



Future of manufacturing **Blue Ocean Robotics – Value chain case study**

[Born globals and their value chains](#)

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Eurofound reference number: WPFOMEF18013

Related reports: This case study is one of the seven case studies conducted in the framework of the project Future of Manufacturing in Europe and produced by Kingston University Enterprises Limited and IKEI Research Consultancy S.A.: Blue Ocean Robotics, COMODULE OÜ, Frog Bikes, Graphenea, Khar & Partners, KristallTurm, Reconnect.

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This is a publication from *The Future of Manufacturing in Europe (FOME)* project.

FOME is a Pilot Project proposed by the European Parliament and delegated to Eurofound by the European Commission (DG GROW).

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This case study was made during the spring of 2017. Blue Ocean Robotics has since adjusted the company's international strategy and setup. In addition, the partnership model Robi-X has been expanded (see section 1.1 for more information) supported by the company's integrated technology platforms, TP-X.

1. General identification of the born global enterprise and the global value chain members

1.1. Description of the born global enterprise: Blue Ocean Robotics

Blue Ocean Robotics is an international company group founded in Odense, Denmark. It is specialised in developing, creating and commercialising robotic solutions and services. The company is classified under the NACE Rev. 2 code 72.19 Other research and experimental development on natural sciences and engineering. It was set up in February 2013.

Blue Ocean Robotics is a leading provider of emerging robotic solutions and services to improve quality of life, work environments and productivity for humans. It provides robotic solutions for manufacturing and a wide range of sectors, such as healthcare, education, construction, agriculture and fishery, safety and security and offshore (wind, oil and gas).

The business model of Blue Ocean Robotics and the way the company creates and accumulates value are based on three closely related activities:

- Product development, by developing robotic technologies at robot-, platform- and component level.
- Commercialisation, by using the product development to generate application-specific and easy-to-use robotic products prepared for global markets. Blue Ocean Robotics brings emerging robot technology to the market with the goal to disrupt industries with innovative robotic applications.
- Internationalisation, by operating around the world to scale up successfully commercialised robots and to pursue product development opportunities based on local partnerships and local strongholds in technology and markets. The company operates directly through local joint ventures (JV) and local sales partners (SP).

Blue Ocean Robotics invests resources and capital into a carefully selected portfolio of robotic projects where it sees a potential to develop a new innovative robot. When developing robots, Blue Ocean Robotics typically teams up with a private or public sector customer¹ who has a specific need, a challenge to solve or who sees an opportunity in developing their business and/or internal processes by creating and/or implementing a robotics solution with them. Before entering a project, Blue Ocean Robotics conducts a risk analysis, which is necessary to increase the possibilities of the project to become a success even though it is very difficult to predict.

A project is successful when a new robot shows clear evidence of commercial potential in a market. When this happens, Blue Ocean Robotics creates a spin-off company based on the newly developed robot or sells the IPR, which are key aspects of how the company creates value.

Blue Ocean Robotics has developed a series of partnership programmes under the headline RoBi-X where they co-create innovative solutions in close collaboration with public and private partners. RoBi-X consists of a three step partnership programme: RoBi-Design, RoBi-Develop and RoBi-GoToMarket:

- The first step is the RoBi-Design Programme, which aims both to investigate the business potential of developing a new robot solution for a specific application in the market, and to develop a robot concept and supportive business plan to realise the business opportunity.

¹ The company establishes partnerships with end-users, existing robotic companies, entrepreneurs, universities, investors and participates in Public-Private-Partnerships (PPPs).

- The second step is the The RoBi-Develop programme, which aims to develop a robot concept into a range of final product versions and to prepare for commercialisation through marketing and pre-sales activities.
- The last step is the RoBi-GoToMarket, aiming to bring the range of final product versions to the market through planned marketing and sales activities, where the company's JVs and SP network will be engaged.

Through RoBi-X, Blue Ocean Robotics and a partner (typically a company) collaborate and invest in the design, development and commercialisation of a unique robotic solution for a specific challenge and/or realisation of an unexploited business opportunity. When a solution has been designed, developed and commercialised to the point where the partners are confident of the potential to scale up sales, the solution is spun out into a spin-off company with an independent management, but still with close ties to Blue Ocean Robotics.

Blue Ocean Robotics is also involved in R&D activities with partners from other sectors through specific actions such as Manufacturing Academy of Denmark (MADE), which is a project aiming to develop the next generation of modern industrial robots. The R&D activities typically involve public sector funding.

Furthermore, Blue Ocean Robotics is involved in innovation projects with private and public sector customers. The overall purpose of the innovation projects is to demonstrate how a Blue Ocean Robotics' robot solution performs in a specific application scenario.

Blue Ocean Robotics was established by the current CEOs, Claus Risager, Rune K. Larsen and John Erland Østergaard. The three founders have known each other since the late 1980s, when they studied together. Claus Risager, Ph.D. in robotics and Artificial Intelligence (AI), has almost 30 years of experience (since 1988) in robotics with expertise in development, innovation and entrepreneurship. Rune K. Larsen, M.Sc. in robotics and E-MBA in change management, has in-depth knowledge on robotics and its industrial application, industrial robot systems as well as on development of new robotic solutions for other areas. John Erland Østergaard, Ph.D. in physics and MBA, is former Professor MSO (professor with special responsibilities)² and institute director at the University of Southern Denmark (SDU).

