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**DISTRIBUTION OF SMART SOLUTIONS FOR EXTERNAL
LIGHTING IN SWITZERLAND - CASE C2 SMARTLIGHT LTD.**

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ABSTRACT

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Keywords: Distribution channels, channel management, distributor support, qualitative research, B2B, SME, LED, intelligent light control, Finland, Switzerland.
<p>Establishing of export operations is the key to the competitiveness for all producing companies in high-tech industry. Distribution partnerships between exporting producer and local distributors of relevant foreign market are utilized by SMEs to gain cost-efficiency of operation.</p> <p>The purpose of this study was to investigate the Swiss market of outdoor lighting solutions and propose distribution channels for the case of company C2 SmartLight Ltd. The literature framework consists of three main parts: description of distribution channels for business products, the selection process of the distributor and management of the distributors. The empirical part of this study composed of the observation of Swiss lighting market, highlighting key customers, trends of energy efficiency and key industry players of the lighting market. The aim was to identify potential distribution channels, which reach the target customer groups and identify the market opportunity. Secondly, the data was collected through semi-structured phone interviews. The company, which operates in outdoor lighting business and has an established distributor in Switzerland, was interviewed and used as a benchmark.</p> <p>As a result of this research the market opportunity for distribution of C2 SmartLight products was identified based on potential customers and market need. C2 SmartLight Ltd. should establish a connection with wholesalers that distribute easy to handle and store electrical equipment. The results of this study can be used by other SME companies, operating in a similar field of economy, for selection of distributors.</p>

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LIST OF ABBREVIATIONS

AES	Advanced Encryption Standard
B2B	Business to business
CHF	Swiss Franc
DALI	Digital Lighting Addressable Interface
EKZ	Elektrizitätswerke des Kantons Zürich
EU	European Union
EWB	Energie Wasser Bern
EWZ	Elektrizitätswerk der Stadt Zürich
GHz	Gigahertz
GPRS	General Packet Radio Service
GSM	Groupe Spécial Mobile or Global System for Mobile Communication
GWh	Gigawatt hour
HQ	Head Quarter
Hz	Hertz
IT	Information Technology
kWh	Kilowatt hour
LED	Light-emitting diode
M	Millions
OeB	Fachgruppe öffentliche Beleuchtung
OEC	Observatory of Economic Complexity
PC	Personal computer
PC	Personal Computer
R&D	Research and Development
RF	Radio Frequency
RGB	Red, Green, Bleu
S.A.F.E	Schweizerische Agentur für Energieeffizienz
SIG	Services Industriels Genevois
SME	Small and medium-sized enterprises
SMS	Short Message Service
SW	Software

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1 INTRODUCTION

The internationalization of business operations and expanding to new markets is considered to be a growth opportunity for the companies through increase of sales. The international sales activities are challenging to manage for large enterprises and particularly difficult for small and medium sized enterprises (SMEs) due to the limited resources (Anderson et al., 2001; Lewin & Johnston, 1997). Because of high costs of international operations, especially in direct exporting methods, SMEs prefer to distribute products through foreign agents and wholesalers localized in the target country. Thus, the desired distribution channel should be selected and distribution process should be planned, before the first product batch is shipped to a new market (Bello et al., 2003).

The research of this thesis work is devoted to the specific case of the Finnish SME, C2 SmartLight Ltd, which produces intelligent systems for outdoor lighting control. The motivation for current research emerged from the company's desire to expand its business operations and enter the Swiss market. The company seeks new opportunities in the developed countries with high demand for energy effective lighting solutions. In order to determine the key factors influencing market entry strategy, a comprehensive market investigation should be made, defining key players, potential customer groups and distribution channels to reach these customers.

1.1 Research gap

The research gap of this work is related to the shortage of available information of SMEs distribution channels in the foreign countries. The available literature concerning the distribution and exporting is commonly based on the examples of large enterprises operating in different industrial sectors (Ferrell & Hartline, 2014; Kotler & Armstrong, 2010; Rehme et al., 2016). However, the resources of small and large companies are considerably different, thus, the export operations of SMEs should be investigated separately (Vachani, 2005). The recent research publications about the exporting of SMEs discuss mainly their relationships with customers and other stakeholders of business network (Laufs & Schwens, 2014; Ojala, 2009; Tzokasa et al., 2015). The topic of trust

and cultural issues is discussed thoroughly taking in account of SMEs operations in different market areas (Nevins & Money, 2008). Whereas, the specific topic of selection and management of distribution channels by SMEs in a foreign market is poorly presented.

This research project is focused to study the process of selecting distributors for high technology products manufactured by SMEs. The processes of identifying, selecting and managing distributors are described and critically reviewed. Developed methodology might be applicable for the SMEs operating also in the other sectors of lighting industry.

1.2 Research questions and research objectives

This research is devoted to a case study of Finnish SME, which operates in the field of smart lighting technologies. The typical behaviours of SME companies while entering new markets are not yet fully studied and described, due to the variety of factors affecting the processes: field of business, target customers, type of foreign market to enter. Moreover, the distribution networks of Finnish SME companies are poorly addressed in the literature. Thus, this research work describes the implications of distribution channels shown on the example of Finnish SME, venturing foreign market. The research aim is to determine effective distribution channels for promotion of smart lighting solutions on the Swiss market. Thus, the main research question is:

RQ1: How to distribute smart lighting solutions in the Swiss market?

In order to obtain answer to the primary research question, the overall understanding of the Swiss lighting market should be obtained. The following sub-questions help to guide the research work:

RQ2: What is the profile of Swiss lighting market?

RQ3: Who are the key distributors in the Swiss market?

RQ4: How to select and manage distributors in the Swiss market?

At the end of research work the overall market study results will be presented and a set of activities for market entry will be developed according to business line of C2 SmartLight Ltd.

1.3 Research methods

In-depth understanding of the distribution channels of SME in a foreign market is required, and thus, a qualitative research approach is selected (Piekkari et al., 2010; Yin, 2013). This research method is suitable to investigate the patterns of establishing new distribution channels (Rehme et al., 2016).

A desktop study is performed in order to obtain the general information about Swiss lighting market, highlighting the key customer groups and market players. At this stage potentially competitive solutions presented on the respective market are analysed and potential distributors are identified. Then, the SME company, which have already established export operations in Switzerland, is interviewed. A semi-structured interview is applied to find out the experience of the company in starting a new distribution network in Switzerland. The obtained information is used as a benchmark to propose an efficient distribution channels for the case company C2 SmartLight Ltd.

1.4 Limitations

The research is done from the perspective of Finnish company operating in outdoor lighting industry that designs and manufactures intelligent control solutions for challenging environments. The research is focused on distribution channels suitable for the particular products of C2 SmartLight Ltd. The distribution networks will be analysed from the SME perspective.

The study of distribution networks is narrowed to the lighting market of Switzerland. The Swiss market is chosen for the research due to the large volumes of imported products, high price tolerance and high demand for energy efficient lighting solutions.

1.5 Outline and structure of the thesis

The structure of this research project is presented in Figure 1 below. The schematic diagram of the research effectively demonstrates the stages of it with specific information, which helps to view project at a single glance.

The research project begins from introduction of the research problem, questions and objectives. The following part covers the literature review of distribution channels, discovering their types and implications. Furthermore, the selection process of distribution channels is also discussed, which is followed by investigation how the distribution channels are managed in the companies. The research methodology is discussed separately from the literature review, highlighting the research practices and pointing out the reasons why qualitative research method is applied in this work.

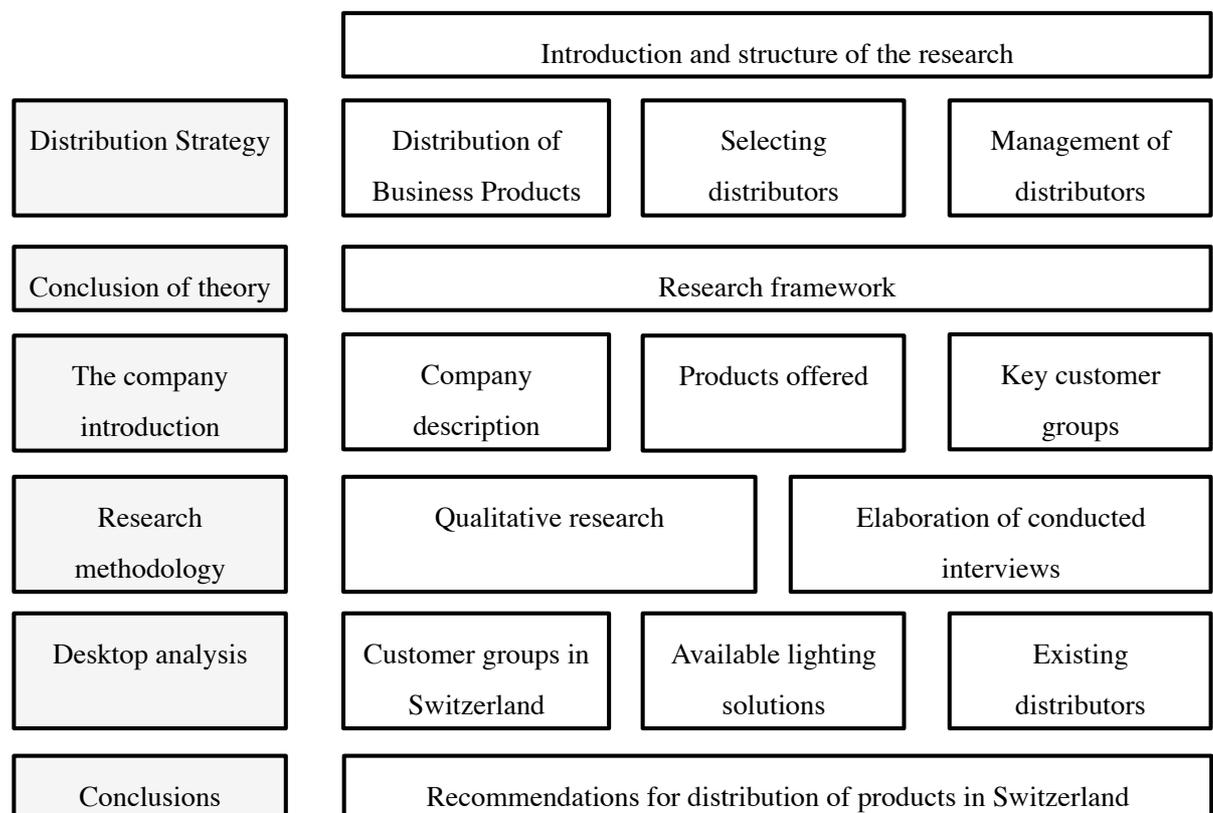


Figure 1. The structure of research.

The products of C2 SmartLight Ltd. are described in order to define a suitable solution for entering the Swiss market. The benefits to the solutions are discussed and compared to

other existing light control systems on the Swiss market. In the research of Swiss market particularities, there are defined different customer groups for the light control solutions and the common distributors of the electrical equipment are presented.

In conclusion, the results of the research are summarized to highlight the recommendations for the further actions of C2 SmartLight in the market. The results of this study can be potentially applied for other SMEs operating in high technology sector.

2 LITERATURE REVIEW

The following chapters are devoted to discover the published literature regarding the distribution networks and their implications. The types of distribution channels are described in the scope of international distribution. The business-to-business (B2B) operations are discussed, because the case company operates primary in this sector. Furthermore, the selection process of the distribution channels is elaborated. Finally, the management of distribution networks are discussed, highlighting the key issues. At the end of this chapter, the research framework is presented.

2.1 Channels for product distribution

This chapter is devoted to the description of distribution channels of business business products. The comparison between distribution of business products and consumer items are emphasised. The product types define the ways of distribution as well as it should be ensured that selected channel reach the target customer group. Therefore, previous researches help identify principal distribution patterns.

2.1.1 Distribution of business products

The term distribution is defined by Albaum et al. (1998) as a system formed by organizations connecting the producer of services or products with end-users in a foreign market. Distribution is one of the key elements of marketing, enabling company to gain a competitive advantage on the market (Coelho, 2003). Distribution channels are selected according to peculiarities of the new markets and should support company's development strategy, type of product and effective access to the targeted group of customers. The selection of correct distribution methods affects success of market entry (Kotler & Armstrong, 2010).

The elements of distribution channel depend on the product type, whether the product is designed for consumers, or other businesses, or a government customer. The types of distribution methods for business channels are illustrated in Figure 2.

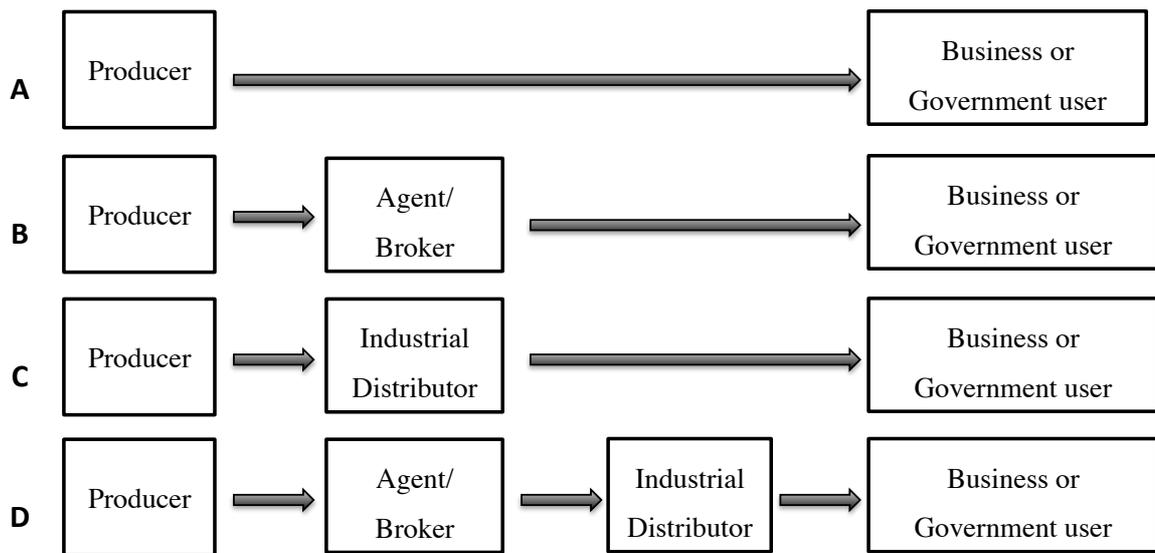


Figure 2. Distribution channels for business products (Pride & Ferrell, 2013, p.489).

The distribution channel can be simple, direct, from producer to end-customer, which are private or government organizations. The A channel demonstrates the direct distribution of products for business customers. According to Pride & Ferrell (2013) the major part of all business products are sold through direct means. Moreover, the direct communication between manufacturer and buyer is usually preferred, when selling expensive or high technology products. This method grants full control over negotiations with customer, ensuring correct product marketing and high level of customer care. However, the direct selling implies high financial costs and engagement of human resources, thus only limited number of customers can be reached. In foreign markets the direct selling is implemented through establishing of direct subsidiary (Pride & Ferrell, 2013).

The selling through industrial distributors enable producer to reach larger customer groups, the distribution channel B in the Figure 2. The industrial distributor is an independent business that sells range of products to the end-customer. The distributor provides variety of products for different industries. A portfolio of distributor usually contains similar products for the same industrial applications, but supplied by different producers. On the other hand, some distributors concentrate on single product domain in a specific industry. Generally, the product with broad target market, which is easily stored and maintained, can be effectively sold through the industrial distributors. The producer decreases own marketing and selling costs, while distributor maintains close relationship with customers

and follows local needs. The distributor keeps inventory, providing fast delivery. However, it does not exempt producer from active marketing, because distributor commonly promotes a product group rather than a specific item. Furthermore, producer does not control distributor. The producer should be ready to display own products with competitive brands. The distributor usually does not have a deep knowledge of product's features and the producer is usually asked for assisting in preparation of special project offers. Also the distributor does not handle large inventories and products that have to be maintained over long period of storage (Pride & Ferrell, 2013).

