were designed in an open and neutral manner, not with leading questions, so the answers would represent what the actual opinion and facts for the company. All this to get as fair responses as possible. However, there was a width of the different questions that sometimes created a difficulty to answer some technical questions. The use of open ended questions sometimes made it difficult to get a straight and clear answer, especially as all actors have different work methods. The benefits were instead that the interviewed gave information that was outside the scope, which contributed with new perspectives to the study. During the interview, were many very dedicated to share and talk about their work.

10.2.2 Conceptual framework

The constructed Market Dynamics Framework is a tool that is conceptual and descriptive for this specific case. The construction of the Market Dynamics Framework and identification of the factors was done by examining the literature (literature study) and the pre-study to adapt the concept to this specific case. By using this method to create the Market Dynamics Framework one get the literatures breadth combined and adapted with the distinction knowledge to this particular area. The PESTLE framework worked as the structure basis and to identify the factors from the pre-study. It also gives an overview approach when applicate the Market Dynamics Framework. The framework has been used to investigate the trade surveillance market and the determinants changing it. When examine a similar case in the future can this framework be a source of inspiration.

The Market Dynamics Framework and its factors were discussed and approved at the commissioner company who has depth knowledge and insight into the industry. The use of the Market Dynamics Framework was performed in a systematic approach to obtain a similarity in the different steps were it was used. The framework stands for the construction and structuring of information handling, to bring unity and a red thread.

During the data gathering was the Market Dynamics Framework the basis to formulate and design the interview questions. The analysis became a natural extension of the material from the data gathering, which was basically structured for the analysis. Since the framework was the basis for the entire information handling, the consistency made that there were no problems with the overall use of the framework and to find the desired information. The choice of factors come naturally and fit in with the topics that were chosen to be investigated. It helped to get different characters and explore different points of view that strengthened the overall impression. The use of the Market Dynamics Framework did not encounter any significant problems that could not be handled and sorted into the factors, this probably because of it was adapted with the factors to suit the studied subject.

One problem with the Market Dynamics Framework can be that it can be perceived as it has is low distinction between the different factors. Some of the factors overlap each other and can be difficult to separate and therefore it is important to clarify how it is constructed and used to not create confusion. The framework is not qualitatively tested and evaluated, therefore can it not be claimed that it is generalizable. As it is not examined whether the framework can be transferable, that the use of the framework can be applied to other situations, therefore is it not possible to generalize the framework. To verify the framework would require further studies, as it contains factors that are developed for just this specific case, as the framework is not tested to be generalizable to other markets or other parts of the financial markets.

The Market Dynamics Framework and the PESTLE analysis, as the framework is inspired from, may have different time perspectives in their analyses. Since the framework is used to analyze the upcoming impact from a regulatory change that probably will influence the market over a period of two to three years. This in contrast to the PESTLE analysis that have factors that influence over a longer time period and the trends can be predicted on how they will influence.

10.2.3 Segmentation

One of the analyses in this research was the segmentation and divide the market into actor groups, which share characteristics and preference of surveillance solution. The dividing into smaller actor groups is a presumption to more accurately describe the market. Each actor group has more in common than if the market should be described in an actor type division, i.e. actor type determines the position of each market actor in the infrastructure.

Kotler & Keller (2011) say that an effective segmentation should be measurable, substantial, accessible, differentiable and actionable. The segmentation in this case is made with respect to surveillance solution characteristics. Meaning, what type of product that they demand. Beyond surveillance solution, other operative characteristics have been identified for each segment. Applying Kotler & Keller's criteria for evaluating the segmentation, it can be seen that the segmentation is:

- Substantial, each segment includes a number of actors. It is a market with little number of actors in total, meaning that segments can contain few actors but still be relevant.
- Differentiable, the segments have several differentiating operational variables (referring back to table 4) and have different surveillance solution characteristics.
- Hard to measure (measurable), since it is based on surveillance solution characteristic which is determined by examining the actors in questions. There are other operative variables that can be measured more easily, e.g. no. of trades, which have shown to be a common trait most actors in all segments.
- Actionable and accessible are not applicable for the perspective of this report.

The analysis that constitutes the segmentation is the researcher's perspective of data gathered from the interviews with the market actors. The segmentation analysis that is carried out is assumed to be valid of a proper degree. The sample size is a majority part of the market population, excluding professional clients, and still of a substantial amount including professional clients. To increase the possibility to measure the segments, it is a need for more quantitative variables to divide the market into segments. In order to verify the segmentation and if it is generalizable for the trade surveillance market and to other geographical markets, it has to be further investigated and tested.

