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## Internationalization Analysis

### US Market

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## Abstract

Welle Laser is a Brazilian company that manufactures marking and engraving machines mainly for large-scale industry segments providing solutions that help increase productivity. Welle laser has 60% market share in Brazil and decided to go internationally in 2015, mainly to increase revenues and diversify business risks. Welle opened an office in Switzerland and celebrated a contract with a Mexican company to distribute their machines in Mexico. The next step for Welle is expanding its operation to USA. In my project I accessed the viability and reasons to enter the US market, the region where Welle should start its operation, and the best entry mode strategy.

**Key-words:** Marking Laser Industry; Internationalization; United States; Exporting

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## **Literature Review**

### **Internationalization of SMEs**

Internationalization occurs when a firm expands its activities into international markets. Although, for SMEs, is a more discrete process, in which management regards each internationalization venture as distinct and individual (Hollensen, 2014).

Traditional theories focus on explaining the internationalization process of large multinational enterprises (MNEs), there was a common opinion that small and medium-sized enterprises (SMEs) due to their size, lack of resources and limited network were not able to expand their operations abroad (Coviello and McAuley, 1999). Though, during 1990s and further, increasing globalization and technological changes have decreased investment and trade barriers, which allowed SMEs to internationalize.

Several theories have tried to explain the internationalization process of firms, but none of them were capable to do it in a way that makes it valid for every company. Literature suggests that there are three leading theories: (1) the Stage Approach; (2) the Network Approach; and (3) the International Entrepreneurship Approach.

#### **1. Stage Approach**

The Stage Approach view internationalization as a gradual export development by stages based on a series of incremental commitment decisions (Coviello and McAuley, 1999). There are two major models that support the stage approach: the Uppsala model (U-Model) (Johanson and Vahlne, 1977) and the Innovation-Related Internationalization Model (I-Model) (Bilkey and Tesar, 1977; Cavusgil, 1980; Czinkota, 1982; Reid, 1981).

##### **1.1. The Uppsala Model**

The model defends that the internationalization process of a firm is made through “gradual acquisition, integration and use of knowledge about foreign markets and operations, and on the incrementally increasing commitments to foreign markets” (Johanson and Vahlne, 1977). Firms should enter new markets with successively greater psychic distance, being psychic distance defined by Johanson and Vahlne (1977) as the sum of factors preventing the flow of information from and to the market, such as language, culture and industrial and business development.

The validity of the model is questioned since it assumes that the firm acquires knowledge by being active in a new market, and this knowledge hardly can be used to enter in other markets (Forsgren, 2002)

## **1.2. The Innovative-Related Internationalization Model**

The I-Model was created on the basis of the Uppsala model and considers that the decision about internationalization is always an innovation for the firm (Andersen, 1993). The main differences comparing with the Uppsala model are the number of stages (between 5-6) to internationalize and the description of every stage.

## **2. Network Theory**

Network theory was introduced by Johanson and Mattson (1988), and then improved by Johanson and Vahlne (1990) and Laghzaoui (2009). It can be considered an extension of the Uppsala model that underlines the importance of network relationships in the firm's international market entry, because the firm's decisions of entry way and market choice are influenced by its network partners (Coviello and Munro, 1995). Firms start with their connections in the domestic market and during the internationalization process they get other networks in foreign markets (Johanson and Vahlne, 2009). Mtigwe (2006) says that network mechanism accelerates internationalization process, because with network connection knowledge about a new market is acquired faster than without any connection.

## **3. International Entrepreneurship Approach**

There are a crescent number of firms that since their inception they think globally and they don't follow the gradual steps to internationalize. According to McDougall and Oviatt (2000) in these companies entrepreneurs play a key role and they are "agents of change". Personal characteristics such as global mindset, being innovative, proactive and risk taking (Mort and Weerawardena, 2006) and a high degree of previous international experience (McDougall, 1997) makes easier and faster to enter new markets.

## **Application to Welle Laser**

Nowadays internationalize is mandatory for a firm to be competitive and diversify their operational risk. Welle Laser was founded in 2008 and started its internationalization process in January 2015, when they exported the first machine. In July they started their operation in Switzerland and in August in Mexico. In my opinion the network approach is the more

adequate to describe Welle internationalization process, since many of Welle's customers in Brazil are multinational companies and have plants in different parts of the world, so the clients network already existed. Switzerland CEO, also was a very important contact to start the operation there. In Mexico the partnership with a local company allowed Welle to start operating with low costs and enjoy network advantages. International Entrepreneurship Approach also can be mention, since Welle founder's entrepreneur mindset played a key role in the process.

## **Methodology**

In order to conduct this internationalization project several interviews were conducted with the Sales Director of Welle Laser, Dr. Bruno Gellert, which is the main responsible for São Paulo operation and directly reports to Welle's CEO, Dr. Rafael Bottós. Firstly, an internal analysis was performed in order to better understand the company, its structure and strategy. Secondly, it was included a brief industry overview. Thirdly, SWOT analysis and TOWS matrix were executed to access Welle Laser positioning and possible challenges. Thereafter, the underlining reasons to enter the US market were given, a PESTEL analysis was performed for a better knowledge of US economic and political environment, and Porter's Five Forces Model was used to access the level of competition within the industry. Thereafter a score model with key variables for Welle Laser business was elaborated in order to choose the best region to start the operation in US. Considering the previous analysis and the advantages and disadvantages of different entry modes, the strategy to enter United States was chosen. Subsequently, on the implementation part, financial risk, exit costs, and available information were considered. The 4P's of marketing were also used to define the product, price, distribution and promotion. Lastly, conclusions and recommendations were made based on the former analysis.