As the founder and head of the Centre of Robot Technology at the Danish Technological Institute Claus Risager observed that the market opportunities for robots evolved significantly in the 2000s and the early 2010s and that the robotics market was likely to continue to grow for many years ahead. For this reason, he and the other two CEOs decided to create Blue Ocean Robotics³. If the company can manage to stay at the forefront of technological development of robots, the founders expect great growth possibilities.

As first activities, the founders started working as consultants and resellers of third party robots by selling some of the newest and most advanced robots for international companies. Besides creating revenue to the company, this also gave access to important customers – both nationally and internationally. In the beginning, the founders were not interested in adding additional investors to Blue Ocean Robotics, nor to raise capital through financial institutions. During the stage where they worked as consultants for other companies, they started generating sufficient cash flow to make it possible to develop their own 'blue ocean' robots together with partners, which is the key focus area in Blue Ocean Robotics today. The founders have since then changed their strategy and are by 2017 open to the idea of third party investments (see section 6.2 for more information).

² This is an academic title in Denmark (https://en.wikipedia.org/wiki/Academic_ranks_in_Denmark).

³ This projection is supported by [Deloitte University Press](#) which estimates that the robotics industry world-wide will create 3 million additional jobs between 2014 and 2020. By 2020, robotics is projected to be a USD 100 billion (approximately € 90 billion) industry.

Except from the Blue Ocean Robotics headquarter located in Odense, Denmark, there are eleven Blue Ocean Robotics JVs⁴ located around the world, which are part of the Blue Ocean Robotics Group (see section 2.1 for further information). A Blue Ocean Robotics JV is partly owned by the Blue Ocean Robotics Holding and partly by a local partner (see section 3.2 for further information).

Blue Ocean Robotics also holds equity in several companies including the Danish robotics companies Scape Technologies, Wallmo, and NanOrig. Some are spin-offs from Blue Ocean Robotics' own R&D activities while others are companies Blue Ocean Robotics invests in and which operate as closely interconnected strategic partners.

In the Blue Ocean Robotics Group, including Blue Ocean Robotics JVs and spin-offs, there are over 110 employees worldwide of whom around 45 work at Blue Ocean Robotics' headquarter in Denmark. At the latter, there are employees from 12 different nationalities and eight employees are women. Most employees are highly educated and have a background in natural sciences, engineering and/or IT, and there are also highly educated employees with a business school or a law background. More than 40% of the robots Blue Ocean Robotics develops are within the healthcare and welfare sector. Robots within the healthcare and welfare sectors in Scandinavia are typically developed in collaboration with a public sector customer, for instance a public hospital. However, in Germany, Blue Ocean Robotics typically cooperates with private sector customers within the healthcare and welfare sectors, such as a private hospital.

The turnover is approximately €8 million per year with an expectation of a significant increase in the years to come. In 2015, Blue Ocean Robotics had a growth of approximately 120% compared to 2014 and approximately 20% of the company's turnover came from exports, which is expected to increase significantly in the future. In 2016, Blue Ocean Robotics did not grow as fast as in the previous years as the founders wanted to consolidate the company, which involved replacing staff to form more qualified teams. As this prioritised costly replacement strategy demanded many resources, the growth aim has temporarily been put aside.

1.2. Description of global value chain member 1: Suitable Technologies

Suitable Technologies is a company located in Palo Alto, California, specialised in developing and building remote telepresence⁵ technology to enable for instance business travellers, remote employees, distributed teams and health professionals to communicate and feel present at another location than where the person is physically located. Suitable Technologies' first product is called Beam Smart Presence System (SPS), which is a telepresence solution that combines user-controlled mobility⁶ and telepresence/video conferencing. Beam was originally developed by San Francisco Bay Area robotics studio Willow Garage. In 2011, founder and CEO Scott Hassan spun off Suitable Technologies from Willow Garage, exclusively to focus on Beam. Scott Hassan, MS in Computer Science, is a software engineer, who is also the founder of eGroups (now Yahoo! Groups) and Willow Garage Inc. When he founded Suitable Technologies, 10 employees from Willow Garage started working for Suitable Technologies. Two years later, in 2013, Suitable Technologies started selling Beam.

Suitable Technologies' customers are primarily businesses; however, Suitable Technologies also sells Beam to schools, universities as well as directly to consumers. The company has strong markets in the USA, Europe and Asia.

According to Suitable Technologies' LinkedIn website, the company has between 51 and 200 employees⁷. Suitable Technologies is growing rapidly and continues to expand their businesses.

⁴ In June 2017.

⁵ Telepresence refers to a set of technologies, which allow a person to feel as if they were present, to give the appearance of being present, or to have an effect, via telerobotics, at a place other than their true location.

⁶ Beam contains a computer, which means one can install an app on Beam and use a phone or computer as a remote control for the movement of a Beam.

⁷ Suitable Technologies does not want to publish specific numbers on employees, sales, turnover or revenue.

Besides product development, marketing and sales activities continue to be important for Suitable Technologies, as Beam is still a new type of solution which needs to be introduced properly to potential customers for them to understand how it works.

Suitable Technologies' products are designed, developed and manufactured at its headquarters in Palo Alto, California. In 2013, Suitable Technologies opened a service and support office in Kansas City, Missouri, and later, the company opened a research and development office in Boston, Massachusetts.

1.3. Description of global value chain member 2: Blue Ocean Robotics Sweden

Blue Ocean Robotics Sweden AB is located in Västerås, 100 kilometers west of Stockholm. The company is a Blue Ocean Robotics JV and is co-owned by the CEO and Co-owner, Lennart Karlsson, and the Blue Ocean Robotics Holding. As part of the Blue Ocean Robotics Group, Blue Ocean Robotics Sweden is specialised in designing, developing and introducing new generations of robotic solutions focusing primarily on the health care, education and manufacturing sectors in Sweden.

