Entry barriers on the training simulator market for construction vehicles in Europe

Authors:
Fjeldheim Ek, Dan – 860213-2774
Mulisic, Anes – 870809-9430
Syta, Filip – 870111-0291

Examinator:
Bill, Frederic

Tutor:
Philipson, Sarah
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Dan Fjeldheim Ek    Anes Mulisic               Filip Syta
Abstract

The research question which we will answer in this paper is following: What are the four entry barriers that are most difficult to overcome when entering the training simulator market for construction vehicles in Europe?

To answer this research question we performed a study on nine companies in the training simulator market for construction vehicles and asked them to rank 25 entry barriers on a Likert scale in order of importance.

The results of our research study show us the barriers of importance. The top four barriers are: R&D expenses in entering a market, access to distribution channels, selling expenses and costumer loyalty advantage held by incumbents. There are several factors affecting the barriers importance on the market. Product type, market characteristics’ and the competitors are some of the most important factors. These factors make the market unique and difficult to generalize. The specific combination of factors creates entry barriers that are unique to the specific market.

Key words: Entry barriers, industrial market, training simulators, entry strategy, high tech product, market entry
Table of contents

1. Introduction ................................................................................................. 8
  1.1 Background................................................................................................. 8
  1.2 Problem discussion.................................................................................... 10
  1.3 Purpose ....................................................................................................... 11
  1.4 Delimitation ............................................................................................... 11

2. Theoretical framework ................................................................................. 12
  2.1 Porter’s five forces .................................................................................... 13
    2.1.1 Competitive rivalry within an industry............................................. 14
    2.1.2 Bargaining power of suppliers......................................................... 14
    2.1.3 Bargaining power of customers....................................................... 15
    2.1.4 Threat of new entrants..................................................................... 15
    2.1.5 Threat of substitute products......................................................... 17
  2.2 Porter’s Generic competitive strategies..................................................... 17
    2.2.1 Cost leadership .................................................................................. 17
    2.2.2 Differentiation ................................................................................... 18
    2.2.3 Focus ................................................................................................. 18
  2.3 Entry Modes .............................................................................................. 18
  2.4 Take-off time ............................................................................................. 21
    2.4.1 Entry Strategy; The focal point....................................................... 22
    2.4.2 Penetration strategy......................................................................... 22
    2.4.3 Compatibility ..................................................................................... 23
    2.4.4 Pre-announcing ............................................................................... 23
2.4.5 External route to market ........................................................................................................24
2.5 Barriers for entering an industrial market ..............................................................................24
2.6 State of the art ..........................................................................................................................26

3. Research question ......................................................................................................................27

4. Methodology ................................................................................................................................28

4.1 Research design ........................................................................................................................28
4.2 Sampling .....................................................................................................................................28
4.3 Operationalization .....................................................................................................................29
  4.3.1 Interview template for actors on the training simulator market ............................................29
  4.3.2 Interview template to understand the rules and regulations in Europe for construction
      vehicles driving licenses ...........................................................................................................30
4.4 Data collection ...........................................................................................................................30
  4.4.1 Primary Data .......................................................................................................................30
  4.4.2 Secondary data ....................................................................................................................31
4.5 Semi-structured interviews .......................................................................................................31
4.6 Likert scale ................................................................................................................................32
4.7 Validity .......................................................................................................................................33
4.8 Reliability ..................................................................................................................................33

5. Empiricial framework ....................................................................................................................34

5.1 Presentation of Volvo Construction Equipment ..........................................................................34
5.2 Presentation of Volvo Construction Equipment’s Advanced Training Simulator ......................35
5.3 Competitor analysis of the training simulator industry for construction vehicles ....................37
  5.3.1 Caterpillar ............................................................................................................................37
  5.3.2 Simlog ..................................................................................................................................39
<table>
<thead>
<tr>
<th>Section</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3.3</td>
<td>John Deere</td>
</tr>
<tr>
<td>5.3.4</td>
<td>Tenstar Simulation</td>
</tr>
<tr>
<td>5.3.5</td>
<td>Komatsu</td>
</tr>
<tr>
<td>5.3.6</td>
<td>Hitachi Construction Machinery Co. (Hitachi)</td>
</tr>
<tr>
<td>5.3.7</td>
<td>Doosan</td>
</tr>
<tr>
<td>5.3.8</td>
<td>Liebherr</td>
</tr>
<tr>
<td>5.4</td>
<td>Importance of barriers to market entry in industrial markets - Survey</td>
</tr>
<tr>
<td>5.5</td>
<td>Market analysis</td>
</tr>
<tr>
<td>5.5.1</td>
<td>Swedish market</td>
</tr>
<tr>
<td>5.5.2</td>
<td>Norwegian market</td>
</tr>
<tr>
<td>5.5.3</td>
<td>Polish Market</td>
</tr>
<tr>
<td>6.1</td>
<td>Top four entry barriers for the training simulator market for construction vehicles</td>
</tr>
<tr>
<td>6.1.1</td>
<td>R&amp;D expense involved in entering a market</td>
</tr>
<tr>
<td>6.1.2</td>
<td>Access to distribution channels</td>
</tr>
<tr>
<td>6.1.3</td>
<td>Amount of selling expense involved in marketing a product</td>
</tr>
<tr>
<td>6.1.4</td>
<td>Customer loyalty advantage held by incumbents</td>
</tr>
<tr>
<td>6.2</td>
<td>Top four entry barriers in Karakaya’s study of industrial markets in general</td>
</tr>
<tr>
<td>7.</td>
<td>Conclusion</td>
</tr>
<tr>
<td>8.</td>
<td>Reflections</td>
</tr>
<tr>
<td>8.1</td>
<td>Recommendations to conquer “R&amp;D expense involved in entering a market”</td>
</tr>
<tr>
<td>8.2</td>
<td>Recommendations to conquer “Access to distribution channels”</td>
</tr>
<tr>
<td>8.3</td>
<td>Recommendations to conquer “Amount of selling expense involved in marketing a product”</td>
</tr>
</tbody>
</table>
8.4 Recommendations to conquer “Customer loyalty advantage held by incumbents” .................. 60

9. Suggestions for further research ......................................................................................... 62

10. References ...................................................................................................................... 63

 Appendix 1

 Appendix 2
1. Introduction

1.1 Background

The world is becoming more globalized; people and companies are crossing borders, developing their views and interests. Companies make business not only with their neighbor countries, but faraway overseas. In this new world of technology it is easier doing and expanding business overseas than ever before.

Especially the European market has changed since the European Union was founded and new regulations established. It is easier for European citizens to work and start businesses in other European Union countries. It is easier for companies to expand and enter new markets, as regulation is similar, EU-Upplysningen (2010).

To sell your product or service in a foreign country you have to enter the specific market, which due to many different factors may not be easy. We call these factors “Entry barriers”. One factor that can influence the market entry is culture. It can be completely different and contradictory to one’s own, which may cause problems. Your product or the strategy for selling it may not be accepted or appreciated the way you expected.

Other problematic factors can be different laws, regulations or politics by the government or others that can forbid the product, or affect the demand for it. There can also be problems with price and quality requirements. To enter some markets there is a high demand of capital and a strong economy. Last but not least, when you are not a first mover on the market there are competitors on the market as well. All these factors are important and must be evaluated in order to form a successful strategy for the market entry.

There are several types of markets with different characteristics such as monopoly, duopoly, oligopoly and perfect competition. All these markets consist of different conditions and possibilities, which affect the behavior on the market, Ekeledo et al. (1998). The type of market characteristics determines how the entry barriers will appear. Different strategies need to be applied to market entry, depending on the market of interest and its characteristics, Montaguti et al. (2002).

It is interesting how these characteristics influences companies’ ways of making decisions to succeed in a specific market, and force them to take certain actions. One market of special interest for us is the industrial market that offers training simulators for construction vehicles. Training simulators for this type of vehicles are relatively new products with a high
technology. Driving simulators was originally developed to help educating and training militaries to operate war machinery during the Second World War. In the late 1970’s, computer technology was improving swiftly and there were at least sixteen driving simulators in the United States and two in Europe. This kind of driving simulators has always needed to persuade the world that the performance in a simulator is comparable with the performance in a real machine. Back in the 1980’s the general opinion was that driving simulators provided an artificial environment that never could be identical to the real one, Blana (1996).

According to M&SCO (2010) education through simulators can be divided into three different categories of simulations:

– Live simulation: is when real people are using simulated equipment in the real world.

– Virtual simulation: are real people using simulated equipment in a virtual environment.

– Constructive simulation: simulated people using simulated equipment in a simulated environment.

The simulator market is becoming more and more developed and with today’s technology, the overall simulator market is growing and expanding with a high acceleration, Rinaldo (2010) & Bergman (2010). Therefore companies are starting to see future opportunities in the industry and want to enter, but there are plenty of obstacles in form of entry barriers that will make the entrance difficult.
1.2 Problem discussion

Today simulators are used in several more areas than just educating militaries, such as practicing in operating cars and airplanes. A relatively new area is the education of drivers in the construction and excavation industry. The focus here is to educate drivers to safely learn how to maneuver heavy machinery such as excavators, wheel loaders, and dumpers, Rinaldo (2010). According to Reiner (2010), this kind of equipment is safer for beginners to practice with than real machines and it gives the student an opportunity to analyze mistakes immediately and repeat situations over and over again. Other significant benefits are financial, environmental, efficiency and it can prepare and educate drivers for dangerous situations, VATSB (2008).

The market for the training simulators is rapidly growing. It is common in the business to say that the market needs one training simulator for each million inhabitants, Bergman (2010). Our case company, Volvo Construction Equipment, wants to enter the market with their new advanced training simulator, which will be a challenge.

The entry barriers are often high and difficult to overcome. To enter you need to fulfill the prevailing conditions. There are few actors on this market that possess the technology and competence necessary, and several of these actors are companies with a strong brand, economics of scale, reputation and high industry experience, which contribute to high entry barriers. Competition creates barriers, and barriers create market conditions.

The barriers can be natural or legal, Parkin (2005). High entry barriers can consist of economies of scale, patents, access to technology and strategic actions by incumbents that want to stop new entrants, Kreps (1990), Pindyck & Rubinfeld (1995).

Radical innovations such as the training simulator often start as a monopoly, as the first mover creates the market, setting the conditions; then followers enter. To climb over the barriers, the followers need new strategies, used in an appropriate way. There are various kinds of barriers in entering a market and they differ, depending on the market situation and the competition.

Some barriers are easier to conquer than other. One has to allocate resources in an efficient way to overcome the barriers that are highest. First we must identify the barriers that are easy to overcome, and then identify the more problematic and resource demanding ones. After identifying the barriers, strategies need to be developed and applied to overcome them. To
identify the barriers and develop suitable strategies we will have to analyze the market and the competitors. These problems and uncertainties raise questions that need research and consideration before entering:

- Which are the highest barriers?
- How can the company conquer the barriers most efficiently?
- What types of strategies are most effective for a late mover?

Are certain methods and theories more successful than others in cases like this? Are they always effective, have they changed over time, due to changed business climate and/or consumer behavior?

We want to identify which barriers are the ones most difficult to conquer in this case since there is no research about the subject on this market. Furthermore, if possible we will develop our own reflections and recommendations of action for Volvo CE that can help them to conquer these specific barriers on the market.

1.3 Purpose

Our purpose is to find out which entry barriers that are most difficult to overcome on the training simulator market for construction vehicles and to give recommendations how to overcome these in an appropriate way.

1.4 Delimitation

We will investigate 25 entry barriers identified for the industrial market and from them identify the four most important barriers in entering the training simulator industry for construction vehicles. We will propose recommendations that can be used to overcome these four entry barriers.

We will delimit us geographically to the European market and the actors that offer and develop simulators for construction vehicles in this area, or are interested of doing so.
2. Theoretical framework

For our theoretical chapter we have chosen to highlight and apply four different theories that we find most suitable for our thesis. After consideration and reflection the selected theories are: Porters five forces and generic competitive strategies, Entry modes, Take-off-time and Barriers to entry. We believe that these theories are well integrated and dependent on each other.