The distribution channel type C characterises an agent, an independent businessperson, who distributes products of one or several producers in the assigned markets and is paid through commission. The agent usually does not import or store the goods. The agent acts on the behalf of the producer and does not influence prices or sales conditions. The agent selling provides numerous benefits. Being a skilled person with experience in related industry, agent can effectively promote and sell equipment. The professional agents commonly have appropriate business connections and established network of customers. For the producer it is economical human resource, when budget is tight for a full-time sales force. However, agents tend to pay more attention to projects that sell fast, while larger projects with long development process is not in the priority. Furthermore, agent does not follow up customers closely after the deal and cannot provide a technical support for the customers. In foreign market, when the customers speak other languages than the producer's technical support service this obstacle should be considered in advance. As the agent does not keep stock of products, the spare parts delivery is rather slow (Pride & Ferrell, 2013).

The producer can combine agents and industrial distributors, as it is shown in distribution channel D, in order to cover larger market maintaining same costs of sales force. This structure of distribution channel is economical for opening new markets (Pride & Ferrell, 2013).

This type grants producer high level of control over operations and control of customers. However, it requires human resource and financing, in order to maintain high quality of service especially in international distribution. The direct selling method is commonly

selected by large enterprises that establish a subsidiary in a foreign country, whereas small companies with limited budget and human resources choose direct distribution from their office if that is applicable to a new market (Albaum et al., 1998; Canzer, 2006).

International companies commonly utilize indirect distribution channels, despite their complexity. This method involves one or several intermediaries between producer and end-customer. There are a number of benefits of indirect distribution such as ability to present your product or service in different countries at the same time and more sales force devoted to market the product. The company minimizes own investments in marketing and shares risks with partner in a foreign market. The drawbacks of this method are numerous and poor management of distribution channels can close the doors of a new market (Albaum et al., 1998; Fernandez, 2006).

The most usual case of product distribution is via retailers either in domestic or foreign markets. Therefore there is only one level of intermediary between producer and end-customer. The producer can display products to a bigger auditory and is able to negotiate with the retailer how the products are promoted or influence how the product are sold. However, a retailer usually sells small quantities and the customer support service is shallow to distribute high-technology product. Then the product sold at a retailer shop should not require any specific knowledge.

When the producer aims to sell large quantities, the products are distributed via wholesalers. The wholesalers work usually with other businesses or governmental organizations in terms of agreed contract. The product turnover volumes are much bigger than those of retailers. However, they do not promote specific products, but rather a product group. In order to influence marketing and promote more a product manufacture has to invest in marketing activities and inform the potential customers where they can find a product. In international distribution companies that do not want to import the products and buy directly from producer can use a local wholesaler that did necessary work.

2.1.2 Mixture of distribution channels

Generally, the producer does not utilize only one of the above mentioned distribution channels, but rather a combination of them. The producer may sell own products to the customers and distributors simultaneously. The principle point is that manufacturer works to maximize the variety of the distribution channels for own products. The more distribution channels the producer uses the more loyalty the products are likely to receive. In international distribution, the customer rarely buys directly from the producer, unless the customer is willing to take responsibility of legal issues of the importing process. In some cases, distributors or the other businesses can contact the producer seeking new products or services to expand their product or service range (Fernandez, 2006). The utilization of multiple distribution channels is characterized by increasing sales through extensive market coverage, better understanding of the market via feedback from distributors, risk reduction (Thornton & White, 2001; Wright, 2002). The management of multi-channels is challenging as the end-customers can be misled by information from competitive suppliers, offering different prices. The design of distribution networks is grounded on the buying behaviour of the customers and the outcome of such distribution (Beckett, 2000; Coelho, 2003). According to Coelho (2003) one way to overcome conflict between distributors is to develop different brands that are sold through different channels in one market area.

The benefits of multi-channel strategy utilization are attractive for producers, especially for SMEs that seek new sources of revenues. The drawbacks of it are usually long-term and emerge over a time. On the other hand, it is difficult to evaluate the real channel performance and resources spent for its development and maintenance. Hence, the producers are advised to take a systematic approach on evaluation of channels performance, utilizing range of available tools. (Coelho, 2003; Easingwood & Coelho, 2003).

2.2 Selection of distributors

The distributor selection process is one of the key topics in development of distribution channels and has been studied by researchers over decades. Generally there was suggested

a plan with four stages for acquiring a distributor (Root, 1998; Shipley et al, 1989). It is suggested by Shipley et al. (1989) to determine potential distributors and then develop selection requirements, whereas, Root (1998) recommends to begin with selection criteria followed by identification of the distributors. Given large number distributors existing nowadays, the selection requirements facilitate search of potential partners and reduces the costs of the producer (Cavusgil et al., 1995). The final stages of the selection process are the evaluation and decision-making. The guide book by Rolnicki (1998) suggest a detailed sequence of distribution channel design, that contains also the factors related to producer's customer investigation of the new market and finalized by monitoring and evaluation of distributor's performance. The proposed channel design procedure includes following steps:

1. Identification of new market/new product to distribute
2. Is there a need for new distribution channel or channel reorganization?
3. Evaluate macro market conditions
4. Conduct a competitive channel analyses
5. Research and rank customer requirements
6. Specify and rank the tasks the channel partner ought to perform
7. Investigation all possible distribution structures
8. Decide upon eagle channel partners
9. Internal corporate recommitment
10. Approach selected distributors
11. Monitor and evaluate the channel structure

Adopted from: Rolnicki, K., 1998, Marketing channels of distribution: The marketing executive's complete guide, p. 32.

According to Rolnicki (1998) the manufacturer should prioritize the distribution channels and start market entry with distributor of "the second choice", building the reputation and brand acceptance before contacting large distributors in the area. The larger distributors notice the success and are willing to collaborate.

The extensive framework of selection requirements of new distributors was developed by Cavusgil et al. (1995) and contains five distinctive categories with 35 criteria, which is demonstrated in Figure 3.

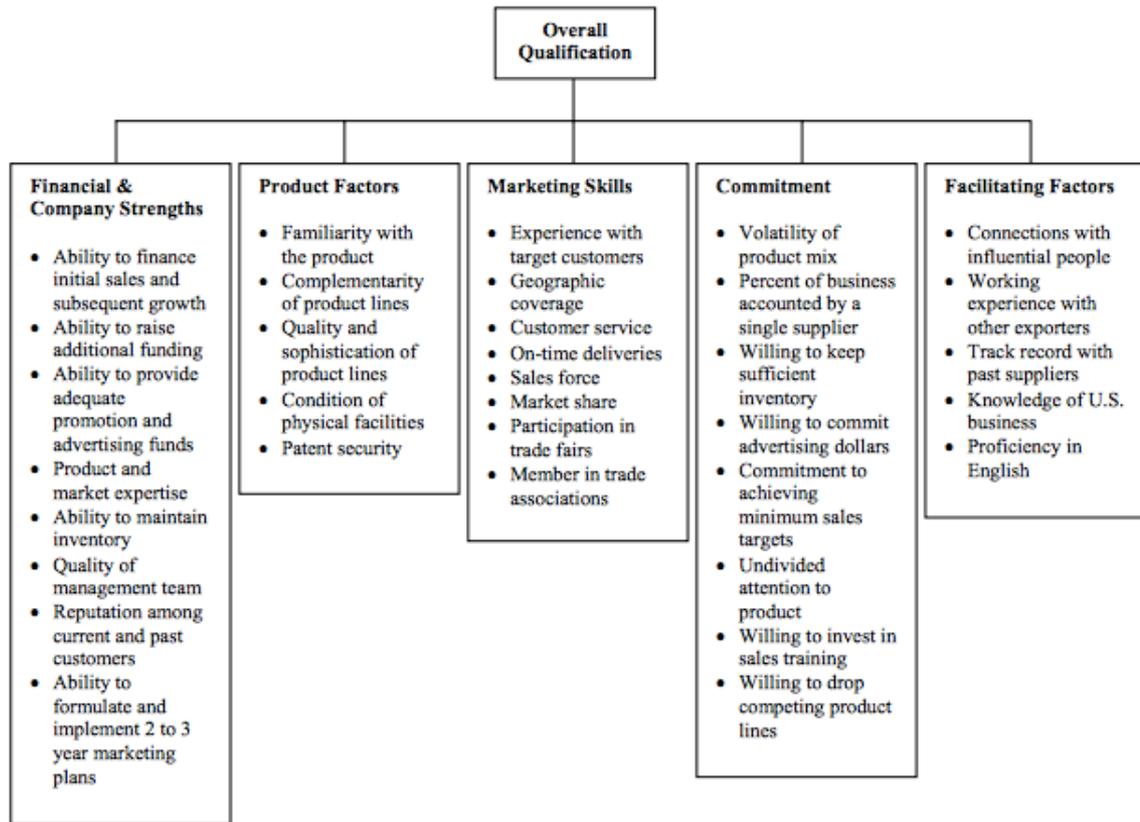


Figure 3. The requirements of channels selection (Cavusgil et al., 1995, p. 300).

Financial strength

The Cavusgil et al. (1995) argues to check the condition of distributor's business, if the company demonstrates stability or growth. It is also recommended to pay special attention on the service quality provided to the customers, quality of management within the company and the ability to handle financial growth. Shipley et al. (1989) points out in their study that the producers typically neglect the financial factors, although these factors impact the distributors credibility among banks, financial organizations and trust of the large customers (Haas, 1995; Root, 1998).

Product factors

The distributor is generally chosen within the domain of producers industry, which implies the necessary knowledge of similar products and skilled sales personnel (Cavusgil et al., 1995). Furthermore, the sufficient technical expertise of distributor is thought, when products require customization, technical support during implementation and after purchase (Jones et al., 1992). On the other hand, the distributor operating in the same domain is likely to have products of direct competitors. The Shipley et al. (1989) reveals that producers prefer distributors that do not sell products of direct competitor. However, Albaum et al. argues that a producer can benefit from displaying own product in direct competition by clearly showing the difference in price, quality and other factors (Albaum et al., 1998).

Marketing skills

Although majority of the distributors desire to take a large market territory with the new product, they usually unable to fulfil marketing obligations due to overestimated sales force and negligence of customer groups. Cavusgil et al. (1995) also recommends to evaluate marketing competence of potential partner in terms of qualified sales personnel, advertising and planning of marketing actions (Cavusgil et al., 1995). In the research of Shipley et al. (1989) it was noticed that producers value distributor's commitment and marketing capabilities, while tolerating the distributor's lack of financial reserves and long established business.

Commitment

The cooperation when potential partner demonstrate adequate commitment to product distribution has better chances to succeed according to Cavusgil et al. (1995). The indicators of commitment demonstrate the distributor's readiness to invest in advertising, investing in training of personnel and keeping stock of products.

Facilitating factors

Additionally, the other factors are considered such as distributor's connections with valuable people for project development, previous experience in importing products and working with foreign companies (Cavusgil et al., 1995).

The numerous methods can be applied for scouting potential partners from investigating the buying behaviour of the target customers to visiting trade fairs for contact building (Root, 1998). Nowadays the most convenient and relatively inexpensive way of contact search is through Internet, when a company's marketer searches potential customers and partners. This method is popular among companies with limited budgets and utilized by those who make initial steps in exploration of a new market.

The selected candidates for product distribution are usually divided into groups regarding the company size and business profile. The companies can be evaluated according to the criteria framework proposed by Cavusgil et al. (1995), which is adjusted to producer's targets. The marketing department or a competent person contacts the companies from shortlist of distributors in order to propose a cooperation thought and request further information. This active stage includes discussions with potential distributors, which is often followed by personal meetings at premises of the companies. According research by Shipley et al. (1989, p. 84), 90% of respondents stated that they usually visit a potential distributor company and 50% responded that a potential partner usually visit the production. The evaluation process is time consuming for a producer and the selection of distributor should be made correctly, because it is a costly process to start from beginning (Cavusgil et al., 1995; Root, 1998; Shipley et al., 1989).

2.3 Management of distribution channels

A systematic approach towards management of distributors is a key success factor for long-term cooperation. The elements of channel management are presented in Figure 4.

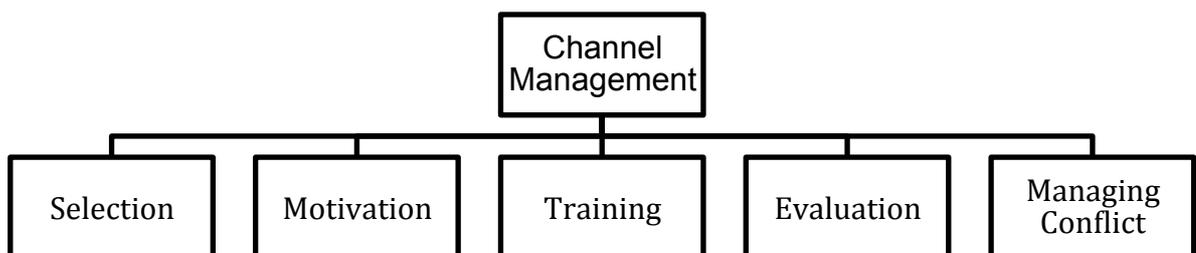


Figure 4. The structural diagram of distribution channel management (Jobber, 2001, p.533)

Selecting channel members

The details of channel selection process were described in the previous chapter 2.2, while highlighting that it is a costly investment and drawback of choosing wrong distributor can be devastating at expanding to new markets (Root, 1998; Shipley; Cook et al., 1989). The company should take into account various factors when selecting a distribution channel, as it can be difficult to keep desired distribution with powerful resellers. The characteristics of distribution channel distinguishing it from others are important factors for producer. The producer should evaluate channel's growth and profit record, reputation and business history. In case of sales agent, company may want to examine previous work, size and quality of sales. In case of retailer store, the producer wants to check stores, locations and plan for business growth (Kotler & Armstrong, 2010).

Motivating & training channel members

According to Kotler and Armstrong (2010) the strong partner relationship management (PRM) applied to cooperation with distributors creates value for both parties and the end-customers. It is suggested that mutual marketing plans and programmes are effective measures for cooperation. Kotler and Armstrong (2010) suggest to recognize and reward the distributors with outstanding performance. Whereas, the company should consider providing more support for those distributors that do not show good results.

Evaluating and controlling channel members

Kotler and Armstrong (2010) recommend producer to regularly examine channel performance against standards, which can be agreed sales objectives and advertising activities. In the research by Shipley et al. (1989) it was found that 40% of companies evaluate their distributors once every year, while 47% do evaluation more frequently. Shipley et al. (1989) empirically found the general points to be applied for evaluation of distributors, conducting a survey among companies that recruit overseas distributors. Table 1 presents factors for evaluating the distributor's performance.

Table 1. Criteria and standards used to evaluate distributors (Shipley et al., 1989, p.89).

Evaluation criteria	Chosen by respondents, %
Volume of sales	93

New business	93
Keeps commitment	90
Value of sales	83
Selling/marketing inputs	83
Market feedback	83
New product introductions	77
Customer services	73
What he costs you	53
Profits from sales to him	43
Personal compatibility	40
Others	3

The most commonly applied factors for evaluation of performance are volumes of sales, new business and value of sales, which are among the selected criteria in the study. Logically, these factors reflect the primary desire for contacting and marketing through a third party. The companies also value the commitment of new distributors and feedback of the market delivered to them (Shiple et al., 1989). Shiple et al. (1989) highlights that despite companies apply motivation technics such as personal contact, the personal compatibility is least used criteria. It is proposed that companies tend to exclude the personal relationship from formal evaluation matrix, which contradicts with the concept of partnership. Additionally, it is suggested to obtain a mutually developed set of objectives for regular evaluation as a measure for effective collaboration (Cabaniss, 1995; Frazier, 1999; Shiple et al., 1989).

Managing channel conflict

In international context the channel conflict may occur either between the channels, when company utilize several distributors in the same territory or between the distributor and the company. The conflict may occur because of differences in objectives, performance, cultural differences and commitment.

According to Kotler and Armstrong (2010) three types of channel conflicts can be recognized, such as horizontal, vertical, multi-channel conflict. Horizontal type is usually characterized by conflict between companies at the same level, for example when

distributors compete at the small market territory or when company's pricing conflicts with offerings of the distributors. The vertical conflict is a disagreement between members of a set channel, for example the conflict between producer and wholesaler, and wholesaler and retailer. Multiple channel conflict may occur when distributors sell to the same customer at the market or when company start selling through a competitor of existing distributor at the same market area (Kotler & Armstrong, 2010). The Cunningham (2013) evaluates the causes of channels conflict as external emerging from type of distribution and internal, which are created by producer and its functional groups.