Blue Ocean Robotics Sweden was founded in September 2015. As a CEO, Lennart Karlsson is responsible for the daily operations and developing the market in Sweden which involves teaming up with public and private sector customers in partnerships. Claus Risager and Rune K. Larsen, two of the founders of the Blue Ocean Robotics Group, are members of the board together with Lennart Karlsson.

Lennart Karlsson, M.Sc. in Vehicle Engineering, has experience in the field of innovation management, product development and entrepreneurship and has a background as member of the management team at the Swedish Innovation Cluster Robotdalen, located near Västerås. Working five years at Robotdalen⁸, Lennart developed extensive knowledge of robotics and a large network in the robot industry including with Claus Risager. This relationship was key to the foundation of Blue Ocean Robotics Sweden. Next to Lennart Karlsson, Blue Ocean Robotics has 1.5 employees. One employee works full time on sales and installation of robotics, and one employee works part-time on marketing related activities.

Blue Ocean Robotics Sweden's primary market is Sweden. Their customers are a mix of public and private sector organisations. Blue Ocean Robotics Sweden is working hard to increase sales by marketing a carefully selected portfolio of five robots out of Blue Ocean Robotics' many robot solutions. Although the company has not reached a positive cashflow yet, Lennart Karlsson, Claus Risager and Rune K. Larsen believe there is a great market potential in Sweden in the years to come, for instance in the healthcare sector⁹.

2. Internationalisation activities of the born global enterprise

2.1. Overview of the international activities of Blue Ocean Robotics

Blue Ocean Robotics is a highly international company. The first international activities were initiated when the company was founded. Today, the two key elements in the Blue Ocean Robotics' internationalisation strategy are to operate and expand internationally primarily through its JV programme and secondarily through SPs.

The JVs in the Blue Ocean Robotics Group are located in France, Lithuania, Germany, the Netherlands, Norway, Spain, Sweden, Turkey, Hong Kong, USA and Australia. The number of JVs will possibly grow in the years to come. The first Blue Ocean Robotics JV was founded in Lithuania in 2014 together with Thomas Solupajev Ronlev, B.Sc. in Business and Administration, and Justinas

⁸ Robotdalen is a Swedish robotics initiative financed by VINNOVA (Swedish government agency that administers state funding for research and development), the European Regional Development Fund, public institutions, universities and the industry.

⁹ Blue Ocean Robotics Sweden does not want to publish specific numbers on sales, turnover or revenue.

Katkus, B.Sc. in Software Engineering and Analytical System Design. Since then, Thomas Solupajev Ronlev and Justinas Katkus created a spin-off company, which has led to the decision to change the legal status of Blue Ocean Robotics Lithuania to a holding company. Nevertheless, they are still part of the Blue Ocean Robotics Group. In March 2017, the oldest active JV in the Blue Ocean Robotics Group is Blue Ocean Robotics Sweden.

Blue Ocean Robotics has SPs in many different countries around the world including Denmark, Austria, Belgium, Estonia, Finland, France, Ireland, Lithuania, the Netherlands, Spain, Turkey, Hong Kong, Malaysia, Singapore, UAE/Dubai, Qatar, Mexico, and USA. Blue Ocean Robotics' SPs are enterprises engaged in various ways to support the sales, support and service outreach globally. Blue Ocean Robotics enters classical distribution agreements or is present in a country through an SP. Blue Danube Robotics in Austria, Meditas in Finland, and Qiwi Technologies in UAE are examples of Blue Ocean Robotics' SPs.

Besides, Blue Ocean Robotics collaborates with some of the leading robot technology companies in the world in different ways. It is a reseller of its partners' robots to their international customers and users. Also, they develop new robots or robot systems together with partners, for instance in the framework of R&D projects financed by the EU (see section 6.2 for more information).

2.2. Importance of internationalisation activities for the born global: main served markets

Blue Ocean Robotics' international activities are closely related to the two other elements in its business model: product development and commercialisation. Concerning international cooperation to develop new robots, Blue Ocean Robotics does this in two ways. Firstly, Blue Ocean Robotics Denmark cooperates with its JVs and local partners in the respective countries to develop new innovative robots. Secondly, the company cooperates with international partners such as universities and robotics companies in R&D projects, which usually have a long-term focus. The latter typically involve public funding. By cooperating internationally, Blue Ocean Robotics gets the chance to access new market possibilities.

Blue Ocean Robotics is present in approximately 40 countries through its JVs and SPs. However, its main market in terms of turnover is still Denmark. Overall, there are three reasons why Blue Ocean Robotics is not exporting more than 20% of its turnover yet, according to the Blue Ocean Robotics interviewee. Firstly, the company is still young and has an ambitious goal to develop and commercialise new robots in new markets. So far, Blue Ocean Robotics has had most success in doing business in Denmark where the company has good references, is a well-known and recognised robotics company. As of 2017, the company and its JVs do not have the same status outside Denmark. Secondly, Blue Ocean Robotics is primarily focused on product development and the early stages of commercialisation until they experience a demand in the market for a new robot. When they experience a demand in the market for a new robot, they typically either sell the IP rights or make a spin-off company to scale up sales and exports. Thereby, the exports are not directly linked to Blue Ocean Robotics. Thirdly, the Blue Ocean Robotics' JVs are still young and have not settled yet. According to the Blue Ocean Robotics interviewee, exports are expected to grow as soon as one or more of the JV companies have settled, meaning sales exceed costs and turnover increases.