The perspective of time is also a considerable discussion. It is fully possible that changes in market dynamics over time will affect the suggested segments. If the regulatory scope is expanded further, firmer requirements are put on actors involved. Costs for having a surveillance department might exceed the level of benefits for having it in-house. As a consequence, the segment Actor group 1 and the choice of outsourced surveillance might expand and include more actors from other segments. It will probably include more actors from the segment Actor group 2, which have a standard solution as surveillance solution characteristics.

10.3 Industrial implications

The mapping of the market gives a covering view of the market and made the actors solutions transparent for others. The market mapping gives an overview of the market and with an objective outside perspective, which is not possible for an actor on the market. The awareness between the actors is something that is demanded to be able to benchmark on each other. The segmentation is a key point for the mapping and to get understanding of it and how the market may be divided. The following analysis of the impact on how the market will change can be used for a possible scenario analysis to predict the future.

The study creates increased awareness of existing technology and solutions especially with the objective of an outsourcing service. The study also finds a gap in the market and a need for a simpler and cheaper surveillance system than the existing ones today. The outsourcing service is just one possible solution on that specific need on the market.

10.4 Research implications

Trade surveillance is a fairly new and small niche industry within the area financial technology (FinTech). This is one reason why few descriptive concepts of the market exist. No previous research regarding trades surveillance in Sweden has been found during the literature search. One consulting report from an American firm is the only existing previous work of this kind to the researcher's knowledge, but performed on a global scale.

Contributions to knowledge are:

- A conceptual framework for market dynamics
- A suggestion to segment the market into four actor groups

The conceptual framework, Market Dynamics Framework, can be a tool for market analysis when changes in the market dynamics factors occur. This research applies the framework to investigate effects from changes in the market dynamic factor Regulations. From this research, the framework cannot be validated as fully covering all aspects of market dynamics on the trade surveillance market. It is a possible topic for future research to investigate effects of changes in other factors of the framework, e.g. a Technological change. If the framework is used in future investigations, it could be evaluated if factors should be removed, added and renamed to cover more or more precise areas of dynamics.

The PESTLE analysis, examining macro-environmental factors, was not considered to be sufficiently applicable to this particular case, but was used as theoretical basis for constructing Market Dynamics Framework.

The segmentation is made with respect to chosen surveillance solution characteristics. The division of actors beyond market actor types, forms groups with common traits regarding operational range and preferences. The perspective of time is not examined in this study. Changes in market dynamics over time can cause other divisions of the market actors. As a possible investigation for future studies is to examine how market segments move between different choices of surveillance solution characteristics.

These are both descriptive and conceptual, meaning that they are used in order to describe this particular case. There is no academic paper about dynamics on the trade surveillance market in Stockholm, Sweden, which makes this report to the foundation in its field. The concepts provide frames for conducting research regarding changes in the market dynamics and demand on the market for trade surveillance and actor segmentation.

10.5 Future research

This chapter proposes suggestions on extension and further development for future research. Following are the proposed suggestions of other topics and future research questions that have occurred during the study:

Proposal to verify the validity and reliability of the Market Dynamics Framework and if factors have to be added, removed or renamed.

- Test changes in another factor than regulations, e.g. the entrance of algorithmic trading which affected the Technology factor.
- Text framework on other geographical markets outside EU. Investigate on an equally well-developed market or on a lagging market.
- Test on other market on different scale than Stockholm, e.g. London, which has a much larger market population.
- Investigate if it can be applicable on other cases and in other industries, this to investigate generalizability of the framework.
- A verification can be made by comparing the outcome from the Market Dynamics Framework with another known framework or analysis tool.

Proposal to verify if the segmentation is descriptive for the market and if the suggested actor groups are valid.

- Investigate whether the division into four groups is suitable and descriptive for the market. Test if the market is divided into appropriate number of groups and if it is segmented with the correct parameters.
- Test the segmentation on other geographical market and on market of different scale.
- Introduce the time perspective and how segments might change over time.
- Examine whether it is possible to describe the market without conducting a segmentation.

Proposal to verify the outcome of the regulations and the consequences from them. Examine how the analyzed impact differed from the actual, and describe how the impact became for the market.

Proposal to further investigate of how outsourcing of surveillance and compliance will develop in the future. Investigate if it will continue to develop at the same pace and also to if and how outsourcing are developed in other geographical markets. Is outsourcing the future for the surveillance market or how should the pricing strategy be for a vendor of trade surveillance systems.

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