2.4 Research framework

The literature framework concludes the principle issues discussed in this chapter, which are utilized during empirical process of the research. As the conclusion, the theoretical factors of distribution channels will be compared to analysis of interviews, thus clear answers to the research questions can be delivered. The framework of this research is presented in Figure 5.

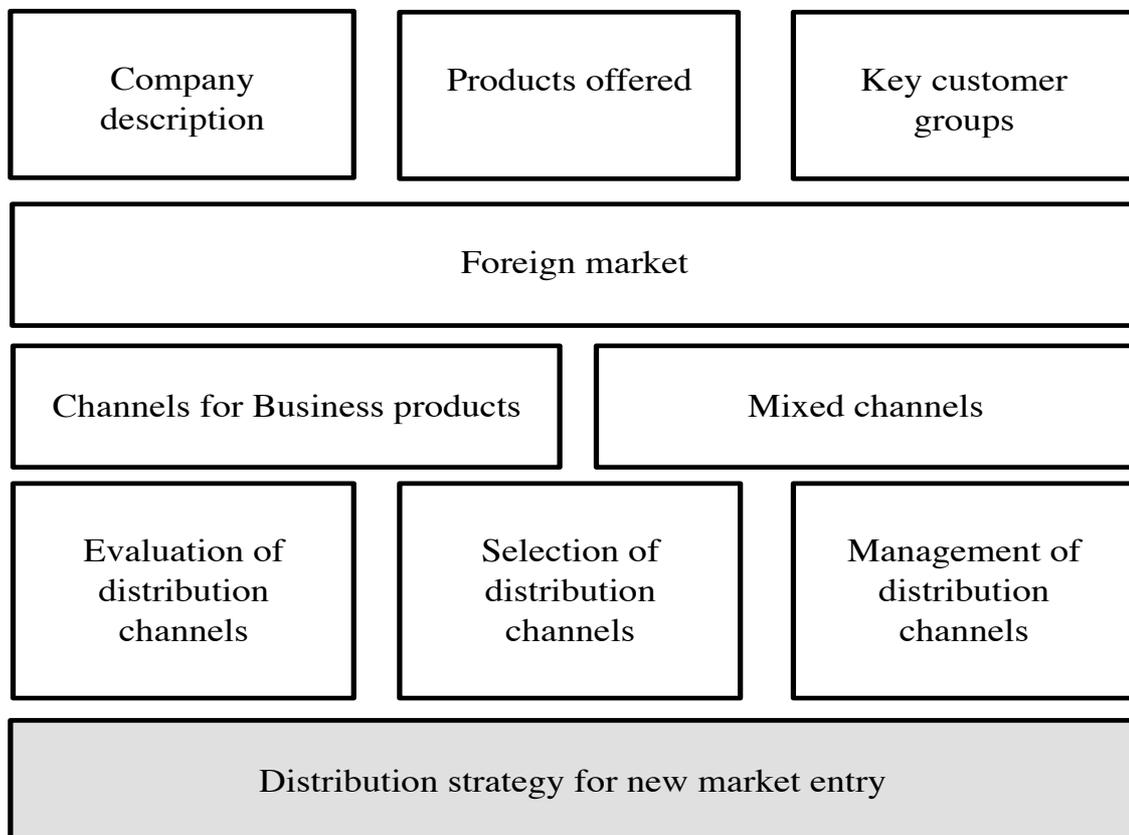


Figure 5. The research framework.

In this research project there were presented three main parts related to the distribution channels in international markets, which consequently shape the company's distribution strategy. As this research is focused on distribution channels for business products, thus, these channels should be defined in the new market. Secondly, the channel mix can be proposed, emphasizing what types of products should be delivered directly to the subcontractors or project organizations and what products are suitable for distribution through wholesalers.

When the distributors are defined, their profiles should be investigated in order to reveal the principle field of business and the key customer groups. The obtained information is compared with the product offerings and target customers of the manufacture. The distributors, which profiles correlates with the business line of the manufacture, are the most promising for cooperation. These are the clear elements of distribution selection.

The management of distribution channels is an issue to be prepared in advance, because it is costly process involving financial costs and human resources. In international markets, the channel management can be challenging, as the cultural and language differences should be considered.

3 CASE COMPANY: C2 SmartLight Ltd.

C2 SmartLight Ltd. was established in 2004 in Jyväskylä, Finland. Since the beginning of business operations there were developed and distributed three generations of outdoor light control solutions on the Finnish market. Today C2 SmartLight is specialized in light control solutions for implementation in challenging environments such as city lighting, highway lighting and industrial environment.

The C2 SmartLight Ltd. team, including management and R&D department, has extensive experience in sales, project management, new product development and IT solutions. The high level professionals of software and hardware development design and customize lighting solutions for multiple applications. The continuous collaboration with customers is a source for ideas and requirements of new product lines.

The service business unit of the company coordinates the deployment of new projects. The team's tasks include supervision of new equipment installation, monitoring of existing customer's networks and assistance of the customer's private control rooms. The service department plays an important role in ensuring the best user experience and customer's satisfaction. The C2 SmartLight Ltd. conducts customer satisfactions surveys annually, in order to evaluate company's performance and investigate new user requirements.

Nowadays C2 SmartLight is the market leader in Finland with approximately 60% share of market of public intelligent light control systems. The C2 SmartLight control solution is used to manage approximately 1 million of lighting points in Finland, including the largest cities Helsinki metropolitan area, Tampere and Jyväskylä. The company also has experience in innovative projects collaborating with other industry players and governmental organizations. One of such projects is lighting design and intelligent system implementation for Green highway project of international highway E18 (Southeast Finland Center for Economic Development, Transport and the Environment, 2014).

Because of the dominant position on the domestic market and general popularity of intelligent lighting solutions in Europe, in 2011 C2 SmartLight started international operations by establishing a representative office in Sweden and investigating other neighbour markets such as Russia. Nowadays, company deployed projects in Russia,

Singapore, Indonesia and European countries. C2 SmartLight always operates through local partners in the new markets, by sharing own knowledge and know-how with a distributor. All partners completed a dedicated training provided by C2 SmartLight team and obtained sample equipment for demonstration purposes. The C2 SmartLight solutions are trusted because of high quality of devices and thorough customer attention.

All products of C2 SmartLight brand are manufactured in Kuopio, Finland. The Elektropoint Oy is a long-term contract manufacturer that ensures quality of components, process manufacturing and onsite product testing. The products are stored at the warehouse of the manufacturer and distributed according to order across Finland and internationally. Due to compact sizes of the devices and relatively small quantities, the contractor effectively deliver the orders directly to customers. However, if the volumes of equipment increase distributing internationally, the company would need to acquire a logistic partner with a larger warehouse and faster distribution service.

3.1 Description of products

This chapter is devoted to the overview of C2 SmartLight products, and where they are produced. The key features and benefits of the light control system are discussed and compared with other light control solutions available on the market. The examples of typical customer groups are presented in order to understand main end-users of the products.

3.1.1 Centralised management solution for light controlling

The C2 SmartLight is specialized in intelligent light control solutions including outdoor and indoor lighting. The intelligent control solution usually consists of the devices that are implemented on site, where the lighting should be controlled, and the software for remote management of it. The software of centralized management is installed on private server of C2 SmartLight. The access to remote management is enabled via Internet page under personal name and password. Hence, central management interface can be accessed regardless the type of computer or geographic location of the user. The administrator can

view multiple projects in single interface. The user interface provides versatile tools for lighting optimization according to ambient lighting, traffic, weather conditions and time of the day. The system includes alarm notifications in case of lighting malfunction, which are displayed in user interface and are send as email and SMS notifications to maintenance personnel.

The modular construction of centralized control solution is cost effective, because of scalability to any budget. Additionally, the basic solution can be upgraded later without significant changes to existing environment. The set of equipment for installation inside the street lighting cabinet is presented in Figure 6, which illustrates C2PU power supply unit, C2CU central unit for GSM communication with server, C2RU additional relay unit, C2MU measurement unit for energy consumption and C2LUCONC base station for RF communication with luminaire specific controllers (see Figure 6) installed on site for controlling of LED luminaires.



Figure 6. The C2 SmartLight control modules for centralized management system.

The product set shown in Figure 6 is sufficient to switch luminaires on and off according to the predefined schedule. The equipment is suitable utilization with LED luminaires and conventional types of lamps.

3.1.2 Autonomous lighting management solution

The C2 SmartLight has been developing local lighting control solution since the beginning of 2015 based on the emerging needs of the customers for simple control. This control

solution is also considerably cheaper to implement and maintain. Furthermore, the technological development of LED light sources encourages the design of new control technologies for them. The illumination flux of LEDs can be changed rapidly and they can be switched on or off instantaneously in comparison with conventional light sources. These advanced properties of new light sources help to design dynamic lighting according to the need and yield up to 70% of energy savings. In order to ensure smooth functioning of luminaires, the intelligent controllers should be reliable using secured data communication channels.

The autonomous system of C2 SmartLight is based on a luminaire specific controller, which is connected with a luminaire and installed either inside its case or inside a lighting pole. The controller can be remotely programmed over Zigbee network via special application. The example of the luminaire specific controller is displayed in Figure 7.



Figure 7. C2 SmartLumo luminaire specific controller.

The controller has out put for dimming control 1-10V and Digital Lighting Addressable Interface (DALI), digital and analogue inputs for connecting other devices such can be motion detectors and light sensors. The controller connects with other controllers on the field creating a mesh-network, where control signal can be transferred between devices. The communication frequency is widely accepted 2,4 GHz, which does not require a country's specific certification for utilization.

The hardware controllers have a 10-15 years life expectancy, whereas the LEDs luminaires lifetime promised by the major manufacturers is 50 000 hours, that corresponds to 11.4

years if they are used 12 hours per day (Philips Lighting Holding B.V., 2016). It means that if the luminaire is changed, the smart controller will operate with the new luminaire. In case of luminaire's damage or failure, the controller will not be replaced. This brings flexibility in maintenance and significant reduction costs.

The concept of stand-alone light control solution is illustrated in Figure 8. The programming of lighting parameters and network optimization is made via laptop-based application (Lumo Manager PC SW).

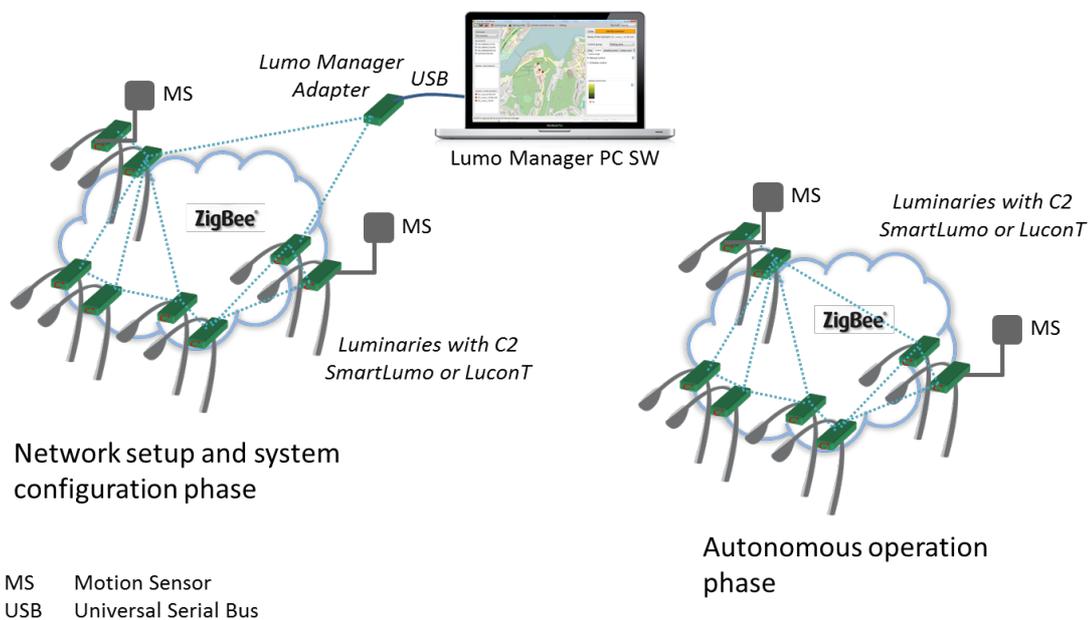


Figure 8. Architecture of C2 SmartLight intelligent lighting management.

The parameters are set to the SmartLumo controllers over RF signal. The Lumo Manager application provides the number of features for optimization of lighting at the specific area including weekly schedules, dimming levels and several levels regulating motion detection. The lighting network operates autonomously once the settings are saved. The supplement equipment such as various sensors can be connected to smart controller in order to utilise the measurements as control parameters for lighting operation. The smart controller transfers the obtained data to dedicated controllers in the network, thus the lighting can be gradually switched on and dimmed as a person or a vehicle passes by.

Autonomous lighting system is very cost-effective, because the data is transmitted via radio frequency. The signal is secured according to AES 128, which limits the possibility of unauthorised access. The operational concept can be implemented in different environments from street lighting to lighting of industrial halls. However, there is a limitation, the controllers should be implemented within 100 meters between the closest one, in order to maintain a stable mesh-network. On the other hand, this is not an obstacle for street lighting as the common distances between lighting poles are 40 or 50 meters, while the industrial luminaires are mounted even closer.

3.2 Evaluation of intelligent light controlling systems

The intelligent systems for light controlling produced by C2 SmartLight are targeted to promote energy efficient lighting and effective retrofit programs. The key sustainability issues of lighting network operation and its maintenance are addressed when a customer examines available lighting technologies. The system should demonstrate how the lighting management will be improved not only instantly, but also how it will affect the design of city lighting in a prospective. The current challenges of public lighting faced by European cities (Ouden & Valkenburg, 2014) are presented in the Table 2 with comments, how intelligent control solution of C2 SmartLight for outdoor lighting is designed to respond to them.

With the growth of urbanization municipalities are facing a common challenge to expand city's infrastructure and preserve energy costs at the same time. Many European cities share the ambition of reducing greenhouse gas emissions and energy costs, but there are obstacles to the ambition, such as financial limitations and technological uncertainty. The smaller the city is, the bigger the challenges are. Hence, C2 SmartLight aims to address these common difficulties and propose a solution, which helps to achieve the objectives of the municipalities.

Table 2. Challenges addressed by C2 SmartLight solution.

Common challenges	C2 SmartLight Solution
Save energy and reduce carbon emissions	Manage energy saving schedules of outdoor light without compromising on citizens' safety.
	Adaptive lighting: light at the right time and place.
High costs of proprietary systems	C2 products are developed according to open and common standards, thus it is compatible with all luminaire suppliers.
	C2 solution can be integrated with bigger city management systems.
Costly retrofit process	Modular centralised management system
	Compatibility of smart controllers with the wide range of LED luminaires
	Lifetime comparable with the one of LED luminaires
High costs of building new lighting networks	Overall reduction of the project complexity by utilization wireless technology
	Smart controlling gives additional savings for shortening return on project investment
	Enables gradual modernization of lighting without redesign of existing infrastructure
Dissatisfaction with quality of public lighting quality	Improve safety and comfort with smart sensing and intelligent lighting

A lot of different technologies are presented on the European market, which are manufactured by local companies, thus it is valuable to highlight the main capabilities of control solution manufactured by C2 SmartLight. The most widespread features and functions of existing light management systems are summarised in the Table 3.

Table 3. C2 SmartLight state-of-the-art solution and other commercialized solutions.

Existing solutions on the market	C2 SmartLight solution
Proprietary closed system and technologies, once purchased it is	Products are designed according to commonly accepted standards; Technology operates with

difficult to change supplier or upgrade system	different suppliers
Cheap inefficient solutions based on timers or astronomical clock	Reasonably priced intelligent control and monitoring system with scalable option
Expensive proprietary solutions	Modular solution compatible with third party equipment, management and measuring systems
Unreliable sensors	Smart sensing: direct plugin to the controller; wireless signal transfer
Ease-of-use	Intuitive interface and smart independent operation; wireless remote controlling
Light operation should be pre-programmed before installation and expensive to configure after luminaires installation	Optimization of lighting schedule at any time after the luminaires installation without additional maintenance costs

As it is illustrated above C2 SmartLight solutions have competitive advantages in comparison with international manufactures. The principal difference of C2 is that company promotes compatibility and flexibility of lighting control.