## **Internal Analysis**

### **1. Company Overview**

Welle Laser Technology is a company that is specialized on laser marking and laser engraving solutions: marking metals and polymers and engraving metals. Created in 2008 by Rafael Bottós and Gabriel Bottós, Welle stands at the forefront of developing laser machine technologies in Brazil. They have pioneered the development of laser coding and solutions for

industrial traceability. Their ability to create customized laser solutions has increased also the trust level of their clients, keeping Welle Laser as a leader, with 60% market share, in the Brazilian laser marking and laser engraving market, with a volume of approximately 90 machines per year and revenues of approximately R\$7 million.

Until 2011 the company only has sold five machines. Current capacity enables to produce about eight machines per month, but is possible to double the production by contracting more employees and doing night shifts. The only part of the business that is not scalable is customized machines, because it demands one project for which machine. In order to provide the best service, Welle works closely with customers in order to analyze and understand their needs and satisfy specific requirements in a fast and detailed way. Also, to ensure a long term relationship, Welle offers to their client's high quality and fast technical support (78% called of technical support solved at the same day).

Welle machines are installed in the manufacturing facilities of the largest companies in Brazil. Automotive sector is the one that most demand components marking followed by medical devices industry, but other sectors such as gifts, services, white goods, and bathroom fittings are clients as well. Important clients are Mahle, Bosch, TRW automotive, Whirlpool, among others. Welle Laser was elected the company with the largest growth in Brazil in 2014, according to Exame PME and Deloitte. In 2013 company has grown 303.2% with net sales of R\$6883 thousands and three year Compound annual growth rate (CAGR) of 1525.8%.

## 2. Mission, Vision and Company Values

**Mission:** Enhance productivity and efficiency of clients with laser technology innovative solutions through a solid and profitable company.

**Vision:** Become leader in Latin America until 2020 and be one of the five world largest companies in the segment until 2024.

**Values:** Commitment with defined goals; Efficiency in methods and processes; Quality and innovation of products and services offered; Positive thinking; Ethics and respect in all actions and relations.

## 3. Growth Drivers

The main business drivers for Welle are: **fiber laser technology**, which is the more efficient nowadays and crucial for machines performance; **investment on R&D** in order to develop

better machines; and **local and fast technical assistance**, which is Welle main differentiation factor and increases customer loyalty. **Expansion Strategy** can also be seen as a growth driver, since it will allow the company to have a bigger operation and as a consequence increase sales.

#### 4. Company Structure

In Brazil, company headquarters and plant are in Santa Catarina, and there is an office with technical assistance in São Paulo. The company is divided in four areas: sales and marketing (21 employees); commercial engineering (15 employees); administrative (8 employees) and juridical department (1 employee).

Operation in Switzerland started in July 2015; Welle Laser actually has an office in Biel-Bienne and exports machines from Brazil. In Mexico Welle operates via a Mexican company that represents Welle products in Mexico since August 2015 and machines are also exported from Brazil.

#### 5. Capital Structure

In 2008 Welle Laser started its operation in Santa Catarina with particular investment of Rafael Bottós and Gabriel Bottós and 1 million R\$ from organizations that support R&D such as Fined and CNPq. In 2011, Welle started negotiations with the investment fund Criatec which has as main investors BNDES – Banco Nacional de Desenvolvimento Econômico e Social and BNP – Banco do Nordeste do Brasil in order to gain a contribution. Currently, Rafael Bottós and Gabriel Bottós have a participation of 70%, Criatec of 20% and particular investors 10%.

#### 6. Company Strategy

Laser is the most advanced **system for marking, engraving and industrial traceability**. Welle Laser works with Fiber Laser 1064 nm, which offers various options for marking metals and polymers. It is possible to mark parts of all sizes and shapes with information. Welle has ten different types of marking and engraving machines (Appendix I) and also provides customized machines. Due to the product characteristics and the technical assistance service offered after the purchase, **price** is higher than low end competitors, but is slightly cheaper than high end competitors. **Distribution** is realized via sales representatives that are outsourced. These sales representatives are divided by different geographic areas and their

income is proportional to the amount of machines sold. **Promotion strategy** is concentrated on direct sales, marketing department select the industries and companies which are potential buyers of Welle machines and then tele-marketing staff realizes the contact. Other types of promotion used are: presence on trade shows; buy Google's algorithm in order to increase company visibility on internet; and public relations, by increased exposure in business websites and magazines.

Firms look for Welle in order to optimize the production lines and increase productivity. Most of the Welle clients are multinational companies. Welle suppliers provide the materials and parts to assemble the machines, so Welle can focus on its core business.

## **7. Positioning, Competitive Advantage and Competition**

Welle Laser position itself as a company that privileges quality and technology of their machines and focus on the client satisfaction. Excellence and efficiency in technical assistance are the main Welle's differential with 78% of technical assistance calls solved in 24 hours. Firm's machines use preferably fiber laser, which is the best technology in the market, and have solutions like an instant communication dashboard and remote technical assistance.

In 2008, when Welle started its operation in Brazil, there were already international players specialized on laser marking and laser engraving solutions, but its operation in Brazil was small, with no technical assistance and no focus on sales and customer satisfaction. Therefore Welle was the first Brazilian player to enter the market. Currently there are other Brazilian competitors (like Automatisa and Omnitek) and since Welle is entering other markets, international companies represent also a big threat (Keyence, Trumpf, Rofin, between others).

Consequently we can conclude that Welle held a competitive advantage at the beginning, since it was the first player in the Brazilian market that provided the product and technical assistance that clients wanted, making its resources valuable and rare, but other players entered the market which proves that the resources were not costly to imitate. Welle still holds a temporary competitive advantage in the Brazilian market due to earlier mover advantages, such as learning economies, network externalities, reputation, and buyers change costs. In order to sustain this position Welle needs to continue to differentiate from competitors, by improving their core product and strengthening their reputation and technical assistance service.