Porter’s theory can affect the choice of entry mode due to its five forces that has a strong impact on the market’s structure. The five forces will give us a comprehensive understanding of the market’s environment and the rules of competition that exist. This will contribute to a deeper knowledge of the market and how to act before, during and after entry. Another important aspect that Porter talks about is the different barriers that aggravate for a firm when entering a market.

Secondly a presentation of the theory Entry mode will be described. We have chosen this theory for the reason that it describes different approaches how to enter a market. It will also show different entry modes and help us to identify which one is the most appropriate to use when entering the industrial market. The different entry mode characters are based on previous science and for that reason we believe that they are important to apply, in order to find the most suitable alternative.

The next theory that we will treat is the process from innovation to market entry and how this is done in an efficient way. The take-off time theory proposes strategies that can be used to implement a product on a market. These strategy decisions are based on previous analysis and knowledge of the market, which stem from the result from the usages of the above illustrated theories. The strategies in the take-off theory give us a more detailed way of how to act when launching a new product.

The last theory that this research will consist of is the theory about barriers to entry an industrial market. The theory is based on an empirical study of 500 companies and the result shows a ranking of entry barriers that occurs on industrial markets in general.

The combination of these theories will give us a theoretical working platform for our thesis and by using these theories together we can identify an effective solution to our problem.
In the end of the theoretical part we will have a “state of the art” description that sums up and explain why some of our chosen theories are validated and accepted among other authors in the scientific world.

2.1 Porter's five forces

Porter (1985) describes the five forces as a way to understand a market, the competitors and the firm’s potential in the particular market. The five forces are influencing the competitive situation in an industry and together they are determining the potential maximum profit for the companies in an industry, Porter (1980). The five forces are; competitive rivalry within an industry, bargaining power of suppliers, bargaining power of customers, threat of new entrants and threat of substitute products, Porter (1985).

Porter (1985) claims that competition is the core for success or failure for a company. Competition determines the qualification of a company’s activities that also affects and contributes to its performance. Gatignon et al. (1990) are also discussing the importance of competition and that it affects how the market will act on certain strategies. When a firm seeks for a profitable situation on a competitive market in a specific branch, it is significant to have elaborated a well-prepared competitor strategy, Porter (1985).

The industry’s structure has a high impact on determining the rules of competition and both Porter (1980); Montaguti et al. (2002) claims that it is of significant importance outside the industry. These elements also have a strong impact on the competition rules, but in a more relative way, in that sense that they are often affecting all companies in the industry. One important thing for companies to handle these situations is to be generally prepared for drastic innovations and changes in the market, Porter (1980). If the firm has developed a successful competitor strategy it is easier for them to regain a profitable and sustainable position against their competitors and earlier mentioned elements, Porter (1985). The strategy is also trying to help the firm to form the environment in the company’s favor, Porter (1979).

The five forces are not always equivalent important, which force that has the strongest influence is depending on the industries unique structure. Regardless of this the collective strength of the forces will always be strongest and have the greatest impact on the companies in the industry, Porter (1979). Because of this, strategists have to investigate and analyze the source of each force to find the best strategy to compete, Porter (1983).
Below, a description of the five forces are presented:

![The Five Forces That Shape Industry Competition](image)

Figure 1. Porter (2008)

### 2.1.1 Competitive rivalry within an industry

The rivalry between competitors is about struggling for the best position on the market. To accomplish a better position than competitors, firms can use different types of strategies, some of the standard tactics are; Price competition, product introduction, advertising and increased customer value such as warranty and customer service, Porter (1980). If the rivalry in an industry is stable it is not the easiest market to enter because of its vast entry barriers and a high average return on investment, Porter (1988).

The level of rivalry in an industry are prepossessed by several elements, Porter (1979); The industry is growing slow, exit barriers are high, commitment to the business is high and competitors are in the same size and possess the same power or are numerous. These elements are not only affecting the level of rivalry, it also influence the core of competition in the industry, Porter (2008). Brandts et al. (2009) discuss the influence of rivalry in an industry and in comparison to Porter, they claim that rivalry neither increase the efficiency or affects the profitability for a company.

### 2.1.2 Bargaining power of suppliers

In an industry, suppliers can use different strategies to earn a beneficial position towards their competitors, Porter (1983). This can include methods such as, raising their prices, advertising campaigns, launching a new product, reduced customer service, product quality and warranty. By doing this, powerful suppliers can reduce profitability in an industry, Porter, (1979).
There are according to Porter (1979) some aspects that determine if a supplier group is powerful or not; if it is dominated by few companies and is more concentrated than the industry it sells to, the product is unique or differentiated, it has developed high switching costs for buyers, they are not only depending on one industry and there are no substitutes for the supplier group.

2.1.3 Bargaining power of customers

Buyers can force an industry to lower their prices, require improved quality or better services. Strong customers have the power to affect companies’ decisions and at the same time play competitors against each other while they are reducing their profitability, Porter (1980).

The power of a buyer group depends on some characteristics that, Porter (2008) explains:

- There are few buyers
- They purchase large volumes
- There are substitutes and incitements for the product

2.1.4 Threat of new entrants

The threats of new entrants in an industry are depending on existing barriers to entry, the structure on the market and how the antagonists will react to the entry, Porter (1979). If the threats of entrants are high then the more established companies have two choices, either to lower their prices or enhance their investments to prevent the entry of new competitors, Porter (2008). Sismanidou et al. (2009) claim that if the market is open and allows new competitors in to the market it will lower the firm’s profitability. This makes it important for incumbents to restrain market barriers to prevent new entrance. Pehrsson (2009) agrees with Porter that entry barriers are preventing firms from being established on a certain market. With this in mind Pehrsson claims that we only have limited knowledge about the real influence that barriers have on a firm’s entry strategy.
Porter (2008) defines seven major barriers that deter the entrance in a market; below, a short presentation of every barrier will follow:

**Supply-side economies of scale**

This barrier occurs when companies are producing their products in larger amounts and by this they can accomplish lower cost per unit. This gives them the opportunity to spread fixed costs over more units, invest in new technology or negotiate for better terms from suppliers. This is forcing new entrants to two different strategies; accept the price weakness or meet the supply-side economies of scale with the same production strategy and by this be able to offer the same price, Porter (2008). Farrell et al. (1986) argue that incumbents often use temporary price reduction on a product to create entry barriers for newcomers.

**Demand-side benefits of scale**

Network effect, customer’s wants to buy the product everyone else is purchasing regardless the price. Companies that succeed with this can take a higher price on their products without losing customers to competitors. This barrier makes it hard for newcomers to gain customers and their only choice is to offer a much lower price, Porter (2008).

**Customer switching costs**

Porter (2008) explains that switching costs are fixed costs that a customer has to pay when they are changing supplier. Montaguti et al. (2002) explains that if switching costs are high for customers it will be harder for newcomers to enter the market successfully.

**Capital requirements**

Entrants can deter when markets are demanding large amount of financial resources to be able to compete. These resources are used to build company facilities, extend customer credits and fund start-up losses, Porter (2008).

**Incumbency advantages independent of size**

Established firms can have cost advantages that are impossible for newcomers to gain regardless of their size and economies of scale. Some of these advantages are: proprietary product technology, favorable access to raw material and locations, Porter (1980).
Unequal access to distribution channels

The newcomer must secure the distribution of his product or service. If this barrier is very high the entrant has to bypass distribution channels or create their own, Porter (1979 & 2008).

Restrictive government policy

Porter’s (1983) last major source of entry is the government and they can limit or prevent new entrance in a market with their power, but also facilitate for newcomers to establish them self in a branch.

2.1.5 Threat of substitute products

If the amounts of substitutes for a product are high it will reduce the profitability for all actors in the industry. This makes it important for an industry to differentiate it self from substitutes through marketing and product performance, Porter (2008). The most powerful substitutes are those that offer a better price then the industry or products that are produced by industries with high profitability, Porter (1980).

2.2 Porter’s Generic competitive strategies

Porter (1985) means that the second central question besides the five forces in competitive strategy is a company’s relative position inside a branch. This position exists of two variants of competitive advantage that a firm can obtain: low cost and differentiation. These two advantages together with a company’s vision lead to three different generic strategies that can facilitate to achieve a competitive advantage in an industry. Those methods are also used for analyzing competitors and predicting their next move. If a company succeeds to identify their competitors and divide them into strategic groups it will give them the opportunity to captivate a lucrative position on the market. The three generic strategies according to Porter (1996) are: cost leadership, differentiation and focus.

2.2.1 Cost leadership

The company endeavor to become a low-cost producer in its industry and by this achieve a cost advantage to their competitors, Porter (1985). Besides a beneficial industry’s structure cost leadership requires aggressive construction of efficient scale facilities, cost minimization in several areas, service, advertising and sales force, Porter (1980).
If a company can restrain an overall cost leadership it can control the prices in the industry. Achieving this, the firm can offer a lower price than its competitors and gain more profitability. One crucial thing for cost leaders is to never ignore the bases and power of differentiation, Porter (1985).

2.2.2 Differentiation

Porter (2000) describe a differentiation strategy as a firm’s struggle to become unique in its industry by meeting the new needs and expanding the market. A company needs to identify what the buyers’ desire and what they think is important. If the firm accomplishes to meet those needs they can expect to be rewarded for its differentiation with a higher price than its competitors, Porter (1985).

2.2.3 Focus

The focus strategy differs from the differentiation and cost tactics in the sense that it is focusing on a specific segment instead of trying to reach out to the whole industry, Porter (1980).

There are two variants of the focus strategy: Cost focus and differentiation focus. In cost focus the company wishes to gain a cost advantage in its segment, while in differentiation focus a firm wants to achieve differentiation in its segment, Porter (1985).

2.3 Entry Modes

When companies discusses to enter a international market or not the main questions for them to consider is; what market/markets do they want to enter, what strategy are they going to use to enter the specific market/markets and when do they want to enter this or these markets, Gaba et al. (2002).

In the last decades the question about choosing the right entry mode has been studied by several international business researchers. When a company decides to enter a foreign market Harzing (2007) claims that they can use two different strategies:

- **Non-equity entry mode:** This means that the company that enters a new country does it by exporting products through agents or licensing.

- **Equity based entry mode:** By using this mode companies owns local companies or partially owned with other partners. Equity mode can be done either through
acquisitions (buy an existing company) or through Greenfield investment (build a new one).

Besides the acquisition of an existing business or through Greenfield investment, the company can also choose to establish the company in a new market through joint venture, contractual agreements and exporting, Kumar & Subramaniam (1997).

- **Joint venture** is a business concept that means that there are at least two companies working as partners. The aim is that all parties will benefit from the collaboration, Harrigan (1986). Joint venture could be a solution or part of a country’s foreign direct investment (FDI). FDI means that a country does an investment in another country, Chow-Ming & Kiyohiko (1988).

- Contractual agreement concept franchising emerged in the 1960’s in the United States. Franchising involves taking part of someone else’s business concept by paying a sum of money to the person who invented the concept, Engström et al. (2005).

- Companies can choose to make an entry in a market through licensing and the main advantage of licensing is that it is relatively economical. Licensing means that licensees must pay a certain sum of money to the original owner if they wish to access and use the original owner’s belongings in another country. It may include patents, brand names, and marketing knowledge etcetera, Albaum & Duerr (2008).

- Probably the easiest way to meet market needs in a foreign country is to use the non-equity mode export. Through the use of export, firms can reduce the risk they take by entering a new market. Export means that firms manufactures products in a country and then sells the products abroad. There are two main approaches to export, indirect and direct export. Indirect export is when companies produce the product and then sell it in another country through different actors/firms in the new country. Direct export involves the selling from the sales offices in the country of origin directly to the consumers in the country they export to. The country of origin is also responsible for the marketing of the new product in the new market, Albaum & Duerr (2008).