2.3. Reasons to go international and for the target market selection

With the goal of developing and commercialising robots in new markets together with partners, typically end-users, Blue Ocean Robotics believes they need to be locally present in the interesting markets and industries where possible customers (end-users) are located. For instance, if Blue Ocean Robotics wants to develop and commercialise robots for the automotive industry, they need to be present in countries such as Sweden and Germany with a Blue Ocean Robotics JV led by a CEO who speaks the local language, knows the local customs, rules and laws and has a large network and great knowledge of robotics. However, as a long-term strategy, Blue Ocean Robotics has not targeted

specific countries or markets they want to enter. Instead, they try to identify new promising markets for new innovative robots which is not limited to certain countries and certain markets.

According to the Blue Ocean Robotics interviewee, having competent CEOs for the Blue Ocean Robotics JV companies is key to the company's international success in the years to come. Identifying the right local partner to become co-founder and CEO of a JV is therefore a critical part of Blue Ocean Robotics' market selection (see section 5.2 for more information).

2.4. Main challenges to engage in internationalisation activities and solutions adopted

Blue Ocean Robotics' primary obstacle about engaging in international activities is closely related to their business model oriented to new international markets. To develop new robots outside Denmark, Blue Ocean Robotics depends on the JVs' ability to develop a successful business following Blue Ocean Robotics' model that, *inter alia*, requires endurance. As robots are still new to many customers, Blue Ocean Robotics and the JV companies need to invest a lot of time and resources to:

- Get potential customers to understand how a specific robot solution can create value to them;
- Develop the robot, which they often do together with the customer;
- Install the robot;
- Train the customer in using the robot which often includes training of employees as well as developing new internal procedures and standards.

According to the Blue Ocean Robotics interviewee, Blue Ocean Robotics Holding typically invests around 50% of the start-up capital in a new Blue Ocean Robotics JV and the rest of the start-up capital has to be funded by the local co-founder and CEO of a JV. This means that the local CEO needs to fund a large part of the expenses, including salaries, during the first couple of years. However, as of 2017, the nine active Blue Ocean Robotics JV have not reached a positive cash flow and liquidity state. Summing up, for the time being, Blue Ocean Robotics does not know if their JV strategy to get into new markets outside Denmark will be successful. Therefore, they are discussing a 'JV strategy 2.0', which includes a greater focus on finding local partners to establish JVs with sufficient capital to finance the first difficult years. However, Blue Ocean Robotics' other criteria for the selection local partner remain important.

Another obstacle about engaging in international activities, and more specifically when starting up a new JV, is related to taxation issues. Due to taxation of shares in JV companies, investing in new JV companies and therefore expanding internationally requires substantial financial resources.

A third challenge when starting up new JV companies relates to local regulations, standards and laws. While it has been easy to set up a JV company in Hong Kong, setting up companies in some EU Member States (for instance Germany and Spain) has been a time and economic resource-consuming process. In Spain, it is difficult to establish and co-found a company, as if one lives and works outside Spain, one needs to be registered as an expatriate Spaniard and have a personal identification number. The plan was to have a Blue Ocean Robotics JV in Spain by 1 January 2017, but the process was delayed until the last quarter of 2017. In Germany, Claus Risager and two employees had to travel to Munich for a short meeting with a notary to be able to set up a JV company, as, according to German law, physical presence is required in order to set up a company.

To navigate the various local regulations, standards and laws in different countries and to make sure the company complies with them, Blue Ocean Robotics makes use of three different Danish law firms depending on the issue. One of the law firms has offices around the world.

3. Global value chains of the born global

3.1. Identification of global value chain(s) of the born global

Blue Ocean Robotics is part of several different global value chains. In this sense, it acts as a supplier of new robotics solutions and services to different customers and as a reseller of new advanced third party robots for several suppliers making use of their JVs and SPs to reach countries around the world. Besides, Blue Ocean Robotics is part of different international R&D projects (see section 3.2 for more information).

3.2. Main roles of the born global enterprise and its partners and governance issues

Blue Ocean Robotics Denmark acts as a supplier of new robot solutions and services to its JVs and SPs.

The JVs handle both sales of existing innovative robots to local customers as well as development of new robots under the Blue Ocean Robotics name. According to the Blue Ocean Robotics interviewee, the Blue Ocean Robotics' JV programme has a franchise-like set up where Blue Ocean Robotics provides the brand name, logo, website, robots, training, partner programmes, business model and strategies. JV companies are supported by Blue Ocean Robotics Denmark employees who the JV CEOs and employees can contact if they for instance need advice on how to make a tender or presentation the Blue Ocean Robotics' way. By extension, the JV companies need to operate in accordance with the overall mission, business model and strategies of Blue Ocean Robotics. However, the specific JV can either work with the full scope of the Blue Ocean Robotics business domain or be specialised and work with a subset of it. Moreover, the JVs are not limited by certain markets, technologies or products. The JVs have the freedom to pursue the business opportunities as they see fit, under the condition that they must not be active where the other JV companies are active.

The SPs are third party companies, which are granted the rights by Blue Ocean Robotics to handle sales of specific innovative robots to customers in specific countries.

