Acquisition model for small privately held manufacturing businesses in the United Kingdom

A case study of the moulding tool industry

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Abstract

Title: Acquisition model for small privately held manufacturing businesses in the United Kingdom
- A case study on the plastic injection moulding industry

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Issue of study: The plastic injection moulding industry has become highly competitive in terms of lead times and pricing, following an increase in low-cost manufacturing from Asia, as a part of the full supply chain. To remain competitive, mould tool manufacturers are looking to complement new tool manufacturing with local after-sales services in countries where their mould tools are being used. Unless the mould tool manufacturer already has local after-sales services in the designated country or area, they need to either construct a facility focusing on after-sales services or acquire a company already specialized in after-sales activities.

When searching for potential candidates to acquire, an acquisition model tailored around the industry needs to be developed. The model needs to be developed both in accordance to the prerequisites of the company looking to acquire, and the market in which it is looking to expand.

Purpose: The purpose of this thesis is to develop an acquisition model specific to the plastic injection moulding industry. The acquisition model and M&A strategy will be developed for the case company Emikron Group and subsequently applied on the United Kingdom market to test its effectiveness in identifying qualified candidates for acquisition.

Objective(s): The objectives involve:
- To develop a model for candidate search & evaluation, as first phase of M&A.
- Identifying what it takes to be competitive in the United Kingdom in terms of after-sales services.
- Apply the developed model through identifying the critical success factors and needs of the case company.
- Develop an acquisition strategy suitable for the Case.

Methodology: By investigating existing models for the first stages of M&A on a new

acquisition model is developed which is specifically tailored towards smaller companies within the plastic injection moulding industry. Using a case company for testing the model, the methodology will involve a highly quantitative and qualitative analysis of current operations. Finding suitable candidates that fit the existing acquisition plan in the United Kingdom will first be gathered using second hand information through search engines. The final candidates will be subjected to an on-site analysis where the authors visit the facilities and inspect the organizations personally.

Conclusions: Applying the developed acquisition model on the case company yielded a successful result in compliance with the prerequisites set by Emikron Group. It is the authors' opinion that this strategy can be applied to a variety of different industrial manufacturing industries apart from plastic injection moulding, as well as in different countries facing similar circumstances.

Key words: acquisition model, acquisition plan, injection moulding market, injection moulding industry, plastic injection moulding, plastic injection mould tools, after-sales services, private company acquisition, M&A strategy, M&A model, acquisitions, mergers & acquisitions, corporate finance, investment strategy, UK toolmakers.

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Lund, June 2015.

Richard Hagander & Alexander Alm

Contents

1. Background

A brief background and introduction to the subject of Injection moulding. It will define the scope of the thesis, introduce the case company and in more detail, cover the objective and issue of study.

Designing a plastic part is a complicated task involving many factors that need to be addressed before the actual manufacturing begins. “How is the plastic part going to be used?” “What loads will the plastic part be subjected to?” “What visual attributes are expected from the plastic part?”. Depending on the structural, functional and visual attributes required from the plastic part there are several different manufacturing processes by which the part can be made. The most common manufacturing process for plastic parts is injection moulding. Injection moulding is a manufacturing process that produces parts by injecting a certain material into a mould *(Thomasnet, 2015).* Injection moulding can use a variety of different materials including metals, elastomers, glass and thermoplastic polymers. The process is used most commonly for the fabrication of plastic parts and is capable of producing a wide variety of products which vary greatly in application, size and complexity. Everything from household items such as toothbrushes, buckets, combs to automotive interiors and electronic housing *(3Dsystems, 2015).*

1.1 Injection moulding cycle

The injection moulding process cycle is fairly short, typically only a few seconds depending on the size on the injection mould. During this cycle the injection moulding process turns raw plastic material into the finished plastic part originally designed. This short, yet efficient process cycle can be divided into the following four primary stages; Clamping, Injection, Cooling and Ejection.

1.1.1 Clamping

Before injecting the raw plastic into the mould, the two halves of the mould must first be sealed together by a clamping unit. The two mould halves are inserted into the injection moulding machine where one of the halves is allowed to slide and the other is fixed. The clamping unit is powered hydraulically and pushes the two halves together with sufficient amount of force to keep the mould halves securely in place when the plastic is injected into the mould. The amount of force required to close the mould halves is determined by the size of the mould, which in turn is based on the size of the plastic part that the mould is designed to manufacture. The time required for the injection moulding machine to close and clamp together the two moulding halves is called the dry cycle time, which is generally shorter with smaller injection moulding machines and longer with larger injection moulding machines *(Custompart, 2009)*.

1.1.2 Injection

Most polymers can be used for the plastic injection moulding process. This includes all thermoplastics, most thermosets and some elastomers. When these materials are being used for plastic injection moulding process, their raw form is either fine powder or small pellets.
The raw plastic is first melted by heat and pressure. When the molten plastic has reached the right temperature, it is injected into the clamped mould cavity either by a screw or a ram. The amount of plastic injected into the mould is called the shot *(Custompart, 2009)*.

1.1.3 Cooling

The short time between the injection of molten plastic into the mould cavity has been completed and the cooling begins is called the dwelling phase. This phase ensures that the mould cavity is completely filled with molten plastic before the cooling starts. The cooling phase will solidify the molten plastic and bring the temperature down to a level that allows for the plastic part to be removed without any deformities arise. During the cooling phase some shrinkage of the plastic part can occur due to the rapid decline in temperature. The packing of molten plastic into the cavity allows for additional plastic to flow into the mould, compensating for the shrinkage *(Custompart, 2009)*.

1.1.4 Ejection

Once the plastic part has been cooled and solidified the clamping force is released and the two mould halves are separated, allowing for the removal of the plastic part. The design of the mould cavity allows for the plastic part to fall freely out of the mould once the two halves are separated, this can also be assisted by spraying the inside of the mould with a releasing agent. The temperature to which the part is cooled allows for the plastic part to be handled by hand as soon as it has been ejected from the injection machine *(Custompart, 2009)*.

1.2 Injection tooling equipment

The equipment required to manufacture plastic parts with injection moulding is comprised of two major components. The injection moulding machine and the injection mould tool (commonly referred to as "*tool*") itself. Both of which are equally important for the injection mould cycle (*see figure 1*).

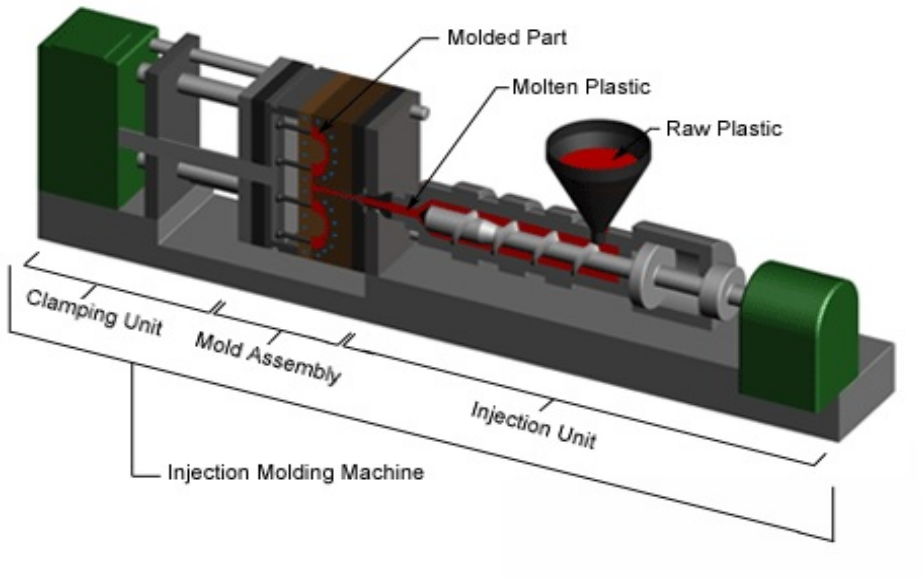


Figure 1. Plastic injection moulding *(Custompart, 2009*).

1.2.1 Injection moulding machine

Injection moulding machines come in a variety of different configurations and sizes, including a vertical and a horizontal configuration. Despite there being a variety of different injection moulding machines they all share the same core components to perform the four stages of the process cycle; an injection unit and a clamping unit. The injection unit heats and injects the plastic into the mould. It is comprised of a hopper where the raw plastic pellets are poured before they are heated up to a molten state. Once molten, the plastic is fed into a barrel that injects the molten plastic into the mould either via ram injector or via a reciprocating screw.

The Clamping Unit is where the two mould halves are mounted. The Clamping unit has two large metal plates on which the two halves of the mould are fixated. The half of the mould that is fixated to the rear metal plate is referred to as the mould Core. The mould Core is moveable along the horizontal axis of the Injection moulding Machine. The other half is fixated to the front metal plate and is called the mould Cavity. The mould Cavity is fixated, and it is through which that the molten plastic is injected *(Custompart 2009)*.

1.2.2 Injection mould

The mould begins as bars of high durability metal that can withstand repeated high pressure injection of plastic *(How its made, 2009)*. Workers assemble several bars into a block called a mould base. They mount this base on a milling machine which shaves the bars to the right dimensions. This step is critical, enabling them to later machine the base into a mould that is faithful to the technical design (*AV plastics, 2015*).

A mould usually consists of two halves, each of which is comprised of several components. The factory drills strategically positioned holes in the bases for the guide pins and bushings that hold the components together when the plastic is injected. A grinder now goes to work, smoothing and leveling all surfaces. This prepares the base for the high precision machining operations that will transform it into a mould component.

A computer guided tooling machine called a CNC slowly machines the base, wearing away the steel particle by particle to create the mould components shape. This process can take anything between 1-10 hours to complete depending on the size and complexity (*How it's made, 2009)*. From here most mould components go on to a second tooling machine especially if they have some fine detailing that the CNC machine is incapable of carving. The second machine is fitted with graphite electrodes in the shape of the plastic part. The electrode goes face-down on the second tooling machine called the EDM. Directly underneath is the mould half that has already been partially formed on the first machine. A strong electric current runs through the electrode and penetrates the mould, forming a cavity in the shape of the electrode.

After tooling is completed, coolant lines are drilled into the mould. This is for the cooling fluid they use to accelerate the hardening of the moulds and plastic. At this stage the surface of the mould's cavity is rough from all the tooling and needs to be grinded and polished to ensure a proper casting *(3D Systems, 2015)*

Figure 2 below shows what the two halves of the finished mould looks like. The pins and bushings fit together to close the mould before injecting the hot liquid plastic. Once the plastic cools and hardens it is just a matter of extracting the moulded plastic part.

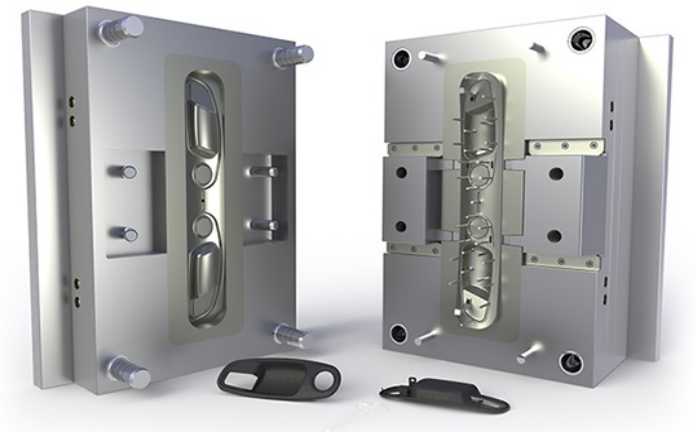


Figure 2. Plastic injection moulding tool *(Emikron Group, 2015*).

1.3 Supply chain and Market participants

Understanding the flow of goods and information between the different market participants is crucial to understanding the plastic injection tooling market as a whole. The flow of goods and information is based on which market participant owns which injection tooling equipment. As previously mentioned in *chapter 1.2 – Injection tooling equipment*, the injection moulding machine and the injection mould itself make up for the two crucial pieces of equipment in the plastic injection tooling market. Depending on which market participants owns what piece of equipment the relationship between the participants can vary.

In the traditional market participant-relationship there are five distinct market participants where the flow of goods and information revolves around the injection moulder employed by the OEM. It is through the moulder that the interaction between all the participants will travel. The OEM is most often the owner of the injection mould tool itself, while the injection moulder is the owner of the injection moulding machines necessary to manufacture the plastic part. To illustrate the relationship between the markets participants see *figure 3* below.

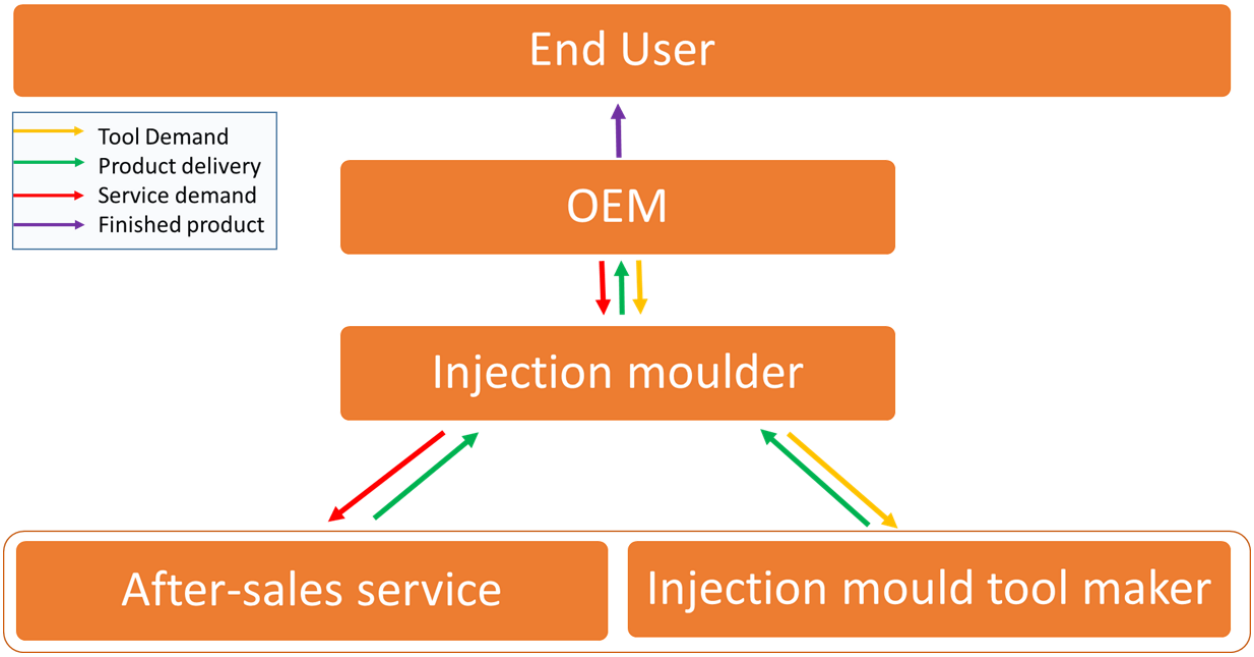


Figure 3. Market participant relationship.

1.3.1 End user

The end user is the target audience; the individuals that ultimately use the product after it has been fully developed, assembled and marketed. The end users are supplied with the finished product directly from the OEM. Depending on the product, a middle-man between the OEM and the end user is not uncommon. It is however not value adding nor relevant to this paper and will therefore not be mentioned as a crucial market participant (*Emikron Group, 2015*).

1.3.2 OEM

The OEM, Original Equipment Manufacturer, is the owner of the product. It is responsible for development, assembly and marketing of the final product towards the end user *(Investopedia 2015*). The product owned by the OEM is often comprised of several different parts that all require different manufacturing methods depending on the OEM's requirements on manufacturing, quality and quantity. The OEM will most often contract different suppliers for different parts. If the part is made of plastic there are five different ways of manufacturing it, the most common of which is plastic injection moulding *(Hedstrom, 2015)*.