A hierarchical model is often used when companies’ managers’ wants and needs to make decisions on mode of entry. According to Pan & Tse (2000) the companies’ managers need, on the first level, to either select equity modes or non-equity modes. The managers then take a step down in the hierarchal model. On the next coming step the managers choose the mode of entry alternatives such as joint venture, acquisition, Greenfield
investment, and exporting or contractual agreements. The last step is to choose how to precede the chosen mode before. If the company chooses exporting then they can choose to export direct to the country or export indirect through another company. If the company selects equity mode and joint venture then they either joint venture via majority, minority or strategic alliance, Kumar & Subramaniam (1997).

Figure 2. Kumar & Subramaniam (1997)

According to Pan & Tse (2000), the hierarchical model is a good tool regarding the mode of entry choice because of two main reasons. The model shows that managers that are making decisions in a difficult situation often uses models of a hierarchical character by using different criteria at each level. In this case managers select the first level in the hierarchical equity mode or non-equity mode and so on. This is a way to get the decision making process more hand able. A second reason to use the hierarchical model when making decisions and selecting entry mode are the big differences that exist between the alternative entry modes, and criteria that occur at each level of each entry mode for example those situations that tend to be good for Greenfield investment may not fit for indirect exporting. It is not preferably to compare these two on the same level, Pan & Tse (2000).

Each one of the entry modes has different characteristics and Kumar & Subramaniam (1997) have developed a model that describes these characteristics for five entry modes; exporting (non-equity mode), contractual agreement (non-equity mode), joint venture (equity mode), acquisition (equity mode) and Greenfield investment (equity mode).
The model above shows four different kinds of characteristics of a entry mode and these characteristics are risk, return, control and integration. Each characteristic have a different level on each entry mode and these levels are low, high, moderate and negligible depending on which entry mode the company choose. If a company choose the entry mode “exporting” then the risk is low, but the profit is also low and if a company chooses the entry mode “acquisition” then the risk is vast but in return the profit may be very profitable, Kumar & Subramaniam (1997).

### 2.4 Take-off time

When companies have the idea of developing a new product, and enter a new market with that product a certain time will pass by from the actual new radical product innovation to the product launch on a specific market. The time between the product development and the product entry on the market is named “Take-off time”, Montaguti et al. (2002). A way to define a radical product innovation is to see the technological advantage and ability to meet customers’ needs better than previous technologies, Chandy & Tellis (1998); Xuereb & Gatignon (1997).

Marketing managers are highly interested if the new radical innovation will achieve a take off at all, and if so at what speed. The main question is still what the most suitable market entry strategies are to be able to reduce the take off time, and actually enter the market in an effective way, Montaguti et al. (2002).

According to Montaguti et al. (2002), managers usually want to reduce the take off time, motivated by: patents that are still valid, the possibility to achieve first mover advantage, the risk that special competencies will be imitated decrease and the opportunity to generate a decisive mass of customers to set a dominant standard.
During the takeoff time a set of entry strategies highlighted by Montaguti et. al (2002) are used to reduce the time to take off, create initial demand and enter the specific market; this is made by considering the impact of technological, competitive and firm-specific factors. We will now present a set of entry strategies to reduce the take off time and manage market entry with a new product.

The strategies that will be described: Entry strategy; the focal point, penetration strategy, compatibility, pre-announcing and external route to market.

2.4.1 Entry Strategy; The focal point

According to Montaguti (2002), there are three key factors that reflect the decisions of the consumers regarding the adoption of a new product. Those three are: awareness, product availability and willingness to pay.

To be able to adopt a new technology it is of course necessary to be aware of that the new product exists. An adoption of a new innovation occurs only if the differences between the advantages of the new innovation and the acceptance barriers are positive. This includes price differences and switching costs and the time needed on learning the new technology. Customers expected values about new innovation increases as more information becomes available to the public, Montaguti et al. (2002).

If the firm wants to achieve quick take off, they should have the customers as a main driving force, when choosing an entry strategy, Howard (1983). The company’s focus should be on the early adopters, and the firm should increase their interest by increasing the awareness, utilities, and reduce the uncertainty, Chatterjee & Eliashberg, (1990); Jensen (1982). The company should also apply a more aggressive pricing strategy or offer higher customer value in order to position the product as more advanced than existing ones, Cestre & Darmon, (1998); Day & Wensley (1988); Green et al. (1995), and the firm should also select a route to the market that can supply the highest level of availability.

2.4.2 Penetration strategy

The penetration strategy is represented by aggressiveness. The company strives to attack the market with aggressive advertising, pricing, sales and promotional activities. There are some factors that promote to implement this strategy. First of all, the purpose is to attract a critical mass of new adopters and future customers to stimulate the demand, Kalish (1988).
To prevent other competitive actors from taking a strong position in the given market, the choice of penetration strategy is important to deter competitors from making a move towards the target market, Montaguti (2002).

The penetration strategy is right when there is a willingness to create full awareness regarding the new product on the market. It is an important condition for adoption decisions and increasing consumers’ willingness to pay by decreasing the price, Gatignon & Robertson (1991); Kim & Mauborgne (2000). The fact that the strategy tackles these important factors in the adoption process makes the strategy an influential instrument in the reducing of time to take off, Montaguti (2002).

2.4.3 Compatibility

The compatibility makes it possible for a firm to reach a superior position on the market, since the consumers see high value in the possibility of accessing a larger network or a product that takes them closer to their ideal technology design, Economides & White (1994) and Gandal, (1994); Matutes & Regibeau (1988). The compatibility reduces the uncertainty for the product among the dominant customer base, Montaguti (2002).

If a technology that is incompatible with existing one is launched, the market acceptance may decrease and change the competitive conditions due to that the early adopters probably will delay their purchase of the new product due to uncertainty. If the product has high compatibility with existing technology it will influence the customer’s evaluation positively, and further on their willingness to pay, Gandal (1994).

2.4.4 Pre-announcing

When companies’ preannounce information about a new product it increases the awareness about the product launch. A research by Eliashberg & Robertson (1988) shows that the main part of pre-announcing is made for the customers, and not for competitive purposes. The pre-announcing strategy has two important effects on consumer’s adoption decisions. The first one is that it provides information and creates awareness in the targeted market segment. The second one is that it may reduce uncertainty and in the same time increase willingness to pay, Farrell & Saloner (1986).
2.4.5 External route to market

The availability of the new product on the market is crucial to achieve a fast take off. Firms can sometimes have problems with the lack of the necessary competencies and resources to manage to commercialize the product. They may have limited access to distributors and customers. Therefore some companies have to choose to make a partnership with an external part in order to gain help to commercialize the product. That kind of route to market with forming an alliance is called “external route”. The external route assists the internal route to manage with the market entry. It helps the firm to get the extra assets that are needed to succeed, Teece (1992); Tripsas (2000).

2.5 Barriers for entering an industrial market

Barriers to enter a market are created by many factors, and in each of these factors, there are more detailed barriers. The main factors that create the barriers are; economies of scale, absolute cost advantage, product differentiation, the level of company concentration, Bain (1956); Mann (1966), capital requirement, customer switching costs, government policy and access to distribution channels, Porter (1980). Some of these barriers are hard to overcome and prevent the entry of new companies, whilst some promote companies to enter a market, for example, market size and growth, Baldwin et al. (1995).

The entry barriers differ, depending on markets characteristics. The barriers also vary if it is a consumer market or an industrial market, Karakaya (2002). According to an empirical study by Karakaya & Stahl (1989) customer switching costs, cost advantages and government policies are of higher importance on an industrial market in contrast to the consumer market. There is other research pointing out the same thing, agreeing with their study. Gruca & Sudharshan (1995) argue that customer switching costs is a high barrier to market entry. A research by Porter (1980) indicates that the cost advantage of incumbents is an important barrier to have in mind.

Karakaya (2002) researched the topic to find out which of the entry barriers that are most important on an industrial market and if the importance had changed over time. The research takes 25 different barriers in mind, and asks 500 different companies about which of these are of highest importance. The company managers were asked to evaluate the importance of the 25 barriers on a Likert scale, ranging from “not important at all” to “very important”. The scale was a five-point scale, where the number 1 was coded as “not important at all” and the
number 5 was as “very important”. 93 of 500 the companies responded before deadline, giving the survey a 19 percent response rate, Karakaya (2002).

The result is presented in the table on the next page, ranking the order of the barriers, with the most important at the top. The table shows the mean score of each entry barrier. The barriers that the managers ranked as having the highest importance were absolute cost advantages and capital requirements. They were followed by incumbent’s superior production process, capital intensity of the market and customer loyalty. The barriers that were given almost no importance were government licensing and heavy advertising. Compared to Karakaya’s previous research the importance of the entry barriers have changed during the previous 20 years, Karakaya (2002).

Table that shows the complete result of the study with all the 25 barriers ranked:

<table>
<thead>
<tr>
<th>Barriers to market entry</th>
<th>Mean</th>
<th>Std. dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute cost advantages held by incumbent firms</td>
<td>4.13</td>
<td>0.90</td>
</tr>
<tr>
<td>Capital requirements to enter markets</td>
<td>4.11</td>
<td>0.98</td>
</tr>
<tr>
<td>Incumbents with superior production processes</td>
<td>3.91</td>
<td>0.94</td>
</tr>
<tr>
<td>Capital intensity of the market</td>
<td>3.84</td>
<td>0.91</td>
</tr>
<tr>
<td>Incumbents with proprietary product technology</td>
<td>3.81</td>
<td>1.02</td>
</tr>
<tr>
<td>Customer loyalty advantage held by incumbents</td>
<td>3.79</td>
<td>0.97</td>
</tr>
<tr>
<td>Incumbents with cost advantages due to economies of scale</td>
<td>3.71</td>
<td>0.85</td>
</tr>
<tr>
<td>Amount of sunk cost involved in entering a market</td>
<td>3.69</td>
<td>1.00</td>
</tr>
<tr>
<td>R&amp;D expense involved in entering a market</td>
<td>3.63</td>
<td>1.02</td>
</tr>
<tr>
<td>Low prices charged by incumbents</td>
<td>3.61</td>
<td>0.81</td>
</tr>
<tr>
<td>Access to distribution channels</td>
<td>3.53</td>
<td>1.10</td>
</tr>
<tr>
<td>Magnitude of market share held by incumbents</td>
<td>3.50</td>
<td>0.87</td>
</tr>
<tr>
<td>Number of firms in a market</td>
<td>3.49</td>
<td>0.94</td>
</tr>
<tr>
<td>Brand identification advantage held by incumbents</td>
<td>3.38</td>
<td>1.04</td>
</tr>
<tr>
<td>Incumbents with cost advantages due to learning curves</td>
<td>3.32</td>
<td>0.90</td>
</tr>
<tr>
<td>Amount of selling expense involved in marketing a product</td>
<td>3.22</td>
<td>0.98</td>
</tr>
<tr>
<td>Customers’ costs associated with switching from one supplier to another</td>
<td>3.17</td>
<td>1.07</td>
</tr>
<tr>
<td>Expected post-entry reaction of incumbents</td>
<td>3.16</td>
<td>0.98</td>
</tr>
<tr>
<td>Trade secrets held by incumbent firms</td>
<td>3.15</td>
<td>1.11</td>
</tr>
<tr>
<td>Incumbents possessing strategic raw materials</td>
<td>3.09</td>
<td>1.17</td>
</tr>
<tr>
<td>Incumbents with relatively easy access to raw materials</td>
<td>2.78</td>
<td>0.96</td>
</tr>
<tr>
<td>Incumbents with government subsidies</td>
<td>2.76</td>
<td>1.28</td>
</tr>
<tr>
<td>High profit rates earned by incumbents</td>
<td>2.63</td>
<td>1.14</td>
</tr>
<tr>
<td>Heavy advertising by firms already in the market</td>
<td>2.54</td>
<td>0.92</td>
</tr>
<tr>
<td>Government licensing requirements</td>
<td>2.20</td>
<td>0.59</td>
</tr>
</tbody>
</table>

Note: Measured on a five point scale ranging from extremely important (coded as 5) to not important at all (coded as 1)

Table 1. Importance of barriers to market entry in industrial markets

Figure 4. Karakaya (2002)

The barriers are later gathered together and divided into four different specific factors. Each factor contains barriers that fit together and create an entry barrier group that represent all the
barriers in it. The four factors are; firm specific advantages, product differentiation, financial requirements or cost of market entry and profit expectation of entering firms, Karakaya (2002).