Besides, Blue Ocean Robotics operates as a reseller of new and advanced robots for some of the leading robot technology companies in the world. Blue Ocean Robotics' role is to market, distribute and sell new third party robots to private and public sector customers around the world. As an example, Blue Ocean Robotics sells and markets Beam for Suitable Technologies (see 4.2 for more information).

Finally, Blue Ocean Robotics acts as a research partner in international consortia working on different R&D projects. As an example, it is part of an international consortium working on the EU funded R&D project BabyRobot. The consortium consists of public and private sector partners from six countries. Blue Ocean Robotics' role and tasks within that project is to lead a Work Package (WP) on 'Child-Robot Communication and Learning'. The aim of the WP is to develop and evaluate the communication and learning capabilities of different robotic platforms (starting from the [Zeno robot](#)¹⁰), as well as use the robot for enhancing the communication skills of children in an edutainment scenario. A detailed work plan and clear description of WPs, tasks and deliverables are a key management tool to make sure the consortium is progressing as planned.

¹⁰ Zeno is a 17-inch tall, 4.5-pound humanoid robot boy.

4. Cooperation between the born global and its selected international partners in value chains

4.1. Brief history and reasons of the cooperation(s) and reasons for initiating them

When Blue Ocean Robotics was founded, they started selling new advanced third party robots for companies such as Suitable Technologies. The cooperation between Suitable Technologies and Blue Ocean Robotics was initiated in 2013 by Claus Risager, who contacted Suitable Technologies to discuss opportunities for Blue Ocean Robotics to act as a SP for Suitable Technologies in Europe. Claus Risager knew Suitable Technologies and Beam Smart Presence System from his previous work at the Danish Technological Institute where he had developed a large network within the global robotics industry. From the time Blue Ocean Robotics first contacted Suitable Technologies, it took less than half a year before they started cooperating.

The cooperation between the co-founder and CEO of Blue Ocean Robotics Sweden, Lennart Karlsson, and Blue Ocean Robotics in Denmark was initiated in 2015. Lennart Karlsson and Claus Risager had known each other professionally for many years when Claus asked Lennart if he wanted to co-found and become the CEO of a new Blue Ocean Robotics in Sweden while Lennart was still working for Robotdalen. Blue Ocean Robotics wanted to expand to Sweden because they were optimistic about Blue Ocean Robotics' market opportunities in Sweden based on the recent success in Denmark. Secondly, being present in Sweden would make it possible to apply for public funding of R&D projects in the country. The negotiations started in the spring of 2015 and in September of the same year Blue Ocean Robotics Sweden was founded.

4.2. Roles of the born global and the selected partner(s) within the value chain

Suitable Technologies acts as a developer, manufacturer and supplier of Beam to, among others, Blue Ocean Robotics. Suitable Technologies also markets and sells Beam directly to customers, primarily in the USA. It makes use of SPs outside the USA as it needs local presence in the markets due to language barriers and in order to compensate for their lack of local networks and knowledge of local systems. In Europe, the Pacific Region and Asia, Blue Ocean Robotics is the Suitable Technologies' SP. Its role is to market, distribute and sell Beam to customers in the above-mentioned regions as well as delivering service and support to customers. Moreover, the Blue Ocean Robotics' JVs and SPs including Blue Ocean Robotics Sweden help selling Beam and deliver service and support to customers in the countries where they are present.

An important task in the sales process is to develop new markets and new customers. As an example of a sales process, in 2015, Blue Ocean Robotics tested Beam Pro in a nursing home in Karise, Faxe municipality, as part of a public-private innovation framework contract. Blue Ocean Robotics also creates awareness of Beam and markets Beam for example at fairs and on social media.

Different forms of ICT (e-mail, phone, video call tools and telepresence systems such as Beam) play an important role in sustaining the cooperation between the two trusted partners. Every week a Blue Ocean Robotics employee 'beams in' at Suitable Technologies, meaning they are using a Beam to communicate. Besides, they are communicating on phone and e-mail when needed. In terms of logistics, Suitable Technologies makes sure that a new container with multiple Beams is shipped to Denmark as soon as they are aware a new one is needed. From Denmark, Blue Ocean Robotics distributes Beams to customers outside USA. Continuous information on sales from Blue Ocean Robotics to Suitable Technologies makes it easy to know when to ship a new container.

The role of Blue Ocean Robotics Sweden in the cooperation with Blue Ocean Robotics Denmark is primarily to grow the market in Sweden by following the overall group strategy - for example developing new robots to new markets. Blue Ocean Robotics Sweden's key activities are to find customers, develop robots in partnerships and sell robot solutions and services primarily in Sweden. Blue Ocean Robotics Sweden can make use of Blue Ocean Robotics' portfolio of robots and robot

related services for their work, but have chosen to focus on five robots that they consider most promising for the Swedish market. Besides providing the portfolio of robot solutions and services, the role of Blue Ocean Robotics Denmark is to deliver the overall Blue Ocean Robotics concept including business model, strategy, brand and logo, but also to support the operations and to give access to a large international network within the robot industry.

The role of ICT in sustaining the cooperation is crucial, as continuous communication between the two partners is important. Even though Lennart Karlsson, Claus Risager and Rune K. Larsen meet face-to-face several times a year at board meetings and Lennart Karlsson is in Denmark three to four times a year, communication via video call solutions, e-mails and phone play a key role on a daily/weekly basis, for instance when Lennart Karlsson or his employees need support.