## **8. Legal Framework**

In Brazil there is legislation for companies that use machines and industrial equipment's in order to ensure a safety workplace (NR 9, NR 12, between others). There is no legislation to regulate energy consumption, but it can be implemented in the coming years.

## 9. Partnerships and Contracts

Welle works close to the top global centers of laser technology such as the **Fraunhofer Institute** in Germany, with the purpose of bringing to the industry innovative and efficient solutions that have significant advantages in cost savings and increased production.

**Endeavor** is the leading organization in the support of high impact entrepreneurs around the world. Welle had the highest score in the selective process of Endeavor, which means that it was that company that Endeavor believed to have the highest potential to growth and generate jobs in Brazil. Nowadays this partnership is crucial to help Welle defining their strategy.

**ABIMAQ** (Brazilian Association of Industry of Machines and Equipment's) and **FIESP** (São Paulo Federation of Industries) are important for Welle Laser politic relations and network.

Last but not least, the partnership that Welle has with some **integrating companies**, that assemble plants with all machines, helps Welle to increase sales, because they automatically place Welle machines on the plants that require marking or engraving solutions.

## Industry Overview

**Laser** is a powerful resource of light, having extraordinary properties not found in normal light sources (mercury lamps, tungsten lamps, and so on). The characteristic that differentiates laser is that its light waves travel long distances with very little deviation; whereas, conventional light can travel only short distances.

There are numerous types of lasers operating at different wavelengths and used for various applications. The **laser cutting** is the segment most explored because of its high returns. Laser cutting machines use laser beam to cut materials such as acrylic, plastic, wood, fabric, and many other non-metallic materials. Welle Laser decided to specialize in a niche market: laser **marking and engraving solutions**.

Marking laser revenues grew 6.7% in 2013 and **marking using fiber lasers**, which is the technology used by Welle Laser, grew 13% (Appendix II). Laser technology is replacing old methods of marking and engraving materials (stamps, labels or ink). This tendency is

expected to continue in the coming years because new government and company regulations for permanent marks for traceability are being put in place, for example, mandated US government requirements for 2D bar code marking of all contractor manufactured parts<sup>1</sup>. **Automotive and medical devices industries** are the sectors that most demand marking and engraving solutions, about 50% of machines produced by Welle Laser are sold to automotive companies.

### **Key Success Factors**

Considering the marking and engraving industry, key factors that may leverage the success of Welle Laser in the international market were found:

- **Market size and growth**, since bigger and growing markets usually have a higher demand
- **Existence of trade agreements**, since it can facilitate exportation to other countries
- **Proximity with industries that most demand data marking solutions for components** – (1) automotive industry and (2) medical devices industry
- **Effective and fast technical assistance service** as it guarantees satisfaction of actual clients and it's a key factor to collect new ones
- **Machines technology and features** as it can increase differentiation from competitors

### **SWOT Analysis & TOWS Matrix**

A fundamental step to define the internationalization process is access company internal strengths and weaknesses and its external environment by identifying opportunities and threats, therefore a SWOT analysis (Figure I) was performed. Then by using a TOWS Matrix (Figure II) it was examined ways for the company to take advantage of opportunities and minimize threats by exploiting strengths and overcoming weaknesses.

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<sup>1</sup> Source: Industrial Laser Solutions for Manufacturing: Fiber laser revenues boost the 2013 laser market  
01/24/2014



Figure I: Welle Laser SWOT Analysis

<p><b>Strengths/Opportunities Strategies</b></p> <ul style="list-style-type: none"> <li>- Take advantage of relation with multinational clients to enter new markets</li> <li>- The fact that there is no investment need to double production in Brazil plant enables rapidly increase international presence by exporting</li> <li>- Current Brazil market share in laser marking solutions can make easier to enter in laser cutting segment</li> <li>- Startup vision of Welle seems to be more connected with industry 4.0 concept and challenges</li> </ul>	<p><b>Weaknesses/Opportunities Strategies</b></p> <ul style="list-style-type: none"> <li>- By increasing international presence Welle increases brand equity and experience overseas</li> <li>- Enter in laser cutting segment and the increasing automatization of industrial processes are two drivers that can increase revenue and enable a higher capital investment</li> <li>- Since fiber laser technology is the most efficient technology by now and other competitors also use it, Welle should try to differentiate them self in other specifications</li> </ul>
<p><b>Strengths/Threats Strategies</b></p> <ul style="list-style-type: none"> <li>- Enhance close relation with clients and tailored solutions because they are more difficult to replicate. Hence it acts against fiber laser suppliers integrating forward</li> <li>- Use technical assistance demand and revenues to be less affect by Brazil economic crisis</li> <li>- Take advantage of the relation with multinational companies in Brazil to collect clients overseas</li> </ul>	<p><b>Weaknesses/Threats Strategies</b></p> <ul style="list-style-type: none"> <li>- Increase international presence to diversify company's revenue and be less affected by Brazil economic crisis</li> <li>- Use strong multinational clients to record testimonies about Welle product and service and enhance Welle brand equity</li> <li>- Differentiate from the competitors in order to decrease direct competition and turn less appealing for fiber laser suppliers integrating forward</li> </ul>

Figure II: Welle Laser TOWS Matrix

It's possible to conclude that many points on TOWS Matrix are directly connected with internationalization. Increase international presence to diversify company's revenue and be less affected by Brazil economic crisis; take advantage of relation with multinational clients to enter new markets; and the fact that there is no investment need to double production in Brazil plant which enables exporting in the short term; reinforce the importance of go international.