2.6 State of the art

With help of the database Google Scholar we can confirm that our chosen scientific articles for this theoretical part are well accepted among other authors.

In Paavola et al. (2009) they are using Porters five forces in their empirical study, with the aim to find out what barriers of entry that exists in different Finnish retail markets. Thus the authors identify the different barriers and competitors that exist on the Finnish market. It is well known and well accepted among authors that barriers exist when entering a market and the theory about entry barriers in general is well empirically tested.

Several articles have helped us to confirm that our theory Mode of entry is validated and dominant. This fact is based on investigating if the theory has been empirically tested or not. Four of the articles that validate the theory Entry mode are described below.

Gaba et.al. (2002) investigate the timing of a firm to enter a international market and the study is based on empirical data of 500 companies in the United States that have done a market entry in China between the years 1979 and 1996. Osland et al. (2001) have done an empirical study that shows the biggest factors that are affecting a firm’s choice of entry mode into international markets. In their case, they have studied the United States market and the Japanese market. Elanga & Sambharayab (2004) have done a empirical study about which entry mode a firm would prefer and what the risks are by for example choosing joint venture respectively acquisition. Furthermore Dikova & Witteloostuijn (2005) have studied acquisition and Greenfield investment and why some firms chose acquisition and some Greenfield investments. They have done this research based on an empirical study of a large amount of firms and their experiences of acquisitions and Greenfield investments.

The theory Take off time is accepted among several authors, one of them are Aboulnasr et al. (2008) that discuss the subject Take off time. The authors have performed a research that is about how firms act when a competitor introduces a new product. The empirical study is based on data that United States Pharmaceutical industry has collected between the years 1997-2001. Homburg et al. (2009) discusses the importance of preannouncements and its effectiveness. The authors investigate if the preannouncement is different depending on if it is
a new product innovation or if it is an already existing product. The research is based on an empirical study of 151 new products launches. Together these two articles confirm that the theory Take off time is both accepted and empirically validated.

One of the authors that have empirically tested entry barriers is Karakaya (2002). In his article from 2002, Karakaya performed an empirical research to examine the importance of 25 potential barriers to entry in an industrial market. Not many authors have acknowledged this study, but one of them is Pehrsson, A. (2009). We consider that Karakaya’s (2002) study is empirically validated, but we suspect that his conclusions are too general for all industrial markets. Karakaya’s study is performed on respondents from various kinds of industrial markets. He works on the assumption that the theory can be implemented on all types of industrial products. To make these assumptions, studies must be performed on different industrial markets, to see if the results are the same. This is why we claim that Karakaya’s theory about entry barriers in an industrial market is an emergent theory that needs further empirical validation.

Studies about this subject have been focusing on the industrial market in general and with the assumption that they all act alike, regardless of product conditions or market characteristics. To empirically validate this, it requires more empirical research on different types of industrial markets. Today there is no research that states which entry barriers are of highest importance on the training simulator market for construction vehicles.

3. Research question

After our discussion about the difficulties to enter markets and entry barriers we have decided to question the following, in order to get an improved view of the problem and possible solutions:

*What are the four entry barriers that are most difficult to overcome when entering the training simulator market for construction vehicles in Europe?*
4. Methodology

4.1 Research design

We have chosen a cross-sectional research design. This design is normally used when a researcher want to study more than one case and gather information from different cases for the study, Bryman & Bell (2005). We considered cross-sectional design as suitable, as we are studying nine companies acting on the market. To identify the four most important barriers of entry on this type of market, we collected quantitative data with the help of questionnaires to all the nine companies. We have also used cross-sectional design, because we have obtained answers at the same time for all of them. Finally, the design was selected since, in addition to quantitative research, we have used qualitative research. According to Bryman & Bell (2005) cross-sectional design is used when you have semi-structured interviews.

The difference between qualitative and quantitative data is that the qualitative data is focusing on giving broad estimation, while quantitative gives a more precise estimation, Svensson & Starrin (1996). We have used a combination between qualitative and quantitative research. Hammersley (1996) has presented three ways that a researcher can use, when choosing a combination between qualitative and quantitative research, triangulating, supporting and complementing. We have chosen to use the supporting variant, as we use qualitative research as support to our quantitative research, Hammersley (1996).

The qualitative research has been done to help us to achieve a deeper knowledge about the market and its players. It is also used to find out how the market for educating drivers for construction vehicles looks like in different countries. We have contacted trade organizations in the countries of interest. This is necessary to be able to develop recommendations for an entry strategy. We need to find out if these countries have different regulations and to see if the regulations could be potential barriers of importance.

4.2 Sampling

We have chosen to use a strategic selection of our interviewees, since we know which people could possess knowledge about our subject based on their position. Further, through this method we found which companies’ that are active on the market. The interviewees chosen for the interviews are chief executives, marketing managers or sales managers, as they possess the most relevant information for our study. We are aware of the risk to get answers that are
biased. We are interviewing the company’s public faces and the chance of getting critical answers from them are small, since they naturally promote their own company and product.

The study is further based on telephone and e-mail interviews. This method is chosen because it is more time-efficient and inexpensive. This chosen method is perhaps not the most optimal, but in our case the cost and time limited us. We are aware of that it would be good to see the respondents and their reactions.

To reduce the risk of losing respondents and answers, the respondents had the opportunity to choose if they wanted to be interviewed through telephone or e-mail. Those answers that have been given over the telephone can be seen of higher credibility, since we can be more aware of hesitation from the respondents about the questions. It gives us the opportunity to explain the questions better, so that we do not get any misinterpretations. The choice of e-mail interviews may mean that we lose some information, but we think it is enough for the type of questions that we asked. To reduce misinterpretations we gave the respondents the chance to be interviewed by telephone, if they want to get questions explained deeper.

4.3 Operationalization

4.3.1 Interview template for actors on the training simulator market

When we made our competitors analysis we asked the chief executive officers or marketing managers of the companies of interest. We asked 13 questions about their product, strategies and organization. These 13 questions are presented in appendix 1.

The first question is asked to find out if the company is an actor on the training simulator market or, if it is not, if it has plans to enter the market. This is asked in order to find out which companies we should use to conduct our study. We asked these questions to relate to the take off time theory to find out when the company entered the market, so that we can judge if they are a first or a late mover.

The questions two to six are asked to find out about their product in general, product differentiation, quality and attributes. To get a strong position on the market companies can use these strategies and deliver more value to their customers, by offering good products and benefits, according to Porter’s generic competitive strategies theory.

With question seven we want to find out who is producing the company’s product, and who is selling it. This is interesting, because we want to know the mode of entry strategy they use,
for example joint venture or contractual agreement. We want to know what the alternatives are to enter the market.

Question eight gives us knowledge if the company’s new product is compatible, according to the take of time theory, with existing construction vehicles on the market, regardless brand. Can the product be used in many areas or is it locked to a certain usage.

Question nine is asked in relation to Porter’s five forces theory and specifically threats of substitutes, new entrants and rivalry among existing competitors. We want to identify the biggest actor on the market, and the characteristics of the market.

Questions 10 to 13 handles mode of entry. The questions give us clues of the entry mode strategy the company used or will use. The questions are also asked to understand how they decided on the entry mode..

4.3.2 Interview template to understand the rules and regulations in Europe for construction vehicles driving licenses

We contacted appropriate authorities and organizations in different countries and asked six questions to find out more about the market and its regulations for construction vehicles and the education of operators for them.

Question one and two are asked to find out if there are any regulations in the country that can prevent a company to enter, and if there exist regulation that make education mandatory. The questions also give a hint about the market’s potential and possibilities to sell.

Questions three to five gives us knowledge about costumer potential and identification of costumers. We want to find out who can be interested in purchasing a simulator.

Question six is asked to get general knowledge about the market for training simulators.

4.4 Data collection

4.4.1 Primary Data

In our case the primary data collection is first based on the interviews with people that work with our case company Volvo CE and their different competitors, also from interviews with people that work with education of the construction vehicles drivers. The interviews are performed primary through telephone/Skype but also some of the interviews are done via e-
mail. We believe that using the telephone is a an appropriate and efficient way to do interviews because we can avoid that the respondents may be affected of the interweaver’s age or background. We also chose this method to save time and money, as we do not need to travel to visit the person. On the other hand we are familiar with disadvantages of this method, such as the fact that we cannot see the person we are interviewing and observe his or her body languages and reactions.

To collect data about the competitors that we are interested in, we will use telephone and questionnaires trough e-mail with the same questions to all the actors. The same method have been used when the countries trade organization have been contacted. Using e-mail is time saving and economic since there is a huge geographical gap and time difference among the competitors. The respondents will have more time to think through their answers and feel no stress or pressure. The disadvantages are that we cannot help the respondent if there is a question that seems unclear, which can make the answers less reliable. The interviewer also loses the possibility to ask follow-up questions, which can be of interest for some answers that we get.

4.4.2 Secondary data
Our Secondary data is being collected from different official homepages on the Internet. Volvo CE has also allowed us to use documents that they hold, for example their BOD-document (Business opportunity description). Arvid Rinaldo, Global market communication manager at Volvo CE has developed the BOD document. The document is about their new product, a training simulator for excavators, wheel loaders and dumpers. The BOD document contains a description of the background to this product development and visions with it. The simulator has been developed due to the fact that Volvo CE has seen a market need for this kind of product.

4.5 Semi-structured interviews
To get a deeper understanding in our study we have chosen to use qualitative interviews, specifically semi-structured interviews. This type of method will provide us information that is relevant for our study. Since we need to get knowledge of the education, existing players and their offers, these qualitative interviews are a good alternative to use in this study. The reason for doing this analysis of existing actors on the market is to later be able to know
which companies we need to get in contact with when we are going to ask them to evaluate the 25 barriers to entry.

This semi-structured interview method is based on that the interviewer has a list with specific subjects that he or she wants to discuss. The respondent is free to interpret the questions as he or she wants and answer them based on what he or she feels. During the interview the interviewer can discuss subjects that are not on the paper but related to the designed questions. This interview method is appropriate if it is led by more than one researcher and in our case all three of us participated, Bryman & Bell (2005).

Another reason why we chose this type of method is that the market consists of only a few numbers of companies that provides customers with this type of product. Due to the fact that there are few players on the market it makes it possible for us to contact all the main players on the market. We are convinced that semi-structured interviews in our case are more suitable than unstructured interviews, due to the risk of acquiring information that is not important to us. With help of semi-structured interviews we can control the interview more and prevent that the respondent discusses subjects that are of less importance for us. The interview questions were designed so we could get as much information as possible about each company’s offers, their view on their product, the market for simulators in general and if it exist any regulations in respective country.

4.6 Likert scale

The Likert scale means that the researcher first develops a question to the respondents, and then he or she requires them to indicate the extent to which they agree or disagree with the stated question/statement or questions/statements, Patel & Davidson (1991).

Since our study concerns 25 barriers to entry when entering on the market for training simulators a specific question were asked. To answer this question we have used a Likert scale as we find it the most suitable form for this specific research. It will help us to get an answer that later can be interpreted and transmitted in a relatively easy way. This facilitates the collection of the information and it will be more clear and easy to grasp.

The respondent’s had 25 barriers to evaluate and each alternative could be given the grade between one to five, where one is “not important” and five is “very important”. The result will give us a good picture of what barriers the companies feel are most important and less
important today, when entering the industrial market for construction vehicle training simulators.