The role of logistics services in sustaining the cooperation is small. As of 2017, Blue Ocean Robotics Denmark does not supply large amounts of robots to Blue Ocean Robotics Sweden and probably never will. As a JV, Blue Ocean Robotics Sweden is a company with the aim of developing new robots for new markets in Sweden and creating spin-off companies (or to sell IPR), which does not generate great demands on logistics.

4.3. Governance issues and formalisation of the cooperation

The cooperation between Suitable Technologies and Blue Ocean Robotics is formalised through a contract, which describes the guidelines of the cooperation in detail, including that Blue Ocean Robotics represents Suitable Technologies in Europe and other markets. A successful cooperation during the last couple of years has led to a high level of mutual trust between the two parties (see sections 4.4 and 4.5 for more information).

The cooperation between Blue Ocean Robotics Sweden and the Blue Ocean Robotics Denmark is formal in the sense that Blue Ocean Robotics Sweden is co-founded and co-owned by Lennart Karlsson and Blue Ocean Robotics Holding. Besides, there is an ownership agreement and statutes for the Blue Ocean Robotics Sweden which among other things describes that there are certain guidelines the company must comply with, including Blue Ocean Robotics' overall mission and strategy and, if necessary, Blue Ocean Robotics has the right to close a JV company if a JV CEO does not follow the overall mission and strategy. Furthermore, Blue Ocean Robotics Sweden cannot replace Blue Ocean Robotics as partner, according to the contractual agreements. However, Blue Ocean Robotics Sweden has much freedom to act on the market opportunities Lennart Karlsson and his employees believe can lead to a sale or to the development of a new robot with great commercial potential. By extension, both parties highlight that it is important that the parties agree on the decisions they take on board meetings and that Lennart Karlsson as a CEO agrees and believes in the decisions, as he is the one who is responsible for carrying out the decisions with his employees.

4.4. Evolution of the cooperation over time

The cooperation between Suitable Technologies and Blue Ocean Robotics has been strengthened over the past two years and the number of tasks that Blue Ocean Robotics handles for Suitable Technologies have increased for instance within marketing and logistics. Today, the cooperation is stable and very important for both parties. With Blue Ocean Robotics, Suitable Technologies gets local presence from a trusted partner in Europe, Asia and in the Pacific Region. On the other hand, Blue Ocean Robotics has the possibility to sell Beams, which is getting more and more popular outside the USA resulting in revenues and (new) relationships with customers. For this reason, Blue Ocean Robotics has no interest in replacing Suitable Technologies as a partner. In addition, Suitable Technology regards Blue Ocean Robotics as a unique partner primarily due to Blue Ocean Robotics' expertise within robotics, specialised marketing skills, its network of JVs and SPs as well as mutual trust, which is difficult to replace.

The cooperation between Blue Ocean Robotics Sweden and Blue Ocean Robotics Denmark has developed since it started in 2015. As of 2017, the parties now work more closely together on a weekly basis and mutual trust exists between them. However, the cooperation cannot be considered as

stable yet, since Blue Ocean Robotics Sweden is still striving to get a positive cash flow, which both parties hope will improve in the coming year or two. If Blue Ocean Robotics Sweden manages to create a successful business, the cooperation as well as the value chain(s) will be more stable. Besides, Blue Ocean Robotics Sweden is working to get more funding supported by Blue Ocean Robotics Denmark. Blue Ocean Robotics Sweden is part of an application to the Horizon2020 funding programme, hoping to get funding for a large R&D project in 2017. If they receive funding from Horizon2020, Blue Ocean Robotics Sweden will have the necessary financial resources for two to three years, which will give Blue Ocean Robotics time to establish and develop markets in Sweden.

4.5. Results of the international cooperation for the different enterprises

Suitable Technologies and Blue Ocean Robotics both agree their cooperation has been very beneficial for both parties. In the beginning, Blue Ocean Robotics sold five Beams a year, now they sell approximately two Beams a day. Increased sales of Beams in Europe, Asia and the Pacific Region have resulted in higher revenues for both parties. Looking ahead, Suitable Technologies believes that Blue Ocean Robotics can grow their business especially in Europe and can manage to maintain a good relationship with their customers. If sales continue to increase, Blue Ocean Robotics will probably make a spin-off company with the purpose of focusing 100% on scaling up sales of Beam in Europe, Asia and in the Pacific Region, which would benefit both parties.

The cooperation between Blue Ocean Robotics Sweden and Blue Ocean Robotics Denmark so far has resulted in the acquisition of an increasing number of customers in Sweden, which is valuable for both parties. In this sense, Blue Ocean Robotics Sweden has been a key factor in entering markets in Sweden. However, Blue Ocean Robotics Sweden has not yet reached a stage where revenues exceed expenses. They believe revenues will increase and that the market for robots in Sweden will grow, especially in the health care sector.

5. Main challenges to engage in international cooperation activities

5.1. External and internal-to-the company barriers

The Blue Ocean Robotics interviewee pointed out three barriers impeding their engagement in international cooperation activities:

- 1) Blue Ocean Robotic JVs struggle to create successful business cases outside Denmark (internal-to-the-company barrier);
- 2) Different time zones (external-to-the-company barrier);
- 3) Language barriers (external-to-the-company barrier).