## **Global Readiness & Country Selection**

Welle Laser' motivations to internationalize are mostly sales expansion and consequently, risk minimization, as it depends on the Brazilian market that is suffering an economic downturn. For Welle Laser exporting was a natural process, since many of Welle's customers have plants in different parts of the world, and they were in need of assistance on these other countries. Even for operation in Brazil, go international is favorable, since multinational companies tend to choose other multinational companies as suppliers of their machines.

The company exported the first machine in January 2015, operation in Switzerland started in July 2015 and operation in Mexico started in August 2015. Switzerland was chosen as the first country to start international expansion mainly because: allows free commerce between other European countries and also with USA; low corporate taxes (CIT between 11.5% and 24.2%) that impact in higher margins; last but not least, the main reason to choose Switzerland was having the right person to run the business there. Henry Goffaux, CEO of Welle Switzerland, is a member of ABIMAQ, with experience in laser industry, knowledge of Switzerland culture, and important contacts there, which enabled to constructed a network of relations much faster. Mexico has chosen because they have a growing industry, especially automotive sector that now accounts for 6% of national GDP and 18% of manufacturing production<sup>2</sup>. Welle has been developing a partnership with a local distributor (Soluciones) and for now they are operating via this Mexican company and exporting the machines from Brazil, which allows a much lower investment and easy access to potential customers.

Considering the geography Welle Laser was thinking about expand to other countries in South America and to United States. Assuming that the main driver to marking and engraving business are the demand of companies mainly in automotive and medical devices industry,

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<sup>2</sup> Source: Automotive Meetings (<http://www.automotivemeetings.com/mexico/index.php/en/automotive-industry-in-mexico>)

it's mandatory to access how these industries are performing and what are the prospects in Latin America countries and US.

### **South America**

Argentina and Colombia are the only countries on South America with an expressive production of vehicles (Appendix VI). Colombia's automotive industry accounts for 10% of GDP, in Argentina 5% of GDP and in other markets with a relatively small automotive industry, such as Chile, Peru and Venezuela, the contribution is significantly lower than 2%<sup>3</sup>. Medical devices industry in Latin America has its largest market in Brazil, followed by Mexico, Venezuela, Colombia, and Argentina respectively. Excluding Brazil and Mexico, countries don't have mature regulatory systems for medical devices. Therefore, Mexico is by far the country with a better positioning, with the 13<sup>th</sup> largest GDP in the world, \$3 billion medical device industry, no import duties for American and Canadian companies, and it's a member of NAFTA.

The large and young population, workforce growth, low cost production, government focus to reduce trade barriers and low car ownership are indicators that favor expansion of some industries to these countries. On the other hand, political and economic instability, volatile exchange rates, dependence on global availability of capital and bureaucratic regulatory process, make these countries very unpredictable. In summary, Welle should continue monitoring economic and political situation and analyzing opportunities mostly in Argentina and Colombia, but right now neither of them seems to be a priority for Welle Laser.

### **United States of America**

On the other hand United States seems to be the most appealing country to start an international operation, mostly due to:

**- The size and growth of the market:** United States is a country of 50 states covering a vast swath of North America, between Canada and Mexico, with approximately 319 million inhabitants (third largest population after China and India). The Gross Domestic Product (GDP) was 17419 billion USD in 2014 and grew 2% in 2015 Q3.

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<sup>3</sup> Source: KPMG Automotive Facts & Figures South America (excluding Brazil)  
(<http://www.kpmg.com/co/es/issuesandinsights/articlespublications/documents/automotive%20facts%20and%20figures%20-%20south%20america.pdf>)

- **Proximity with key clients and suppliers:** Welle Laser supplier of fiber laser IPG is located in USA and actual multinational clients in Brazil have plants in USA, which can be an easier way to start a network.

- **Strong automotive industry, it is where most of the large-scale industry multinational companies have plants:** The proximity to industries that are more automatized and need marking fiber laser machines is also a plus. Automotive companies usually are the main clients, since they demand more machines for their operation. US is the second largest motor vehicle producer in the world (Appendix IV) and automotive sector is growing again in USA with 16.5 million vehicles sold in 2014, versus 10.4 million in 2010.

- **Strong Medical Devices Industry:** US is the largest medical device market in the world with 38% of the global medical device market. Medical devices industry is the second sector where Welle Laser has more customers.

- **Free trade agreements with other countries:** US negotiated favorable treatment through an FTA to make easier and cheaper exporting activity. Accessing FTA benefits can give the product a competitive advantage versus products from other countries. The United States has 14 FTAs in force with 20 countries. U.S. FTA Partner Countries: Australia; Bahrain; Chile; Colombia; DR-CAFTA: Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, & Nicaragua; Israel; Jordan; Korea; Morocco; NAFTA: Canada & Mexico; Oman; Panama; Peru; and Singapore.

- **Effective way to enhance brand equity:** Expand to US will leverage the image and increase Welle Laser network, which can facilitate company's growth and expansion in other countries.

## US PESTEL Analysis

Since Welle Laser is approaching a new market it's important to identify issues that are outside the control of organization and can impact them, in order to do so a PESTEL (Political, Economic, Social, Technological, Environmental, and Legal) analysis of United States was performed (Figure III and detailed PESTEL analysis on Appendix VI).