3.3 Customers' profile: domestic market

The behavioural segmentation approach was chosen in order to describe the principle customer groups for C2 SmartLight products. Kotler and Armstrong (2000) describe behavioural segmentation as “dividing a market into groups based on consumer knowledge, attitudes, uses or responses to a product” (Kotler & Armstrong, 2010, p. 197). Despite, Kotler & Armstrong refer to the investigation of the consumers' buying behaviour, the approach suites for analysing business customers, because they reveal certain behavioural patterns. This approach ought to show the product utilization by the customer of particular type and closely associated with their needs (Ferrell & Hartline, 2014). The behavioural segmentation of customers is suitable for describing a new market before company's expansion, because it provides insights about different aspects of the consumption. According to behavioural segmentation, customers are usually analysed by following variables: occasion segmentation (when consumer gets idea to buy, use the

product), benefits sought (benefits consumer seek from the product), usage rate (light, medium and high product users), and loyalty status (the degree of loyalty to the brand). In Finland the customers of C2 SmartLight Ltd. are analysed according to variables of behavioural segmentation in the Table 4, understanding of the domestic customers is utilized to identify customers in the new market area, such as Switzerland. The customers of two distinctive markets are compared in order to find out differences in buying principles, which are represented in Chapter 5.9.

The primary customers of C2 SmartLight products are public organizations and private businesses. The municipalities across Finland represent the largest share of the company's customers in terms of sales value. Additionally, the projects with road authorities and consortiums results in considerable sales and long-term after-sales service contracts. However, the public projects have long sale process and the final decision is usually made according to the results of a public tender. Additionally, the company is bounded with its customers who deployed lighting control system by providing a regular technical support and maintenance. In Finland the service contracts are 10 or 15 years with the supplier.

The work with public customers usually involves a project selling along with product tailoring to the specific requirements. Thus the understanding of consumers is a crucial part in selling process. The following description brings insights about buyers of smart lighting solutions in Finland and their basic needs.

The public customers can be classified according to their functions and responsibilities, for example in Finland there can be depicted following groups: city departments responsible for infrastructure development, sports and recreation departments, facility service departments, transport agencies including consortiums of special projects. These groups of customers are responsible to maintain own infrastructure, thus are financed for the lighting development.

The city might have a department, which is responsible for development and maintenance of the entire city including streets, parks and household premises. If the city is large it might have a separate city lighting department, which is responsible for ensuring operation of city lighting. These are the cases when the city owns the infrastructure including roads,

street lighting poles, fixtures and all electrical network. Occasionally municipalities can sell out its infrastructures to private companies like energy companies or maintenance companies, thus municipality purchases lighting as a service. There is a number of drawbacks of this ownership type, but the national and regional regulations for energy consumption are followed regardless the type of owner in Europe.

The sports and recreation departments that maintain parks, public stadiums, hockey rings, play grounds, skiing trails and other facilities available for residents. This is a special group of customer with distinctive needs that should be approached separately. This customer group requires special attention of the producer. The city departments do not necessarily cooperate well enough, unless there is a requirement to include lighting of recreation facilities to lighting management system of entire city.

The facility service departments manage public facilities from buildings to warehouses including outdoor premises. This customer group has outdoor and indoor lighting infrastructures, which should be maintained. The facilities are usually small, but when renovation projects are commissioned then a great number of facilities are usually involved. Thus, facility departments are attractive customers with big purchasing power.

The transport agencies regulate the construction of new highways and maintenance of the old ones. These customers usually have specific requirements for the technical features of the products and their quality. Usually the projects begin with planning of project schedule and defining the project requirements, features and factions of the equipment. At the planning stage, the industrial players may impact the project scope by demonstrating the capabilities of the new technologies. The projects are usually implemented in several stages during several years, which brings stable sales in case if the manufacturer is selected by results of public tender.

The Table 4 shows the characteristics of the customers classified according to the approach of behavioural market segmentation. The public customers are analysed according to the type of the occasion, when the intelligent lighting system is introduced. As it can be seen, the most common reasons to introduce the system are planned retrofit projects and construction a new infrastructure.

The deployed lighting control solution should improve energy and maintenance savings. In addition, customers introduce smart lighting solutions in order to obtain a better control over their lighting, which help to improve safety in the implemented area. It is challenging to address the usage rate according to proposed analysis approach, because the buyer of the solution is not the user. The dedicated service personnel manage lighting networks, whereas citizens are the end-users of lighting. However, the lighting control system should operate without malfunctions all the time.

Table 4. Characteristic of customers by behavioural approach.

	Occasion	Benefits sought	Usage rate	Loyalty status
Cities & Transportation Agencies	Planned renovation of infrastructure	Long lifetime of equipment and service	Operation 24/7	Support domestic brands
	Special projects for new technologies implementation	The best fit for the existing infrastructure		
		Reliability Energy savings		
Sports and Recreation & Facility Service departments	Planned renovation	Energy savings	High usage rate	Local producers and brands are preferred, but price sensitive
	Expansion of the infrastructure	Improved control of lighting		
Harbours	Retrofit projects	Energy savings	High usage rate	Reputable brands are selected regardless producer's origin
	Improvement of energy efficiency	Maintenance savings	Manual control	
		Improved lighting control Better safety		
Factories	Retrofit projects	Increasing energy efficiency by introduction of smart lighting	High usage rate	Price sensitive
	Construction of new buildings		Scheduled operation	
Warehouses/ storages	Construction of new buildings and premises	Energy savings	Only scheduled operation	Price sensitive
	Retrofit projects	Easy maintenance		

The other groups of end-customers for intelligent lighting management system are privately owned companies and, in some cases, the companies which have some financial support of the governmental organizations. This customer group includes factories, construction companies and harbours.

The projects with these companies can be small in terms of purchased volumes, but large in number of implementation cases across the country. This customer group searches “turn key” solutions for their lighting infrastructure without services fees and complicated maintenance.

4 METHODOLOGY

The aim of the research is to find out how new distribution channels should be established in Swiss market based on the experience of other SME company on this market. The research is a qualitative study, utilizing semi-structured interviews for primary data collection and desktop study to make an overview of Swiss lighting market. This chapter is devoted to the description and justification of research methodology applied in the current research work. The details of qualitative interviews are discussed in Chapter 4.4.1, whereas the Swiss market investigation is presented in Chapter 5. Additionally, the validity and reliability of the research are elaborated, pointing out main issues and challenges.

4.1 Research approach

The chapter is devoted to the research approach and strategy, which contains information about the available market research techniques and tools. Due to the objectives of current research, the qualitative research method is applied and, thus, the details of this research technique are described.

The widely used in marketing research quantitative and qualitative approaches are discussed by many authors in scientific literature (Nykiel, 2007; Saunders et al., 2000; Yin, 2013). A qualitative approach is a research technique, which requires a relatively small sample of respondents and data are not analysed by statistical methods. The qualitative research is utilized to define opinions and behaviours of the research problem in the selected market or segment. The qualitative approach can be used to answer question “how?”, while the quantitative approach provides information about “how many?” (Nykiel, 2007). The qualitative techniques are commonly utilized to deeply understand the topic and reveal facts from complex data (Saunders et al., 2000).

Among the research strategies the qualitative interviews and desktop investigation of distribution channels for light control industry in Swiss market were selected in this work, because it helps to obtain a deep understanding of causes and consequences of the phenomenon (Saunders et al., 2000). The gathered information from the interviewed

company was used as benchmark. The reasons why the interviewed company built its distribution networks in a certain way were analysed.

Additionally the recommendations of Finpro advisor were obtained regarding the establishment of distribution networks by SMEs in new markets through a phone interview. The risks and challenges of operating in Swiss lighting market were highlighted. Also the semi-structured questionnaire with open questions were used to guide the discussion. However, the questions were expanded in comparison with questions utilized in the discussion with SME company, because the advisor provides more broad view on establishment of distribution networks by different companies.

The data obtained from benchmark study is used to compare with research framework in order to provide a deep understanding of the problem. Additionally, the obtained results of Swiss market research are applied to correct the benchmark according to the current trends and needs of the market. The gathered results may support the theory or conflict with it, thus, there might be need for further research. However, the best practices can be drawn from the results of this research and applied to the development of C2 SmartLight Ltd. distribution model in Switzerland.

Semi-structured interviews are conducted to perform the research. The interviews are widely used in qualitative researches, because of the benefits of this method. The research questions are mainly used to guide the discussion, hence, the flexibility of data collection. In a discussion apart from direct answers to the questions, the other important topics may emerge in the discussion (Saunders et al., 2000; Yin, 2013).

The interviews can be described as structured, thematic and open. A defined questionnaire form is utilized in a structured interview, whereas topics and questions are used to guide discussion in a semi-structured interview. The open interview is an open discussion in a scope of a defined topic. In this research the interview supported by a form of open questions to assist a discussion (Saunders et al., 2000; Yin, 2013).

The interviews conducted via telephone or Internet tools help research to limit financial costs for traveling to reach the respondents and improve time management, as many

respondents are quite busy. However, the face-to-face communication is valuable especially in conducting in-depth interviews, because it is important to establish a friendly discussion with a respondent rather than a formal interview (Saunders et al. 2000).

The semi-structured interviews were selected for this research, because of the flexibility and provide deep understanding of the analysed processes. Establishing interviews over the Internet solved the challenges of geographical location and time management of the participants.

4.2 Collection of secondary data

According to Saunders et al. (2000) secondary and primary data type are utilized to answer questions during research project. The primary data are usually acquired by researcher conducting interviews and other techniques, which help get data directly from the analysed sample. There exists a large variety of secondary data, which include journals, reports, articles, presentations and video materials. The availability of secondary data saves time and effort of the researcher providing extensive information about the research questions. Nowadays, the reputable organizations publish valuable reports about markets and industries, using their data for the research purposes supports, the research and in some cases the researcher is not able to obtain some data via personal contacting. Additionally, it is possible to develop new concepts and investigate new factors, when analysing and reviewing existing information and raw data. On the other hand, Saunders et al points out that data collected via own research can be higher quality (Saunders et al., 2000; Yin, 2013).

In this research multiple secondary data sources were utilized in order to describe a lighting market in Switzerland. The information about market values was obtained from national statistics organizations such as Federal Office of Energy (Office fédéral de l'énergie). The other information about players of lighting market was derived from the official webpages of the related companies.

4.3 Questionnaire and interview process

The questionnaire for the interview is strongly connected with observed literature and theoretical framework, which defined key issues to be considered in establishing distribution networks. However, the general information about the company has to be obtained in order to receive a better picture of the company's motivation. The questionnaire starts with the general information about the company:

- Business field of the company and key facts
- General exporting areas of the company
- The choice of establishing operations in Switzerland

The companies were chosen from the domain of lighting industry, whereas their specialization may differ. Such specializations as production of LED luminaires and light control systems are frequently distributed through the same channels and accompany each other in the energy efficient projects. Thus, the distribution models of the companies can be compared. There are many companies from Finland operating in Switzerland in the domain of lighting industry, but there are few SMEs among them. A Finnish SME operating in indoor lighting industry was contacted for the interview, but they did not agree to participate. One of the issues was time limitation. Thus, other SMEs of the required domain were contacted, among which a company with a similar product was interviewed. Because of the language limitation, it was a foreign SME agreeing to the interview.

The discussion of operation areas of the company provides understanding of internationalization level and experience of managing international operations. The companies were asked to justify their choice of establishing operations in Switzerland, because Switzerland is quite distant and undiscovered market of lighting solutions in comparison with other European countries.

The next set of questions is focused on the distribution channels established by the company in Switzerland. The well-operating distribution network is considered to be one of the company's core competences, providing a competitive advantage on the market.

Thus, questions can touch a sensitive topic, especially, for SME companies. The following questions were asked in order to obtain some information about the distribution channels:

- The type of distribution in Switzerland
- Criteria for evaluation of the distributors
- Support and management of distributors

The second part of questions is targeted to obtain the information about practices of SME company. The criteria of evaluation of partners derived from the literature review are discussed and compared to real life application. Then the company's practices of remote support and management of distributors are discussed. There is a challenge how to manage distributor when the exporting company is located abroad and being SME has limited human resources.

When the research questionnaire for SME was defined, the potential companies for interviewing were contacted. There was a challenge to identify suitable candidates, because a great deal of large enterprises operates on Swiss market and SMEs are not clearly visible. The large enterprises are not in the scope of this research work, because their distribution abilities cannot be compared with the ones of SMEs. The other challenge was to reach identified SMEs for interviewing. SMEs represented mainly companies from Germany, Austria, France and Italy, thus the communication language was main obstacle to initiating a discussion. Companies from these countries do not have to know English, because German, French and Italian are official languages in Switzerland. It makes the market intervention easier of SMEs from countries, where these languages are spoken.

A company, Comlight AS, was identified from news articles about successful implementation of energy effective lighting solutions in Switzerland. Thus it was contacted to share their experience about exporting to Swiss market and represent an example of SMEs distribution. Because of similarity of products of the case company and Comlight AS, the interview was open to an extent when confidential was not revealed.

Additionally, the senior advisor of Finpro, who consults companies in exporting matters to Central European countries, was interviewed. The Finpro organization has a long

experience in matchmaking and assisting collaboration between Finnish companies and foreign partners. Thus Finpro observed many collaboration cases, when distribution was successful and what are the common practices.

The interviews were planned and conducted from April to beginning of May 2016. The discussions were conducted on the phone, due to the geographical location of interviewees. All the participants were informed about the purpose of the research and research questions in advance. The thematic interview questions were used to guide the discussion. In Table 5 the general information about interviews is presented.

Table 5. The general details of the interviews.

	Comlight AS	Finpro
Date of interview	03 May 2016	13 May 2016
Interviewee's title	Sales & marketing assistant	Senior advisor
Duration of interview	15 minutes	50 minutes
Field of business	Producer of light control system	Finpro helps Finnish SMEs go international

The interview with Comlight AS was rather short, due the time shortage of the respondent. However, the discussion by exchange of emails provided some details regarding the company's operation in addition to the interview.

The discussion with senior advisor from Finpro was rather long and helped to uncover risks and challenges, when a certain type of distributor is selected. The detailed elaboration of both interviews is presented after this Chapter, where each interview is discussed separately. The information about common distribution practices of case company, C2 SmartLight Ltd., is presented in order to clearly point out the issues for improvement or consideration.

4.3.1 The distribution network of benchmark SME

The Norwegian company Comlight AS was established in 2007 and after many years of intensive product research and development changed from being an innovative development company to a commercial technology supplier in the international market. Being a small company, Comlight AS recognise own strength as being flexible and able to change a direction quickly in a rapidly changing industry.

Comlight AS has developed a system called Motion Sensing Streetlight Control, which help to save considerable amount of energy in road and street lighting. The light control is based on a radar detection of movement. When a car or a pedestrian is detected, the lighting is switched on in a detected area according to the needed luminosity without compromising the safety. The solution has a clear position to be the world-leading standard. The product line is suitable for outdoor applications and can be used by large and small customers, having centralized and autonomous control.

Comlight AS exports mainly to Europe, where distributors in Germany, Hungary and Switzerland are the largest clients. The other partners, located in Germany and Hungary, distribute the products to all the Europe. Smaller quantities of Comlight products are also exported to the U.S.A, India and Turkey amongst others.

In Switzerland Comlight AS came across a distributor, who matched the selection criteria. Importantly, the distributor is a market leader in Swiss outdoor lighting industry. Additionally, this distributor is well-established and trustable. Thus, the exclusive distribution of Comlight products was granted. According to the feedback of the company, the cooperation was successful for the moment. This also is reflected in publically available resources, such as articles about deployment of energy efficient lighting solutions.