4.7 Validity

Based on our interview guide, we can conclude that our study is of high validity. We can draw this conclusion based on our interview questions, since they have given us the answers that we wanted and needed to carry out this research. Furthermore, we have been able through our operationalization translate these questions to our theory and by that provide this research with high validity. With the help of our empirical study we have been able to state, in a reliable way, how it actually is in reality. In other words, the empirical study demonstrates and measures what is supposed to be measured, in our case the ranking of the 25 entry barriers.

4.8 Reliability

Reliability is about trust, can you trust a researcher that the study is done correctly and trustworthy without different uncontrolled factors affecting the result. The lesser distraction and errors in the survey the higher is the reliability. The reliability also depends on the respond frequency. The higher the respond frequency, the higher is the reliability. To get high reliability the survey should get the same results if it is done one more time in the same conditions.

This paper has high reliability, due to several factors. One is that the response rate was high; seven out of nine respondents gave full response without indicating any doubts. The survey that the respondents were exposed for was clear and well described. The questionnaire was well structured and the answers were to be given in a five-grade Likert scale. There were no extra factors in the survey that could have created distraction. Further on, the methodology is carefully described, so that it is easy for someone else to understand how the study was made and copy it. That makes it easier to make a re-test, using the same methodology and to come up to the same results. However, the result may vary due to time difference and changing business climate.
5. Empirical framework

5.1 Presentation of Volvo Construction Equipment

It all started in 1832 when Johan Theofron Munktell started his machine shop in Eskilstuna, Sweden. A century after the foundation of Munktell machine shop it merged with Bolinder’s to become BM; this company has later become Volvo Construction Equipment. Volvo CE is still active in construction machinery and it is the oldest industrial company in the world. Despite the company’s size and development they still have its main roots in Eskilstuna, VCE (2010a).

When the company started in 1832 they only produced products on demand from customers. The most common products were for example tools for lathes, grinders and iron chests. After two decades Munktell’s started to produce their own products, one of the earliest inventions was steam engines and in 1853 they manufactured the first Swedish steam locomotive. In 1906 the company produced a steamroller, which became the first construction equipment product by Munktell’s. After the steamroller the company constructed a farm tractor followed by several different tractor models that created the basis for construction equipment products at Volvo CE. Some of these products are motor graders, wheel loaders, articulated haulers, backhoe loaders, excavators and forestry equipment, VCE (2010b).

An important collaboration for Volvo was the one with Swecon, today the reseller of all Volvo CE’s products. Swecon started their business in 1999 after a merger between ten smaller resellers to Volvo. Swecon has not only nationwide operations; they are also represented in the Baltic region and in larger parts of Germany, VCE (2010c).

In 2001 Volvo CE started collaborating with the Swedish company Oryx Simulation AB, Bergman (2010). Rinaldo (2010) report that the reason for this collaboration was that Volvo CE was interested in producing advanced training simulators for their machines. The company Valmet founded Oryx Simulations in 1999 because they needed someone to produce simulators for their forest machines. Oryx is still producing products for Valmet, but their business idea has changed a little since the start. Today the idea is to deliver simulators that can facilitate the education of operators. Their main customers are vehicle manufactures, training organizations and large fleet owners, Oryx (2010).
5.2 Presentation of Volvo Construction Equipment’s Advanced Training Simulator

Rinaldo (2009) claims that Volvo CE started to develop their training simulator for construction equipment back in 2001. The main reason for this was to make the education of drivers more efficient and to prepare them for situations that are impossible to practice in a real machine. Volvo CE was the first company to develop this type of simulator, but because of a time-consuming process they still have not managed to get the product out on the European market. This is one of the major reasons why competitors succeeded to implement their equivalent products on this market, Rinaldo (2009).

Volvo CE is manufacturing the advanced training simulator together with Oryx under Volvo’s brand. Today, Oryx not only construct the simulator, they also sell it. This structure is going to change in the near future. Volvo CE wants to be the only seller of this product but Oryx will continue to manufacture it. When this structure change Swecon will take over the selling operations of the simulators Rinaldo (2010). According to Rinaldo, Volvo CE do not have simulators in storage, the manufacturing process begins when a customer place and order. He explains that this type of product is not appropriate to have in storage, since the market is relatively new and the production cost is too high.

Rinaldo (2010) talks about three different versions of the Volvo CE simulators: excavator, dumper and wheel loader. The dumper and wheel loader version have the same hardware while the excavator’s hardware differs. All three models have different software but the total price is still the same, which is €45,000. At the moment Volvo CE only offers one level of every version, but if the market is interested in different levels of complexities they will produce it, Rinaldo (2009). For now Volvo’s primarily focus is on their existing and more advanced simulator. To give the customer what they really need and to give them a higher value Volvo will offer tailor made software to the customers, Rinaldo (2010). This customized software can include different kinds of work scenarios that are designed after the customer’s demands, VATSB (2008).

The lifespan of the hardware is estimated and calculated to be approximately six years, but the software has to be upgraded during this period of time. Volvo CE offers all their customers’ two years warranty and one year free of charge service support, Rinaldo (2010). If the customers are interested to continue with the service support there will be a cost that is regulated after the amount of simulators they bought. The price for one year of service
support for one machine is €500 and this package includes; access to Internet based self-
support FAQ, E-mail support with guaranteed 24 hour response (Monday-Friday), free
software service packs, discount on future software upgrades, on-site service/support
according to agreement and phone support, Rinaldo (2009).

Rinaldo (2010) talks about a unique technical solution that Oryx has developed for Volvo
CE:s simulators. It is about how they can calculate real-time composition. This mean that they
can calculate the exact material mixture and with help of this it makes the simulator more
reality based. This is very unique in the business and today Volvo CE is the only company
that can provide this to their customers.

According to Volvo CE their simulators are primarily developed for beginners, but it can also
improve experienced operators technique, fuel efficiency and productivity. This can give
the drivers an opportunity to sharpen their skills and as for beginners practice in difficult and
dangerous situations, VATSB (2008). Volvo CE wants to change the structure of educating
construction equipment operators. Rinaldo explains that Volvo's goal is not to erase all
practice in real machines, but reduce it to 40 percent of the education process. They are well
aware of that training in a simulator never could replace real machine practice totally, but it is
a good complement that can make the training more providing, Rinaldo (2010). As mentioned
before the simulators are primarily focusing on educating novice operators and it will
contribute to a faster and safer training with zero impact on the environment. After a training
session it is easier to evaluate the operator’s performance and remake critical situations,
Rinaldo (2009). The simulator also facilitate the education because it can be used 24 hours a
day, it is less expensive then a real machine and it does not tie up a real machines from
participating in real production, VATSB (2008). Rinaldo (2010) insists that the first weeks in
an operator’s education should be spent in the simulator, so he or she achieves knowledge
about how to maneuver the machine.
5.3 Competitor analysis of the training simulator industry for construction vehicles

For our market analysis we have asked appropriate employees in the nine companies that are active in the training simulator market or interested of market entry. In this chapter we will present the result from these interviews.

5.3.1 Caterpillar

Since the start for over 80 years ago Caterpillar has grown a lot and today they are one of the largest producers of construction and mining equipment. Today Caterpillar manufactures and delivers products, services and technology solutions to three major industries: machinery, engines and financial products. Their aim is to always maintain and offer products with a high quality and by this contribute to a better infrastructure in the world, Caterpillar (2010).

Simulators

According to Caterpillars account manager Andrew Cardinal Caterpillar started to develop their simulators back in 2006. From the beginning Caterpillar manufactured all their simulators by themselves but after October 2008 they started collaboration with Simformation and today they are producing the simulators for Caterpillar.

Caterpillar offers training simulators for excavator, wheel-loader, motor grader, tractor-scrappers, mining truck and Off-highway truck, Cat Simulators (2010).

In the interview with Cardinal (2010) he explains the three major reasons why Caterpillar started to produce simulators; the first reason was that they wanted to offer a safer training opportunity, secondly, Caterpillar wishes to prevent the “wear and tear” of real machines that is enormous during training, and finally, Caterpillar saw a huge potential market with chances to gain profitability.

Specification/Quick facts

- The product life cycle (PLC) is not estimated yet. Cardinal (2010) believes that the PLC will differ a lot depending on who is using it and what simulator model it is.

- Caterpillar offers 24 hours service 365 days a year to all their customers. To manage this they have six specialists that works with customer service that are accessible through phone, Cardinal (2010).
- During the first year the support and service is free of charge. If the customer wishes to continue with the service deal there is a cost that varies depending on the amount of simulators, Cat Simulators (2010).

- Cardinal explains that the marketing of the product is made by presentations at trade shows and via their own homepage.

- The delivery time for all Caterpillar simulators is expected to be 40 working days, Cardinal (2010).

- Caterpillar do not sell only the software, customers must buy both the hardware and the software in a package deal, Cardinal (2010).

- If the customer has specific wishes about how the software should be, Caterpillar offers customized software. In 2009 Caterpillar delivered a tailor made software to the US-army, Cardinal (2010).

- The price for a simulator from Caterpillar varies depending on what model it is, Cat Simulators (2010). The relevant models and prices for us are:
  - Wheel-loader: $18 750,00/$19 750,00 (Small/Large model)
  - Excavator: $11 000,00

- Cardinal (2010) states that all their simulators are generalizable on competitor’s equivalent construction machines.

Andrew Cardinal (2010) argues that there are several reasons why customers should chose their simulators before competitors tendering. Cardinal claims that they have the most realistic simulators with the best graphics and that Caterpillar is the only company that offer “actual machine controls” in their simulators. Cardinal explains that competitors’ offers are more expensive and will not give the customers the best value for their money; with this he means that Caterpillars product is the most affordable simulator on the market.

Andrew Cardinal (2010) thinks that John Deere is there biggest competitor in the simulator business. When we ask Cardinal about the future simulator industry for construction equipments he believes that it will continue to grow and generate a high profitability for Caterpillar. The market is still very new and has not reached its full potential for a long time. Cardinal expects that more companies will enter the market and the demand will increase.
from customers. This will contribute to a more rapid development of simulators that will make them even more advanced. According to Cardinal their largest segment is a mixture between education schools, large construction equipments businesses and mining companies.

5.3.2 Simlog

Simlog was founded in 1999 in Canada, for the reason to produce training simulators. The company contends that they have a unique product focus because they have developed a revolutionary new personal simulator. This simulator can use the power of the computer to provide truly cost effective training help for heavy equipment operators. Since the start Simlog have sold hundreds of personal simulators to 42 countries, all around the world, Simlog (2010).

In Sweden Maskinutbildarna is the only distributor of Simlog’s simulators and we have been in contact with Hans Erlandsson that works as a market and sales manager at Maskinutbildarna.

Simulators

Simlog is offering a computer program that the customers install in their own PC and complement with preferable two joysticks that imitates the vehicles maneuvers, Simlog (2010).

To date, Simlog has simulators for excavator, wheel-loader, mining- and off-highway truck, forest machines, mobile and tower crane. Simlogs simulators are not that advanced as many other competitors’ offers, instead they are focusing on producing an affordable simulator, Erlandsson (2010). It is up to the customer how much financial strength they want to spend to make the simulator more realistic. The basic version of Simlogs products is only requiring a PC and the software. If the customer wants to complement it with joysticks, a projector or sound systems it is possible. This will contribute to a more realistic simulation experience, Maskinutbildarna (2010).

Erlandsson explains that the main purposes with their machines are to assist students and to establish joystick experience. The simulators are appropriate to use in three situations according to Maskinutbildarna: Basic education for new operators, supplementary training for professionals and to decide if a person is qualified to undergo an education.
Specifications/Quick facts

- According to Erlandsson the PLC of Simlogs simulators are affected by the development of the “real machines” that they are simulating. As long as the “real machines” are using the same technology and equivalent joysticks their simulators will work.

- When purchasing a simulator the service package is included. This service package includes support and software updates, Erlandsson (2010).

- The delivery time for the software is a couple of minutes and for the joysticks it can take a couple of days. When a customer buy a simulator from Erlandsson he will send them an e-mail with a link where they can download the software alternatively they can get a CD, but that will take one day.