The OEM approaches an Injection moulder with a demand for a plastic part with specific characteristics and quantity. It is from the Injection moulder that the OEM receives the finished plastic product that the OEM later uses to assemble the final product which is supplied to the end user. Should the OEM require any adjustment on the plastic part, for example small alterations to the esthetics, it deals directly with the injection moulder *(Emikron Group, 2015)*.

1.3.3 Plastic injection moulder

The Injection Moulder works as a subcontractor to the OEM. When the injection moulder is approached by the OEM to manufacture a specific plastic part, the injection moulder must first contact a mould tool maker. The injection moulder only facilitates the manufacturing of the plastic parts and not the manufacturing of the mould tool itself (*see figure 3*). Once the injection moulder has received specifications and requirements for a plastic part by the OEM the injection moulder forwards the demand to the mould tool maker. The mould tool maker is then contracted by the Injection moulder to manufacture the mould tool according to the requirements specified by the OEM via the injection moulder. Once the mould tool has been completed and delivered to the injection moulder, the desired parts will be manufactured in the required quantity specified by the OEM *(Emikron Group, 2015).*

Figure 4. Machine use by plastic injection moulders (*CBECL, 2014*).

In the event that the OEM requires any changes to the plastic parts already being manufactured, the OEM will express their adjustment demand to the injection moulder. In turn, the injection moulder will approach a specialized injection mould service location to perform the necessary adjustments to the tool in order to meet the new requirements from the OEM *(Emikron Group, 2015)*.

1.3.4 Injection tool maker & Injection tool service location

It is not uncommon that the Injection tool maker and service location are the same market participants. Some tool makers perform services on injection tools to fill up periods with low order volume, and vice versa with service locations. In the case where they are separate, the injection mould tool maker receives an order to create a mould tool from the Injection moulder. The specifications of which are detailed from the OEM. The Injection tool service location merely provides service or adjustments to existing tools and is not equipped to create an entire plastic injection tool. Both market participants operate under the Injection moulder and usually have no contact with the OEM *(Emikron Group, 2015)*.

1.3.5 Exceptions

As to every rule there are always exceptions. The relationship between the market participants shown in figure 3 is the standard around which the market revolves. However, it is important to note that this is not always the case. Some OEM manufacturers have their own plastic injection moulding machines, therefore eliminating the need for a sub-contracted plastic injection moulders. Instead these OEMs deal directly with the plastic injection mould makers and the service locations.

Likewise, the plastic injection mould maker possesses nearly all the equipment necessary for after-sales services. Therefore, some plastic injection mould makers also offer after-sales service to their customers. This is however not the case with pure after-sales service locations, they do not possess the equipment required to manufacture an entire plastic injection mould. While treating plastic injection mould makers and service locations as separate market participants, the majority of companies in this industry perform both manufacturing and servicing. Many of the plastic injection service locations operating today started up as plastic injection mould makers that, due to high market competition, chose to focus on plastic injection services instead *(Emikron Group, 2015)*.

1.4 Case company

Emikron Group is a world-class producer and service provider of plastic injection tools. 70% of Emikron Group’s annual revenue is delivered to the automotive industry, providing companies such as Volvo, Scania, BMW and Audi with plastic injection tools. Along with the automotive industry, other large segments include Lawn & Garden, Home Appliances and the construction industry. The plastic injection tools are manufactured in the Peoples Republic of China under Swedish leadership, offering customers competitive prices with the assurance of European standard quality. For after sales purposes Emikron Group offers local support in the form of a Swedish facility.

Emikron Group is comprised of Verktygsmekano and ARC Tooling Technology, each with their own sub-set of companies (*see figure 5*). ARC Tooling Technology is comprised of a manufacturing company in Shenzhen, Peoples Republic of China, where the plastic injection tools are manufactured, and international sales offices in Sweden, United Kingdom and Germany. ARC Tooling Technology has an annual turnover over MSEK 100 with approximately 170 employees across the companies (*ARC, 2012*), most of which are based in the production facility in Shenzhen.

Verktygsmekano focuses purely on after sales activities, working close to the European market hus offering quick response time in terms of service, repair or modifications of existing plastic injection tools. Being located geographically close to the market for after sales purposes is vital due to entire production lines coming to a halt if repair or maintenance on the plastic injection tools should be required. Verktygsmekano has an annual turnover of MSEK 30 with 20 people employed (*Verktygsmekano, 2014*), six of which are based in Dongguan, China.

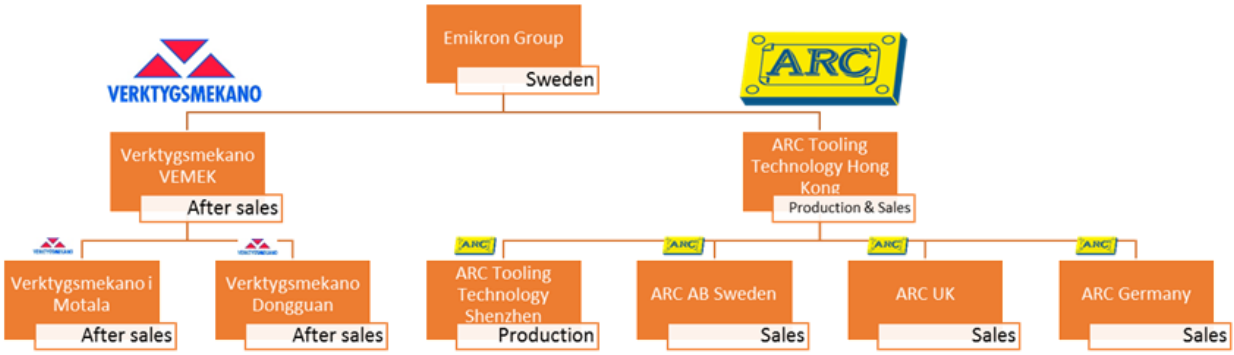


Figure 5. Emikron Group structure *(Emikron Group, 2014).*

1.5 Issue of study

Emikron Group as a company is fairly new. Formed in the beginning of 2014 following the acquisition of ARC Tooling Technology Hong Kong and its sub-set of companies (*see figure 5*). After the acquisition of ARC Tooling Technology Emikron Group's offer to its customers was merely the manufacturing of plastic injection tools. Emikron Group wanted to expand its offer towards its clients by including after sales support in the form of service, repair and modifications to existing tools. During this time over 90% of the plastic injection tools were delivered to Europe where Sweden was the largest recipient (*see figure 6*).

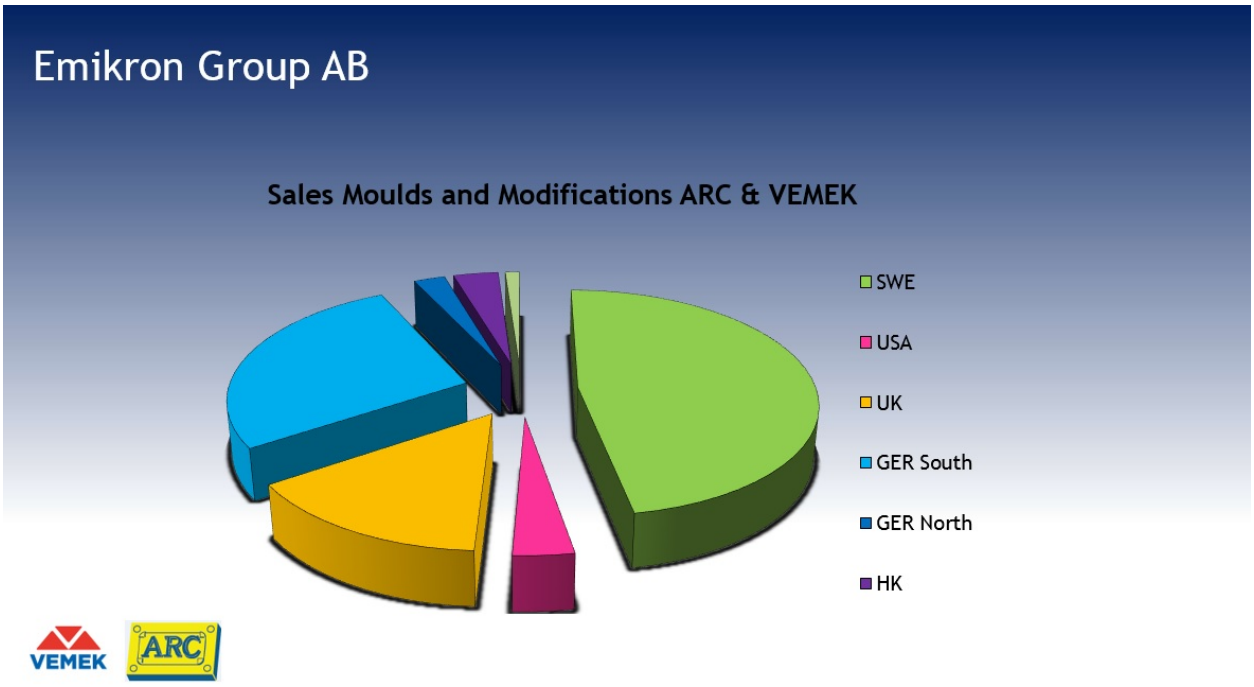


Figure 6: Market shares (Emikron Group, 2014).

In order to be competitive in the after-sales market, one has to be in close proximity to its target audience. Clients in need of after-sales services are dependent on short lead times as a faulty tool can result in an entire production line coming to a halt, resulting in a costly experience. Emikron Group's three largest markets are Sweden, Germany and the United Kingdom, Emikron Group is looking to offer local after sales services in all these three countries as they make up more than 80% of Emikron Group's total market.

As depicted in figure 6, Sweden represents Emikron Group's biggest market. During the summer of 2014 Emikron Group acquired 100% of the shares in Verktygsmekano, a Swedish injection tool company focusing on after-sales services. Following this acquisition, Emikron Group was now offering their Swedish clients local after-sales services. This marked a first step in the goal of offering all of their clients local after-sales services in combination with injection tool manufacturing. Emikron Group is now looking to extend its offer to Germany and the United Kingdom by acquiring after-sales locations in the respective countries to mimic the idea behind the purchase of Verktygsmekano.

1.6 Problem

Expanding into a new market by means of acquisition is a popular strategy widely used by companies all over the world. Despite being such a fundamental part of company growth, research shows that 70% of all acquisitions fail to create any value to the stakeholders (Rovit, 2004). In order to increase the chance of a successful acquisition, company leaders must take an active part in the acquisition process. This involves choosing an appropriate acquisition strategy that accurately reflects the preconditions of the company in question.

Today most models and theories for M&A have been developed mainly for big takeovers. The strategies follow a process based on the assumption that all financial and operational information is available, and that both parties are aware of the pending transaction. There is no M&A strategy that aims towards smaller, privately held companies that do not wish to reveal financial or operational information.

1.7 Project objective

The objective is to develop an improved acquisition strategy that focuses on smaller, privately held companies. The acquisition strategy will identify the most suitable after-sales candidates for acquisition within the plastic injection moulding industry in the United Kingdom. Using Emikron Group as a case company, the strategy will be applied on the market in the United Kingdom to search for potential acquisition candidates. Once the process has been completed, the result of the strategy – the candidates – will be evaluated along with the strategy itself to see if it is a viable alternative to the existing M&A models.

The report structure will first outline the theoretical methodology and underlying research criteria and design. The report will then proceed to analyze the case company Emikron group in terms of key success factors and define necessary variables that will be required from the candidates. Once established, a pool of companies will be identified and added to an acquisition pool of candidates. These candidates will then be compared to the success factors and variables previously established when analyzing the case company Emikron Group, and ranked against each other according to said factors and variables. The product of this report will be the most relevant candidates based on Emikron groups prerequisites and in accordance to the key success factors and variables identified. Based on the relevance of the candidates, the strategy itself will be subjected to analysis to determine if it can be applied to different fields or industries.

2. Theoretical Methodology

This segment will examine the theoretical foundation on which the research has been conducted. The research methods will have their contribution and approach discussed, where some research methods are more prevalent than others.

2.1 Scientific reasoning

2.1.1 Deductive

Deductive theory is the most commonly used connection between theory and research. A hypothesis within the area of research is formulated and then tested through empirical research (*Bell, 2011*). The hypothesis must be formulated in a way to allow for the social scientist to conduct research. This is done by reformulating the hypothesis into an actionable plan of research steps to be taken in order to test the concepts that make up the hypothesis (*see figure 7 below*).

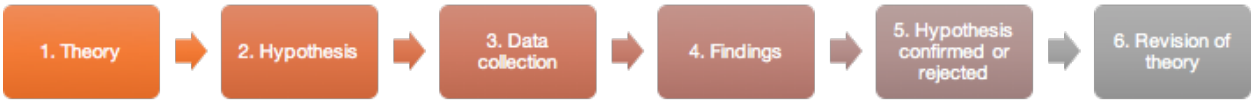


Figure 7: The process of deduction (Bell, 2011).

2.1.2 Inductive

Inductive theory is based upon learning from observations and concluding theories from the observations. This observational process is also used as a final step in the deductive approach. In order to get a better understanding of reality, the observations must be compared to the firstly formulated hypothesis which is then revised. A more complete inductive study will contain deductive elements as the social scientist conducts further observations after formulating theories based on the first observations (*Bell, 2011*). This process will often be iterative in order get the best result.

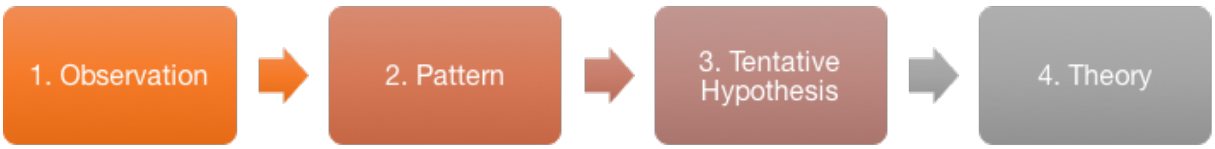


Figure 8: The process of induction (Bell, 2011).

2.1.3 Abductive

An abductive approach is the combination of an inductive and a deductive approach. By combining an inductive and deductive approach, the linearity of deductivity becomes more flexible. One is not limited to following the process of deduction but can base some of the theory on observations made beforehand (*Bell, 2011*).

The authors of this thesis will conduct their research and reasoning based on a combination of deductive and inductive theoretical approach. While studying existing theories related to the subject of the thesis, the authors have chosen to make observations and attempt to create a model applicable on the target market.

2.2 Research strategy

The research strategy will mostly be of a qualitative and quantitative in nature. The approach will abductively generate theory based upon the given case company. It is then desired to quantify the findings of the qualitative research in order to increase the transferability and applicability of formulated theory into other fields and markets.

2.2.1 Quantitative

A quantitative strategy mostly applies a deductive approach to identify the relation between theory and research. The main focus is put on testing of hypotheses and theories set up by the social scientist (*Bell, 2011*). This strategy makes use of models of the natural sciences mainly in a way that is defined by positivism. The cycle of the quantitative research strategy is illustrated below (*see figure 8*).

Figure 9: The process of quantitative research (*Bell, 2011*).

2.2.2 Qualitative

A qualitative study mostly takes on an inductive approach in order to define a relationship between theory and research. This strategy emphasizes the generation of theories from observations made during research. The focus lies on the individual to interpret the social world (*Bell, 2011*).

2.3 Research design

There are several different research design models that look to set up the research in a structured and logical way that is easy to follow and understand. This thesis will be partly cross-sectional, case study-based and comparative in its design.