There are many examples of partnerships with exclusive distribution model. Unfortunately, no one can predict the successfulness of such cooperation. The number of external and internal factors influences the cooperation, where the domain of business and trust plays a major role. The distributor's desire for exclusivity is denoted by personal investments into

the market development and desire to gather all the fruits. On the other hand, a dishonest distributor may prevent the product from entering the market by obtaining an exclusive right for selling it. Therefore, the contract for exclusive distribution should ensure secure the producer, for example, by introducing a time constrain during which distributor has to demonstrate the genuineness of the intentions.

4.3.2 Review of distribution issues by Finpro

The Export division of Finpro offers support and expert guidance in all phases of international business. The advisors help exporting companies to find new opportunities, identify their potential and develop them into a profitable business. Finpro organizes matchmaking events and seminars regularly, in order to promote Finnish companies and products. The event facilitators are usually the experts in the particular business area with long experience.

Obtaining new contacts

According to the advisor, commonly the matchmaking events are organized to facilitate the freeform discussion between producers and customers. The events usually result in establishment an initial contacts and identification whether there is an opportunity for further meeting to discuss the details. One of the critical challenges, highlighted by the advisor, was the unsystematic approach of the producers participating in such events. For instance, it is recommended to follow up the contacts after the first matchmaking event. It is important to participate in several matchmaking events within a certain period, which will demonstrate that the company is serious about establishing operations in the market and it will not disappear next year. Thus, it can be concluded that the best outcome from taking part in matchmaking event can be expected only after several years with condition of regular participation.

Selection of distributor

When the company does not have enough financial resources for establishing a local office, which is the ideal case of market intervention, then the company should make investigation of potential customer groups and determine what type of distributor will be most effective. When the type of distributor is selected, then the company develops criteria

for selecting a partner among the distributors operating on the market. The financial strength and experience of the distributor are definitely among the most important ones. However, it is necessary to remember that there are new distributors, which established their operations recently and cannot provide their project portfolio and existing customer contacts. The selection between established distributor and a new comer is not evident, because the new distributor is hungry for projects and seeks rapid growth, whereas the established distributor is slower in the business processes. According to the advisor, the producer should select the distributor based on the ability to handle the product offered to distribute, the potential coverage of key customer groups the product is designed for and the alignment of business strategies of producer and distributor. If the offered product is about 1% of the distributor's business, then the producer should be careful and really identify that his product creates some value to the distributor.

The support of distributors

The developed plan for support and encouragement of foreign distributors should be developed. The support measures can include the coaching of distributor's sales team and supply of marketing materials and test equipment. Although the producer assumes that the distributor is fully responsible for promotion of the products in new market areas, it was found that cooperation is more successful when both parties invest in promotion activities. During the first stages of market entry, it is especially valuable that distributor focuses on the right type of customers. Additionally, when the distributor had nonexclusive selling right, then he is not interested in investing into large marketing campaigns, because there is a risk that the other distributors will acquire developed customers. One of the best practices, which was highlighted by the advisor, is the annual gathering of all sales people and distributors in the head quarters of producer in order to maintain the relationship and keep team updated with the new product lines.

Management of distributors

The management of foreign distributors is challenging especially for SMEs. It is recommended to develop a long-term strategy to manage partners and follow it. When producer has a distributor who is large company, the equality of powers should be established in the contract.

4.3.3 The distribution network of C2 SmartLight Ltd.

The general distribution strategy of C2 SmartLight Ltd. is described in order to compare it to the research data and provide suggestions for further development. The information about practices is obtained by researcher through own experience in the case company and being a part of sales team for three years.

The C2 SmartLight Ltd. has experience of exporting to European countries and countries that are located outside European Union. The common exporting method is indirect distribution through locally acquired business partners. The distributors are selected according to the criteria list developed by the company management. Such criteria include the domain of operations of the potential partner, the availability of potential customers, the willingness to acquire new know-how and expand own product portfolio and the level of commitment. The commitment is an imported issue and refers to involvement of human and financial resources of the partner. When most of the criteria are satisfied and cooperation grounds are negotiated, the regular meetings are arranged either personal or over Internet.

The regular information exchange and project updates reported personally plays important role in establishing trust between companies, facilitating business development. The regular exchange of marketing materials is necessary for ensuring the competitive advantage of the distributor.

The distributors, which represent project organizations and sell whole projects to the customers, are often invited for educational visits together with the customers. During the excursion the production line of company's equipment is demonstrated. Additionally, the deployed equipment is demonstrated at the local customers. Thus, potential customers can obtain a third party independent opinion about light control solution.

The long-term management of the distributors is a challenge, especially in a foreign market with different language and business culture. Therefore, the companies are more likely to cooperate when there is a common language of communication and business targets.

4.3.4 Comparison of interviews with theoretical framework

The information obtain from interview analysis of each case is compared according to the key aspects brought up by Finpro expert in the scope of this research framework. Table 6 contains information regarding the key issues, which are elaborated by the SME companies seeking international distribution.

Firstly, the direct operation on the foreign market is preferred, because it grants full control over handling potential customers, marketing activities and distributed product. The SMEs usually select indirect operation method through exclusive or non-exclusive partnerships, because of lowering operational costs and enlarging sale power. Additionally, partner's knowledge of the market is used for distribution own product, while restricting own control of sales.

It is recommended to use the mix distribution channels in order to approach the maximum number of customer groups in the market. The method of distribution is challenging to suggest, because it is highly dependent on the exporting market and target customer groups, business domain and potential distributor. The controversial distribution under exclusivity can be successful, when the partners make a perfect match. However, it is definitely risk for producer and uncertainty can be limited through building the trust between companies.

Table 6. Comparison of interview results according to the research framework.

Issues raised Finpro	Comlight AS	C2 SmartLight Ltd.
Full control over distribution via representative office or sales agents	Exclusive distributor	Nonexclusive distribution
Multiple distribution channels are beneficial	Single channel of distribution	Mixed channels
Select distributors to reach most of end-customers	Identify market leader in project realizations	Identify company with existing customer list

Attention to financial strength and the record of realised projects, motivation	Strength on the market, business domain, existing customers	Existing customers, ability to handle the product, motivation to sell
Systematic training and meeting of distributors in the HQ, proactive marketing in the exporting markets	Training, marketing material support, support with project realisation	Sales team training, supply of marketing material, transfer of company's know-how
Clear responsibilities of partners and equality of powers	Set of defined practises	Common marketing plan for product distribution, regular reporting, sales forecast

Generally the processes of identification of distributors, developing selection criteria and later stages of support and management of distributors are not very different from practices described in the theory. However, there are some issues to consider. Being a third party observer of cooperation between companies, the Finpro advisor made an important emphasis on stages of selecting, supporting, and managing the distributors. Firstly, the selection criteria for established distributor can be different from selecting factors of new distributor. The new comer may not have yet the customer list and track of realised projects, but experienced sales team and high motivation for cooperation can compensate that. It is important to remember that the offered product represents a clear value for the business of the distributor. Otherwise the distributor won't promote it actively.

According to Finpro advisor, the common mistake made by producers is an assumption that the distributor will actively promote their product in the same way, as producer itself would do it. Unfortunately, usually it is not happening, especially if it is a high technology product. Additionally, the distributor is not eager invest in marketing, if the distributor has nonexclusive distribution right. Thus, it is advised that producer invests into proactive marketing in order to help selling own product more effectively and teach the distributor how to work with appropriate customer groups. Finally, the regular meetings of foreign distributors at the producer's HQ are very significant and help to improve the relationship between partners.

The analyses of selecting distributors according to the product type can be summarized as it is presented in Figure 9 based on the overview of Swiss distributors of electrical equipment and analysis of the interviews.

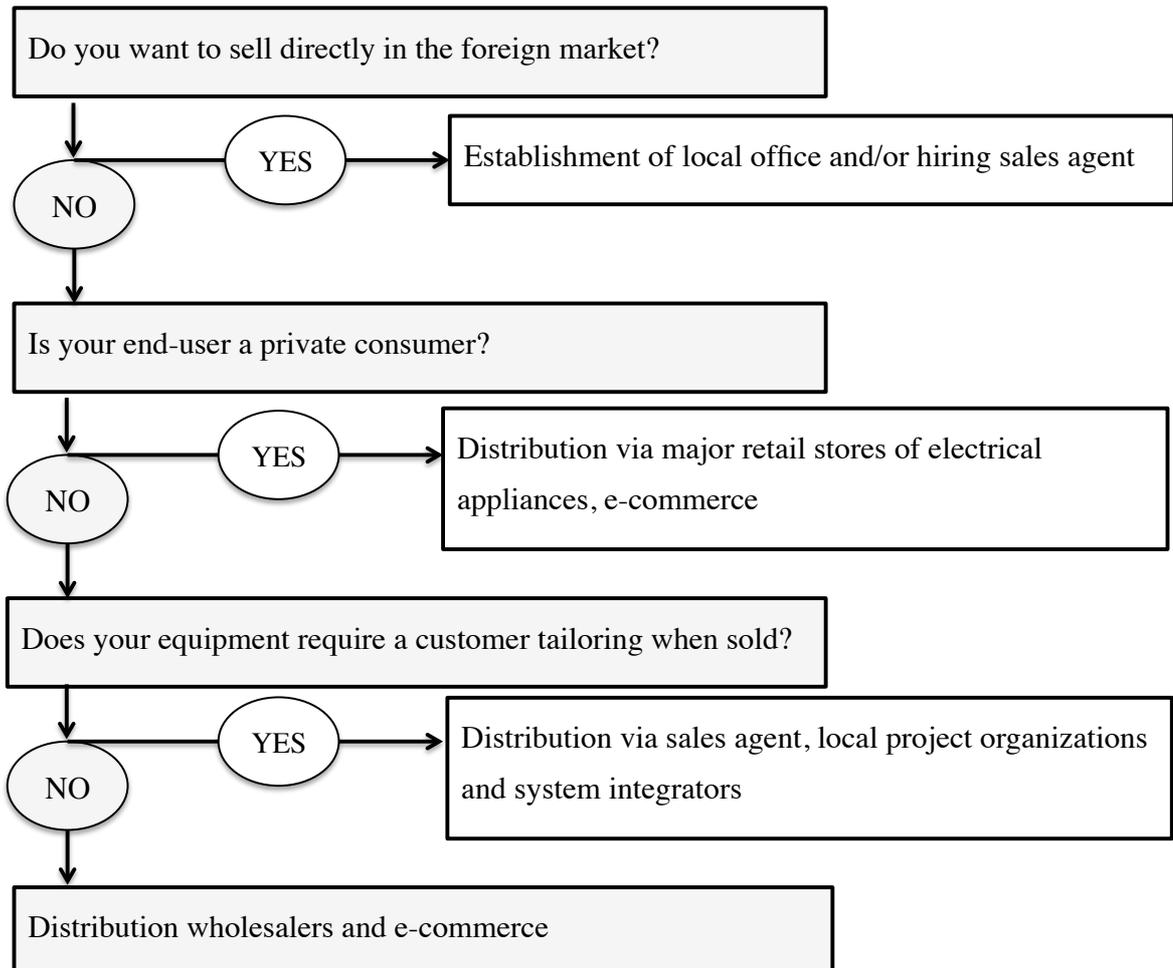


Figure 9. The process of selection a distribution channel based on the product type.

The general sequence of selecting a distributor's profile is presented in the Figure 9. It provides a clear initial structure, where the company should start investigating the types of distributors. Despite this model is built on the example of distribution networks in Swiss market, it can be utilized for establishment of distribution networks in other European countries, due to similarities in the business environment.

4.4 Quality of data and reliability of the research

The quality of data obtained from non-standardized interviews can be influenced by many factors. Saunders et al. (2000) highlights the four main issues related to the data quality obtained from interviews, which are reliability, bias, validity and generalizability. The challenges and proposed solutions are summarized in the following Table 7.

Table 7. The data quality challenges and solutions related to semi-structured and in-depth interviews (Saunders et al., 2000, pp.326-335).

Obstacles	Solution
Reliability of non-standardized interviews: lack of standardization in interviews	Justification of the chosen research method Clear research approach and interviews procedure Written track of conducted interviews
Forms of bias: interviewer - way of asking questions and interpreting answers; interviewee - perceptions to interviewer, mistrust to the research	Approach to questioning: questioned phrased correctly, take into account the respondent's background, leave sensitive questions to the end Behaviour of the interviewer: professional, posture and tone encouraging conversation Demonstration of attentive listening skills Clear test understanding by respondents Cultural differences and bias: be aware of cultural differences and know their implications
Validity	Approach to collecting data: interview recording, personal notes, recording contextual data
Generalizability: small and unrepresentative number of cases	Justify unstructured nature of the research, which can be related to a complex issue that requires flexibility in data collection Demonstrate the significance of this research project to theoretical propositions Point out relationship between theory and research

The presented methods for reliability elaboration can enhance the research development and yield trustworthy result.

According to recommendations found in literature (Nykiel, 2007; Saunders et al., 2000; Yin, 2013), the combination of the data and information resources were deployed during

current research process in order to effectively elaborate research problem. The secondary resources, such as reports, were utilized in order to identify customers' needs, industrial leaders and drawing pattern of lighting market in Switzerland. The articles and governmental reports about the energy efficiency targets and completed projects provided information about project organizations, managing companies and suppliers of lighting equipment in the country. The obtained contacts were grouped and used for further personal contacting, in order to acquire primary raw data for the research.

The credibility of research findings and procedures defines the research trustworthiness and usability for other researchers, who have the same goals. Thus, the current research procedures can be utilized in similar investigations and results can be compared with findings of other researches (Saunders et al., 2000, p. 156).

The reliability refers to consistent findings obtained through data selection techniques and analysis procedures (Saunders et al., 2000, p. 156). The validity of the research is the extent to which research findings appear to be a result of the investigation or a casual relationship (Saunders et al., 2000, p. 157). The reliability and validity of the research can be improved through research methods and data analysis transparency.

The stages of the research process are reported in the early chapters and the reasons for their utilizations are justified. The interview questions were created in order to support the primary research question and provide in-depth understanding of establishing of distribution networks. The interview questions were sent to the interviewees in advance along with introduction to this research and its objectives. Before the interview, the brief discussion via emails took place. The interviewee was required to obtain an approval of the top management and define the extent to which the research questions can be answered as the research touches the core capabilities of the company. However, the answers should be considered trustworthily as some of the details were kept secret due to the contracts between the exporting and importing parties.

5 ANALYSIS OF THE SWISS LIGHTING MARKET

This chapter is devoted to the overview of Swiss lighting market. Firstly, the general information about the country is presented, presenting the most densely populated areas and the condition of public lighting at these areas respectively. Then, the volumes of lighting equipment, which is imported to and export from Switzerland, are analysed in order to understand the market trends. The description of local luminaires producers is presented and available control solutions for lighting are compared. Finally, the distributors of electrical equipment are classified and their fields of business are described.

5.1 Swiss Customers' profile

Switzerland represents a large market of public lighting with potential for big investments into modern lighting technologies (Office fédéral de l'énergie, 2015). The government made commitments to reduction of energy consumption and carbon dioxide emissions, which are presented in Plan 2050 (Faust & Fetz, 2014) and initiative 2000-watt society (Novatlantis, 2016).

Switzerland is comprised of 26 cantons or administrative subdivisions and each of the cantons has own constitution, legislation and government. The population of Switzerland is 8 million people according to data of 2015 with the density of population 206 people per km² (Swiss Statistics, Population - Key figures, 2015a). The high density of population requires development of effective lighting in the cities. In Table list of most populated cantons is presented.

Table 8. The largest cantons by population in Switzerland (Swiss Statistics, Population - Key figures, 2015a).

Canton	Capital	Language	Population	Area
Zürich	Zürich	German	1 425 538	1 729
Bern	Bern	German, French	1 001 281	5 959
Vaud	Lausanne	French	749 373	3 212
Aargau	Aarau	German	636 362	1 404
Saint Gallen	St. Gallen	German	491 699	2 026

The areas with large population require the infrastructure expansion and intensive renovation of the old premises. Thus, municipalities invest in maintenance of the infrastructure specifically the new lighting technologies are implemented for improvement of city's infrastructure. The top four of the largest cities in Switzerland according to data of Swiss Statistics (2015) are presented in Table 9.

Table 9. The largest cities in Switzerland.