- Erlandsson explains that they do not participate in trade shows as much as the larger and more established brands. He argues that it is hard for a small company like Simlog to compete with companies like John Deere, Volvo CE and Caterpillar, because they have a huge basis of loyal customers.

- If the customer wish to have their software tailor made, it is possible to purchase according to Erlandsson (2010).

- The price for a simulator from Simlog varies depending on what model it is and the amount they want to purchase. When purchasing more than five simulators they will offer a 10 percent discount, Erlandsson (2010). The relevant models and prices for us are:

  o Wheel-loader: $6 000,00

  o Excavator: $4 000,00

- By using the excavator simulator it will reduce the training in real machines with 25 percent, Maskinutbildarna (2010).

- According to Erlandsson their simulators are standardized to all equivalent machines, regardless of the brand.
Hans Erlandsson does not think that Simlog are in the same product category as the more advanced alternatives from companies like Volvo CE and Caterpillar. Erlandsson label Simlogs products as “low-cost” simulators, but the educational result from his machines and the more advanced alternatives are very small. Simlogs biggest competitors in Sweden are according to Erlandsson, Tenstar Simulations and Oryx/Volvo CE. He also thinks that the genre qualify gaming (advanced gaming solutions) can develop to be an incitement to their products and conquer more market shares in the future. Maskinutbildarna’s most important segments today are high schools that focusing on construction, Erlandsson (2010).

5.3.3 John Deere

Deere & Company, or John Deere as it is collectively called is a worldwide company with over 50,000 employees. The company’s core values that were established back in 1837 when John Deere was founded are still important in the organization. The values are: Integrity, quality, commitment and innovation, Deere & Company (2010a).

John Deere is divided into three major segments: Agriculture & turf, Construction & forestry, and Credits. In each one of the three segments they are one of the leading company’s Deere & Company (2010a).

Simulators

In our interview with John Deere’s instructional designer and developer Michael Hoeg he explained that they started to produce simulators in 2008 and the reason was because of lack of efficient education of construction vehicle operators. At the same time John Deere’s customers was asking for a more cost effective way to educate new operators. To answer this demand John Deere developed a three level training approach to operator training. According to Hoeg this training approach is completely customer driven so it can meet their needs.

The three level training is self paced and consist of: Self-study, Simulator- and Instructor led training, Hoeg (2010). The self-study stage includes an online program where the student can learn and see how the machine works; this service cost 25 dollars per student, Deere & Company (2010b). The second stage consist of practicing in John Deere’s simulator, this stage requires that the customers purchase a simulator, Deere & Company (2010c). The third and last stage contains education in real machines instructed by John Deere’s construction driver’s instructors. The final stage is only possible in the United States and costs 1,500 US dollars per participant, Deere & Company (2010d).
Michael Hoeg describes the collaboration with Southwest Research Institute in San Antonio, Texas United States of high importance. The institute is a non-profit research firm that does the programming and the dirt physics for the simulators. According to Hoeg, John Deere is constantly modifying their simulators and focusing them on what the customers prioritize. Today they have three simulator models: 4WD wheel-loader and motor grader, Deere & Company (2010e).

Preferences/Quick facts

- The simulators PLC will last as long as the controls on the real machines are still offered according to Hoeg (2010). Every time they launch a new machine type John Deere also need to release a corresponding simulator. If the changes on the real machine are minor then the customer only need to do a simple software upgrade. John Deere has not since the production start of simulators had a change in their machines that affected the simulators hard- or software, Hoeg (2010).

- All John Deere simulators have a 90 days part warranty and one year technical support that is available via both email and telephone. According to Hoeg, John Deere have only had one problem in the past two years and he argues that their simulators are very reliable.

- Hoeg explains that the delivery time depends on the volume that purchase, but the standard delivery time regardless model is 6-8 weeks.

- The price for a simulator depends on the model, Deere & Company (2010e). It is also possible to only buy the software and then complements it with joysticks to achieve a low-cost simulator, but this is according to Hoeg not effective as imitate the machines maneuvering. The relevant models and prices for us are: Deere & Company (2010e):
  
  o Wheel-loader: $9 976,00/$6 998,00 (Soft and hardware/Only software)

  o Excavator: $15 997,00/$4 776,00

- It is recommended to upgrade the software periodically, when it is time the customer will be notified and they can download the upgrade from Internet. During the first year all software upgrades are free, Hoeg (2010).
- John Deere offers customized software if it is necessary, but normally the customers do not require it, Hoeg explains.

- The excavator simulator contains 8 different training sessions, Deere & Company (2010f) and the wheel-loader has 9 lessons, Deere & Company (2010g).

- Hoeg describe that John Deere’s simulators are designed to teach the operator the maneuvering technique, not the John Deere machines. This is why the simulators are generalizable on all construction machines brands.

Hoeg believes that their simulators are the most affordable, most portable and leading the simulation market in regards to dirt physics and modeling. He claims that they offer the only “state-of-the-art” simulator for less than $10 000, 00 US dollars and this is something that was unthinkable for a few years ago.

One of the most important requests from customers according to Hoeg is that the simulators have to be portable. Many of John Deere’s clients want to be able to transport the simulator from e.g. classroom-to-classroom, building-to-building or even take them to the jobsite. They need to have the opportunity to load the simulator and TV into the back of a vehicle easily. Hoeg claims that they have the most lightweight and portable simulator available on the market today.

John Deere are well aware of who their competitors are in the simulator industry. There are some multi-million dollar units, but also smaller more portable ones like their own machine. Hoeg thinks that Caterpillar and Volvo CE are their direct competition.

**5.3.4 Tenstar Simulation**

Tenstar started as a joint project in 2005 between construction driving schools, the trade association “Maskinentreprenörerna” and several other players. The reason for the project was to develop a tool that could make the education of drivers more efficient and contribute to an increased interest among young people. This led to the very first version of Tenstars excavator simulator that had the intention to facilitate the training of operators, Tenstar Simulation (2010).
Simulator

Tenstar Simulation is offering three different training simulator models: digger, cargo and timber, Tenstar Simulation (2010). We have interviewed Nancy Hebbelinck, market manager at Tenstar Simulations in Sweden.

Specification/Quick facts

- The software is recommended to upgrade continuously and the hardware needs to be upgraded every third year according to Hebbelinck (2010).

- Hebbelinck explains that Tenstar sometimes participate in trade shows to present their simulators to potential customers.

- The delivery time for a Tenstar simulator is between four to six weeks, Hebbelinck (2010).

- Tenstar have chosen not to offer a hydraulic platform, because many students have complained about motion sickness when using the simulator, according to Hebbelinck.

- The simulator has a pedagogical approach and excellent graphic technology, Entreprenadaktuellt (2010). These two qualities, together with the hydraulic feeling of the machine contribute too a more realistic feeling for the students.

- Tenstar do not sell only the software, the customers have to buy both the hardware and software. On the other hand can the software be customized after customers’ wishes, Hebbelinck (2010).

- Hebbelinck describes that because of that they only develop simulators, not real excavators; their products are generalizable on all excavator, regardless of the brand.

In our interview with Hebbelinck she states that simulators in general should be used in a preparatory usage, not to be a substitute for practicing in real machines. She also thinks that their simulators differentiate from the competitors offers because they have a much more realistic graphics which contributes to an overall better experience.

According to Hebbelinck Tenstars biggest competitors in the simulator industry are Oryx, Simlog, John Deere and Caterpillar. She claims that Simlog is offering similar products as Tenstar, but Caterpillar and John Deere are producing simulators that have a more advanced hardware.
Tenstars most important customer groups today are schools, education institutes, retailers and manufactures of excavators, Hebbelinck (2010).

5.3.5 Komatsu

The company was established in 1921 in Japan and has two major operations: Construction, mining and utility equipment is the first one and it stands for 86.3 percent of the company’s sales, the second operation is Industrial machinery and others which stands for 13.7 percent of the sale. In 2009 Komatsu had almost 40 000 employees around the world, Komatsu Global (2010).

Simulators

We have been in contact with the Swedish retailer for Komatsu, Daniel Falk sales manager and technical support at Hesselberg maskin AB. Falk explains that Komatsu have simulators for construction equipment in Asia, but they are not for sale and only for educational purpose. These simulators are used to improve the internal education at Komatsu and the education that they offer. On the European market they only have simulators for machines that are used in the forest and under the brand Valmet which is produced by Oryx, Falk (2010).

5.3.6 Hitachi Construction Machinery Co. (Hitachi)

Hitachi C.M. produces products for the mining and construction industry. In North, Central and South America, Hitachi has integrated their marketing and support functions with Deere & Company to strengthen their brands and provide more value to customers, Hitachi Construction Machinery (2010).

Simulators

We have interviewed the administration manager Jan Hallberg and the marketing manager Thomas Johnsson at Delvator AB, the Swedish distributor of Hitachi’s construction products. They are both very skeptical to that simulators are being used in educating operators. According to Johnsson Hitachi does not offer any simulators for construction vehicles in Europe. He believes that they have simulators under research and development at Hitachi in Japan.
5.3.7 Doosan

Since the start in 1975 Doosan have become a front-runner in the hydraulic system industry, Doosan (2010a). The company has 336 dealers around the world and every year they manufacturing 30,000 excavators, wheel-loaders and skid steer loaders. This makes them the fourth largest producer of construction vehicles in the world, Doosan (2010b).

Simulators

We have interviewed Nikki Bruce, communication manager at Doosan Infracore Construction Equipment in the United States and Hans Eric Haraldsson, sales manager for region Småland at Maskinia, the Swedish retailers of Doosan. According to both men, Doosan do not offer any training simulators for construction vehicles to date. Haraldsson claims that Doosan has simulators under development in Japan. This is confirmed on their official homepage research and development chapter, Doosan (2010c).

5.3.8 Liebherr

Founded 1949 and has since then grown to become one of the leading producers of construction vehicles. Today they have over 33,000 employees in over 120 different companies, worldwide, Liebherr (2010).

Simulators

Liebherr do not manufacture training simulators for construction equipment vehicles, according to the Company executive officer of Liebherr Sweden, Göran Karlström.
5.4 Importance of barriers to market entry in industrial markets - Survey

In this chapter we will present the result of our own study that is based on Karakaya’s (2002) study. We have asked the Company executive officers, market managers or communication managers on the nine companies we presented earlier. Seven of the nine companies answered within the deadline. Two chose not to participate in our study, John Deere and Liebherr.

The managers were asked to evaluate the importance of Karakaya’s (2002) 25 barriers when entering an industrial market. More specifically they were asked to implement these barriers on the training simulator market were they operate, or want to operate in.

The barrier ranking result came out differently to Karakaya’s result from 2002, when he did a general study of the whole industrial market. In our study the managers have very similar responses while evaluating the barriers importance on the five-grade Likert scale. We can see that the bigger and more established companies do not consider many barriers as high obstacles, while smaller firms do.

Below we present the 25 barriers and rank them after the mean of the evaluation of the seven companies that answered. This ranking will show us the difference between our study and Karakaya’s study from year 2002, so that a comparison can be made and the differences between the studies can be distinguished. The ranking will also show us the four most important barriers of entry on the training simulator market in Europe, which will be the four barriers that we later will analyze.