2.3.1 Cross-sectional design

Cross-sectional research design aims to collect data from several cases through structured observations, content analysis, official statistics and diaries (*Bell, 2011*). The goal with this data collection is to amass quantifiable data and information in order to find connections between multiple variables and detect patterns of association. It is important that the data from the different cases is collected more or less simultaneously to avoid seasonality impacting

conclusions and to make sure that the circumstances and conditions are as similar as possible. By doing this it will be easier to detect patterns when examining the results. The data collection can be made by several parties as long as the method for how data is to be collected is firmly established beforehand.

2.3.2 Longitudinal design

Longitudinal research design is a lot similar to cross-sectional research design. The main difference is that in case of a longitudinal research design the social scientist looks at the same variables at different points in time as to incorporate the factor of change over time (*Bell, 2011*). Longitudinal studies play an important role in understanding mechanisms and processes within organizations through which change is created (*Pettigrew, 1990*). It is a contextual research design, involving the interconnection of horizontal and vertical analysis through time (*Pettigrew, 1990*).

2.3.3 Case study design

A case study research involves the detailed and intensive analysis of a single case (*Bell, 2011*). The case study design is primarily concerned with the complexity and particular nature of the chosen case (*Stake, 1995*). A case study will be based on either a single organization, location, person or event. The term case refers to the closed off system or bounded situation that is studied by the social scientist in the research (*Bell, 2011*).

2.3.4 Comparative design

A comparative study consists of more or less identical methods to analyze two or more contrasting cases (*Bell, 2011*). One of the most typical forms of this research design that would be relevant to the authors and the purpose of this thesis is the cross-cultural or cross-national research. This cross-national comparative research occurs when an individuals or teams set out to examine particular issues or phenomenon in two or more countries with the express intention of comparing their manifestation in different sociocultural settings (*Hantrais, 1996*).

2.4 Level of analysis

The level of analysis refers also to research design and its primary unit of measurement. There are four different levels of analysis: Individuals, groups, organizations and societies (*Bell, 2011*). For the purpose of this thesis the focus lies on separately examining the organizations and the individuals within them to a possible extent. The level of analysis in this thesis will start on a very high-level, qualitative analysis of potential acquisition targets in order to determine their relevance as an acquisition target. The thesis will then move on to a more detail-oriented quantitative level where the relevant acquisition targets are analyzed using all available information and interview material.

2.5 Research Criteria

There are a number of research criteria that need to be explored and fulfilled in order for a thesis to be reliable and trustworthy to the reader. The most important criteria chosen by the authors are reliability, validity, credibility and transferability.

2.5.1 Reliability

The reliability of research lies in the ability to replicate the study and receive the same results. If the same research would be conducted again with a different outcome the research would not be considered reliable. The issue of reliability is particularly important when it comes to quantitative research since that type of research needs the variables to be stable in order to take measurements (*Bell, 2011*).

2.5.2 Validity

Validity is one of the most important criteria in business research. It is the concern of the integrity of the conclusions drawn from the research (*Bell, 2011*). The form of validity the authors will concern themselves with is often referred to as *measurement validity* and is prevalent mostly in quantitative research. This form of validity brings into question whether one variable that is being used in order to measure a process really reflects the properties of this process in a fair way.

2.5.3 Credibility

Credibility is also sometimes referred to as *internal validity* (*Bell, 2011*). Credibility deals with the issue of causality between two variables. There needs to be clear evidence that supports the theory of change in x causing change in y.

2.5.4 Transferability

Transferability is the issue of how the results and conclusions of this thesis can be applied to other cases or fields of science. It is the link between the authors' findings and a more general academic conclusion. This thesis is aimed to develop an acquisition strategy for the United Kingdom market that is transferable to different countries and different manufacturing industries.

3. Acquisition Strategy

Acquisition strategy refers to the strategy of one business acquiring another. The strategy of this procedure and how it is usually executed will be explored by the authors in this chapter.

3.1 Acquisition process

There are many theories exploring the motives behind mergers and acquisition (Trautwein, 1990). The motives will not be discussed in this thesis as it is not part of its ultimate objective.

When looking to acquire an existing business or merge with one there are a set of pre-purchase and post-purchase decision activities to go through. This process is known as the *The Acquisition Process Flow* (*see figure 10*) (*DePamphilis, 2010*)

The pre-purchase decision activities consist of creating a new business plan for the company in question. The business plan contains a strategy that the company follows in order to create value and eventually profit. An acquisition plan will be created that supports the current business plan and states how the acquisition should strategically fit into the company's current corporate value chain. After these parameters have been developed and studied the next step is to search for potential candidates. These candidates are then screened and ranked according to a set of parameters depending on the goal and nature of the acquisition.
When the potential acquisitions targets are determined, the next step is to approach them.

"*If time permits, there is no substitute for developing a personal relationship with the seller; especially if theirs is a privately held firm. Developing a rapport often makes it possible to acquire a company that is not thought to be for sale*" – Donald DePamphilis, Merger & Acquisition Basics.

After the initial contact is established the negotiations begin. Negotiation in regards to a potential business acquisition should consist of refining the valuation, deal structuring, due diligence and a financing plan. After negotiations a decision is made whether there will be a deal or not. This is the most crucial step in the whole acquisition process.
If negotiations were successful, the next step is to develop an integration plan. The integration plan is the first of the post-purchase decision activities and contains detailed description and plans on how the acquired company is to be integrated into the current business model. Now it is time to close the transaction; the necessary approvals are obtained and post-closing issues are resolved. Once the integration of the acquired company into the business is complete a post-closing evaluation should be conducted to draw conclusions and lessons for future deals (*DePamphilis, 2010*).

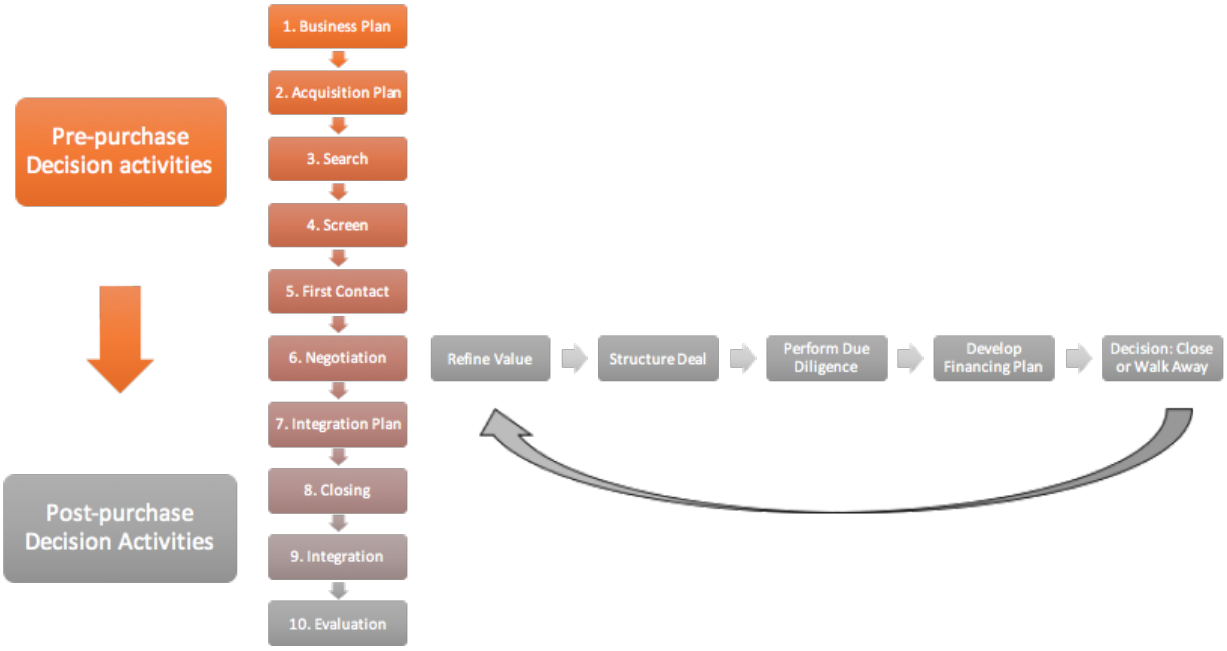


Figure 10: The Acquisition Process Flow Diagram (*DePamphilis, 2010*).

For the purposes of this project, steps 1 and 2 of the entire acquisition process fall outside the scope of the defined study. In the following chapters, the authors will focus on step 3 through 5 of the acquisition process as described by DePamphilis. Steps 6 through 10 also fall outside the scope of the study defined by the authors.

4. Case Model Development

Using research strategy and theory explored in previous chapters, the authors will develop an acquisition strategy and model that fits the purpose and prerequisites set by Emikron Group.

4.1 Case Company Research Process

In order to generate a model to fit the problem given by the case company, Emikron Group, the authors looked at how different research strategies best be used at what part of the project. Figure 11 illustrates how different research strategies will be applied throughout the project. During the first part of the project the authors will be looking at the Swedish toolmaker Verktygsmekano as a case study (1). When exploring the UK toolmaking market, the authors will take a cross-sectional approach (2) where the first case study will serve as a cross-cultural and cross-national comparison (3).

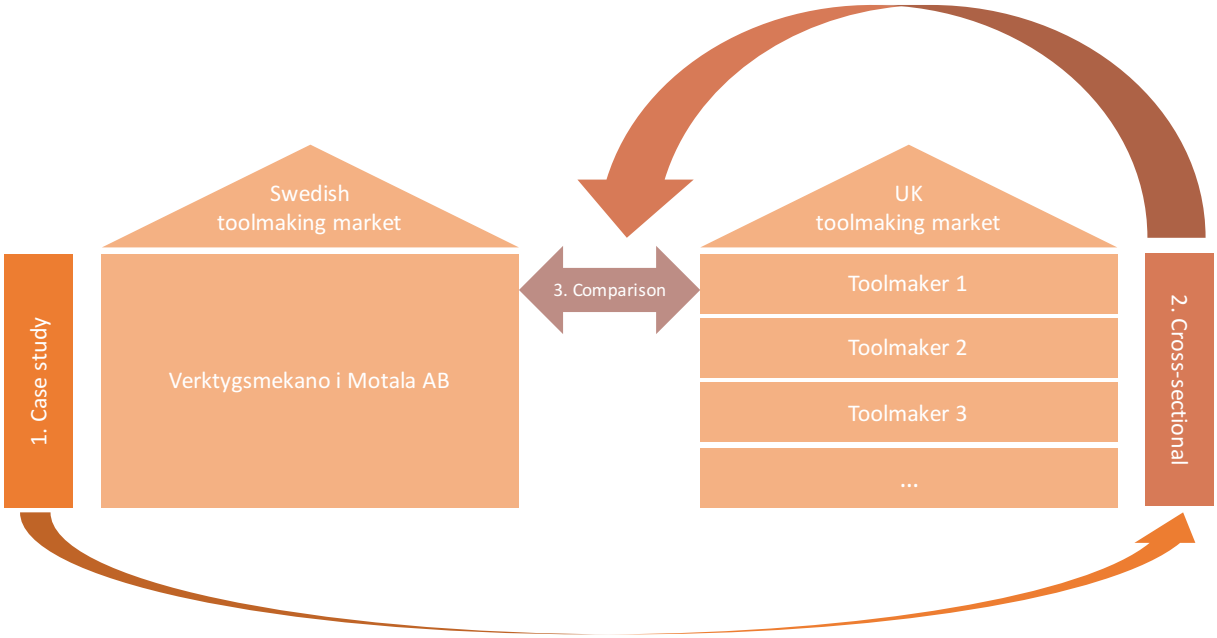


Figure 11: Proposed research design.

4.2 Case Company Acquisition Process

In accordance with the needs of the case company Emikron Group this thesis will only cover phases 2 through 5 of the acquisition process (*see figure 12*). From developing an acquisition plan to firstly contacting potential acquisition targets that have been screened and prioritized. Emikron Group already has a specified business plan that will be taking into consideration when developing the acquisition plan throughout this thesis. The negotiation process and the following post-purchase decision activities will be conducted by Emikron Group itself, should they concur with the findings of this thesis and the acquisition of a recommended company is viable.

Figure 12: Acquisition Process Thesis Focus.

To approach this, a candidate acquisition pool will first be developed. The first draft of the candidate pool will essentially be a long list of companies that fit into high-level criteria such as correct industry and country. From there, the candidate acquisition pool will gradually decrease in size as more criteria and search parameters are added into the equation. Once the candidate acquisition pool only contains companies that meet all the requirements established by Emikron Group, the remaining candidates will be ranked against each other. The three highest ranked companies will be the companies this project eventually recommends to Emikron Group. The thesis will move from a qualitative nature to a more quantitative in nature as it approaches the screening and ranking of the potential acquisition targets. The summarized approach to the acquisition strategy is described in the model below (*see figure 13*).

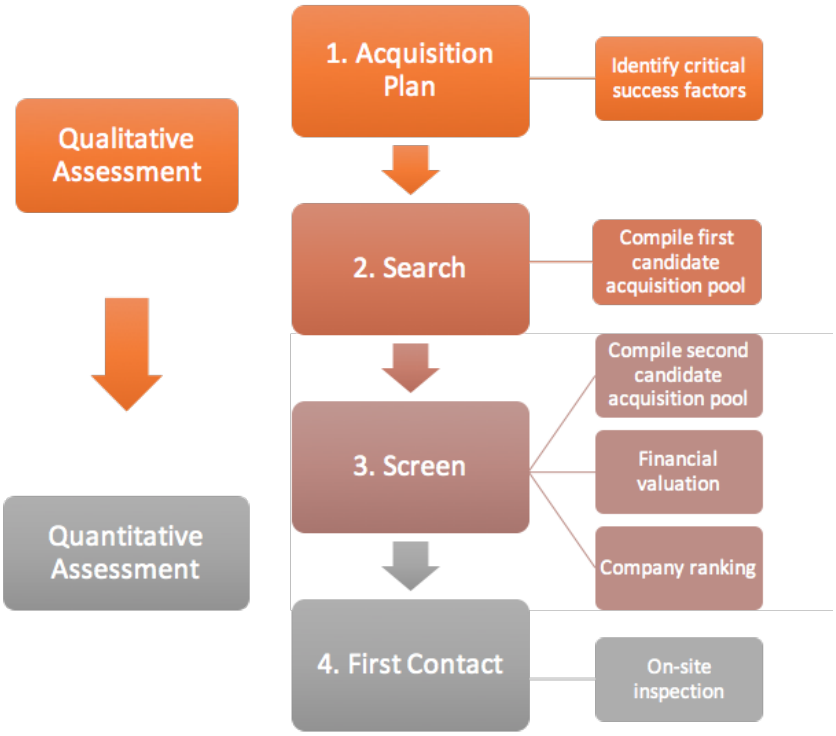


Figure 13: The Case Model Process.

5. Case Model Application

Case Model Application ultimately defines how the different steps throughout the case model process will be executed during the empirical analysis phase.

5.1 Acquisition Plan

The first step in identifying potential candidates for acquisition is to first establish the specific needs and critical factors that make a candidate eligible to begin with. An interview with Emikron Group will be conducted to get first-source information on their specific needs. Interview questions will cover the following topics:

- Specific industry of potential candidate
- Revenue and size of potential candidate
- Location of operations
- Materialistic needs and equipment requirements.
- Current market allocation in the United Kingdom
- Current customers in the United Kingdom

Once these parameters have been specified from Emikron Group, an interview and on-site analysis of Verktygsmekano will be conducted. Verktygsmekano in Sweden is the most recent purchase of Emikron Group in its attempt to provide all its customers with local after sales services. By comparing the answers provided directly by Emikron Group by interview and on-site analysis on Verktygsmekano, a complete framework can be established by which all potential candidates will be assessed by. A business model canvas will be created for Verktygsmekano in order to better understand the value creation process within Verktygsmekano. The business model canvas is a helpful tool that provides a simplistic and broad overview of the value creation process within a company.