According to the Blue Ocean Robotics interviewee, the main challenge concerning international cooperation activities is related to Blue Ocean Robotics' vision and business plan. To survive and succeed as a company in the long run, Blue Ocean Robotics must succeed in doing business outside Denmark and, more specifically, in developing and commercialising new robots with partners abroad. The idea is that having a Blue Ocean Robotics JV with local presence in a certain country will enhance the possibilities of creating successful business cases. By extension, successful business cases will strengthen Blue Ocean Robotics' reputation as company in that country, which in turn will increase the probability of finding other customers and partners. However, creating successful business cases is an expensive and time-consuming challenge, not only for the co-founders of a Blue Ocean Robotics JV, who struggle to create a successful business, but also for Blue Ocean Robotics Denmark. Both parties depend on successful business cases and the success of the JVs.

When cooperating with partners in different time zones, it is a challenge to find time for phone or video call meetings during normal working hours (8 a.m. to 6 p.m.). As an example, the time difference between Palo Alto in the USA where Suitable Technologies is located and Odense in Denmark where Blue Ocean Robotics Denmark is located is nine hours. If a meeting is supposed to take place during normal working hours, there is only one possible hour a day. The Suitable Technologies interviewee also pointed out different time zones as a barrier impeding their engagement in international cooperation activities.

Language barriers are a challenge when engaging in international cooperation activities. Though the employees working at Blue Ocean Robotics generally have great English speaking and writing skills, it is not always the case with customers. Correspondingly, the Blue Ocean Robotics Sweden interviewee pointed out language barriers as a factor complicating international cooperation activities.

5.2. Solutions adopted by the companies to solve these challenges

As already described, finding the right partner who is qualified and willing to become co-founder and CEO of a Blue Ocean Robotics' JV is very important to enhance the chances of success in the countries where the JVs are (to be) located. Therefore, the founders of Blue Ocean Robotics have several criteria, which a potential co-founder and CEO of a JV must meet. Firstly, the local partner must have the competence, experience and network to make the JV grow and prosper. Secondly, the local partner must have an entrepreneurial mind-set and be open for exploring new opportunities. Thirdly, the local partner must value working in collaboration with the other local partners and employees internationally. Fourthly, the local partner needs to have in-depth knowledge of robotics as a JV is not just a sales partner, but needs to have the capability to enter a partnership with a customer to develop and commercialise new robots. Lastly, sufficient financial resources to finance for instance wage payments to employees for the first couple of years has also become a very important criteria. These criteria coupled with a well-established international network in the global robotics industry have been key to find competent partners to establish JVs in new countries with the potential to enter new markets (see section 7.2 for more information).

Besides travelling all around the world to meet partners face-to-face, different forms of ICT play a critical role in Blue Ocean Robotics' communication with partners and international cooperation

activities. The flexibility of employees is another necessity when having partners on different continents, for instance when considering the existing time differences.

English as a working language in Blue Ocean Robotics, employees from 12 different nationalities working at Blue Ocean Robotics Denmark as well as locally present JVs and SPs in many countries with employees who speak the local language are different ways of trying to overcome the language barriers.

6. External support as regards internationalisation and international cooperation

6.1. Main identified needs for external support

Two main needs for external support concerning internationalisation and international cooperation were pointed out by the Blue Ocean Robotics Denmark interviewee:

- 1) Raising capital and access to finance;
- 2) Access to legal advice.

Blue Ocean Robotics still needs to raise capital to finance their business activities when developing a new robot for new markets, including the development stage, the commercialisation of the robot and the creation of a spin-off company. To raise the capital needed at the different stages, Blue Ocean Robotics seeks for investors and funding internationally (see section 6.2 for more information).

Blue Ocean Robotics regularly encounters tasks and challenges where they need legal advice from lawyers. With regards to Blue Ocean Robotics' international activities, they need legal advice from lawyers when establishing new companies including JVs and spin-offs to be sure it is done correctly and according to local legislation. Blue Ocean Robotics also needed legal advice when they carried out a share issue in 2016.

The Blue Ocean Robotics Sweden interviewee explained that the company's main needs for external support are related to raise capital and access to finance (see section 4.4 for more information) and legal advice, which, however, is not concerning international cooperation issues. Furthermore, Blue Ocean Robotics Sweden receives external support from Blue Ocean Robotics Denmark (see section 4.2 for more information).

The Suitable Technology interviewee explained that the company does not have needs for external support due to the company's wealthy founder and because the management of the company wants to handle things autonomously (with the only exception of its use of sales partners for markets outside the USA, as already explained in a previous section).

6.2. Use of external support

Blue Ocean Robotics has benefitted from a few external sources of support, both private and public, to raise capital and access to funding and legal advice. According to the Blue Ocean Robotics interviewee, the reason why the company has only benefitted from a few external sources of support is that they have not sought for other means of external support because the company has a wide range of competences internally and has not needed to seek external support for other purposes¹¹.

With regards to external support to raise capital and access to finance, Blue Ocean Robotics is searching for investors and funding from both private and public sector sources. As an example of private external support obtained, in 2016, a group of private investors provided DKK 50.72 million (approximately € 6.8 million) to consolidate the global growth of Blue Ocean Robotics, strengthen the development of the company's robot portfolio and hatch multiple successful spin-off companies. Due to the interest of private investors to acquire shares in Blue Ocean Robotics, the original plan for listing the company on the stock exchange NASDAQ OMX First North in Stockholm was abolished. The investment from the group of private investors means 66.7% of Blue Ocean Robotics is owned by the three original founders and 28.3% is owned by external investors. The rest is owned by employees. To the legal aspects of receiving private investment, they get external support from a lawyer who is an expert in legislation in relation to company law including share issue and subscription for shares.