<table>
<thead>
<tr>
<th>Barriers to market entry</th>
<th>Mean</th>
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<tbody>
<tr>
<td>1. R&amp;D expense involved in entering a market</td>
<td>3.86</td>
</tr>
<tr>
<td>2. Access to distribution channels</td>
<td>3.43</td>
</tr>
<tr>
<td>2. Amount of selling expense involved in marketing a product</td>
<td>3.43</td>
</tr>
<tr>
<td>2. Customer loyalty advantage held by incumbents</td>
<td>3.43</td>
</tr>
<tr>
<td>5. Capital intensity of the market</td>
<td>3.29</td>
</tr>
<tr>
<td>6. Absolute cost advantage held by incumbent firms</td>
<td>3.14</td>
</tr>
<tr>
<td>6. Capital requirements to enter markets</td>
<td>3.14</td>
</tr>
<tr>
<td>6. Number of firms in a market</td>
<td>3.14</td>
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</tbody>
</table>
6. Low prices charges by incumbents 3.14
10. Incumbents with proprietary product technology 3.00
10. Amount of sunk cost involved in entering a market 3.00
12. Brand identification advantage held by incumbents 2.86
13. Incumbents with superior production processes 2.71
13. Heavy advertising by firms already in the market 2.71
13. Expected post-entry reaction of incumbents 2.71
13. Incumbents with cost advantages due to learning curves 2.71
13. Magnitude of market share held by incumbents 2.71
18. Government licensing requirements 2.57
19. Incumbents with cost advantages due to economies of scale 2.43
19. Incumbents with government subsides 2.43
21. High profit rates earned by incumbents 2.29
21. Incumbents with relatively easy access to raw materials 2.29
23. Customers costs associated with switching from one supplier to another 1.86
23. Incumbents possessing strategic raw materials 1.86
25. Trade secrets held by incumbents firm 1.71

5.5 Market analysis

In order to get information about the training simulator market in specific countries we have contacted authorities and organizations in the countries and interviewed them. We will now present the market information and regulations for each country.

5.5.1 Swedish market

In order to get the information about the Swedish market and the regulations for driving construction vehicles, we have been in contact with Ulf Andersson, vice president at Maskinentreprenörerna.

In order to be permitted to operate a construction vehicle like an excavator, dumper or wheel-loader in Sweden the driver of the vehicle needs a special working license. The regulation is applied if the vehicle weighs over 1500 kg. This regulation tough is not set by the Swedish
government, but by the collective agreement of the branch. Regarding the dumper, which is consider as a “heavy vehicle” there is no special working license, but simply a regular driving license for a heavy vehicle issued by the Swedish national road association, Andersson (2010).

The licenses are not exactly the same for all the construction equipment vehicles. Some of them vary between the vehicles; there is a need of a basic education and later for a further education in order to operate another vehicle. The education varies since the different machines work in different ways and have different safety procedures. A driver that has a license for a wheel loader is not necessary allowed to operate an excavator, Andersson (2010).

In order to get a working license for some of the vehicles a person need to undergo the proper education. To be able to graduate the education and get the working license the person need to be at least 18 years old. This education is handled by “secondary school” and “KY” education, or trough the construction company that hires a driver. An education trough the company is led by the “Profession education agreement” that has an agreement with the national labor union of the branch. This means that a collective wage agreement is mandatory in order to have the permission to run this sort of education, Andersson (2010).

5.5.2 Norwegian market

We have been in contact with Fred Arild Gyldenås that works at the Norwegian trade organization “Maskinentreprenorenes Forbund” (MEF). This institute is an industry and employer organization that handles questions regarding the construction area in Norway, MEF (2010).

In Norway there are rules and regulations for operating construction vehicles. Machines that require a driving certificate are excavators, wheel-loaders, dumpers, bulldozers and road-scrappers. Depending of the machine, there are different education requirements and these requirements decide what the education must contain, Gyldenås (2010).

The education for driving licenses consists of a theoretical and a practical part. The theoretical part must contain a minimum of 32 hours practice, were the student treats rules, regulation and general machine learning. After passing the theoretical part the student can continue with the practical moments, which have to include 40 hours of training. These 40 hours must be in a real machine and training with a simulator cannot reduce the time, Gyldenås (2010).
Only certified organizations and institutes have the right to offer this education and issue driving licenses for construction vehicles. Gyldenås (2010) explains that these organizations and institutes need to be certified by the accepted certificate issuer. Today most of the approved schools issuing driving licenses are public schools, but there are also some private institutes.

Gyldenås (2010) explains that to start the education the person must have turned 17 years old, but if the person goes to a public school the age limit is 16. To legally work without supervision, the operator must be over 18 years old. The price of a driving license varies with the institute issuing it and if the student is a member in ME. According to Gyldenås the price can be between 10 000 to 30 000 Norwegian kronor. For students at public schools the education for free.

5.5.3 Polish Market

We have interviewed Malgorzata Balinska, information manager at the Polish institute of training machine operators.

To be permitted to operate construction equipment vehicles in Poland you need an education and pass the education in order to get a specific license to be able to work with the machines. Without the license issued through the institute a person is not allowed to operate construction equipment vehicles in Poland, Balinska (2010).

To be able to attend the education the candidate has to be at least 18 years old and pass a health examination. When the education time has passed the education process ends with a final exam in front of a committee that issues the licenses. If the candidate passes the exam he or she gets the specific license and a small book that lists all the skills and working permissions that the driver posses, Balinska (2010).
6. Analysis

We will start to compare our study regarding the entry barriers with Karakaya’s study. Karakaya’s study is focused on the industrial market in general, and we argue that it gives a general result of which entry barriers that are of highest importance on an industrial market. We claim that Karakaya’s result cannot necessarily be applied to all industrial markets. To confirm this we have performed an identical study, using the same barriers with the difference that our study focuses on one specific industrial market. Our study involves the actors in the market for training simulators for construction vehicles, and the actors that are interested in entering. In Karakaya’s study 93 out of 500 respondents answered compared to our study were 7 out of 9 respondents participated.

There are some significant differences between our and Karakaya’s results. From the tables shown below we can see that his barrier ranking for industrial markets in general does not correspond to the one on our market and the barriers that are of highest importance on it.

<table>
<thead>
<tr>
<th>Our study’s result</th>
<th>Karakaya’s result</th>
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<tbody>
<tr>
<td>1. R&amp;D expense involved in entering a market</td>
<td>1. Absolute cost advantage held by incumbent firms</td>
</tr>
<tr>
<td>2. Access to distribution channels</td>
<td>2. Capital requirements to enter markets</td>
</tr>
<tr>
<td>2. Amount of selling expense involved in marketing a product</td>
<td>3. Incumbents with superior production processes</td>
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<tr>
<td>2. Customer loyalty advantage held by incumbents</td>
<td>4. Capital intensity of the market</td>
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<td>7. Incumbents with cost advantages due to learning curves</td>
</tr>
<tr>
<td>6. Number of firms in a market</td>
<td>8. Amount of sunk cost involved in entering a market</td>
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<tr>
<td>6. Low prices charges by incumbents</td>
<td>9. R&amp;D expense involved in entering a market</td>
</tr>
<tr>
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<tr>
<td>13. Expected post-entry reaction of incumbents</td>
<td>15. Incumbents with cost advantages due to ec. of scale</td>
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We can conclude that the positions from number 18 and down in the table are similar in both studies, there are no big differences with the exception of position 24 and 25. The barrier “Heavy advertising by firms already on the market” is ranked as number 24 on Karakaya’s table. The same barrier is placed a bit higher on our table, namely on position 13. We argue that the reason to this difference is that the training simulator market is relatively new, small and under rapid growth. Many future costumers are not aware of the simulators and companies need to show their product to make the costumers aware of it. Kalish (1988) talks about that a penetration strategy with aggressive advertising and promotional activities is crucial to attract new adopters and future customers. According to Farell & Saloner (1986) the pre-announcing strategy is important in order to create awareness of the product on the market, and to reduce the costumer’s uncertainty to it.

The second exception on the lower half of the table is “Government license and requirements”; ranked as number 25 in Karakaya’s study. In our study the same barrier is ranked as number 18. According to Porter (1983) government policies can either aggrivate or facilitate companies’ entrance on a market. The regulations regarding education of drivers for construction vehicles can vary in different countries, in some countries a driving license for the vehicles is mandatory, and in other countries it is not. These regulations may affect the demand of the training simulators. Hence, government regulations can become a high entry barrier that has to be taken into consideration when developing entry strategies. We think that
the reason why the barrier is ranked higher in our table is that government regulations can affect the entry on the simulator market more than on industrial markets in general.

6.1 Top four entry barriers for the training simulator market for construction vehicles

As we see these barriers as most important we will now focus on analyzing the top four ranked barriers in our study and then in Karakaya’s study, and compare the differences in the ranking

6.1.1 R&D expense involved in entering a market

The barrier “R&D expense involved in entering a market” is in our study ranked to be of highest importance. In Karakaya’s study this barrier was ranked as number nine. The training simulator is a high technology product, which makes the market a high-tech market. To develop a high technology product that meets costumers’ requirements and is superior to previous technology, the investment is high. According to Economides & White (1994); Gandal, (1994); Matutes & Regibeau (1988) the new technology should have a high compatibility with previous technology to succeed. Gandal (1994) claims that if the product is not compatible with recent technology, the acceptance of the product will decrease and the uncertainty will rise. The simulators are compatible with all brands and their equivalent machines in real life. The product will get positive reactions if it is compatible with existing technology. To develop compatible simulators that meet costumers’ needs, more research is needed which brings extra costs.

This market requires large amounts of financial resources to develop these high technology products. Porter (2008) talks about the importance of capital requirements, if a market demands a large amount of financial resources, it is more difficult for new companies to enter. This is why the R&D expenses barrier is high on this market.

6.1.2 Access to distribution channels

In Karakaya’s study the barrier “access to distribution channels” was ranked as number eleven. This is a big difference from our result were it is ranked at second place.

We consider that the barrier’s importance is higher on the training simulator market due to that the market consist of few manufactures, distributors and costumers since it is a relatively new market under development that sell a “complex product”, which is high tech and
expensive. A training simulator is not a consumer good product, which makes it even harder to sell. It is also difficult for some of the companies to develop their own distribution channels and sell the product since they have limited experience and competence in selling a training simulator.

Porter (1979) talks about the importance to get access to distribution channels. Volvo CE has used Oryx as their selling channel for their simulators and in the future they will use Swecon. Some companies have problems in making the product available in the market, because of lack of competence or resources. Hence, they should use an external route to the market and create a partnership with an external part to get help to distribute their product, Teece (1992); Trispas (2000). Also Harrington (1986) talks about how an external route can help a company to get access to distribution channels. Harrington names this collaboration joint venture, which has the goal to facilitate the distribution process and create a win-win situation for all participating parties.

These market conditions make it crucial to have good access to distribution channels, and that we consider is the reason why the barrier is ranked so high in our study compared to Karakaya’s.

6.1.3 Amount of selling expense involved in marketing a product

The entry barrier “amount of selling expense involved in marketing a product” was ranked as a runner-up in our study and in Karakaya’s study it was ranked as number 16. This is the most remarkable difference between the two studies.

We argue that it is expensive, resource and time demanding to sell training simulators compared to a mass-produced industry product. The sales process is longer and more complicated. Some customers demand the simulators software to be customized for their needs and wants, which complicate the selling and producing process. The costumers require much information about the product, before they can make their buying decision. By this the sales process demand time and resources, especially when the market is relatively new and unknown, both buyers and sellers have a lack of experience of the simulator. These facts are highlighted by Montaguti et al. (2002) that claims that it is important to give the costumer a lot of information about a new product to meet their expected values of it. Companies like Volvo CE, John Deere and Caterpillar show their new products on industrial trade shows around the world to inform the costumers about their products. This is named pre-announcing
by Farrell & Saloner (1986). The pre-announcing strategy is used to give the costumers information about the product in an early stage.

The price of the products on the market varies a lot and all companies offer similar customer services. Hence, companies have to differentiate their products to persuade the customers to buy their simulators instead of the competitors’ equivalent offers. To succeed with this is costly, making this barrier important.

6.1.4 Customer loyalty advantage held by incumbents

The third barrier “customer loyalty advantage held by incumbents”, also ranked as number two in our study. This barrier was ranked at sixth place in Karakaya’s research, which makes this the smallest differences from our top four compared to Karakaya’s.

To accomplish customer loyalty on a market, the company has to offer a product that meet customer’ requirements. If the company succeeds in developing an innovative product that differentiates it self from competitors’ offers, they can conquer new market segments and start building relations which may lead to loyal costumers. Loyalty is often something that is build over a long period of time. When a company has built up a large basis of customers that are loyal to them, they will be able to get a higher price for their products, without losing customers to competitors. Porter (2008) states that if this occurs, it will be hard for newcomers to gain customers and the only strategy to compete is to offer significantly lower price.