<p><b>Political</b></p> <ul style="list-style-type: none"> <li>- Oldest democracy in the world</li> <li>- Leading superpower in the world</li> <li>- Federal system in which power is divided between national government and states</li> <li>- Which state has their own constitution, government, and courts</li> <li>- Threat of terrorism</li> </ul>	<p><b>Economic</b></p> <ul style="list-style-type: none"> <li>- USA represents 28.10% of the world economy</li> <li>- GDP growth was 3,9% in Q2 2015 and 1,5% in Q3 2015</li> <li>- High regulatory efficiency and an open market</li> <li>- Country risk rating A1, meaning corporate default probability is very low on average</li> <li>- Increasing budget deficit</li> </ul>	<p><b>Social</b></p> <ul style="list-style-type: none"> <li>- Population annual growth rate in US was 0.7% in 2014</li> <li>- Aging population which can lead to a serious labor shortage and rising tax rates in the future</li> <li>- Unemployment Rate was 5.0% in Oct 2015, which means an improvement comparing with 6.2% for the year of 2014</li> </ul>
<p><b>Technological</b></p> <ul style="list-style-type: none"> <li>- Leading in terms of adapting and applying technology</li> <li>- Strong competition from rising economies, such China and India</li> <li>- Second country with the higher number of internet users (201,78 million)</li> <li>- 65% of Adults in U.S. Use Social Media</li> </ul>	<p><b>Environmental</b></p> <ul style="list-style-type: none"> <li>- Satisfaction level with the national environmental quality in United States is higher than the majority of OECD countries</li> <li>- Renewable energy development (solar panels, wind turbines) on current and formerly contaminated land, landfills and mine sites is promoted by the U.S. government</li> </ul>	<p><b>Legal</b></p> <ul style="list-style-type: none"> <li>- Federal corporate income tax applies to bands of taxable income at rates between 15% and 35%</li> <li>- Branch profits tax imposes additional 30% tax on foreign corporations engaged in US trade or business</li> <li>- U.S. corporate statutory tax rate is higher than the average tax rate of OECD countries</li> </ul>

Figure III: US PESTEL Analysis

## Porter's 5 Forces Model for US

In order to analyze laser marking and engraving industry in US Porter's 5 forces model was performed (detailed Porter's 5 Forces Model on Appendix III). This model was developed by Michael Porter in 1979 and is an analysis tool that uses five forces to determine the profitability of an industry and shape a firm's competitive strategy<sup>4</sup>.

Considering the 5 forces intensity (Figure IV) it's possible to conclude that the marking industry still is an attractiveness sector, since it's growing at two digits a year and it will to continue to grow in next years, due to the substitution of other marking methods for fiber laser technology. However, the increasing competition and the threat of fiber lasers supplier's integration forward can represent huge risks.

<sup>4</sup> Source: Porter, M.E. (2008). The Five Competitive Forces That Shape Strategy. Harvard Business Review

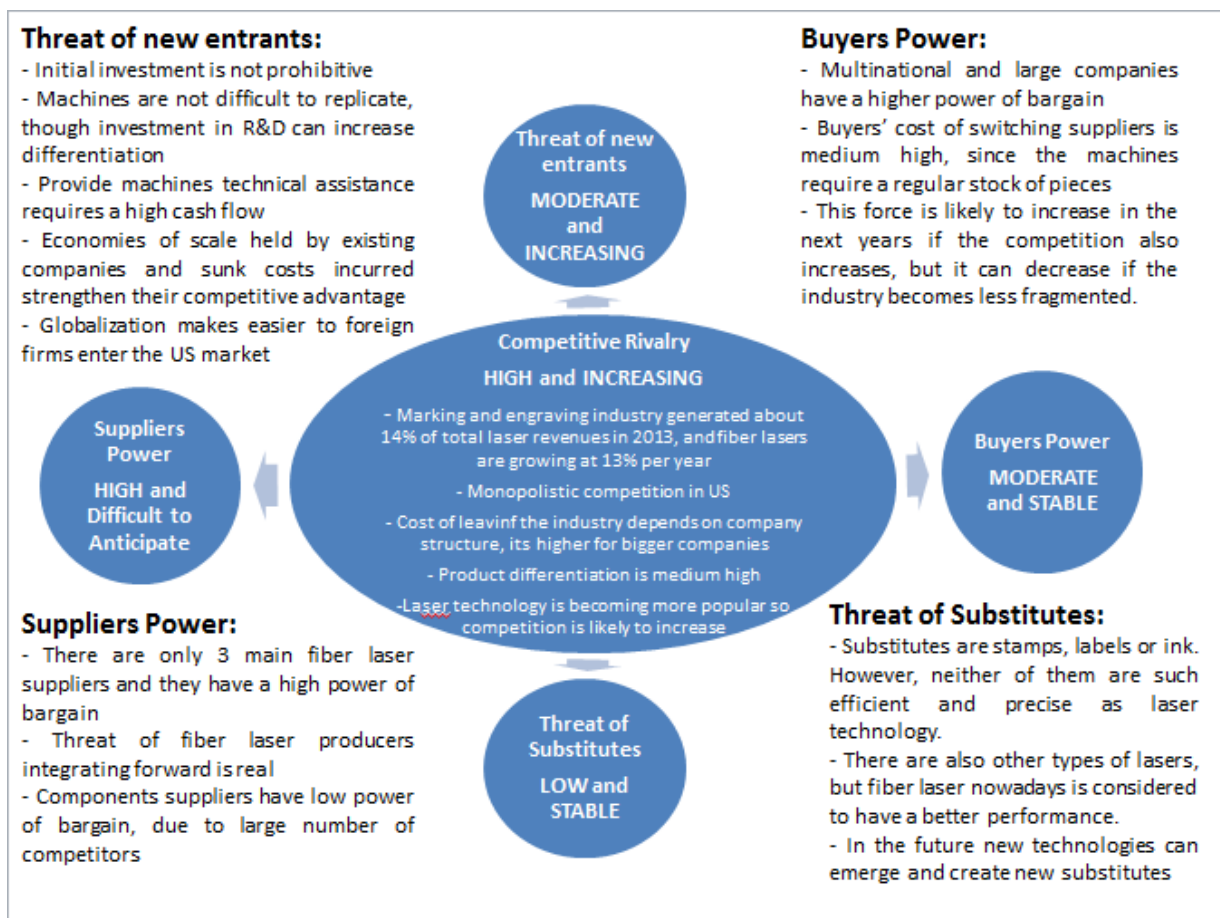


Figure IV: Porter's 5 Forces Model for Marking Industry in US

## Score Model

United States is a country with 50 states so it's mandatory to decide where Welle Laser should start its operation. In order to do that a score model considering key variables for Welle Laser business was elaborated.