5.1.1 Business Model Canvas

The business model canvas (*see figure 14*) focuses on data about a company's customer segments, customer relationships and the channels through which a company communicates with said customers. Through the value a company proposes to its customers (*value proposition)* revenue streams are created. In order for a company to deliver this value to its customers it is dependent on a set of key activities, key resources and key partners. These activities are linked together and form a company's cost structure. By understanding how these interact one can gain a thorough understanding of a company's business model (*Osterwalder, 2004*). The business model canvas will serve as a base of knowledge about Verktygsmekano and how they operate. This knowledge will be used when searching for potential candidates.

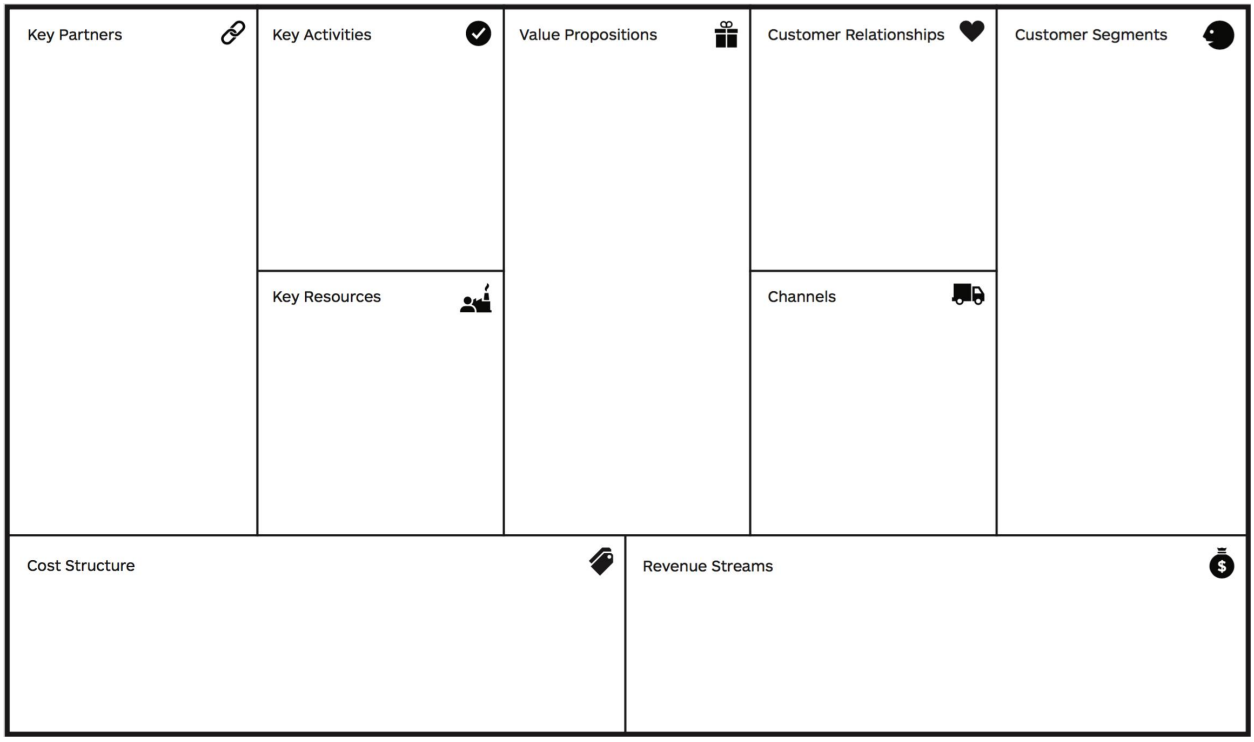


Figure 14. Business Model Canvas (*Osterwalder, 2004*).

5.1.2 Corporate value chain

To further the understanding of the nature of Emikron Group's acquisition and the needs that the target company has to fulfill, it has to be clear where the two parties take part within the corporate value chain (*see figure 15*).

Figure 15. Corporate Value Chain (*DePamphilis, 2010*).

The corporate value chain describes the process through which value is created and retained within the limits of the company. These processes can be divided into five steps or building blocks. These buildings blocks are inbound logistics that incorporates the purchase of raw materials and services that the company uses during the next process, Operations and production. This is a general model of a corporate value chain. For customer unique products or low-volume products, the specific value chain may differ slightly including extra steps or disregarding some. In the traditional manufacturing business this is the largest and most important process step as it is the process during which the company creates most of its value. The finished product is then marketed and distributed in their respective business units. To retain a good customer relationship and increase brand value a company needs to be able to provide some form of customer service. By understanding what value creating processes

Emikron Group uses today and what activities need to be provided by the acquired company it becomes clear what functions and requirements need to be met by the acquisition target.

5.2 Search

Once the specific needs and critical success factors have been identified by interviewing Emikron Group as well as performing a thorough analysis of Verktygsmekano, the first draft list can be created. Creating the first draft list of candidates is expected to generate a large list of companies based on high-level search criteria such as correct country and correct industry. The expected outcome after this first draft will be to have a list of at least 100 companies within the correct industry and country that are suitable for acquisition (*Deloitte, 2014*).
An important part of this step is in what way companies are located and added to the first draft list. Primarily the authors will locate any existing databases of companies that correspond to the high-level search criteria by which they will be screened. Search engines combined with information gathered from interviews will serve as the main source that companies will be identified by.

Companies are constantly being created and dissolved. Being able to locate every single available company at any given time that fits into the right criteria is next to impossible due to that simple fact. To compensate for this, every time a company is added to the first draft list, a time-stamp and origination source will be recorded and saved in an appendix attached to this paper (*Bryman & Bell, 2011*). Another factor that needs to be taken into consideration when creating the first draft list is how many man hours that have been invested into simply searching for potential candidates. The Authors will dedicate three weeks to assemble the first draft list of companies.

5.3 Compile second draft candidate acquisition pool

Once the first draft list has been completed a more thorough analysis will be performed on the companies to narrow down the list (*Deloitte, 2014*). A qualitative analysis will be conducted on all the available information of the companies in the first draft list, screening the companies by the remaining criteria established in chapter *5.1 - Acquisition plan*. This will be done by looking closely into company websites as well as personal contact with the companies when information on the website is not sufficient. The outcome after this step is to have a second draft list of candidates that all qualify as potential acquisition targets. The remaining criteria by which the companies will be analyzed by are first and foremost:

- Not only correct industry, but also correct sector
- Materialistic requirements
- Still active, non-dormant
- Not bankrupt
- Built up experience

Once this step has been completed the candidate acquisition pool will only contain possible candidates that both meet the requirements set by Emikron Group, as well as the profile of Verktygsmekano. At this stage no other companies can enter the candidate acquisition pool.

5.4 Financial valuation

In order to assess the size and profitability of the potential target companies a financial valuation will be conducted. The financial valuation will conclude if a potential target company is within Emikron Group's target size as an investment. This is crucial since Emikron Group will not be able to acquire a company that would require an investment over their capabilities or what they budget for. Neither will Emikron Group be interested in acquiring a very small business where the amount of resources put into the acquisition will not pay enough dividend over time.

This section will include some of the most widely used valuation methods within finance. There are a wide variety of more specific valuation methods that will not be covered in this paper.
The most widely used valuation methods can be divided into three different categories: **Income approach, market comparison, balance sheet methods** (*Deloitte, 2014*). These different valuation methods are best used in different situations depending on a company's capital structure and nature of the industry. What valuation is best used is also greatly influenced by whether the company in question is privately owned or publicly traded since private companies' equity is much less liquid than that of its publicly traded counterparts (*Bryant, 2007*). The result of the financial valuation of a company will be considered its current value or price the acquiring firm would have to pay for ownership of the target company. The valuation will establish a maximum price that the acquiring firm will pay as well as a minimum price. Companies that don't fall within the established price range of Emikron Group will be disregarded as potential candidates.

5.4.1 Income approach

Discounted Cash Flow (DCF) can be calculated based on historical earnings. Future earnings will be estimated by looking at historical company data and market statistics. The future earnings are then divided by a weighted average cost of capital (WACC) in order to calculate the DCF also known as the present value of future earnings. This method can be extended to incorporate the riskiness of future cash flow to more accurately reflect its present value (*Investopedia, Discounted Cash Flow Analysis*).

5.4.2 Market comparison

One of the best and simplest ways to look at a company's value is the so called *Enterprise Value* (EV). Enterprise Value = market value of common stock + market value of preferred equity + market value of debt + minority interest - cash and investments (Investopedia, Enterprise Value (EV)). This method is often very accurate because the acquirer takes on all of the target's equity and debt in the case of an acquisition. Due to the fact that this method uses market value of equity and debt it may be complicated to calculate for privately held firms,

where there is no clear market value since neither their equity nor debt is publicly traded. (Oricchio, 2012)

Price-to-earnings (P/E) ratio is one of the most common valuation multiples. Using it at the right time and in the right context means getting a very accurate valuation of a firm's value. To calculate a company's P/E-ratio the company's share price is divided by the company's earnings per share (EPS). The P/E ratio can then be used to compare a company to other companies that are similar. The similar companies should be within the same industry as the company that is being valued. This gives a good market based evaluation of how under- or overvalued a company is compared to other companies (Investopedia, Understanding The P/E Ratio).

Another common and effective multiple used when comparing businesses is the EV/EBITDA ratio. This is a company's Enterprise Value (EV) divided by its earnings before interest, taxes, depreciation and amortization (EBITDA) (*UBS Warburg, 2001*).

The advantage in using EBITDA is that it ignores variations in capital expenditure and depreciation as well as potential value creation or destruction through tax management. This is very valuable when looking at valuation in regards to M&A since a merger or acquisition along with new management and guidelines can adjust the company's asset management, tax management and capital expenditures. In other words, costs and income that is not directly related to the company's main business (*Hughes, 2012*).

5.4.3 Balance sheet methods

Book Value (BV) or net worth is the value of the shareholders' equity stated in the balance sheet (Company Valuation Methods. The Most Common Errors in Valuations, Pablo Fernández, IESE Business School 2004). This is also equals to a company's difference in total assets and liabilities [Assets - Liabilities = BV]. In order to get an even more accurate valuation using this method one could calculate the adjusted BV. This would mean making valuations of a company's current assets such as a real estate property and adjusting its value from book value to an *actual value*.

Liquidation Value (LV) is an interesting value because it describes a company's lowest value. It represents the amount of money that owner(s) would receive, if the company were to be liquidated today. Liquidation means selling everything the company owns such as real estate, raw material and products as well as paying off all of its debt. This can also be described as the company's adjusted net worth minus liquidation associated expenses. (*Fernández, 2004*).

5.5 Company ranking

After the financial valuation, has been performed on all the candidates, the remaining candidates all qualify as potential acquisition candidates in terms of market industry, sector and valuation. To distinguish which of the remaining candidates that will qualify as the top 5 candidates they will all be ranked against each other based on three different parameters. The ranking is performed to distinguish the attractiveness of the candidates in comparison to each other and based on the needs of Emikron Group. These parameters are:

1. Geographical location
2. Financial Risk
3. Available equipment and operations

Each parameter is given a multiplier based on the importance and weight it carries to the overall result. The multiplier will range from 1-3 which demonstrates the different parameters relative significance to each other. The multiplier 1 represents the lowest value and will be given to the parameter that carries to least amount of importance when identifying the top five candidates. The multiplier 3 will represent the highest value, and therefore the most important parameter when ranking the candidates against each other. Within the three different parameters the candidates will get a score value on a scale from 1-5. A score value of 5 represents the highest value available and translates to that specific candidate being ideal in terms of that specific parameter. Getting a score value of 1 signifies the lowest value, meaning that the candidate in question is severely outperforming in the specific parameter. The score will be multiplied with the given multiplier specific to the parameter in question to give each candidate an overall point for the given parameter. The points from the three separate parameters will be added to each other, and the five candidates that have achieved the highest set of points will be the top five candidates that move onto the final stage of the project, which is the visual inspection. To illustrate what the scoring will look like, see table 1.

Table 1. Example of score table.

Candidate	Geographic location			Financial Risk			Equipment			Total points
	Score	Multiplier	**Points**	Score	Multiplier	**Points**	Score	Multiplier	**Points**	
1	1	2	**2**	2	1	**2**	5	3	**15**	**19**
2	2	2	**4**	2	1	**2**	5	3	**15**	**21**
3	3	2	**6**	3	1	**3**	1	3	**3**	**12**
4	4	2	**8**	5	1	**5**	1	3	**3**	**16**
5	5	2	**10**	1	1	**1**	2	3	**6**	**17**

In the example above, the multipliers have been distributed with Equipment as the highest valued, followed by Geographical location and lastly Financial Risk. After each of the five candidates in the example have been given their set of scores within the parameters it is clear that the highest ranking candidate is Candidate 2, followed closely by Candidate 1. The worst candidate in this example is Candidate 3 that only obtained a final score of 12.

The following sub-chapters will explain the individual parameters in more detail, what makes them significant as well as what multiplier they will receive and why.

5.5.1 Geographical location

The main goal of the potential candidate is to facilitate after-sales services to the existing customers in the United Kingdom. From the customer's point of view, the service industry is driven by response time, accessibility and availability *(Kabak, 2012)*. This means that the geographical location of the potential candidate must take into consideration who the current customers are and where they are located. This is to minimize the physical response time and accessibility towards the customers *(Kabak, 2012)*. From Emikron Group's point of view, a close geographic proximity to existing clients not only heightens their competitiveness towards their competitors, but also decreases transportation costs and service times.

By first analyzing the current customers and demand on the United Kingdom market, the optimal geographical location will be determined using the "Center of Gravity" method (CoG) *(Chase, 2001)*.

$$C_x = \frac{\sum d_{ix} V_i}{\sum V_i} \qquad C_y = \frac{\sum d_{iy} V_i}{\sum V_i}$$

$\mathbf{C_x}$ = *X coordinate of the Center of Gravity*
$\mathbf{C_y}$ = *Y coordinate of the Center of Gravity*
$\mathbf{d_{ix}}$ = *X coordinate of the* i_{th} *location*
$\mathbf{d_{iy}}$ = *Y coordinate of the* i_{th} *location*
$\mathbf{V_i}$ = *Volume of goods moved to or from the* i_{th} *location*

Once the optimal geographic location has been established using the Center of Gravity method mentioned above, the potential candidate's locations will be compared and scored in accordance to the proximity of the CoG.

This geographical location parameter receives a multiplier of 2 in the final ranking. This due to the significance of short response time and efficiency when servicing the existing clients, but also to cement themselves towards potential competitors as the closest alternative.

5.5.2 Financial Risk

When acquiring a company, the target company's financial situation plays a large role (*Sharpe, 1964*). One important aspect of this analysis is how much risk an investment in an acquisition target could entail. Before having a complete understanding of each of the potential acquisition targets, the best way to measure risk associated with the transaction is to weigh the lowest possible value of a company against the cost if the acquisition. In this case and for the purpose of this thesis, financial risk will be measured by the quotient of the company's liquidation value and its enterprise value. This means in theory that in the event of the company having to be liquidated after acquisition, the financial risk value determines the return of the invested assets used to purchase the company. The higher value the more of the acquisition value is returned.

$$[Financial\ Risk\ Quotient\ = \frac{Liquidiation\ Value}{Enterprise\ Value}]$$

It is important to note that while financial risk when acquiring a new business is crucial, it is equally important that this financial risk is an excellent point for final acquisition price negotiations. A high financial risk is not necessarily a negative when considering the capital asset pricing model and the relationship between risk and return. Higher risk justifies higher expectations on the return or in this case a lower asking price for the acquisition of the business (*Sharpe, 1964*). Due to this, the financial risk parameter receives a multiplier of 1.