¹¹ The three co-founders and CEOs of the Blue Ocean Robotics Group all have a good overview, awareness and knowledge of how to run a business from previous positions and the available internationalisation policy support measures due to their experience of making use of different national and international (EU) policy measures before and after Blue Ocean Robotics was founded. As an example, Claus Risager has worked as a reviewer and evaluator of applications and projects under the Horizon2020 funding programme and former framework programmes for the European Commission since 2005.

For the R&D activities, Blue Ocean Robotics and partners also apply for public funding. Blue Ocean Robotics has many years of experience in seeking funds from different public funds, such as the Horizon2020 programme and the Innovation Fund Denmark, and has succeeded in receiving funding for R&D activities several times. The following are two examples of the EU funded projects Blue Ocean Robotics is part of:

- ECHORD++, aimed at enhancing the use of robot technologies in Europe. The project is funded under FP7-ICT.
- [Sustainable and Reliable Robotics for Part Handling in Manufacturing Automation \(STAMINA\)](#), aimed at developing a robot system for part handling in manufacturing automation. The project is funded under FP7-ICT.

As regards the need for legal advice, Blue Ocean Robotics uses three different law firms for different purposes. One lawyer is used for tasks such as employment contracts and partner contracts. Another lawyer helps Blue Ocean Robotics when establishing new companies as well as in relation to new share subscription agreements and share issues. The third law firm is one of the largest law firms in the Danish market. Blue Ocean Robotics makes use of the services of this law firm for instance when they need legal advice on a specific law outside Denmark quickly. One example, raised by the Blue Ocean Robotics interviewee, was when they needed legal advice concerning a specific law in China within 24 hours.

6.3. Assessment of this external policy support

According to the Blue Ocean Robotics interviewee, the external support from the Horizon2020 programme and the Innovation Fund Denmark is important primarily for the support provided to some of Blue Ocean Robotics' R&D activities.

However, the Blue Ocean Robotics interviewee thinks the Horizon2020 programme is too focused on promoting scientific and academic aspects - for example research articles and funding of PhDs when funding robotics related projects - and to a lesser degree on creating a commercial impact (which, however, was not the original idea behind Horizon2020). According to the Blue Ocean Robotics interviewee, the EU could do more to make sure that EU citizens and enterprises can get access to the results and outcomes of EU funded projects one to two years after a project has ended. This would make sure that more European citizens and enterprises can benefit from the results of EU funded projects.

The Innovation Fund Denmark, which was established in 2014, replaced The Danish Council for Strategic Research, The Danish Council for Technology and Innovation and The Danish National Advanced Technology Foundation. However, the Blue Ocean Robotics interviewee thinks it is a shame that the latter does not exist anymore, as it funded several high-quality projects. The Danish National Advanced Technology Foundation offered private companies and universities the funds and the framework for developing new and important technologies with a 50/50 split of financing between the partners and the Foundation.

7. Concluding remarks

7.1. Future plans regarding internationalisation and international cooperation

Blue Ocean Robotics wants to continue to grow in terms of turnover, revenue and the number of countries they are present in. The Blue Ocean Robotics interviewee believes there are approximately 75 countries around the globe where they can operate as a company. However, they do not have the ambition to be present in all 75 countries. Their primary goal for the future is to develop new robots, commercialise robots in new markets and create new JVs where they find the right partner and where the market opportunities are good. By extension, they want to continue to create spin-off companies to scale up sales of commercially promising robots and to sell IPR when the timing is right, which is key to build a successful business. Lastly, Blue Ocean Robotics' long-term goal is to be the preferred partner for companies in big industries such as the car manufacturing industry when companies want to build new robots.

7.2. Conclusions and lessons learned

Blue Ocean Robotics is a fast-growing born global enterprise. In four years, it has managed to build a successful international company with 110 employees, a turnover of €8 million, which is expected to grow, and is present in 40 markets. In 2016, Blue Ocean Robotics was recognised as one of the 20 most promising robotic solutions providers in the world by the [American CIO Review](#).

Five success factors underpinning Blue Ocean Robotics' internationalisation and international cooperation activities were pointed out by Claus Risager. They are:

- To be extremely focused: The co-founders of Blue Ocean Robotics were very focused on what they wanted to do and how to get there from the beginning, which has not changed. They want to develop new robots for new markets around the world. For that reason, they did not change their mission and business model which have helped to keep focus.
- Perseverance: The co-founders of Blue Ocean Robotics have been very determined to overcome different challenges and have invested many resources and much time to succeed in growing their business in Denmark and internationally.
- A large international network and the 'right' contacts: A lesson learned is that it takes years to build a large international network. Claus Risager decided to develop his international network and to get the 'right' contacts in the early 2000s. At events, he actively presented himself to different people in the international robot industry and especially to 'the big guns'. This has been very important to Blue Ocean Robotics' internationalisation as these contacts have helped opening doors.
- To find local partners with the right competences and mind-set and build trust: This is especially important with regards to Blue Ocean Robotics' JV strategy. Without the right competences and mind-set, the chances of failing increase. By extension, international partners who trust Blue Ocean Robotics and vice versa are key to successful international cooperation.
- Marketing and storytelling: Blue Ocean Robotics has had great success in putting much effort into social media marketing on Facebook, Twitter and LinkedIn telling the story of Blue Ocean Robotics. Their marketing department invited all the company's international contacts to follow Blue Ocean Robotics on social media, which makes it possible to share Blue Ocean Robotics related news daily with a targeted audience. As a result, Blue Ocean Robotics' employees are contacted by people from their networks, from all around the globe.

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WPFOMEEF18013

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