City	Canton	Population	Number lighting points	Energy consumption of public lighting, [GWh/year]	Energy consumption of the city, [GWh/year]
Zürich	Zürich	391 359	42 250 ¹	20	-
Geneva	Geneva	194 565	22 800 ²	5.2	39.28
Lausanne	Vaud	133 897	14 000 ³	5.8	700
Bern	Bern	130 015	18 500 ⁴	15.8	-

1 – (Stadt Zürich, 2014), 2 – (Ville de Genève, 2014a), 3 – (Services Industriels Lausanne, 2014a), 4 – (Energie Wasser Bern, 2016).

The conditions of public lighting of the four largest cities in Switzerland are discussed in details below in order to provide a general understanding how public lighting operates in Switzerland.

Zürich

Zürich city plans to extend lighting infrastructure to 75 000 luminaires, 90% of which are high-pressure sodium lamps and are replaced gradually. The department of public lighting, OeB, constantly improves lighting by introducing new lighting technologies and, hence, keeping the energy consumption level low. The LED luminaires in comparison with sodium lamps provide better light quality when traffic signs are more visible and light is more focused on the streets and sidewalks. The EWZ replaces 700 to 800 out-dated lamps every year. The street lighting of a city consumes 20 GWh of electricity annually, because most of the lighting is not switched off between midnight and 5 am. It is expected that

LED technology with dimming function and smart control can yield up to 80% energy savings in comparison with conventional technology (Hartmann, 2015). According to S.A.F.E. in 2015 there were 11 500 LED luminaires deployed in Zürich.

Among the characteristics of new technologies the most important are acceptance, reliability, energy saving and life cycle costs. The city tests various systems, for example the pilot project implemented in city of Urdorf as a result of cooperation between the electricity supplier of the canton Zürich, EKZ, and the building department of the canton Zürich. The 27 LED luminaires with adjustable luminosity were implemented on approximately 1 kilometre of road. The lighting intensity of luminaires is regulated according to traffic intensity and should yield 30% of energy savings. The deployed system takes into account the ambient luminosity, road class and complexity of the visual field for light regulation (Zürcher Umweltpraxis, 2016).

It is considered that Zürich city uses inefficient lighting in terms of energy efficiency and light distribution. Elektrizitätswerke des Kantons Zürich (EKZ) is an energy supplier in Canton Zurich producing 10% of electricity required by Switzerland, which makes it the largest Swiss power company. The company provides wide range of services for private customers and business customers. EKZ maintains public lighting of Zurich Canton and provides consulting. The maintenance organization, EKZ, targets to reduce the energy consumption and lighting pollution of the city by introducing modern LED luminaires and light control technologies. The new technologies allow designers to rethink the lighting, introducing lighting where it is needed. The city became a large testing ground of new lighting solutions. Since November 2014 the technology from Norway has been tested. The intelligent luminaires are combined with radar sensors, which can detect and distinguish pedestrians and vehicles in order to provide correct lighting setting for the area. According to Christoph Girsperger, the head of street lighting in EWZ, the LED technology will be rapidly implemented in the future in order to reduce energy consumption and light pollution (Hartmann, 2015).

Geneva

The city of Geneva (La Ville de Genève) contains 22 800 lighting points, which consumes 14% of electricity of the city and costs of 12% of city budget. The average age of

luminaires was 26,5 years and 4 500 luminaires were in state of dilapidation (Ville de Genève, 2015b). About half of the luminaires were inefficient mercury vapour. In 2015 there were only 900 of them and those will be modernized by 2017 according European regulations. The replacement of out-dated fixtures should yield 35% of energy savings in addition to the energy efficient lighting schedules. According to regulation of Geneva city the street lighting operates from dusk to dawn, while the illuminations are switched on from dusk to midnight and other lighting called "Geneva Public Transport" operates from dusk to 1 am and from 5 am to dawn (Ville de Genève, 2015b).

Services Industriels Genevois (SIG) is a public service organization devoted to service and maintenance of Geneva community. The company's shares are split between State of Geneva (55%), city of Geneva (30%) and the Geneva communities (15%). The Lumina public lighting division of the company provides maintenance and complete operation of lighting network.

Lausanne

The electricity consumption of public lighting in is less than 1% of city's annual energy consumption city of Lausanne (Services Industriels Lausanne, 2015b). The city has 90 types of different luminaires and most of the luminaires are high-pressure sodium vapour lamps, while 3 000 mercury vapour luminaires were replaced by 2015. The city utilizes 6 voltage regulators in order to save 58 000 kWh of energy, which is comparable with energy consumption of 13 Swiss households.

The Services Industriels de Lausanne (SiL) manages the public lighting of the municipality and is part of municipal organization. The responsibilities of the organization covers electrical service, gas and heating. The maintenance of existing lighting infrastructure is also performed, for example, luminaires are maintained and cleaned once in period of 3 years and more frequently on the lakeside. Every five years, an electric static testing is conducted in accordance with legal requirements (Ordinance on electrical installations with high current, s. 734.2). Since 1964 the city lighting is controlled remotely from central room Pierre-de-Plan (Services Industriels Lausanne, 2015b). Pedestrian zones and parks have about 4 000 lighting points in the city, the regulation for lighting them is more flexible than for the road lighting.

Bern

Since 2014 the city of Bern started to exchange 1000 luminaires to LED luminaires every year. There were implemented 66 smart luminaires as test project. The lighting is regulated by motion sensors between 8.00 pm and 6.30 am (Tiefbauamt des Kantons Bern, 2015). According to the Canton of Bern the effectiveness of lighting can be 95% to 90% of energy saving. The company EWB provides service and maintenance of 350 km of lighting network in Bern city. The city of Bern selected four types of luminaires to utilize in city lighting, which are shown in Table 10. The other cities do not demonstrate such regulations, however it can be noticed that cities usually maintain a common style of luminaires throughout the city.

Table 10. The types of LED luminaires accepted by Bern municipality (EWB, 2014).

Type	Airtrace	DL500	SL 10	SL 10 micro
				
Application	District lighting	District lighting	District lighting	Pathways
Lighting post height	From 6 metre	6 metre	6 metre	4 metre
Power	90 Watt	60 Watt	36 Watt	14 Watt

In addition to introduction of modern light sources, city of Bern implements the energy efficient lighting schedules from 01.00am to 5.30am. The programmed switchers dim the luminaires of 60 watt by 75% and 90-watt luminaires by 60%, while the footpaths are constantly lighted. The city of Bern is also committed to 2,000-watt society, which means that during first 30 years the energy consumption will be reduced from 6,000 to 4,000-watt per person. This goal will be achieved by introducing energy efficient technologies,

ecological and economic innovation (Bau-, Verkehrs- und Energiedirektion des Kantons Bern, 2015).

Switzerland is densely populated area, where the cities expand their lighting infrastructure every year. The major concerns over the energy efficiency resulted in implementation of testing projects, where LED luminaires are combined with novice light control technologies. The trend shows that municipalities realise the benefit LED luminaires and light control technologies, thus, the real actions are taken for utilization of energy efficient technologies. For the producers of lighting technologies this means that there are potentially large projects and the new lighting solutions can be promoted.

5.2 National programs for energy efficiency and lighting in Switzerland

There are number of initiatives related to the energy conservation, which also affects lighting technologies. First of all, the European regulation for elimination of mercury vapour luminaires is also supported by Switzerland. The European initiatives for energy efficiency are even taken further, ambitiously building 2,000-watt society.

Energy strategy 2050 is dedicated to withdrawal of nuclear energy and increase usage of renewable energy. There are plans for promotion of energy efficiency in buildings, appliances and in a transport sector. In 2012 the Federal Council released a package of measures for reaching the objectives, which are supported by modernization and expansion of the existing electricity networks (Federal Department of the Environment, Transport, Energy and Communications DETEC, 2014).

The vision “Initiative 2,000-watt society” was introduced in 1998 by the Swiss Federal Institute of Technology in Zürich, according to this concept the average citizen reduce own energy consumption to 2,000-watts by 2050 without compromising on standard of living. The program doesn’t only addresses the private households, but also entire society. The implementation of the initiative requires significant efforts for restructuring and modernization of existing infrastructures and construction of only energy sustainable buildings (Ledergerber & Kuy, 2008).

The first pilot region was launched in 2001 in Basel city, which targets to develop and commercialise some of the technologies. The pilot project is cooperation between universities, industry and authorities and coordinated by Novaties. In 2007 city of Zurich joined the program and in 2008 Canton of Geneva expressed interest in participation (Ledergerber & Kuy, 2008).

The “Plan Lumière” is a public lighting project of the cities, which is usually divided into several parts devoted to project planning and project deployment. The first part is usually devoted to developing a documentation, design, and scouting of available technologies. The second part includes implementation of designs and technologies. The overall project duration is around 3 years, during which the colour concept of public lighting of particular city is designed and deployed utilising the most modern technologies. The general principles of such project include highlight of city’s architecture, improvement of safety, reduction of energy waste and light pollution. The lighting plan a national wide initiative and nearly every city develops own project.

In 2013 the city of Lausanne presented the “Light Plan”, according to which all luminaires in the city will be modernized. The illumination design of city is defined by the plan and will be implemented in two parts. First lighting of parks, monuments and main roads will be modernized, while the second part is devoted to light up pedestrian arias and other parts of the city. The principal objectives of the plan are to provide greater visual comfort and feeling of safety for users as well as reduce lighting pollution and energy consumption. The municipality plans to invest 13 million Swiss francs. The public lighting design of Lausanne city was develop by Belgian company Radiance 35 (Radiance 35, 2013; 24 heures, 2013).

The city of Geneva initiated the Lighting Plan in 2008, which will be completed by 2018. The “Plan lumière” is divided into two parts, first is the light master plan – fixed part, which combines main objectives and themes of the project. The second part is the light charter – progressive plan, which provides recommended techniques for implementation. According to information of 2009 Plan Directeur Communal (Plan Directeur Communal, 2014), the objectives of lighting plan is to improve management of public lighting, quality

and quantity of it. The modernization of lighting should enhance the image of Geneva, improve illumination and reduce energy consumption to 5.2 GWh.

5.3 Investigation of the Swiss lighting market

Switzerland is an open market for all the international players that seek new projects and can offer a competitive product or service. According to observation of lighting industry, the market is influenced strongly by the industry leaders of the neighbour countries: Italy, France and Germany and well-known global brands. According to information of the Observatory of Economic Complexity (OEC), Switzerland imported light fixtures for \$752M in 2014, while it was \$735M in 2013. The import of lighting fixtures is 0.27% of total volume of import in 2014 (OEC, 2016b). The countries that exported light fixtures to Switzerland are illustrated in Figure 10.

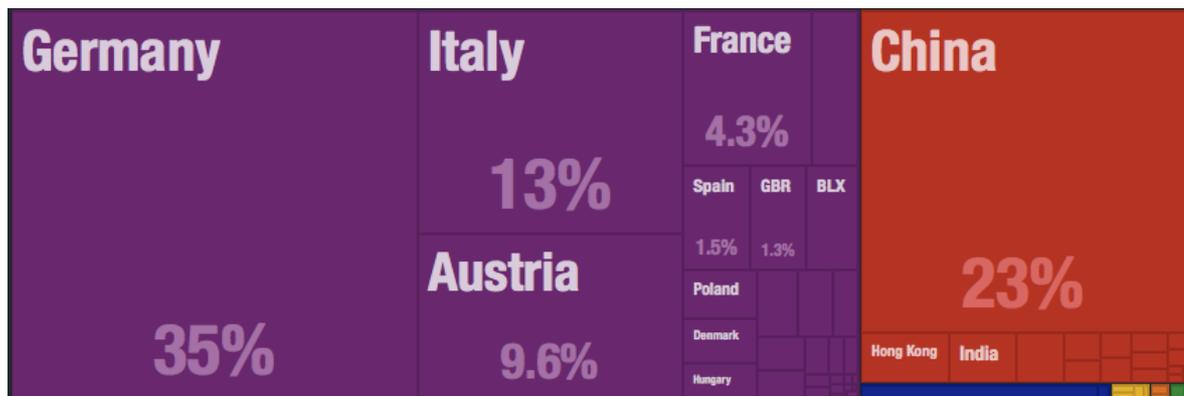


Figure 10. The Swiss import of light fixtures in 2014 (OEC, 2016d).

As it can be seen from Figure 10, the light fixtures were mainly imported from Germany for \$261M, China for \$173M, Italy for \$97.3M and Austria \$72.5M. The import of light fixtures from Finland was \$2.74M, which made 0.36% of total import.

The figures of Swiss import also demonstrate high demand for lighting products from different producers. The world-known brands are presented on the Swiss lighting market, such as Philips, Osram, Scheider Electric, Vossloh Schwabe, Zumtobel and others. These companies usually have representative offices in different cantons and maintain close collaboration with local municipalities and service organizations. Additionally, there are

collaboration projects with large companies that have factories in Switzerland, such as Nestlé SA.

Despite wide variety of lighting products offered by international producers, Switzerland has a number of own manufactures that produce competitive LED luminaires and light control systems. In 2014 Switzerland has exported light fixtures for \$140M, which is 0.5% of total export that year (OEC, 2016a). In Figure 11 the export values are shown based on the destination. The major part of exported light fixtures were delivered to Germany 41% (\$58.8M), France 12% (\$16.9M) and Austria 7.7% (\$10.8M). It can be seen in the Figure 11, that the lighting fixtures are also exported to United Arab Emirates (UAE) for \$9.13M, which is popular export destination nowadays.

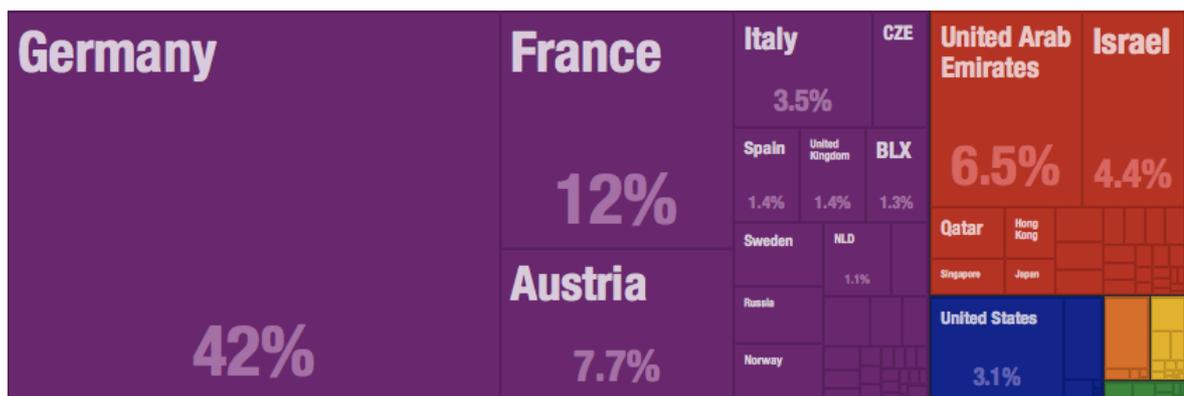


Figure 11. The Swiss export of light fixtures in 2014 (OEC, 2016c).

The overview of export and import of light fixtures showed that there is slight increase of both sectors over the years. However, Switzerland imports five times more fixtures than exports, \$752M and \$140M respectively. Thus, it can be concluded that there is a high market demand for lighting products from international producers. Although, it can be seen that products of German and Chinese companies dominate Swiss market, the light fixtures produced in other countries are sold in the market.

The values of import and export do not, however, reveal the types of light fixtures. It can be estimated that the share of lighting for indoor and household application is bigger than share of luminaires for outdoor usage. According to Schweizer Licht Gesellschaft SLG (2015, p. 7), the value of outdoor lighting is the smallest with about 91M CHF, whereas

the value of indoor lighting and light bulbs is 580M CHF and 141M CHF respectively. However, if the quantities of the luminaires of each sector is compared, it is seen that in 2014 there were sold 635,000 outdoor luminaires, around 7M of indoor luminaires and 38M light bulbs. Thus, it is seen that outdoor luminaires are very expensive items (Schweizer Licht Gesellschaft SLG, 2015, p.7). In Figure 12 the composition of outdoor lighting sector is presented.