5.5.3 Available equipment and operations

Ranking manufacturing companies against each other in terms of equipment comes down to identifying the necessary equipment required to perform the task at hand (Deloitte, 2014). A minimum base-line must first be established regarding what type of equipment is necessary in terms of production value and capacity. This minimum base-line will be based on the equipment information gained from analyzing Verktygsmekano. All subsequent companies will then have their respective equipment compared to the established minimum base-line and scored according to what equipment is missing or production limitations (*Deloitte, 2014*).

An initial base-line of requirements will be developed by combining the information gathered from the interviews with Emikron Group, Verktygsmekano as well as the on-site analysis of Verktygsmekano's manufacturing facility. Using this information, a matrix will serve to visualize how the potential candidates compare to each other in terms of necessary equipment, production capabilities and capacity.

An example of what this could look like is depicted below in *table 2* below. The number of Machines in the top row is dictated by the equipment specifications determined after analyzing Verktygsmekano and performing corresponding interviews. In this example, the base-line is composed of five different machines and a capacity of handling 10 tons in weight. The candidates will be listed one by one and have their equipment compared to the established base-line and capacity. If the equipment is missing or is not suited to handle the capacity, it is given a "*no"*. If available at the candidate it will be marked as "*yes"*. If the capacity is below the minimum capacity established by the base-line, it will be marked with a red text.

Table 2. Example of equipment parameter scoring.

Candidate	Machine 1	Machine 2	Machine 3	Machine 4	Machine 5	Capacity	Score
1	yes	no	yes	yes	yes	10 tons	**4**
2	yes	yes	yes	yes	yes	15 tons	**5**
3	no	yes	yes	yes	yes	5 tons	**3**
4	no	no	no	yes	yes	8 tons	**1**
5	yes	yes	yes	yes	yes	10 tons	**5**
Base-line	**yes**	**yes**	**yes**	**yes**	**yes**	**10 ton**	**-**

The final score will be based on the number of equipment or capacity that is missing from the established base-line. In the example portrayed in table 2 above, candidates 2 and 5 both meet the minimum capacity and have all the machines established by the minimum base-line. In terms of equipment this constitutes a perfect score and will earn both candidates the highest score of 5. Depending on the amount of equipment missing compared to the base-line the remaining candidates will receive a score based on the number of equipment missing. Candidate 4 in this example is the worst candidate in terms of equipment, as it is missing 4 pieces of necessary equipment. The candidate therefore receives the lowest score of 1.

This parameter receives the highest multiplier three out of all the parameters. This due to the significant impact it will have on a candidate that is missing equipment or has insufficient capacity. If equipment is missing, resources will not only be spent on acquiring the necessary piece of equipment, but personnel will be needed to operate it and space will need to be allocated for it in the facility. If the capacity is too low it can result in a complete re-construction of the existing structure to facilitate the new lifting capabilities in terms of foundation, walls and roof.

5.6 On-site inspection

When the ranking has been completed there will now be five remaining candidates in the pool of companies that rank differently against each other in terms of financial valuation, geographical location and in regards to what type of equipment they have. At this point the next and final step will be to find the top three candidates out of these remaining five. These remaining three candidates will be the final product of this thesis and subsequently presented to Emikron Group. To distinguish which three candidates that will make up the final result, an on-site inspection of each of the five candidates will be performed. Two key aspects will be focused on when performing the on-site inspection of the candidates, validating and complementing existing information *(Brumsey, 2012)*.

5.6.1 Validating information

Up to this point the work has weighted and ranked the companies based on second hand information received from websites and communication over phone or e-mail. Performing an on-site inspection will give a great deal of validation against the already gathered information. The goal of this step is to question all the information that has been gathered up to this point, and subjectively determine whether it was accurate or not *(Rimmer & SanAndreas, 2012)*. The best case scenario would be that all the equipment, capabilities and facilities match the

information received from earlier communication. Worst case would be that the company does not have the equipment, facilities or capabilities that they claimed. This would in fact render the initial scoring useless, thus eliminating the company as a candidate.

5.6.2 Due diligence

Due diligence generally refers to the investigation or audit of a company or asset before an investment (*GE Capital, 2012*). Up to this point the companies on the candidate list have been analyzed by the available information obtainable through basic means of communication, whether it's reading through their websites, email or phone. The on-site analysis that will be performed not only serves as an opportunity to validate the existing information already acquired, but also gives insight into the target company's structure. The inspection will present the opportunity to look for factors that might increase or decrease the attractiveness of said company. The goal of this step is to search for as much information as possible that is not otherwise available through conventional ways of assessing the candidate (*GE Capital, 2012*). Subjects that will be covered include, but are not limited to:

- Age and quality of equipment
- Age and quality of facilities
- Managerial structure
- Additional financial information
- Corporate culture
- Necessary future investments
- Developed experience

The very nature of this step is subtle investigation (*Brumsey, 2012*). Therefore information not specifically searched for might present itself in a manner not anticipated. The goal with this step is to absorb as much information as possible during the time available that will be value adding when doing the final assessment of the candidates. Once this step has been completed the information will be added to the existing ranking of the companies to form complete company profiles. Based on this final step the top three candidates will be selected and presented to Emikron Group as the final result of this thesis.

6.0 Empirical Results of Model Application

The analysis will focus on implementing the methods and theories established previous chapters. It will cover the entire process from defining parameters based on interviews and analysis of the case company, to analyzing, scoring, ranking and selecting suitable potential candidates.

6.1 Acquisition Plan

Emikron Group's long term goal is to provide all its customers with local after-sales services. Today Emikron Group is already supplying its largest market Sweden with after-sales services following the acquisition of Verktygsmekano in 2014, and is now looking to enter the United Kingdom market with the same mind set. Before identifying potential acquisition targets in the United Kingdom market an interview has been conducted with CEO Bengt Hagander to get first-hand information over the needs and goals of Emikron Group.

Over the years the customer segments have shifted greatly on the United Kingdom market in terms of order volume and revenue for plastic injection moulds. Until 2011 the market segments Home Appliances, Consumer Electronics and Lawn & Garden stood for 83% of the annual revenue while the automotive industry stood for the remaining 17% (Emikron *Group, 2014*). Since then, market shares have been lost in all the market segments except the automotive industry causing a decline in revenue up until the mid-2013. At this point the company focus shifted towards actively targeting the automotive industry more directly and less resources were allocated to maintain the other customer segments *(see figure 16 below)*. Since this pivotal change in company profile, the automotive industry has become the dominant market segment for Emikron Group, increasing the overall revenues as well as their market share in the Automotive industry.

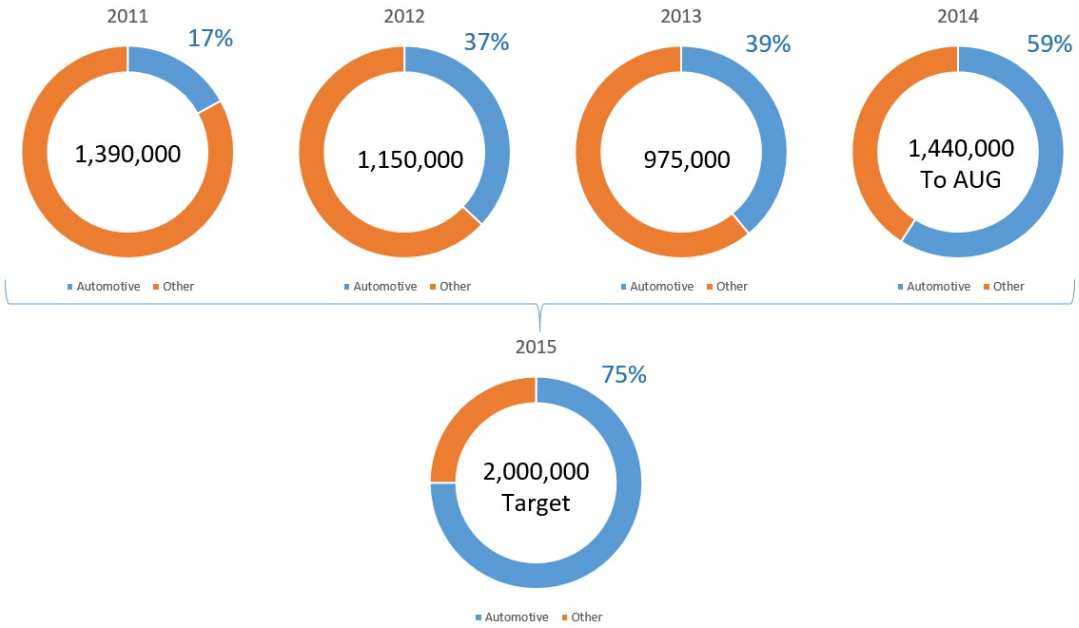


Figure 16. Revenue allocation (*Emikron Group, 2014*).

It is this market blend that the potential acquisition candidate is planned to facilitate after-sales services to. This translates into a company profile that has experience in servicing plastic injection moulds to the automotive industry when it comes to their quality standards and expectations *(Hagander, 2015)*.

In terms of financial capabilities Emikron Group is looking to invest no more than two million British pounds into the potential after-sales service company. It is emphasized that there is no lower limit to the financial investment, as the main goal is to facilitate the existing market structure. If the potential acquisition candidate fits all the needs and criteria required, the lower valued candidate will be more favorable when comparing the candidates to each other *(Hagander, 2015*).

To summarize the prerequisites for the potential acquisition candidate the following key needs have been established after interviewing Emikron Group:

1. *Plastic injection mould tool service company*
2. *Located in the United Kingdom, aimed to service existing customers*
3. *Experience within the Automotive industry*
4. *Potential cost of company no more than two million British pound*

6.1.1 What constitutes an after-sales oriented company?

After discussing and pinpointing the needs of Emikron Group, the next step is to perform a more in-depth analysis over what criteria and factors that are required for a company to qualify as an after-sales oriented service company within the plastic injection moulding industry.

The recently acquired Verktygsmekano served as a case company in determining the model structure for the potential candidates being searched for on the United Kingdom market. Since being acquired in 2014, Verktygsmekano is currently servicing Emikron Group's Swedish demand for after-sales services. In terms of market segments, 80-90% of Verktygsmekano's revenue is in the automotive industry (*Estlander, 2015*). Essentially, Verktygsmekano is performing the task in Sweden that the potential candidate is planned to perform in the United Kingdom. By interviewing the CEO of Verktygsmekano, Niclas Estlander, as well as performing an on-site inspection and analysis of the facility and operations, a complete framework has been established by which all potential acquisition candidates will be compared to.

Outlining the materialistic requirements and necessary equipment is most critical success factor (*Estlander, 2015*). Verktygsmekano has the following equipment at their disposal, without which Verktygsmekano cannot perform the necessary steps that are required of an after-sales oriented company within the plastic injection moulding industry.

- *Lifting capabilities of at least 10 tons*
- *Large multi-operational milling machine size able to support tools up to 5 tons*
- *At least 3 to 4 smaller CNC milling machines*
- *Welding equipment available. Minimum TIG-welding, preferably laser-welding*
- *Spark Erosion*
- *Wire erosion preferable, however not necessary*
- *Manual milling equipment*
- *Manual turning equipment*
- *Grinding equipment*

Apart from the equipment above being the necessary equipment to perform after-sales services, the equipment's size also needs to be taken into consideration. A company in the plastic injection industry categorize themselves after the size of mould tools they are able to handle (*Estlander, 2015*). In Verktygsmekano's case their lifting capabilities are 10 tons, meaning that the cranes in the facility are able to lift objects as heavy as 10 tons. Anything heavier than 10 tons would require a complete restructuring of the entire facility in terms of support beams, foundation and additional support equipment resulting in a costly endeavor. Due to this, a company's lifting capability is a good indicator on what general size of tools the company is comfortable working with (*Estlander, 2015*).

Apart from the necessary equipment mentioned aboedabove, additional emphasis can be put on the personnel at the company. Being a service oriented company means having a volatile stream of incoming business. If an emergency repair needs to be performed on a mould tool, the staff quickly needs to adapt within a day's notice to meet the short deadline. Likewise, there will be times on the opposite end of the spectrum when incoming business is slow. Having flexible personnel will go a long way in tackling these volatile periods. Once performing an on-site inspection of a potential acquisition candidate, a qualitative analysis of the personnel and the overall atmosphere of the company will be done in order to assess a company's strength in dealing with difficult periods of high and/or low stress (*Estlander, 2015*).

6.1.2 Business Model Canvas of Verktygsmekano

Looking at **customer segments** that purchase Verktygsmekano's services, it consists solely of plastic injection moulders. The majority of the plastic injection moulders in turn are supplying the automotive industry, including clients such as Volvo and Scania.

The **value proposition** of Verktygsmekano is the continuous modification, repair and refurbishment of the tools being used by the plastic injection moulders and the reliability of a timely execution and high quality results. These activities are currently the only source through which Verktygsmekano creates **revenue streams**. The foundation of the **customer relationship** between Verktygsmekano and its customers lies in the returning nature of customers in this business. Repair, modification and refurbishment are all done regularly in order to maximize the lifetime of the tools that are used. This requires a good contact and relationship management by Verktygsmekano for business continuity. Verktygsmekano communicates to their existing and potential customers through various **channels**. The large part of customer communication comes through e-mail exchange, while the delivery of the serviced tools to international customers is made by third party logistics provider. National transport is handled by Verktygsmekano themselves and sometimes through pick-ups by the plastic injection moulder. Today Verktygsmekano does not actively search for new customers but they do use advertising and exhibitions to some extent.

The **key activities** for Verktygsmekano to retain its current business and customers is well structured relations management, customer referral through tool manufacturer and owner Emikron Group as well as channel management. Good channel management consists of making sure Verktygsmekano keeps the right communication channels towards both customer and supplier and updating them accordingly. The importance of customer relationship cannot be undervalued and is conducted both through good contact with current customers as well as through parallel planning with Emikron Group and their customers.

In order to run their business and deliver value to their customer Verktygsmekano need a few **key resources**. These are the all the machines and components that are used to repair, modify and refurbish plastic injection mould tools. Due to the variance in order volume for Verktygsmekano they cannot have designated machine operators for all of their machines but rather flexible machine operators that have the skill and knowledge to operate several. Having designated machine operators would mean having idle workers when processing order where their designated machine is not being used. The **key partners** Verktygsmekano needs to run their business as consist of their international transportation partner TKL Logistics, component suppliers IVM, Masterflow and TEMEC along with their outsourcing partners Bröderna Carlsson and Tool Tech. Emikron Group acts as a source of customer referral and communications channel. Order income through Emikron Group is estimated to increase in the future.

Verktygsmekano's **cost structure** is mostly made up of fixed costs for machines and the factory grounds along with salaries for machine operators and management. There are variable costs associated with high/low volume seasonalities that occur throughout the year

which make out-/insourcing necessary. The relationship of these parts that make up Verktygsmekano's business model are illustrated in a Business Model Canvas (*see figure 17*)

Key Partners	Key Activities	Value Proposition	Customer Relationship	Customer Segments
International transport TKL Logistics Outsourcing of key activities: Bröderna Carlsson Tool Tech i Gislaved Component suppliers IVM Masterflow TEMEC Emikron Group	Customer relationships management Customer referral through Emikron Channel management **Key Resources** Flexible machine operators CNC machines Overhead cranes Turning machines Welding equipment EDM machines	Plastic injection mould tools -refurbishment -repair -modification Reliability High quality	99 % are returning customers Regular refurbishment, repair of plastic injection tools and personal meetings keep a healthy customer relationship **Channels** Customer contact 90 % through e-mail 10 % through telephone Direct product delivery through 3rd party Currently not activiely engaged in customer exploration. Use of advertising and exhibitions	Plastic injection moulders that deliver to: 90 % Automtive industry 10 % Other plastic applications

Cost Structure	Revenue Streams
Fixed costs in the form of machine operator salary Fixed cost associated with factory and machines Variable costs for during low/high volume seasonalities	Volumes greatly vary throughout the year All revenue comes from plastic injection moulders tool servicing, modification and refurbishing

Figure 17. Business Model Canvas for Verktygsmekano.