Since it's not viable to consider the 50 states on the model it was mandatory to select the ones with an upfront higher potential. The first aspect considered was the proximity with automotive industry, since it is a local economic developer and the industry that most demand marking laser solutions. Traditionally, the geographic center of the automotive industry has been located in the Midwestern states of Illinois, Indiana, Michigan, Missouri, and Ohio, but international automotive companies expanded for the Southern states of Alabama, Georgia, Mississippi, and Tennessee (Appendix VII). On the other hand, Silicon Valley has recently attracted significant auto-related investment, with companies such as Tesla, Google and

Apple reinventing the car. Therefore to choose the states to be accessed on the model the proximity with automotive industry was the key variable.

To construct the model the twelve states with the higher number of jobs in automotive industry were select, assuming that this indicator is a proxy of the dimension of the automotive industry by state. Then, it was necessary to select the variables to include on the model and each variable was scaled in a value ranged between 0% and 100%, given the different scales present across the variables. The indicator score was given by  $X'_{ij} = \frac{X_{ij} - \min_i}{\max_i - \min_i}$ , where  $X'_{ij}$  is the scaled score of state  $j$  on variable  $i$ ;  $X_{ij}$  is the value of state  $j$  on variable  $i$ ;  $\max_i$  is the maximum value for variable  $i$  and  $\min_i$  is the minimum value for variable  $i$ .

Macroeconomic indicators totaled 25% and microeconomic indicators 75%, which are divided in automotive indicators (45%), medical devices indicators (20%), and Welle Laser competition (10%).

**Macroeconomic indicators** selected were: (1) GDP Per Capita (PPS), (2) Percentage Change in Real GDP, (3) Index of Economic Freedom. The **GDP Per Capita** is a measure of the total output of a country that takes the gross domestic product (GDP) and divides it by the number of people in the country; it is the best aggregate measure of economic activity. The **Percentage Change in Real GDP** gives the growth in real GDP (nominal GDP adjusted for inflation) from one year to another. The states with a higher change on real GDP have more probabilities of future growth. The **Index of Economic Freedom** measures economic freedom based on 10 factors: property rights, freedom from corruption, fiscal freedom, government spending, business freedom, labor freedom, monetary freedom, trade freedom, investment freedom and financial freedom. A higher position of the state in the ranking increases the chances of choosing a better place to invest in.

**Automotive industry indicators** considered in the model were: (1) Number of Jobs in Automotive Industry, (2) Number of Automobile Assembly Facilities, (3) Number of Automotive Manufacture Establishments, (4) Proximity to Mexico and (5) Proximity to the other states with a strong auto industry. The first three indicators are used as proxy to measure the size of the automotive industry in each state, since more automotive companies represent more potential clients. The **Number of Jobs in Automotive Industry** considerers total industry employment contribution. The **Number of Automobile Assembly Facilities** only

accounts for the assembly motor vehicle plants in which state. The Number of **Automotive Manufacture Establishments** covers motor vehicle, body and trailer and parts manufacturing. The **Proximity to Mexican Parts Suppliers** was also included in the model since it can provide a logistical advantage for plants located in the Auto West Corridor, if the trend toward increased Mexican parts content continues. Recent new investment in the Auto West Corridor and its proximity to Mexico suggest that states in this corridor may be in a position to compete for the next new Greenfield U.S. auto assembly plant (Appendix VI). **Proximity to states with a strong automotive industry** (distance to one state to another minor than 600 miles) it's also considered, since there are states with a more strategic location than others, therefore states that are close to a high number of states can easily sell to that states.

The **Medical Devices Industry Concentration** by state was included. This sector is the second sector where Welle has more clients and US remains the largest medical device market in the world with 38% of the global medical device market<sup>5</sup>. Even this industry being very fragmented it was accessed from the states previous selected the size of the industry in each region, states with more medical devices companies were ranked with a higher score.

**Number of Welle Laser Direct Competitors** in each state was accessed, because despite the fact that companies can transport their product to other states, proximity to clients can facilitate the operation and leverage sales. The marking and engraving laser industry is very fragmented and only the main competitors were considered.