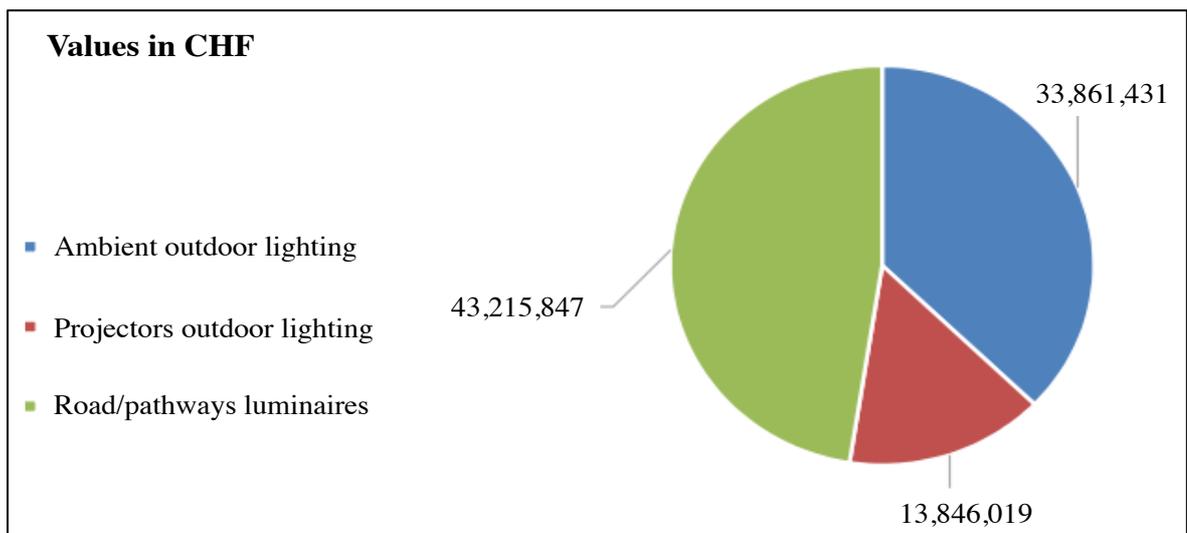


Figure 12. The composition of Swiss market of outdoor luminaires in CHF (Schweizer Licht Gesellschaft SLG, 2015, p.12).

The biggest turnover has the category of luminaires for road lighting with 43M CHF, the luminaires of this type are also the most expensive as it can be seen from Figure 13, the sold quantity is the smallest compared to the other types of luminaires. The largest sector is luminaires for ambient lighting, which includes luminaires for facade lighting, garden lighting and outdoor household lighting. In 2014 the turnover of this sector was 34M CHF, which 448,145 items sold (Schweizer Licht Gesellschaft SLG, 2015, p.12).

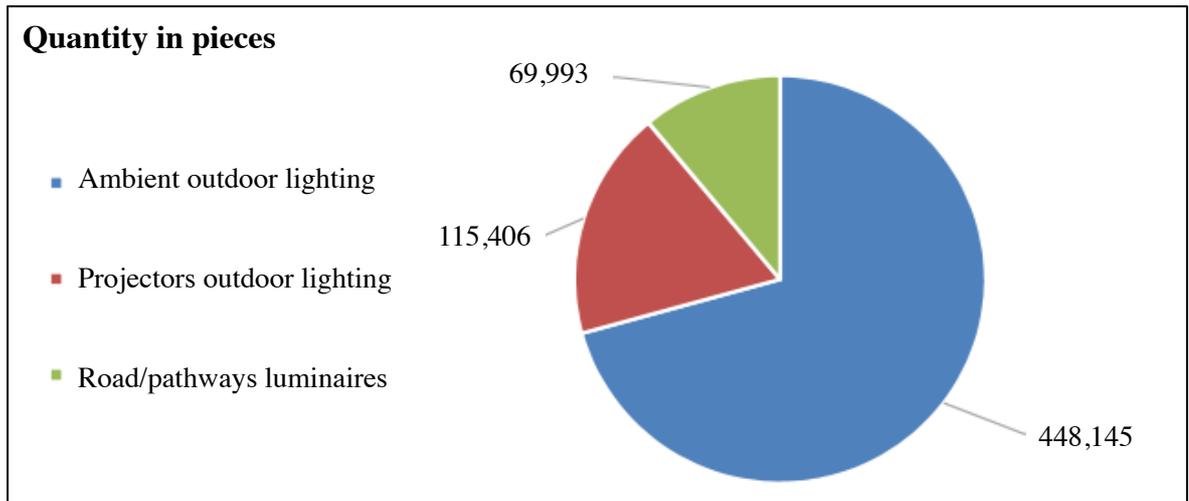


Figure 13. The composition of Swiss market of outdoor luminaires by quantity (Schweizer Licht Gesellschaft SLG, 2015, p.12).

Despite LED lighting gains popularity, the Swiss market is still saturated with conventional luminaires. In Figure 14, the share of outdoor LED luminaires is presented according to specific category.

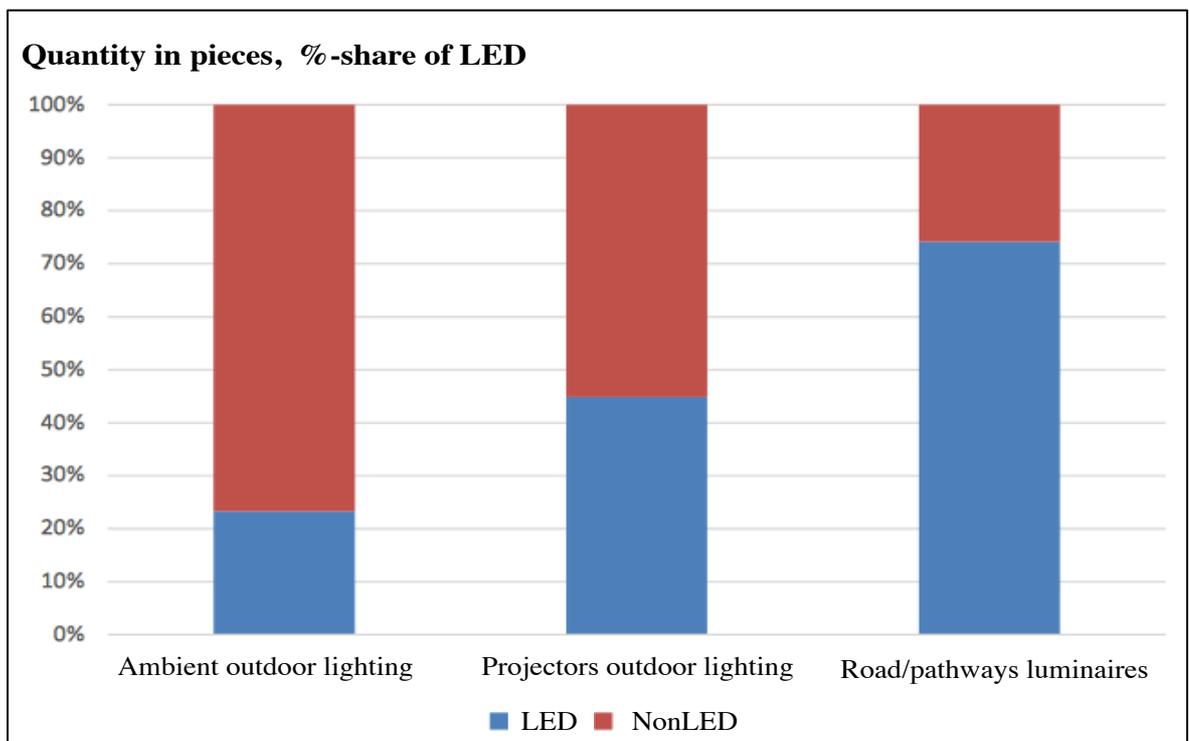


Figure 14. The share of LED luminaires on Swiss market of outdoor lighting (Schweizer Licht Gesellschaft SLG, 2015, p.14).

As it can be seen from Figure 14, the LED luminaires dominate the category of professional public lighting, which includes luminaires for road and street lighting, with 70% share. The shares of LED luminaires in sectors of ambient lighting and projector lighting are still low, 22% and 45% respectively. The obstacles of rapid LED luminaires adoption in these sectors are the high cost of quality LED luminaires and the limitation of LED technology for delivering high powers required in projector lighting (Schweizer Licht Gesellschaft SLG, 2015, p.14).

The analysis of market composition of outdoor lighting shows that despite the adoption LED technology is still developing, the market turnover is large with 91M CHF in 2014. There is a tendency for LED technology dominance, when quality and long lifetime is required as it is displayed by road and street lighting sector. Because of popularity of LED lighting, there is an opportunity for adoption of light control solutions, which helps to maximize the usability of LED technology.

5.4 LED luminaire producers in Switzerland

According to the market analysis of Office fédéral de l'énergie (2015), which is based on data from producers, wholesalers and retailers which represent 90% of Swiss lighting industry. The study showed that luminaires turnover was 670M CHF which corresponds to 8.3M sold luminaires. According to the study, the LED lighting dominates the category of professional public lighting. The luminaires are mainly distributed directly by producers and through retail stores, which contributes 54% and 25% of the turnover respectively.

The local producers of LED luminaires are large companies with international operations, for example, Regent Lighting SA, Swiss LED, Emcom SA. Variety of lighting solutions from LED luminaire for interior and exterior applications to the smart technology to manage lighting by manual switch on or off and automatic dimming based on smart sensors. The majority of the companies produce LED lighting for indoor applications and distribute through own online store is quite common among the companies. In Table 11 main producers of LED luminaires are described in terms their location and portfolio.

Table 11. The manufacturers of LED luminaires in Switzerland.

Company	Details	Lighting	Light controlling	Reference projects
Regent Lighting SA ¹	Since 1908, HQ in Basel, 600 employees in six countries	Retail, Commercial/ Office, Residential, Landscape & Façade lighting, street lighting	Intelligent system for office lighting and supermarkets; Dimming, movement sensor, mobile application	Hospitals, museums, office lighting
Swiss LED SA ²	Since 2007, HQ in Chavannes de Bogis, operates internationally	Retail, Commercial/ Office, Residential, Landscape & Façade lighting	Not found	Hospitals, buildings, retail stores
Emcom SA ³	Since 1990, HQ in Geneva	Retail, Commercial/ Office, Residential, Landscape & Façade lighting	Intelligent system for office lighting and supermarkets; Dimming, movement sensor	Not presented
ANTA SWISS AG ⁴	Kirchberg	Indoor lighting	OWLET by Schreder	Open storage lighting, buildings

Sources: 1 - (Regent Lighting SA, 2016b), 2 - (Swiss LED SA, 2016), 3 - (Emcom SA, 2016), 4 - (ANTA SWISS AG, 2016a).

According to the findings presented in Table 10, there are few Led manufacturers in Switzerland, because of small internal market and high competition of products imported from neighbour countries and China. It is important to highlight that the producers are mainly focused on indoor lighting for retail and office applications. The selection of LED luminaires for industrial and street lighting is very poor. However, the companies operate

internationally and some companies are concentrated on foreign markets, for example Swiss LED SA has complete over 10 projects in UAE (Swiss LED SA, 2016). The small companies, like Emcom SA, offers project designing and consulting as additional services.

The implementation of interior LED luminaires is more common than deployment of exterior LED luminaires. The governmental initiative S.E.F.A educates consumers how to choose technology correctly, which also stimulates promotions of energy effective technologies. Additionally, utilization LED luminaires and smart technologies in new projects is wide spread.

The overview of LED manufacturers in Switzerland revealed that the number of local producers offers LED luminaires mostly for indoor applications, whereas only some companies provide solutions for external lighting. Secondly, the manufacturers cooperate with producers of supplementary equipment that can be incorporated with LED luminaires, for example ANTA SWISS AG and Regent Light SA. Finally, it can be concluded that many producers operate internationally.

5.5 Comparison of smart solutions for light controlling

The Swiss market is filled with diverse smart technologies for outdoor and indoor lighting applications, which are offered by the range of domestic companies and well-known European brands. There are a number of young SME companies that offer lighting solutions in Switzerland, the local companies offer them directly and the foreign SMEs realise projects in cooperation with local project company or distributor. However, the large companies like Schröder have offices across Switzerland and also sometimes offer additional services like electric maintenance to consumers.

In Table 12 there are summarised principle features of smart lighting solutions of the most outstanding companies on the Swiss market. It can be seen that the technology level offered by different companies is comparable and the main differences are types of sensors supported, available interfaces to external management systems.

Table 12. Comparison of the key features of smart lighting systems available on the Swiss market.

Functions	Smart systems for light controlling				
	Comlight AS (Norway)	Paradox Engineering (Switzerland)	Novaccess (Switzerland)	Regent Lighting (Switzerland)	Schröder (Belgium)
Centralised control	optional	PE.AMI gateway	NovaLight Gateway	no	yes
Luminaire controllers		PE.AMI LM wireless/PLC node	NovaLight OLC NEMA – controller with NEMA 7-pin	yes	yes
Smart sensors	Eagle eye (traffic detection by radar)	PE.WSNi Node is I/O interface module	yes	yes	yes
Autonomous operation	Yes		yes	yes	yes
Dimming	yes	yes	yes	Based on ambient light sensor	yes
Special feature	Compatible with all dimmable luminaires; Interface with CMS software.	PE.AMI offers dual narrowband (sub GHz 6LoWPAN) and broadband (2.4/5.4/5.8G Hz) integrated network technologies serving as a backhaul.		The control applications are designed for interior applications like office and house lighting.	The intelligent pole that contains sensors, cameras etc., there are about 10 different types of product.

Paradox Engineering SA established in 2005 is a part of Japanese Group Minebea Co. Ltd. since 2015. The company is focused on smart technologies, which can be implemented for management of cities, grids and industrial plants. The solutions are based on advanced sensor networks and Internet of Things applications. The products utilize broadband for

connecting data from city cameras, energy meters and other devices. In 2014 the company realised smart city project in Chisasso city in collaboration with AGE SA, the company managing water, electricity, gas in the city and neighbourhood. The PE.AMI solution was implemented to manage 150 Osram-Siteco LED luminaires with the aim to combine devices into wireless network. In 2015 the Bellinzola city adopted 600 LED luminaires with PE.AMI management system for defining lighting schedules and customization of lighting according to the needs. In 2016 there will be introduced other 900 LED luminaires aiming to achieve 50% reduction of energy consumption.

Elektron AG operates in diverse business areas such as drive engineering, power electronics, lighting engineering and payment systems. Elektron AG is a partner with EWO, Italian producer of outdoor and architectural LED luminaires and poles (EWO, 2016). The company's portfolio includes projects in Italy and Germany by introduction of smart lighting at harbours, airports and cities. The Elektron AG has other partnerships for obtaining other smart solutions for example: Comlight, Philips, Paradox engineering, VS Lighting solutions. The Elektron can be proposed for further cooperation in order to offer a unique product in comparison with other solutions of their partners for utilization in their projects.

In 2014 Elektron in cooperation with GESA (Gryuère Energie SA) helped to implement smart project in the city of Bulle (Ville de Bulle), which aims for "2000watt society". The 700 LED MiniLuma and Luma I luminaires of Philips utilize smart dimming schedules in order to save about 300 000 kWh per year, in 2015 additional 200 LED luminaires replaced sodium vapour lamps saving additional 30 000 kWh (Elektron AG, 2016b).

Elektron AG has been partner of St. Galler Stadtwerke for 10 years and in 2014 under their collaboration the project for lighting controlling according to motion was realised. The Comlight Eagle Eye solution was implemented with Mini-Luma LED luminaires, the solution detects cars and pedestrians separately and increase the lighting to 100% and dims lights to 30% when there is no one around (Elektron AG, 2016a). The Eagle Eye solution for lighting control is offered at a competitive price with 890euro for 6 devices with RF connect and including one device with GPRS connectivity (Comlight AS, 2016). Elektron

AG has collaboration with SWL Energie AG, Lenzburg for 19 years (Elektron AG, 2016c).

Regent Light SA has a long history in lighting business, focussing on fixture production and smart technologies for interior application (Regent Light SA, 2016a).