6.1.3 Emikron Group Value Chain

After interviewing Emikron Group, a Corporate Value Chain (*DePamphilis, 2010*) is created to better illustrate Emikron Group's current operations within the United Kingdom. Judging from the Corporate Value Chain, the absence of after-sales customer service is notable (*see figure 18*).

Figure 18. Corporate Value Chain, Emikron Group in the United Kingdom.

It is this gap in the Corporate Value Chain, focusing on after-sales services to the existing customers that the potential acquisition candidate will attempt to fill. This further emphasizes the key objective, which is delivering three suitable candidates for Emikron Group (*see figure 19*). A merger or acquisition of this sort, involving firms at different stages of the corporate value chain, is known as a *vertical merger* (*DePamphilis, 2010*).

Figure 19: Corporate Value Chain, Acquisition Target.

6.2 Search

Based on the needs and goals of Emikron Group established in the previous chapter *6.1 Identifying critical success factors & needs*, the first candidate acquisition pool is created based on the high-level search criteria:

1. Operating in the United Kingdom
2. Operating within plastic injection moulding industry
3. Manufacturing and/or servicing injection mould tools

Using the programs Thomson Reuters Eikon and S&P Capital IQ combined with the Google search engine, 114 companies were located over a three week period in October that fit into the high-level search criteria above. The majority of these companies were located due to being registered on three major company profiling websites, each of them focusing on the manufacturing industry:

GTMA – Engineering Companies Trade Association
Free index – UK business review
Engineering Capacity UK

A complete list of search phrases, keywords, websites and originating sources can be found in *Appendix 1*. The whole first draft list of companies can be found in *Appendix 2*. At this point, no in-depth qualitative assessment over the companies has been performed. The main focus of this step has been to generate a large list of companies that will determine the scope of the project. These 114 companies that the first search is comprised of will subsequently be subjected to additional, and more scrutinizing screening criteria as the project progresses.

6.3 Narrowing candidate acquisition pool

The 114 candidates in the candidate acquisition pool from *6.2 Search* are subjected to a more thorough screening process to narrow down the list of candidates. This involves an in-depth qualitative analysis over available company information on their respective websites. If the information on the website was insufficient they were contacted either by email or telephone to fill in the information otherwise not found on their respective websites.

The company screening was based on the analysis of Verktygsmekano chapter *6.1.1 What constitutes an after-sales oriented company?*. At this stage a majority of the companies on the candidate acquisition list were removed due to not being in the correct sector of plastic injection industry. Despite being in the plastic injection industry most candidates had little to no experience in performing after-sales services, resulting in being eliminated from the candidates list. This was the most prominent reason as to why companies were removed from the list of potential candidates. Other reasons were among other things not having the right equipment, being bankrupt or being noticeably too big for the two million pound investment capability.

After the screening was completed the list of potential acquisition candidates was substantially reduced from the initial 114 candidates to 17. At this point, all remaining candidates meet the needs from Emikron Group as well as the critical success factors from Verktygsmekano, therefore being prime candidates for acquisition.

See *appendix 3* for the full list of the final 17 candidates that passed the screening process.

6.4 Financial valuation methods

At this stage the 17 companies left in the candidate acquisition pool are all potential acquisitions that meet the requirements determined by Emikron Group as well as mimic the profile of Verktygsmekano. To further determine whether a company on the potential candidates list is a potential acquisition target it will be subject to a financial valuation that will determine its financial value. The financial value output of the valuation will serve as a baseline to determine the possible acquisition cost for Emikron Group. As provided by information from Emikron Group, this cost should not be greater than two million pounds (2M£). Companies that fall outside of this requirement along with inactive businesses and businesses that have not yet published any accounting information will be disregarded as candidates.

Due to the nature of the acquisition requirements given by Emikron Group the best valuation method would be one that prioritizes companies that could be acquired for a low price. This would be the case for companies where shareholders no longer receive a fair return on their invested capital, companies with small to no profits or companies with a high financial risk associated with the acquisition. The acquisition by Emikron Group would then bring new business to this company and make the company profitable.

The lack of transparency involving privately held companies dramatically increases the difficulty in valuing the company. Because the company is not being publically traded it is hard to know what is would be worth on the open market. The only public available information on the United Kingdom limited companies that are examined throughout this project is an abbreviated balance sheet with very limited information regarding the financial standings of the company. The information provided by *Companies' House* was examined in order to determine a suitable valuation method using the financial information available. The financial statement line items (FSLI) included as listed in the abbreviated balance sheets were:

- **Fixed Assets** divided into Tangible Assets and Intangible Assets
- **Current Assets** divided into Stocks, Debtors and cash at bank and in hand
- **Creditors** of amounts falling due within one year
- **Net Current Liabilities**
- **Total Assets Less Current Liabilities**
- **Creditors** of amounts falling due after more than one year
- **Provisions for Liabilities**
- **Net Assets**
- **Capital and Reserves** divided into Called up share capital and Profit and loss account
- **Shareholders' Funds**

6.4.1 Valuation methods for privately held companies

Without a detailed Profit and loss account for the listed companies there is no possibility to use any financial valuation methods of the income approach such as DCF. *Discounted Cash Flow*. Based on historical earnings, future earnings will be estimated and then discounted by an industry-average weighted average cost of capital (WACC) in order to calculate the DCF. Again due to the private nature of the companies that are looked into there is no weighted cost of capital that can be calculated using cost of equity since there is no public demand for a return on invested capital. Furthermore the possibility to find a cost of debt very limited, since the companies' interest rates are not public. Neither are historic earnings available to the public which eliminates the use of this valuation method. Other valuation methods that become inconceivable are all based on information found in the profit and loss account. This includes the P/E-ratio and multiples using EBIT/EBITDA for example.

Enterprise Value

A fact one should be wary of when using Enterprise Value (EV) to value a privately held company is that the amount of cash and cash equivalents wouldn't be reflected in the market value of common stock. Because the stock is not being traded on an open markets accessible to the public the company's equity value is not adjusted from carrying a high or low amount of cash and cash equivalents. Because of this fact it will not be subtracted when calculating a company's EV in this thesis. This is also true for a company's current investments and they will thus neither be subtracted when calculating the Enterprise Value. Taking this fact into consideration, the EV for private companies is equal to its equity value added to its total debt [EV = Equity + Debt].

Liquidation Value

In order to further assess the value of a potential acquisition the liquidation value will be used as a baseline for a company's value. It is the absolute lowest value for a company and its the amount paid out to the owners of a company is liquidated. As stated previously the liquidation value of a company is its adjusted book value or net assets minus liquidation associated expenses. For the purpose of this paper the liquidation value will be equal to the net assets for the respective companies as any speculation on liquidation associated expenses would be based on guessing and in order to calculate an adjusted book value, consultants would have to be hired to assess the true value of all company-held assets. This does not fall within the goal of this thesis and would be very impractical.

6.4.2 Company equity

Equity is the amount of capital invested by a company's owner(s) or what the company is worth to its owner(s). For a private company this means the current value of its assets subtracted by the value of its current liabilities. This is also called the Net Book Value or Net Worth [Equity = Total Assets - Liabilities]. The total amount of assets for each company is calculated by adding up fixed assets and current assets.

6.4.3 Company debt and liabilities

In the case of all the studied companies the amount of total liabilities and the total amount of debt are very similar. In most cases the liabilities were the company debts and It is the amount that the company owes to other parties such as bank loans, taxes payable or accounts payable. For the companies studied in this thesis the difference between debt and liabilities were the provision for liabilities that are part of the company's liabilities but not their debt. The studied companies' debts were calculated by adding **Creditors** of amounts falling due within one year and **Creditors** of amounts falling due after more than one year. When provisions for liabilities were added to this total debt the total amount of liabilities for a company has been calculated.

6.4.4 Calculating Enterprise Value

As stated previously the formula for calculating Enterprise Value or EV for a privately held company is [EV = Equity + Debt]. After collecting financial information of all companies that remain in the candidate pool from *Companies' House*, Total Asset, Total Debt, Liabilities, Net Assets, Liquidation Value and Enterprise Value were calculated for each of the companies. The information provided by Companies House is an extract from the *Register of Companies*.

Candidate 7 was removed due to the company having been marked as inactive. Candidate 10 was incorporated early in 2015 and has yet to submit its first accounts which are not due until April 2017. This caused them to be disqualified as a potential candidate. Candidates 8, 5, 12 and 15 were all eliminated because of their size and thereby the probable cost of investment. They all exceeded an Enterprise Value of two million pounds.

A total of six candidates have been removed from the pool of potential acquisition candidates. The 11 candidates that remain all have an Enterprise Value lower than two million British pounds, which is within the price range of Emikron Group for this project (*see table 3*).

Table 3. Candidates' Financial Information.

Candidate	Total Assets	Total Debt	Liabilities	Net Assets	Liquidation Value	Enterprise Value
6	£ 269,428	£ 158,254	£ 201,181	£ 68,247	£ 68,247	**£ 226,501**
3	£ 255,132	£ 211,149	£ 230,567	£ 24,565	£ 24,565	**£ 235,714**
11	£ 454,636	£ 320,434	£ 320,434	£ 134,202	£ 134,202	**£ 454,636**
4	£ 536,159	£ 329,517	£ 399,286	£ 136,873	£ 136,873	**£ 466,390**
16	£ 651,247	£ 169,082	£ 196,332	£ 454,915	£ 454,915	**£ 623,997**
13	£ 726,845	£ 650,007	£ 738,772	-£ 11,927	£ -	**£ 638,080**
14	£ 801,551	£ 314,486	£ 332,035	£ 469,516	£ 469,516	**£ 784,002**
2	£ 973,086	£ 624,875	£ 656,839	£ 316,247	£ 316,247	**£ 941,122**
17	£ 962,768	£ 398,043	£ 401,087	£ 561,681	£ 561,681	**£ 959,724**
9	£ 1,040,968	£ 386,032	£ 398,032	£ 642,936	£ 642,936	**£ 1,028,968**
1	£ 1,228,388	£ 1,116,158	£ 1,158,158	£ 70,230	£ 70,230	**£ 1,186,388**
~~8~~	£ 2,551,499	£ 1,633,027	£ 1,721,140	£ 830,359	£ 830,359	**£ 2,463,386**
~~5~~	£ 2,564,847	£ 1,667,476	£ 1,733,171	£ 831,676	£ 831,676	**£ 2,499,152**
~~12~~	£ 2,548,592	£ 1,043,734	£ 1,089,734	£ 1,458,858	£ 1,458,858	**£ 2,502,592**
~~15~~	£ 2,734,938	£ 544,047	£ 605,176	£ 2,129,762	£ 2,129,762	**£ 2,673,809**
~~7~~	-	-	-	-	-	-
~~10~~	-	-	-	-	-	-

6.5 Company ranking

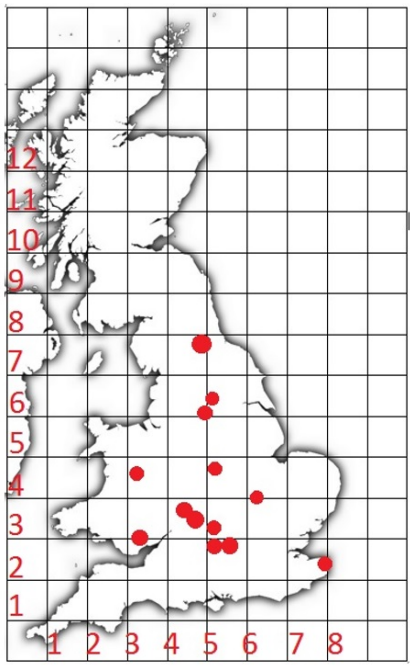
With the financial valuation completed, the remaining 11 candidates are ranked against each other in three different parameters: *Geographical location, Financial Risk* and *Equipment Inventory*. With all three parameters completed the final score between the candidates will be compared, and the five candidates with the highest score will proceed to the last step of the analysis, which is the on-site inspection of their respective facilities and operations. The following chapters *4.5.1-4.5.4* show how the ranking within the three different parameters has been performed with corresponding results.

6.5.1 Geographical location

Using the center of gravity method (CoG) aims to provide an accurate depiction over where in the United Kingdom the optimal location of the potential acquisition candidate will be in order to facilitate the current demand from the existing customers. Emikron Group has provided a list of the companies that have placed orders exceeding 50,000 pounds (GPB) over the past four years in the United Kingdom. This list of companies constitutes the demand and volume that the potential acquisition candidate is thought to serve.

A grid is placed on top of a map depicting the United Kingdom, creating a grid with an x- & a y-axis. On this grid the existing customers provided by Emikron Group have each of their locations marked out. Each customer's location registers to a certain x- and y-coordinate that

is weighted with its demand against the combined demand and locations of all the customers *(see figure 20)*.



$$C_x = \frac{\sum d_{ix} V_i}{\sum V_i} \qquad C_y = \frac{\sum d_{iy} V_i}{\sum V_i}$$

C_x = X coordinate of the Center of Gravity
C_y = Y coordinate of the Center of Gravity
d_{ix} = X coordinate of the ith location
d_{iy} = Y coordinate of the ith location
V_i = Volume of goods moved to or from the ith location

Figure 20. Center of gravity map - existing customers.

The resulting CoG coordinates corresponds to the area around the city of Birmingham in central England, marking it as the optimal location for a potential candidate to have its operations in (*see figure 21)*. By using the CoG method, the assumption is made that the demand during the coming years will have the same distribution and volume as the existing customers provided by Emikron Group have. If any of the customers with larger demands were to withdraw their business it could greatly affect the location of the CoG. Likewise, the CoG does not take into consideration of potential new customers arising.

In this case the resulting CoG is located in a close to the geographically centered part of England. Therefore, it slightly mitigates the potential loss of big customers, as well as hedges itself against the arrival of new potential customers.