In the training simulator market the majority of players are companies with a strong brand and a large basis of loyal customer. This is something they earned from many years of producing construction vehicles with high quality. Both Arvid Rinaldo at Volvo CE and Hans-Eric Erlandsson at Simlog claim that customer loyalty is something that is widespread and important in the construction vehicle industry and customers are often using the same brand during their whole working career. Erlandsson (2010) also state that minor company’s like Simlog and Tenstar, are having a hard time competing with more established firms, such as Volvo CE, John Deere and Caterpillar, because these possess a vast number of loyal customers that accept that their products are more expensive. This means that companies have to find new customers for their high-tech product on this relatively new and unknown market.

This is why the barrier is of such high importance and is a problem for companies on the training simulator market compared to Karakaya’s study of the industrial market in general.
6.2 Top four entry barriers in Karakaya´s study of industrial markets in general

Karakaya’s top four barriers on a general industrial market were ranked; 1.Absolute cost advantage held by incumbents, 2.Capital requirements to enter markets, 3.Incumbents with superior production processes, 4.Capital intensity of the market. The barriers ranked as number one, two and four have no significant differences compared to the result of our study, when they just finished outside the top four ranking. These three mentioned barriers all manage financial aspects and are therefore ranked high on our market as well, since it demands financial strength. The only remarkable difference from Karakaya’s top four, compared to our study, was the fact that the barrier “incumbents with superior production processes” was ranked as number three in Karakaya’s study while in our it was ranked at position thirteen.

Since the training simulator is not a mass production product, it is not as important to be able to produce high quantities in a quick and efficient way. The production process is not as important in this case as when producing high quantities of standardized products. The simulator is manufactured mainly on costumers order and is customized according their needs. When Volvo CE receives an order the production process starts. Rinaldo (2010) says it is too expensive to mass-produce the simulators and stock them in a warehouse. All companies in the industry, except Simlog, have a minimum delivery time of 30 days on their simulators. Porter (2000) claims that companies need to know what the costumers want and what they consider as important. If the company succeeds with the differentiation they may be rewarded. Quality, technology, and innovation are at the moment stronger attributes on this market than a superior production process. If a company posses these attributes, the incumbents’ superior production process is not considered as a big barrier to market entry. That is probably why this barrier is ranked lower in our study than in Karakaya’s study.

As a summary we can conclude that there were some significant differences between our research and Karakaya’s research regarding the importance of the entry barriers. The market and product characteristics affected these differences for some barriers. Although we can see that the financial barriers had no significant difference between the studies, which can be understood as that they are important on industrial markets in general.
7. Conclusion

Our purpose was to identify the four most difficult barriers to overcome when entering the training simulator market for construction vehicles. Through our research study we can conclude that the four barriers of highest importance in order are:

- R&D expenses involved in entering a market
- Access to distribution channels
- Amount of selling expense involved in entering a market
- Customer loyalty advantage held by incumbents

Through our analysis of our study compared to Karakaya’s study of entry barriers on industrial markets in general, we can conclude that it is not possible to generalize all industrial markets and its characteristics’. There are several factors that contributes to the markets differences; the type of product, for example if it is a high technology product, a mass production product, or a highly differentiated product. The number of actors on the market, how new the market is, the markets characteristics and financial demands are also factors that create differences between the markets. Hence, companies need to adjust their strategic choices to the prevailing market conditions, to overcome the barriers that are of highest importance in the specific market of entry.

According to Karakaya (2002) the importance of some entry barriers differs between consumer markets and industrial markets. Our research shows that there are not only differences between industrial and consumer goods markets, but also between different industrial markets. Each specific market within the group of industrial markets has meaningful and distinguishable differences that affect the importance of entry barriers for that specific market. It is important to consider that Karakaya’s study is managing industrial markets in general and his study has not taken different market characteristics in consideration. This is necessary to do to find the barriers that are of highest importance in the market of interest.
8. Reflections

We will now present our own recommendations for how Volvo CE should act in order to overcome the four highest entry barriers that obstruct a market entry on the training simulator market for construction vehicles.

8.1 Recommendations to conquer “R&D expense involved in entering a market”

Volvo CE can get a greater competence in this area with the help of the collaboration with Oryx since they possess a high technology competence. Since they have developed this type of relationship, our recommendation for Volvo CE is to keep developing it and create a win-win situation. Relationships of this kind take time and financial resources to create and therefore we consider a search for another partner company as unnecessary in the present situation.

To point out we consider this barrier to be less important for Volvo since they according to Rinaldo (2010); Bergman (2010) already have developed a training simulator that is more advanced, innovative and differentiated from their competitors equivalent offers.

8.2 Recommendations to conquer “Access to distribution channels”

We have earlier ascertained that the training simulator is a “complex” product on a relatively new and unknown market with few distributors. As a late mover this barrier can be even more complicated to conquer. A proposal to erase or minimize this barrier is to engage in partnerships with other parties interested of the market. This can facilitate for Volvo CE to create new distribution channels or get access to existing ones. This is something Volvo CE already succeeded with in their collaboration together with Oryx and Swecon. These are two extraordinary joint venture partnerships that give Volvo CE a huge asset and access to important distribution channels.

A recommendation for Volvo CE is to create an external route to the market as Tecce (1992); Tripsas (2000) talks about. By forming this type of alliance it can help Volvo CE to access potential distribution channels or create new ones. This will also give Volvo CE more competencies and resources to facilitate the commercializing of the product.

We recommend Volvo CE to create a new potential distribution channel. This could be to offer customers the possibility to lease simulators. This offer can mainly be directed to
schools that offer construction vehicle driving licenses in countries were it is mandatory to have a license to legally operate the machines. This offer can contribute to that more schools afford to invest in a training simulator. Schools and above all, public schools have a very bureaucratic buying process that involves several people and the more expensive the product is the more bureaucratically the process gets. A leasing contract could mean that more schools have the financial strength to use a training simulator and if Volvo CE can offer this, it can stimulate the schools decision makers and lead to a shorter buying process.

If schools start to use Volvo CE’s training simulator students will be presented to the Volvo brand in an early stage in their working career. If this experience is positive from the students’ point of view this new distribution channel can eventually lead to a higher level of loyal customers for Volvo CE and an expanded positive word of mouth.

**8.3 Recommendations to conquer “Amount of selling expense involved in marketing a product”**

To overcome this barrier and try to make it a smaller obstacle while entering the market we are proposing some recommendations of actions for Volvo CE. In order to reduce the threat of this barrier Volvo CE should create a website containing proper and relevant information about their new simulator, since Volvo CE do not have any information at all available today about their simulators. Using the Internet is an economical and effective way to reach out with information. Incumbents at the market like Caterpillar have information about their products on their website. It is important for Volvo CE not to fall behind their competitors in the aspect of providing their future costumers with product information. In order to reduce their selling and marketing expenses the website should provide easy access to relevant information. It should present videos of the product and the areas it could be used in, highlight the benefits of Volvo CE’s simulator compared to competitors’ simulators, as e.g. that Volvo CE’s simulator is the only one that can calculate the exact material mixture.

The website should also present the strongest attributes and differentiation of the simulator. Additionally, the website and salesmen should also highlight the Volvo CE brand and bring forth the company’s good reputation to simplify the selling process. Furthermore, they should send information brochures to potential costumers to inform them about the new product and the website. These actions by Volvo CE would contribute to the pre-announcing strategy. According Eliashberg & Robertson (1988), pre-announcing is done mainly for the costumers. Farell & Saloner (1986) says that it has two important effects on costumers’ adoption
decisions. Moreover they claim that the strategy provides information and create awareness about the product among the customers in the market segment, it also reduces the uncertainty customers may have about the product, which increase their willingness to purchase it. All these procedures will hopefully contribute to reduce the selling process and the expenses involved.

Volvo CE should also focus on specific market segments, for example schools and fleet owners, in order to reduce marketing costs on segments that are not of high interest and profitability. To achieve differentiation in its market segment Porter (1985) claim that differentiation focus should be used. If they gain good reputation in the market segment through the differentiation, it will be more economical in the future to give effect to marketing actions, and by that lower their expenses.

**8.4 Recommendations to conquer “Customer loyalty advantage held by incumbents”**

As we have mentioned in our analysis, different managers in the market consider that customers are highly loyal to their brand. Since this type of market has limited sum of potential customers the loyalty question is of high importance. To gain profitably companies’ need to have this type of customers. Porter (2000) talks about differentiation and companies struggle to become unique in their branch.

Our recommendation is that Volvo CE should use their strong brand and build long relations to their existing and potential customers. Since the training simulator market for construction vehicles is relatively new, it can be to Volvo CE:s advantage due to the fact that they already have a large amount of loyal customers in the construction equipment industry. We also recommend Volvo CE to capture the early adopters, which Chatterjee & Eliashberg (1990); Jensen (1982) talks about. To capture future customers and make them loyal to Volvo CE, a penetration strategy should be implemented. According to Kalish (1988) the main purpose with the strategy is to attract new customers and create a demand for the company’s products. Therefore our recommendation to Volvo CE is to conduct aggressive promotional activities and advertising that highlight their simulators benefits. This action should be directed to the specific market segments.

These are our own recommendations for how Volvo CE could act to overcome the barriers. They are based on our thoughts and knowledge about Volvo CE, competitors and the training simulator market.
We have concluded that Volvo CE has performed well so far in overcoming the barriers. We do not consider the barriers as very high for Volvo CE. Although they should try to create more distribution channels, make more information available for customers about their product, emphasize their strong brand and reputation, and draw attention to their innovative and differentiated training simulator.
9. Suggestions for further research

To be able to get generalized results of patterns of differences in market entry barriers, we suggest that different types of industrial markets are studied in clusters. Each cluster should contain industrial markets of a similar type, for example high tech markets in one cluster, mass production products in one cluster etcetera.

It would also be interesting to see if it is possible to identify differences between different high technology markets or if entry barriers are generalizable to all high tech markets.
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Appendix 1

Interview template for actors on the training simulator market

Questions below were asked to appropriate persons in the companies that offer training simulators for construction vehicles or are interested in starting to produce and sell them on the European market. The questions were asked through telephone or email, depending on what interview form the respondent preferred.

1. Do you offer any kind of simulators for construction equipment such as excavators, wheel loaders or dumpers? In case of yes, when did you start to develop and sell these simulators and why?

2. What kind of service agreement do you offer to your customers?

3. How long is the delivery time for your simulators? Does it differ between the models?

4. How long is the product life cycle (PLC)? Is the PLC different between hardware and software? Or between the models?

5. How often is it recommended to upgrade the software/hardware in the simulators? How much does the upgrade cost and is it possible to only buy the software?

6. Can you customize the software after the customer’s need/request?

7. Who is producing and selling your simulators?

8. Are your simulators generalizable, i.e. can the student train in your simulators and then in real life operate construction vehicles of other manufacturers?

9. Who do you see as your biggest competitors?

10. What do you think about simulators development and their potentials for the future? Do you expect a market growth?

11. What region/country do you think has the highest potential for a market entry with training simulators?

12. Which is your largest customer segment?

13. Why do you think people should choose your simulator instead of competitors offers?
Appendix 2

Interview template for market analysis of the rules and regulations in Europe regarding construction vehicles driving licenses

*Questions below where asked to appropriate persons in the countries we chose to analyze in our market analysis. The questions were asked through telephone or email, depending on what interview form the respondent preferred.*

1. What are the rules and regulations for driving an excavator, dumper or wheel-loader in your country?

2. Is it the same license for all construction equipment (CE) vehicles or are there different licenses for different construction vehicles?

3. Who is handling the education for construction vehicles drivers in your country?

4. Who has the right to issue driving licenses for CE vehicles in your country?

5. Who can apply to become eligible to issue these licenses?

6. What do you know about training simulators that are used in educating drivers’ skills in maneuvering e.g. excavators, wheel-loaders and dumpers?