Level of Screening	Weight	Criterion	Weight
<b>Macro-Level</b>	<b>25%</b>	GDP Per Capita (PPS)	5%
		Percentage Change In Real GDP	10%
		Index of Economic Freedom	10%
<b>Automotive indicators</b>			<b>45%</b>
<b>Micro-Level</b>	<b>75%</b>	Number of Jobs In Automotive Industry	10%
		Automobile Assembly Facilities	10%
		Automotive Manufacturing Establishments	10%
		Proximity (in miles) to Mexico	5%
		Proximity to US States with a Strong Auto Industry	10%
		<b>Medical Devices indicators</b>	<b>20%</b>
		Industry concentration	20%
		<b>Competition</b>	<b>10%</b>
		Number of competitors	10%

Figure V: Criteria Weight

<sup>5</sup> Source: Select USA (<http://selectusa.commerce.gov/industry-snapshots/medical-device-industry-united-states.html>)

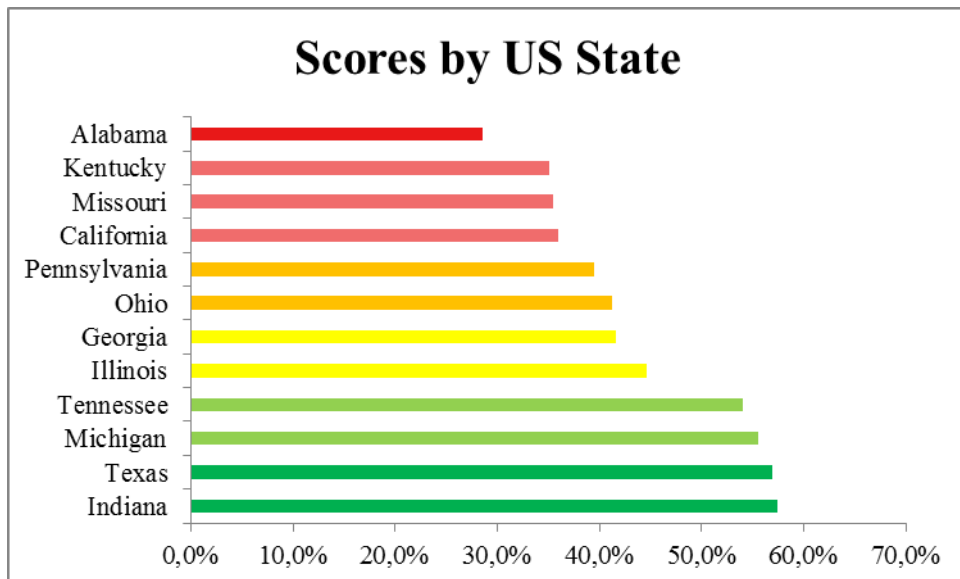


Figure VI: Score Model Results

Considering the variables above and the respective weight, each state was evaluated with a final score. According to the results the state with the higher score was **Indiana** (57,4%) and consequently the one where Welle Laser should start its operation. Indiana presented good results on the indicators related with the automotive and medical devices industry, which ended in a higher total score.

## Entry Mode

When a company internationalizes, there are several strategies that can be used. Each option has different characteristics that should be analyzed by the company in order to choose the one that fits best, taking into account the company's specifications, strategy and objectives, but also the degree of risk, control, commitment of resources and return on investment. The choice between strategies entails a trade-off between cost and financial risk, and between profit potential and control.

**Licensing agreement** is an arrangement where the licensor grants the right over intangible property to another entity for a specific period, and in return, the licensor receives a loyalty fee from the license (Hill, 2007), this kind of tactic is not appropriate for Welle Laser since is a temporary agreement and the objective is the transference of knowledge between the parental company and the licensee. **Franchising** is a long-term kind of licensing agreement and it only makes sense when the franchisees have interest in become identified with franchiser trademark, to sell its products or services, and often to use its business format and system, which do not apply to Welle Laser, due to its lake of reputation in US. **Turnkey**

**projects** are where two entities/firms are responsible for putting up a plant or equipment and it's usually a way to export know-how to other countries, which it's also not the intention of Welle, since Welle wants to establish in US market and it will strengths a competitor.

**Exporting** has been traditionally regarded as the first step to entering international markets, serving as a platform for future international expansions (Kogut & Chang, 1996). It doesn't require higher investments of time, resources and personnel and also organizational changes, which makes exporting less risky than other strategies. Laser Engraving Machines are duty free, therefore costs to export are residual (merchandise processing fee, shipping and insurance cost)<sup>6</sup>.

A **joint venture** is an entity formed by two or more independent firms working together. The firms agree to join together sharing revenues and costs, as well as the control of the new firm. The venture can be just a project or a long-term relationship; companies involved can complement their skills and gain international presence. There are five common crucial advantages in a joint venture: market entry, risk/reward sharing, technology sharing, joint product development, and distribution channel access that may depend on relationships. Welle Laser size, market power, and resources are small compared to the industry leaders which can be a reason for considering a joint venture, on the other side a joint venture attempts to develop shared resources, which is not the main goal for Welle, and find a partner can be very difficult and risky.

A **wholly owned subsidiary** includes two types of strategies. Setting up a new operation in the host country, often referred to as a **Greenfield venture**, or it can **acquire established firm** in the host nation and use that firm to promote its products (Hill, 2007). Acquisition strategy offers the fastest, and the largest, initial international expansion of any of the alternative. Acquisition is lower risk than Greenfield investment because the outcomes of an acquisition can be estimated more easily. The question is if there is a company for sale with a fair valuation and if Welle can get financing to realize the acquisition. Unfortunately Welle was not made yet any research about this, consequently it is not possible to conclude if it is viable or not. The main disadvantage of these strategies is the large investment.

After analyzing the entry modes above, it's possible to conclude that for Welle Laser the best options are **exporting in a first phase**, taking advantage of the excess production capacity in

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<sup>6</sup> Source: Duty Calculator (<http://www.dutycalculator.com/new-import-duty-and-tax-calculation/>)

Brazil plant and the valorization of dollar. It's also the tactic that requires a minor investment and less exit costs and as in Switzerland Welle Laser can open an office in US to support sales, increase network, and coordinate technical assistance. **In a second phase**, when production capacity in Brazil plant exhaust Welle should go for a **Greenfield venture or acquire a US company** in the same segment in order to have a plant in US. This will naturally leverage Welle presence and sales in US and gives the opportunity to export from US to other markets that US have free trade agreements. Therefore Welle can this way export from US to Switzerland and Mexico (markets where Welle Laser is presence nowadays) without paying taxes, turning the operation more profitable.