Company #	Demand (V)	X-coordinate (Dx)	Y-coordinate (Dy)	Dx*V	Dy*V
Customer 1	5.9	5	8	29.5	47.2
Customer 2	4	4.5	3.5	18	14
Customer 3	3	4.5	3.5	13.5	10.5
Customer 4	2.55	3	3	7.65	7.65
Customer 5	2.5	5.2	2.8	13	7
Customer 6	1.5	5	3.3	7.5	4.95
Customer 7	1.4	5.2	4.5	7.28	6.3
Customer 8	1.3	8	2.5	10.4	3.25
Customer 9	1.2	5.4	4.3	6.48	5.16
Customer 10	0.6	3.3	4.5	1.98	2.7
Customer 11	0.55	5	6	2.75	3.3
Customer 12	0.5	5.7	2.8	2.85	1.4
Customer 13	0.5	4.8	6.5	2.4	3.25
	25.5			**123.29**	**116.66**

$$C_x = 4.8$$
$$C_y = 4.5$$

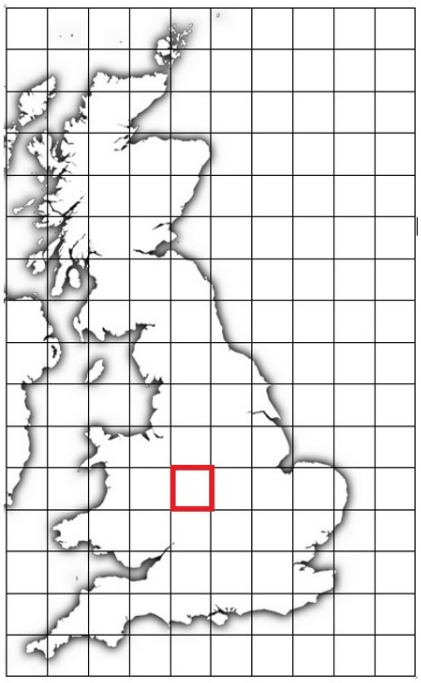


Figure 21. Center of gravity

With the CoG established, the potential acquisition candidates can now have their addresses compared to the CoG and their driving distances recorded using Google Maps. The driving distance of each potential acquisition candidate have been rounded to the nearest factor of 10. Companies within 50 driving miles of the CoG receive the highest score of five. Five candidates receive this score, where candidates 1 and 17 are both located within the city of Birmingham and therefore have 10 miles or less to the city center from which the distance has been calculated, making them ideal candidates in terms of geographical location. The candidates with a driving distance between 51-100 miles receive a score of four, in this case candidates 14, 2 and 9. Two candidates receive a score of three as they have 101-150 miles driving distance to the CoG, candidates 6 and 11. The candidate that has the furthest driving distance to the CoG is candidate 13, with 180 miles, that receives a score of 2 as it falls into the interval 151-200 miles of driving distance to the CoG (*see table 4*). The candidates all have their score multiplied with their multiplier to give them their final set of points

Table 4. Geographic parameter, Candidate score table

Candidate	Driving distance to CoG	Score	Multiplier	Points
7	10 miles	5	2	10
17	10 miles	5	2	10
3	40 miles	5	2	10
16	40 miles	5	2	10
4	50 miles	5	2	10
14	70 miles	4	2	8
2	100 miles	4	2	8
9	100 miles	4	2	8
6	120 miles	3	2	6
11	120 miles	3	2	6
13	180 miles	2	2	4

6.5.2 Financial Risk

For the purpose of company evaluation within this thesis, financial risk has been defined as the quotient of the company's liquidation value and its enterprise value.

$$[Financial\ Risk\ Quotient\ = \frac{Liquidiation\ Value}{Enterprise\ Value}]$$

The financial risk quotient is in other words is the part of the acquisition investment that would be returned upon liquidation of the business. Applying this principle on the remaining 11 acquisition candidates yielded a financial risk quotient between 0 and 0.73 (*see table 5*).

Table 5. Financial Risk.

Candidate	Liquidation Value	Enterprise Value	Financial Risk Quotient
13	£ -	£ 638,080	**0.00**
1	£ 70,230	£ 1,186,388	**0.06**
3	£ 24,565	£ 235,714	**0.10**
4	£ 136,873	£ 466,390	**0.29**
11	£ 134,202	£ 454,636	**0.30**
6	£ 68,247	£ 226,501	**0.30**
2	£ 316,247	£ 941,122	**0.34**
17	£ 561,681	£ 959,724	**0.59**
14	£ 469,516	£ 784,002	**0.60**
9	£ 642,936	£ 1,028,968	**0.62**
16	£ 454,915	£ 623,997	**0.73**

The results were broken down into five scores evenly distributed between a financial risk quotient of zero (0) and one (1), with one (1) being the highest achievable value and zero (0) being the lowest (*see table 6*).

Table 6. Financial Risk Quotient and Score.

Financial Risk Quotient	Score
0 - 0.2	1
0.21 - 0.4	2
0.41 - 0.6	3
0.61 - 0.8	4
0.81 - 1.0	5

A value of zero (0) would mean that there will be no return on the acquisition investment in case of a business liquidation while a value of one (1) would mean a return of the entire investment. The score is then multiplied by the multiplier determined to be used for financial risk and the new total is added to the company ranking score.

6.5.3 Comparing available equipment and operations

Using the information gathered from chapter "*4.1.1 What constitutes an after-sales oriented company?",* it is determined after interviewing CEO Niclas Estlander combined with an analysis of Verktygsmekano what equipment Verktygsmekano currently is using in the facilities to maintain their level of operations. Since the potential acquisition candidate in the United Kingdom is thought to mimic the functionalities and operations of Verktygsmekano, Verktygsmekano's equipment list and capabilities will serve as the minimum base-line by which all potential acquisition candidates will be compared to. Eight different types of machines in varying quantity are essential for maintaining Verktygsmekano's level of operations to its current customers. They are listed as *Machine 1 - Machine 8* below (*see table 7*).

Table 7. Minimum base-line based on Verktygsmekano.

Machine 1	Large multi-operational milling machine size able to support tools up to 10 tons
Machine 2	At least 3 to 4 smaller CNC milling machines
Machine 3	Welding equipment available. Minimum TIG-welding, preferably laser-welding
Machine 4	Grinding equipment
Machine 5	Manual & automatic milling equipment
Machine 6	Manual & automatic turning equipment
Machine 7	Wire erosion
Machine 8	Spark erosion
Lifting Capabilities	10 tons

With a minimum base-line established, information on all candidates current operating equipment needs to be gathered in order to perform an accurate comparison. All available information from the candidate's websites were collected and compiled. However, after going through all available information of the candidates that was available online it was soon made apparent that the information was very insufficient. Most candidates chose not to reveal key

information pieces regarding their operations in terms of operational equipment. To circumvent this issue, an alias and corresponding email was set-up to allow the authors to pose as customers without revealing the case company or the author's intentions to potentially attempt to acquire them. All of the candidates were contacted by either email or phone to discuss their operational equipment. At this point, nearly all candidates were willing to openly discuss their operations and equipment, allowing for a complete equipment comparison to be done. See the complete list of all the companies' equipment compared to the established base-line in *table 8* below:

Table 8. Equipment comparison.

Candidate	Machine 1	Machine 2	Machine 3	Machine 4	Machine 5	Machine 6	Machine 7	Machine 8	Capacity
1	yes	yes	yes	yes	yes	yes	yes	yes	16 tons
2	no	yes	yes	yes	yes	yes	no	yes	4 tons
3	-	-	-	-	-	-	-	-	-
4	no	yes	yes	yes	yes	yes	yes	yes	1.5 ton
6	no	yes	no	yes	yes	yes	yes	yes	2 tons
9	yes	yes	yes	yes	yes	yes	yes	yes	10 tons
11	yes	yes	yes	yes	yes	yes	yes	yes	10 tons
13	yes	yes	no	yes	yes	yes	no	yes	1 ton
14	no	yes	yes	yes	yes	yes	yes	yes	2.5 ton
16	no	yes	yes	yes	no	yes	yes	yes	3.2 ton
17	yes	yes	yes	yes	yes	yes	no	yes	10 tons
Base-line	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**10 ton**

Candidate 3 in *table 8* has all its information missing. This is due to no operational equipment being listed on the candidate's website during the time of visit. When contacted, it was made clear that they were unable to facilitate our desired after-sales services as it would imply a conflict of interest for them as a company. Candidate 3 will therefore receive a score of 0, and subsequently removed as a potential top 5 contender.

The companies are each given a score depending on the amount of equipment that is missing compared to the base-line. For every missing piece of essential equipment the candidates have 1 score removed from the maximum of 5. This means that a candidate that isn't missing any equipment receives a score of 5, while a candidate that is missing 5 or more pieces will receive a score of 0 (*see table 9*).

Table 9. Operational equipment parameter, Candidate score table.

Candidate	# equipment missing	Score	Multiplier	Points
1	0	5	3	15
2	3	2	3	6
3	5	0	3	0
4	2	3	3	9
6	3	2	3	6
9	0	5	3	15
11	0	5	3	15
13	3	2	3	6
14	2	3	3	9
16	3	2	3	6
17	1	4	3	12

The result of the operational equipment scoring shows that candidates 1, 9 and 11 have all the necessary equipment to meet to base-line requirements and therefore reach a maximum score of 15. Candidate 3 is the only candidate that fails to grab any points this this segment's ranking. This due to the potential conflict of interest with the candidate's current operations.

6.5.4 Ranking results

With the scoring of candidates in the individual parameters complete, a table depicting the final result is shown below (*see table 10*). From this table, it is clear that the five candidates with the highest total points in descending order are candidates 9, 1, 17, 11 and 4. By finishing as the top five candidates in the ranking, these candidates are deemed as the most suitable candidates for acquisition for Emikron Group and therefore move to the final assessment step which is an on-site inspection of their facilities and operations.

Table 10. Total Ranking Points all parameters.

Candidate	Geographic location			Financial Risk			Equipment			Total points
	Score	Multiplier	**Points**	Score	Multiplier	**Points**	Score	Multiplier	**Points**	
1	5	2	**10**	1	1	**1**	5	3	**15**	**26**
2	4	2	**8**	2	1	**2**	2	3	**6**	**16**
3	5	2	**10**	1	1	**1**	0	3	**0**	**11**
4	5	2	**10**	2	1	**2**	3	3	**9**	**21**
6	3	2	**6**	2	1	**2**	2	3	**6**	**14**
9	4	2	**8**	4	1	**4**	5	3	**15**	**27**
11	3	2	**6**	2	1	**2**	5	3	**15**	**23**
13	2	2	**4**	0	1	**0**	2	3	**6**	**10**
14	4	2	**8**	3	1	**3**	3	3	**9**	**20**
16	5	2	**10**	4	1	**4**	2	3	**6**	**20**
17	5	2	**10**	3	1	**3**	4	3	**12**	**25**

6.6 On-site inspection

To distinguish which of the remaining five candidates would become the final three, the on-site inspection was performed to validate the existing information retrieved from early communications and from their respective websites.

By expressing an interest in sourcing a great deal of after-sales activities to the final five candidates, they all allowed the authors a 1 hour audience with them at their facilities. During this time a tour of the operations and facilities was performed to validate the information obtained earlier regarding their operations and equipment. Along with the quantitative analysis in terms of facilities and equipment, a great deal of qualitative information was gathered: ownership structures, recent trends, employee capabilities and general attitudes to mention a few. What type of qualitative information that was gathered from the candidates varied greatly. This due to the authors not wanting their true intentions to become apparent, and therefore refrained from asking to intimate questions. The qualitative information will be presented in the final recommendations chapter. In this segment focus will be on the quantitative information gathered from each visit to determine if the current top three candidates from the previous ranking will remain as the top three candidates, or if any changes in the current ranking is necessary.

Before performing the on-site inspection, candidates 9, 1 and 17 were the top three candidates with 27, 26 and 25 points respectively. After performing the on-site inspection, it was made clear that candidate 9 did not have the lifting capabilities that they claimed. Instead of the 10 ton capabilities it was in fact 5 tons. This means that candidate 9 loses three points in the existing ranking and drops down from first place to third place (*see table 11*). The other candidates had no change to their current standing in the final points ranking as their facilities and equipment all matched the information received earlier.

Table 11. Final result top three candidates.

Candidate	Points before inspection	Change	Final results
9	27	-3	24
1	26	0	26
17	25	0	25
11	23	0	23
4	21	0	21

In spite of losing three points candidate 9 is still among the top three candidates along with candidate 1 and 17. These three candidates represent the result of this thesis and case study and will subsequently be presented to Emikron Group.

7. Case recommendations

In this segment the final three candidates that will be delivered to Emikron Group are presented. It will be a combination of the existing candidate rankings combined with the information provided from the on-site inspection both in terms of qualitative and quantitative information.

Based on the acquisition strategy developed by the authors, 114 companies have been targeted and analyzed both quantitatively and qualitatively within the plastic injection moulding industry in the United Kingdom. After subsequently eliminating candidates by introducing additional parameters, three final candidates have been produced that are deemed the best target companies for acquisition to meet the needs and criteria of Emikron Group.

7.1 Candidate 1

26 Points.

Located within 10 miles of the center of gravity, the facility and operations of Candidate 1 is situated extremely near the optimal location in terms of satisfying the existing customers. With an enterprise value of 1,073,095 £ it falls within the investment range that Emikron Group has declared as acceptable. In terms of equipment and operations It not only has the minimum requirements set as the equipment base-line, but also supports bigger tools (lifting capabilities up to 16 tons).

The financial risk with Candidate 1 is very high. If Candidate 1 were to be liquidated today only 50,000£ would be refunded (6% of the enterprise value). When visiting Candidate 1 it was made clear that many recent investments have been made in large equipment and new facilities, this could be one explanation as to the low liquidation value. This high risk associated with Candidate 1 is not necessarily a negative aspect from Emikron Group’s perspective. If Emikron Group is confident they can avoid liquidation this financial risk can be used to negotiate a lower price if an acquisition was pending.

Candidate 1 is experienced in dealing with the automotive industry. Over 90% of their new tool manufacturing and after-sales services are performed towards the automotive industry. Today Candidate 1 services tools that not only inject plastic, but also different types of metal. When asked if they could manage a “substantial increase” in order volume of servicing plastic injection mould tools the response was positive. The fact that Candidate 1 also services injection tools that use metals is seen as a good additional revenue stream to the existing business Emikron Group is looking for.

7.2 Candidate 17

25 Points.

Candidate 17 is, just like Candidate 1, also located within 10 miles of the center of gravity. Therefore, scoring the highest in terms of geographical location. With an enterprise value of 959,724 £ it costs roughly the same as Candidate 1, well within the 2 £ maximum investment capabilities of Emikron Group. With a liquidation value of 561,691£ (59% of enterprise value) the risk of Candidate number 17 is set at a relatively standard rate. In terms of operations and equipment, Candidate 17 has no new tool manufacturing and operates only with after-sales services. The only equipment they are missing is a wire-eroder, a piece of equipment that Candidate 17 has had but did not use often enough to merit owning one.

Candidate 17 has done business with ARC before and has a good standing relationship with one of the subsidiaries of Emikron Group (specifically ARC UK). As the relationship between Candidate 17 and Emikron Group subsidiary ARC UK is good, this could be seen both as a negative and a positive standpoint. The negative aspect is jeopardizing an already established working relationship. The positive aspect is that a good business relationship can mean a solid foundation and trust to base an acquisition on.

Candidate 17 has been family owned for three generations with one current owner. A business that has been family owned for three generations could possibly be difficult to negotiate with, as there could be an unwillingness to sell 100% ownership to anyone outside their family.

7.3 Candidate 9

24 Points.

Candidate 9 is the third and final candidate. Situated in the vicinity of Leeds this candidate is located 100 miles away from the center of gravity. Geographically not ideal, as this translates to an average 2 hour drive further to each customer of Emikron Group’s existing customers. With an enterprise value of 1,028,968 £ Candidate 9 is priced fairly even compared to the other two candidates. A liquidation value of 642,936 £ (62% of enterprise value) puts the financial risk within the average interval. In terms of operational equipment, Candidate 9 did not have lifting equipment to support the 10 ton lifting minimum (Candidate 9 has a 5 ton crane). To perform service on the biggest tools the lifting equipment would need to be upgraded.

The owner described himself as an entrepreneur. 8 years ago he purchased another manufacturing company and sold it after only two years making a substantial profit. Following that deal he purchased Candidate 17 that he has been running over the past six years up to this day. This can be interpreted as a clear indicator of someone willing to sell his company if the price is right, therefore making Candidate 17 ideal to pursue in terms of realizing an acquisition in the United Kingdom.

Candidate 17's facility was located in an industrial park where several lots had been abandoned. The owner described this as the potential for future growth if business increased to a point that the current facility no longer could support the operations. It is the author's opinion that this day might come sooner rather than later, as the facility was considerably smaller than the other two candidates and the equipment was stationed very close to each other to fit in the facility.

Due to this, it would be necessary to assume that should this company be acquired the need for additional facilities will most likely be necessary if the company is looking to grow.