Schröder projects in Switzerland: In a new project in the small town of Canobbio, canton Ticino, is illuminated by 23 ModulLum poles (Schröder Group, 2016b). In town of Lutry there were implemented 200 Stylage LED luminaires with incorporated autonomous light management system (Schröder Group, 2016a). In town of Mellingen there are implemented 16 TECEO LED luminaires with intelligent OWLET system in order to control lighting based on sensors on the bike path. The system allowed gradual dimming of lighting when cyclists pass by and complete switch off during quiet hours of the night. It was estimated to save 4100 kWh annually (Schröder Group, 2016c). During renovation project of petrol station in Oron-la-Ville the metal-halide lighting was replaced by LED luminaires and smart control system that supported motion detectors. Thus, lighting was dimmed to 50% at quiet hours. The project helped to reduce energy consumption by 60% (Schröder Group, 2016d).

5.6 Global wholesalers in Switzerland

Due to the fact that Switzerland imports a lot of lighting equipment and other products, there are a great number of companies distributing those products across Switzerland. The number of global wholesalers is represented in Switzerland, operating through their local offices, subsidiaries or acquired companies. The world biggest wholesalers specialized in distribution of electrical equipment and located in Switzerland are presented in Table 13.

Table 13. The biggest wholesalers presented on Swiss market.

Company	Distributor in Switzerland	Type of distributed equipment
Rexel Holdings (Rexel/Gexpro) ¹ , since 1967 in France.	Subsidiary or acquired companies: Elektro-Material ² , founded in 1913. Branches in Basel, Bern, Geneva, Lausanne, Lugano, Luzern, and Zurich.	Over 250 000 articles of electrical and supplementary equipment.
Sonepar ³ , since 1969 in France.	Sonepar suisse AG in Wellisellen	Office of the company
	Dysbox SA ⁴ , since 2005 in Sion	Primary lighting products
	Electrolan SA (Winterhalter Fenner AG) ⁵ , since 1903 in Neuchâtel	Electrical equipment and luminaires
	Electroplast SA ⁶ in Meyrin	Electrical equipment and luminaires
	Fabbri SA ⁷ , since 1977 in Magazzino	Electrical equipment, luminaires, cables
Anixer ⁸ , since 1957 in USA	Subsidiary: Z. I. La Foge in Montreux, Zurich	All types of electrical equipment: cables, electrical enclosures, security and networking
Elbro AG Swiss Technology Company, since 1978 ⁹	Office in Steinmaur, canton Zurich	Producer and distributor of lighting equipment. Production of LED luminaires with simple on/off function based on motion sensor and RGB lights controlling. Other businesses: circuitry, measuring technology and cabling systems.
Lampenwelt GmbH, since 1999 in Schiltz ¹⁰	Online store	Retail, Commercial/ Office, Residential, Landscape & Façade lighting

Sources: 1 - (Rexel Electrical Supplies, 2010), 2 - (Electro-Material SA, 2016), 3 - (Sonepar, 2016), 4 - (Dysbox SA, 2016), 5 - (Electrolan SA, 2016), 6 - (Electroplast SA, 2016), 7 - (Fabbri SA, 2016), 8 - (Anixer, 2016), 9 - (Elbro AG, 2016), 10 - (Lampenwelt GmbH & Co. KG, 2016).

The common trend among the companies described in Table 12 is that they operate through subsidiaries that have multiple offices usually covering parts of Switzerland with different languages. For example, Elektrolan SA operates in Romandy, a French-speaking part, while Winterhalter Fenner AG operates in German-speaking regions. However, both companies belong to Sonepar Group and maintain same product range.

Rexel Holdings have long history in Europe and currently operates in 35 countries worldwide. The distribution of lighting equipment brings 20% of sales revenue and electrical equipment provides 39% of sales to the company. The company's primary customer groups are 36% SME contractors, 24% large customers and 21% industrial companies. Since 2006 Rexel Holdings operate through acquired company Electro-Material SA in Switzerland. In 2014 the Elevite SA was overtaken, which is the producer of innovative lighting. The distributor offers range of products also through own online store (Electro-Material SA, 2016).

The Sonepar was established as primary business-to-business distributor and now operates in 44 countries, providing equipment for industrial and commercial implementation. The company's branches also distribute products online for better customer service. In Switzerland, the company is presented via subsidiaries. The Elektrolan SA (other name Winterhalter Fenner AG) became part of the group in 2008 and has multiple offices around the country (Electrolan SA, 2016). The other subsidiary Dysbox SA is specialised primary on lighting product for indoor and outdoor applications, and, additionally, supplies building automation equipment and products for light controlling (Dysbox SA, 2016). The Electroplast SA has same range of products, but operates in different region (Electroplast SA, 2016). The Fabbri SA operates in Italian speaking region of Switzerland (Fabbri SA, 2016).

Furthermore, it can be noticed that distributors develop their online stores for product distribution. Companies provide special offers for consumers and business customers, which prices and services can be viewed by registering on a wholesaler's page. However, not every company developed a user-friendly interface and catalogues, which means that these companies do not utilise e-commerce successfully. It is also very common for a company to offer online purchase and demonstration of equipment at own show room.

The majority of subsidiaries operate a long time on Swiss market specializing in an electrical industry, which makes them good candidates for establishing a cooperation and offering a new product. These companies can be trustworthy partners in a new market due to their long business history.

5.7 Swiss distributors and wholesalers

Along with global wholesalers of electrical equipment, there can be found originally Swiss wholesalers and retailers of luminaires, cables and other products related to lighting industry. The some of originally Swiss wholesalers are presented in Table 14 below. The distributors of electrical equipment were selected for the analysis and their distribution methods are highlighted.

Table 14. The wholesalers and distributors in Switzerland.

Company	Product range	Solutions for light controlling	Means of distribution
LedFox AG, since 2010 HQ in Arlesheim, canton Bâle-Campagne ¹	Street lighting, industrial lighting, retail lighting	DMX and DALI controllers, Dimmers, RGB controllers	Online distribution, direct selling
Distrelec AG (part of DATWYLER), since 1973, HQ in Nänikon- Uster, canton Zurich ²	Electronics and automation Electronic components and connectors Electrical engineering I&C equipment ICT components and accessories Building technology and building automation Alarm and security technology	Building automation	online distribution, direct selling
Lumina Swiss GmbH, since 2012, Unterengstringen,	LED products: indoor lighting,	RGB controllers	Online distribution, special

canton Zurich ³			project design for business customers, direct selling
LEDOTOP Sàrl, in Martigny, canton Valais ⁴	Street lighting, retail lighting, industrial lighting	not found	Direct selling
Best Light AG in Kirchberg, canton Bern ⁵	Indoor lighting, Retail, Commercial/ Office, Residential, Landscape & Façade lighting, Emergency lighting	Switchers, Programmable motion sensors	Direct selling
Alltron AG (Competec group), since 1985 in Mägenwil, Aargau ⁶	Electrical department of the company provides outdoor lighting and indoor lighting products	Building automation, luminaires with incorporated motion sensors, RGB controllers	Online store, direct selling
roJECO LED Light, since 1990s in Montreux ⁷	Residential lighting, retail lighting, industrial lighting, office lighting, Emergency luminaires, outdoor lighting	DMX and DALI controllers, Dimmers, RGB controllers	Online store, showroom, direct selling

Source: 1 - (LedFox AG, 2016), 2 - (Datwyler Group, 2016), 3 - (Lumina Swiss GmbH, 2016), 4 - (Ledotop Sarl, 2016), 5 - (Best Light AG, 2016), 6 - (Alltron AG, 2016), 7 - (roJECO éclairage LED, 2016)

As it can be seen from Table 14, the majority of the companies offer online distribution and for some of them it is a main selling channel. The product ranges are suitable for consumers as well as for business customers. The distributors also provide range of services from installation to lighting design of the project and selection of suitable luminaires. In the lighting sector of offered equipment, the LED luminaires for indoor applications, landscape and façade lighting prevail. Additionally, some varieties of outdoor LED luminaires integrated with motion sensors are offered by each of the distributors, commonly of the same brands Steinel and Philips. The equipment for light controlling is poorly presented and is mostly associated with colour control of RGB luminaires and building automation. However, the distributors, which operate as contractors in projects,

deploy smart lighting systems. For example, ANTA SWISS AG realised project with smart lighting system produced by Schröder (ANTA SWISS AG, 2016b).

As it can be seen from the overview of distributors and their product ranges that there is a gap in lighting control solutions for retail customers. At the moment, the LED luminaires are supplied either with integrated motion sensors or simple timer switchers, whereas the solutions for indoor light control is widely presented. It is also important to notice, that smart lighting solutions that are available on Swiss market, can be found only via project deployments.

5.8 The price level of equipment for lighting control

The control solutions for outdoor lighting available on the Swiss market are usually distributed through the local offices of producers and sub-contractors. The light control solutions are usually supplementary equipment in the projects targeted for energy efficiency. The recent trend for lighting at a right place and time resulted in the popularity of luminaire specific controllers, controllers integrated with various sensors and luminaires integrated with sensors. The simple solutions can be found in a retail stores for consumer applications. The available solutions are presented in Table 14 with distributor and original producer.

The brief information about the price level of lighting equipment presented in Table 15 helps to estimate the suitable pricing level of the control solutions by C2 SmartLight in Switzerland. However the table provides information only about the products available to the consumers, whereas the price levels of competitive smart solutions are clear due to the confidentiality of between supplier and distributor.

Table 15. Overview of prices for products with lighting control features and equipment related to control of LED luminaires.

Distributor in Switzerland	Producer	Solution	Price
Luminaires with integrated control			
Distrelec AG ¹	Steinel	LED luminaire with movement sensor (residential lighting)	135 – 177 CHF
	Brennenstuhl	LED luminaire with movement sensor (residential lighting)	70 – 97 CHF
ANTASWISS AG ²	Under ANTASWISS brand	LED luminaire Colibri 45W, IP65 for indoor applications without light controlling	250 CHF
Equipment for lighting control			
Distrelec AG ¹	Grässlin	Time clock relay, Daily, weekly and date range program	100 – 199 CHF
Electro-Material SA ³	Tridonic	Motion sensor for DALI system Touch Panel DALI Tridonic with light configuration for RGB lights	120 – 200 CHF 1020 CHF
	Philips	Dynadimmer controller Controller ACTILUME controller	251 CHF 115 CHF
roJECO LED Light ⁴	roJECO brand	RGB controllers, dimmers, switchers for LED luminaires	50 – 200 CHF

Sources: 1 - (Distrelec Group AG, 2016), 2 - (ANTA SWISS AG, 2016b), 3 - (Electro-Material SA, 2016), 4 - (roJECO éclairage LED, 2016).

As it can be seen from Table 15, the price of LED luminaires with integrated motion sensor for automatic light switch on and off depends on brand of the manufacturer and power of the luminaire. The common price level of such combination is under 200 CHF, which can mean that a new solution with advanced light controlling should not be a lot pricier than the simple one. The consumers would not invest a lot in “unusual” control solution, when there is an option to select a standard and simple solution based on movement sensor. The majority of products are manufactured in China regardless the brand, thus, the country of origin does not impact the price strongly (Distrelec Group AG, 2016).

Among the device for lighting control there can be found simple time switchers and various controllers for RGB luminaires. There was found only one controller Dynadimmer, which is comparable with C2 SmartLumo according to features with a retail price of 250 CHF. However, the lighting control is mostly associated with indoor lighting of houses and offices, commonly being a part of build automation system.

5.9 Summary of Swiss market study

The investigation of potential customers in Swiss market for light control solutions showed that there is a growing demand for light controlling as the cities recognised benefit of adaptive lighting. The public customers are the largest customer group, because the LED luminaires strongly dominate this market sector. The comparison of C2 SmartLight Ltd. customers in Finland and potential customers in Switzerland is presented in Table 16.

Table 16. The comparison of customers for light control solutions in Finland and Switzerland.

	Finland	Switzerland
Cities & Transportation Agencies	Annual renovation of infrastructure, EU commitments for energy efficiency	Annual renovation of infrastructure, 2050 Energy strategy commitments for energy efficiency
Sports and Recreation & Facility Service departments	Expansion of the infrastructure	Follows the specific strategy of the city
Harbours	Improvement of energy efficiency	Port of Basel
Factories	Improvement of energy efficiency of premises	A number of large factories
Warehouses/ storages/ indoor parking	Retrofit projects	

Due to inland position of Switzerland, there no large harbours in Switzerland. However, multiple marinas and small passenger ports are wide spread.

The potential customer groups for light control solution would be municipalities as they represent a large market share. Another potential group of customers is the construction and maintenance companies of warehouses and indoor parking.

The national programmes are comparable with the ones of European Union, which are targeted for energy efficiency not only in lighting. Switzerland follows the regulations with precision, which definitely promotes smart lighting technologies among the public and among the companies.

Despite local production of luminaires, a great number of light fixtures from Germany and China are imported in Switzerland. The capacities of local production are not enough to satisfy the growing market need.

The light control solutions of global brands are available on Swiss market along with solutions produced by local companies. Thus, the Swiss market of light control solutions is highly competitive.

The Swiss market is also competitive for the distributors of electrical equipment, because the international distributors established local subsidiaries along with multiple local distributors. The ranges of products are similar across the distributors. The most common light control solutions offered are simple switchers and RGB controllers. There is clear opportunity for light control systems, which can be sold to private customers and small enterprises.

As it was discovered by analysing the distributors there is a tendency for distributors operates as wholesalers and retailers, which, nowadays, enabled through possibility of online shopping. Thus the distributors structures presented in the literature review of this research can be modified as shown in Figure 14.

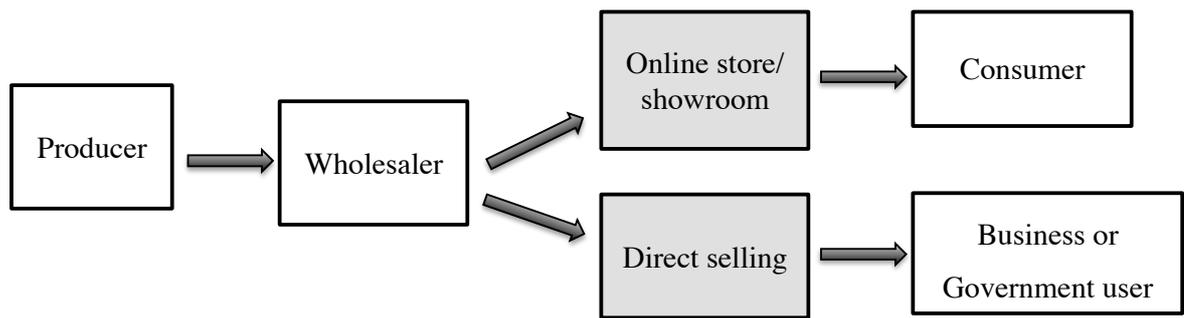


Figure 15. Visualization of distribution channel found from the analysis of the wholesalers.

6 CONCLUSION

The research aim of this work was to determine effective distribution channels for promotion of smart lighting solutions on the Swiss market for case company C2 SmartLight Ltd. It was found that distribution through exclusive partner can be efficient, based on the interview of benchmark SME, offering similar products. Whereas, it is suggested by exporting advisors to build a network of sales agents in order to reach the larger number of targeted customers. Due to the fact that there is a similar products offered exclusively by one company on the Swiss market, the other distributors may search for a product with the same features and quality, which they can sell. This issue is related to the competitiveness among the Swiss distributors and contractors within the market.

The analysis of Swiss lighting market revealed that volumes of imported lighting equipment are large. Government of Switzerland promotes energy efficiency by creating targets for energy conservation, developing and financing projects in cooperation with industry players and public organizations. These factors increase the popularity of LED luminaires and brought recognition of adaptive lighting benefits. Thus, there is an opportunity for smart lighting technologies.

The Swiss market is very competitive, because many global producers are presented. However, the control systems for external lighting aren't widely available neither in wholesalers nor in retail stores. The most common technology for light controlling is based on inefficient time switchers and simple motion sensors. Whereas, there is a need for simple but effective light control solution, which can be utilized not only by public customers, but also small and large business customers.

During the market investigation, the global and local distributors of electrical equipment were identified. All distributors have a similar product ranges with similar price levels. It is recommended to further contact the distributors to investigate a cooperation opportunity.

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