## Implementation

Welle Laser initially will export the machines from Brazil; therefore there is no need of a plant in US, which is the main investment and represents a higher financial risk. The office in Indiana can be rented in order to decrease exit costs and in a first phase Welle will have only key persons on the US office to minimize workforce costs. The key persons are: CEO Welle US (responsible for US operation); Sales Director (main responsible for sales in US and coordinate sales representatives); Sales representatives (outsourced and commissioned,); and Technical Assistance Experts (required to assist customers). In order to decide which products Welle is going to export to US, at what price, and how it will be distributed and promoted, marketing mix tool was used.

## Marketing Mix – 4Ps

**Product:** Welle Laser will sell the same product as in Brazil, a line of 10 marking and engraving machines that fit different production needs (Appendix I). To sell the product in US is necessary to adapt the machines in accordance with UL standards, which is an American worldwide safety consulting and certification company. It is a relatively simple procedure and Welle Laser can use APEX (Agência Brasileira de Promoção de Exportações e Investimentos) support. What differentiates Welle is the technical support provided after purchase, since clients usually favor companies that offer premium assistance, because if a machine stops working the damage on production represents a cost for the company. In US Welle will have qualified technicians providing 24 hours assistance and available to go to the customer plant. Overall the cost benefit relation of the machines and the technical support given after purchase will be the main differentiation factors.

**Place:** Welle Laser office and a possible future plant will be located in Indiana. This location was chosen taking into account macroeconomic indicators and the proximity to automotive and medical devices industries, which are the main industries where Welle has clients. A sales force to directly sell the product to customers is mandatory, only this way is possible to differentiate the product by explaining technical specifications, how technical assistance works and recommending the most appropriate machine for each business. Sales representatives will be outsourced and divided by different geographic areas.

**Price:** Welle Laser wants to enter in US marking and engraving market, which is very fragmented and competitive. Chinese companies have in general the lowest prices in US, but usually they export the machines from China and don't provide local technical assistance, which means that if a machine has any problem, the customer needs to send the machine to China to fix it, which causes a great cost and annoyance for the client. There a lot of US based companies providing marking solutions, however most of them sell machines less updated and modern than Welle. Welle strategy includes establish a price in line with the average price of an initial typical marking machine in US, which is about \$30.000. Since Welle machines are better than average, pricing them with the same price as other machines will turn Welle in the best cost benefit option.

**Promotion:** Welle Laser target customers are companies demanding traceability solutions, and mostly companies that are in automotive and medical devices industries. Welle is a Brazilian company with no experience in US market or US customers. It is necessary to start the operation in US with a local team with a good understanding of the industry there and also a cultural mindset in order to communicate with future clients, suppliers and other entities. It is important to reinforce that it's a B2B business; therefore direct marketing and negotiation are crucial functions for the success of Welle Laser. Direct marketing actions will include call to potential clients; send newsletters by email, exposure in business websites and magazines, and presence on US trade shows. Welle will also buy google algorithm for their page appear on the first results when someone is looking for marking solutions. Other important types of promotion are recommendation and word of mouth. Welle can record some of their multinational clients recommending their product and post on their website; this will increase other company's reliability on Welle machines.

## Conclusions and Recommendations

Marking and engraving laser fiber market is growing and it's a tendency for future growth, since many companies are replacing old marking systems for fiber laser. Welle Laser started looking abroad in the beginning of 2015 when the sales in Brazil were flat due to the economic crisis and international expansion seemed the best way to increase revenues and risk diversification. Welle currently has an office in Switzerland to support sales and provide technical assistance when exporting the machines from Brazil. In Mexico Welle is operating via a partnership with a Mexican company. Despite of these advances, Welle wants to expand more and targeted South America countries and US as the next countries to be present. In my previous analysis I explain why enter in US market seems to be the next move.

United States is a big country, with favorable macroeconomics indicators and above all its one of the primary locations of automotive and medical devices industries, which are the companies that most demand marking and engraving solutions. However, there are some difficulties in expand to US: fragmented and competitive marking laser industry, Welle Laser lack of capital, and non-existing brand equity in US.

Given the size of United States and the differences between states a score model was elaborated in order to choose the most attractive state for Welle start an operation. The score model account macroeconomics indicators by state (25%) and microeconomics indicators (75%) associated with the automotive and medical devices industries, which were previous considered the main drivers for Welle Laser demand. According to the model Indiana is the state with the biggest potential for Welle establish its business.

After analyzing the different entry modes, direct exporting the machines from Brazil and have an office in Indiana to support sales and technical assistance was chosen as the best entry mode for Welle Laser. The reasons behind that decision are: excess production capacity in Brazil; lower costs, risks, and exit costs at an initial phase; time to get more familiar with US market and to focus on sales. In a second moment, since Welle is also exporting the machines from Brazil to other countries, production capacity in Brazil plant will probably exhaust. US seems to be the right country to have a second plant since: its easier to export to other countries due to the large number of free trade agreements; large number of potential clients in automotive and medical devices industry; proximity with fiber laser supplier (IPG Photonics); and have a plant in US will enhance Welle brand in the rest of the world. In order

to have a plant in US Welle can go for a Greenfield venture or acquire an existing company, turn the process faster.

There are limitations that can modify these recommendations: change on US Dollar Brazilian Real exchange rate; the credit capacity of Welle Laser is not known, Welle needs to access it with banks; lastly there is not enough information to advice pursuing an acquisition, but I strongly recommend Welle to do further research in order to access the viability of this hypothesis.

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