8. Evaluation of the Case Model

The purpose of the case model created by the authors was to have a foundation from which to build a solid acquisition proposal. In this chapter the authors will evaluate how the model was used and how successful the model was in serving as the foundation on which the project was executed. This chapter also looks at how the model was concretized through the empirical analysis. One general problem that the authors had throughout the completion of this project was the gathering of reliable information and data. There is cause for the model to be more focused on how the information is to be collected since there was less problem with the analysis. A model that is more concretely applicable as to how data will be collected could have been more useful in a project like this.

8.1 Acquisition Plan

The first part of the model was the acquisition plan. It was largely made up of identifying critical success factors for an acquisition to be successful and worthwhile. A list was formulated that contained what the authors believed to be the information necessary to determine what companies would be considered potential candidates. Having not had any prior specific information of businesses in this industry the starting point was quite broad and unspecific. This resulted in a few of the firstly identified success factors not being listed among the empirical results (*see figure 22*). An example of this was the *current customers in the UK*. After having interviewed key persons at Emikron the authors deemed this no longer a critical success factor. Some factors had to be altered or removed because information just wasn't available such as the *materialistic needs and equipment requirements*. This critical success factor was in the end buried within the potential cost of the target company, since all equipment is readily available at a cost and the price is mostly dwarfed by that of the acquisition itself.

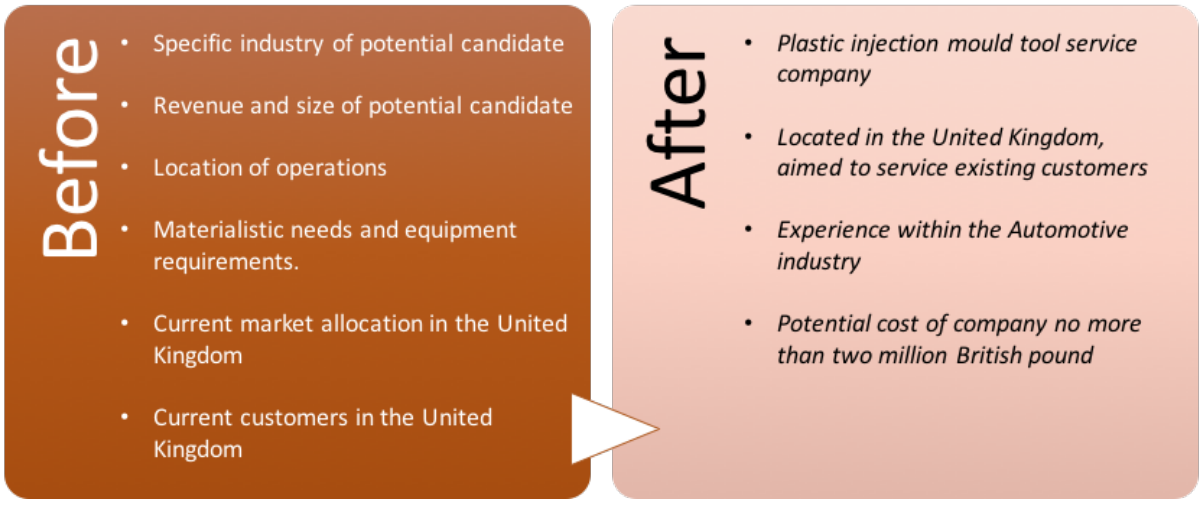


Figure 22. Changes in critical success factors

8.2 Search

This part of the model took shape in the project as the compilation of the first candidate acquisition pool. Using high-level search criteria from the acquisition plan a first, large list of potential companies was created. This turned out to be more troublesome than first expected. Because the companies in this business were largely privately owned, there was very limited information and no companies that matched what we were looking for were found in the databases the authors first used. After a more qualitative approach a list of potential companies was created. The authors used a combination of search terms linked to the tool manufacturing business in order to find potential target companies. The list was smaller than the authors first had anticipated it to be but in all likelihood the vast majority of potential acquisition targets would be on this list.

8.3 Screen

The companies contained in the first candidate acquisition pool would then be screened by several criteria to determine which ones are fit to be recommended as acquisition targets to the case company, Emikron. Before the actual valuation and ranking of companies is done.

8.3.1 Second candidate acquisition pool

This was the first step, where the authors rejected all the companies from the first list that were not actually the correct type of company. This was done using the critical success factors from the acquisition plan and qualitative research on each of the companies' webpages, e-mails as well as phone calls. The only information the authors had to go on before this, were the companies' names, addresses and the search tags through which the companies had been found. By researching these companies' webpages and contacting them the nature of their business could easily be determined. This could not have been done had the first list been a lot longer, since the process was very time-consuming.

8.3.2 Financial valuation

The financial valuation was probably the hardest part to get right. There are many good financial valuation methods and models linked to business acquisition but all of them make use of a number of financial statements that the authors did not have access to. Through the UK government site, *Company House,* it was possible to find an abbreviated balance sheet of most of the companies now remaining. Using some justifications and logical reasoning the authors altered and combined some of the existing financial valuation methods in order to create a financial valuation yielding usable results for the purpose of this case. The result was the financial risk quotient that became the financial representation of the remaining companies.

8.3.3 Company ranking

The results of the company ranking gave the authors the best potential candidates to be acquired by Emikron. The result seemed plausible as the top companies had throughout the

evaluation stages steadily seemed like the best candidates for an acquisition. The ranking process in itself was very straight-forward, although there was room for improvement here since the multipliers for the three different ranking factors were decided subjectively. In a more complex version of this ranking system, the input from all three factors could be converted to present money value. This would have made the ranking infinitely more complex as it would be hard to anticipate the value of company locations due to the relation to upcoming deliveries and orders. By changing the multipliers of the different ranking factors one could easily reflect a different prioritization. For example, when using this model in a different situation, industry or company, the geographic location could be of greater importance. By increasing the geography multiplier and decreasing the other two the model would reflect that fact and give a more relevant result.

8.4 First Contact

The on-site inspection of the top candidates mostly served to confirm and dismiss the information that the authors had used to evaluate the company. In one case a company that seemed questionable regarding its primary focus, turned out to have the precise machinery and expertise to fulfill the requirements set by the authors. The authors feel that the on-site analysis maybe could have been more quantifiable to be very useful in the sort of model that was created. On the other hand, it was impossible to know how much information the respective companies would make available once visited.

8.5 Model Transferability

As the general academic contribution of the work and the model itself, the authors are convinced that this model will be applicable to any acquisition similar in size and nature on the UK market. If sites equal to the UK *Company House* can be found for other countries this model and overall process could be used there as well. The methods used throughout this model and the model itself are easily replicated for any other intended acquisition for small-medium sized, privately held companies in the UK. When looking at publically traded companies or companies in general where there is more information available, there are better financial valuation methods available. The rest of the developed acquisition model applies just as well even in these cases.

9. Project Objective Fulfillment & Contribution

The acquisition strategy was successful in producing relevant candidates that fit the needs of Emikron group. The authors have successfully fulfilled the objectives outlined in - 1.7 Project objective - and produced the deliverables as intended. With the final three candidates produced by the acquisition strategy, the next step for Emikron Group (should they choose to continue with the given result) is to deliver a letter of intent to the candidates, notifying them of Emikron Group's intention of acquisition.

9.1 Research Criteria

The candidate company information that the project builds upon is considered valid and reliable as it has been verified both by on-site inspection and personal contact with target company representatives. Several search iterations have yielded the same company information, further verifying the reliability of the information at hand.

9.2 Academic Contribution

The authors have created a strategy and model that is specifically tailored towards smaller privately held industrial companies within the United Kingdom.
It is the authors' opinion that this strategy can be applied to a variety of different industrial manufacturing industries apart from plastic injection moulding, as well as in different countries facing similar circumstances. With minor adjustments to the model or more case-specific choices within the model such as the multiplier values, the possible applications of this model are near limitless. Even though the model is especially useful in target markets and companies where there is limited financial information available, it can be used where there is an abundance in information available. The model will generate very usable results in any case as long as reasonable adjustments are made. The ranking multipliers used in this project are the results of a line of reasoning connected to the specific circumstances of one market and industry. They can easily be adjusted for any other industry. Even though this particular model will have the most success when looking at production companies with significant inventory and machinery, it could also have its uses for a service-based company or industry. In that case the equipment factor would have to include the human capital aspect. This would increase the complexity and no longer be a straight forward quantitative measurement.

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Appendix

Appendix 1 – Search terms and timestamps

Search term	Timestamp
Plastic injection mould makers UK	2015-10-02
Plastic injection mould toolmakers UK	2015-10-03
Plastic injection mould tool manufacturer UK	2015-10-03
Plastic injection moulders UK	2015-10-03
Plastic injection mould toolers UK	2015-10-05
Plastic mould toolmakers UK	2015-10-05
Plastic mould makers UK	2015-10-07
Plastic mould toolers UK	2015-10-07
Plastic mould tool manufacturer UK	2015-10-07
Injection mould makers UK	2015-10-08
Injection mould toolmakers UK	2015-10-08
Injection mould tool manufacturers UK	2015-10-08
Injection mould toolers UK	2015-10-08
Injection moulders UK	2015-10-08
Plastic injection moulders UK	2015-10-08
Plastic toolmakers UK	2015-10-08
Injection toolmakers UK	2015-10-09
Injection tooler UK	2015-10-09
Injection tool manufacturer UK	2015-10-09
Plastic injection mold makers UK	2015-10-09
Plastic injection mold toolmakers UK	2015-10-09
Plastic injection mold tool manufacturer UK	2015-10-09
Plastic injection molders UK	2015-10-12
Plastic injection mold toolers UK	2015-10-14
Plastic mold toolmakers UK	2015-10-14
Plastic mold makers UK	2015-10-15
Plastic mold toolers UK	2015-10-16
Plastic mold tool manufacturer UK	2015-10-16
Injection mold makers UK	2015-10-16
Injection mold toolmakers UK	2015-10-17
Injection mold tool manufacturers UK	2015-10-18
Injection mold toolers UK	2015-10-18
Injection molders UK	2015-10-19
Plastic injection molders UK	2015-10-20

Appendix 2 – First candidate draft list

3Dimensional Ltd	Investment Tooling International
A F Gaskin Ltd	J Cam
AAV Plastics Ltd	J G Fowler Engineering
ADM Precision Tools	Jobec UK Ltd
Adreco Ltd	Kelland Precision Tooling Ltd
Agemaspark	Kiartis ltd
Agentdraw	L Hodge Engineers (UK) ltd
Airforme Products	Langstone Engineering ltd
Alan Meeks at Visitech Design	Ledwell Plastics
Alliance Tooling	Light Patterns & Tooling Ltd
Anderside Tools	Lodent Precision Ltd
Appliance Training	LPS Engineering ltd
AV Plastics	Lynar Manufacturing
Balls Grinding	Mason Pinder Toolmakers ltd
Batchelor Polyurethanes Ltd	Mastermoulders
Beaubury Precision Moulds Ltd	Maxmag Moulded Magnets Ltd
BEC Group	MBE Precision Engineering Ltd
Berger Tools	Metal Marking
Blow-it	MHP Industries Ltd
Boddingtons Technical Plastics	Microkerf
Broadvale Ltd	Midland Precision Toolmakers
BS Tooling	Mingkang Co., Ltd
CA Models	Moorland Toolmaking Company
Cahill Plastics ltd	Mouldtech Solutions
Cgp Engineering Ltd	ND Precision Products
CL Designs Ltd	Omega Plastics
Colourfoil Ltd	Paul Norman Plastics Ltd
Complete Tooling Solutions	Plastech Tooling and Moulding ltd
Copeland and Jenkins	Portchester Microtools ltd
CRDM	PPL Polyurethane Products Ltd
CRDM lth	Premier Mould Services
Crossen Engineering	Pro-Moulds Midlands Ltd
Crunch Tooling Ltd	Procom Engineering Europe
CSS Group	Protek Ltd

Cutter Care	Protool Manufacturing Ltd
Cutting Corners Mitre Makers Ltd	R A Labone
DCE Holne (R&D) Ltd	RG Engineering Ltd
Denholm Rees & O´Donnell ltd	Rotomachines Ltd
Dudley Associates Ltd	Rotomech Engineering Ltd
EDS Engineering	Rtr
ENL Ltd	S&S Plastics
Essex injection mouldings	Saif Mikail Limited
Euromould	Signal Plastic Components Ltd
European Tool Steels Ltd	Somatech ltd
Extem Engineering Ltd	Spring Tool and Die
Faulkner Moulds	SSE Precision Engineering
G M Tools	Strand GRP
Gotools	Stuart Precision Engineering
GT Group	Superite Tools
H Eccles (Patternmakers) ltd.	Synergy Tooling Solutions Ltd
Hang Plas	Thomas Keating
Hayden Products Ltd	Thornflex Plastics
HBC Engineering Solutions ltd.	Tower Tool Company Ltd
Hi-Technology Group	Tyne Valley Plastics Ltd
Hockley Pattern & Tool Company	UCP Auto Turned Parts ltd
HT Tooling Solutions	Uniplas UK Ltd
Hymid Multi Shot Ltd	White Horse Plastics Ltd

Appendix 3 – Second candidate draft list and complete financial information

		2014					2013					
Candidate	Total Assets	Total Debt	Liabilities	Net Assets	Liquidation Value	Enterprise Value	Total Assets	Total Debt	Liabilities	Net Assets	Liquidation Value	Enterprise Value
1	£1,228,388	£1,116,158	£1,158,158	£70,230	£70,230	£1,186,388	£1,074,096	£1,022,592	£1,023,592	£50,504	£50,504	£1,073,096
2	£973,086	£624,875	£656,839	£316,247	£316,247	£941,122	£950,129	£611,763	£654,155	£295,974	£295,974	£907,737
3	£255,132	£211,149	£230,567	£24,565	£24,565	£235,714	£282,797	£237,154	£259,576	£23,221	£23,221	£260,375
4	£536,159	£329,517	£399,286	£136,873	£136,873	£466,390	£390,223	£196,187	£236,128	£154,095	£154,095	£350,282
5	£2,564,847	£1,667,476	£1,733,171	£831,676	£831,676	£2,499,152	£2,613,703	£1,623,559	£1,664,647	£949,056	£949,056	£2,572,615
6	£269,428	£158,254	£201,181	£68,247	£68,247	£226,501	£276,175	£200,220	£229,772	£46,403	£46,403	£246,623
7	*Company inactive*											
8	£2,551,499	£1,633,027	£1,721,140	£830,359	£830,359	£2,463,386	£1,883,437	£1,107,498	£1,195,611	£687,826	£687,826	£1,795,324
9	£1,040,968	£386,032	£398,032	£642,936	£642,936	£1,028,968	£1,205,082	£516,024	£552,638	£652,444	£652,444	£1,168,468
10	*Newly incorporated, First accounts due by April 2017*											
11	£454,636	£320,434	£320,434	£134,202	£134,202	£454,636	£351,431	£239,964	£239,964	£111,467	£111,467	£351,431
12	£2,548,592	£1,043,734	£1,089,734	£1,458,858	£1,458,858	£2,502,592	£2,458,428	£1,080,517	£1,125,517	£1,332,911	£1,332,911	£2,413,428
13	£726,845	£650,007	£738,772	-£11,927	£-	£638,080	£356,025	£326,154	£349,211	£6,814	£6,814	£332,968
14	£801,551	£314,486	£332,035	£469,516	£469,516	£784,002	£840,627	£383,481	£400,271	£440,356	£440,356	£823,837
15	£2,734,938	£544,047	£605,176	£2,129,762	£2,129,762	£2,673,809	£2,311,691	£608,367	£672,622	£1,639,069	£1,639,069	£2,247,436
16	£651,247	£169,082	£196,332	£454,915	£454,915	£623,997	£451,074	£133,408	£150,908	£300,166	£300,166	£433,574
17	£962,768	£398,043	£401,087	£561,681	£561,681	£959,724	£720,721	£371,030	£372,896	£347,825	£347,825	£718,855