



Future of manufacturing **Frog Bikes – Value chain case study**

[Born globals and their value chains](#)

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

1.1. Description of the born global enterprise: Frog Bikes

Frog Bikes is a British manufacturer of lightweight children bikes and accessories. The company is classified under the NACE REV 2. Code: 30.92 in the manufacturing sector. The company was founded in February 2013 in Egham, UK by Jerry and Shelly Lawson.

By February 2017, the company had recruited 48 employees including 28 employees in the office in Egham and 20 in a newly built factory in South Wales that opened in August 2016. Before setting up the factory in Wales, the company cooperated with a factory in the Far East to manufacture the bikes and export to different countries. After three years in operation, the company has generated 40% of turnover from foreign sales, and has been active in 38 countries worldwide, including the UK, mainland Europe, Canada, South Africa, Hong Kong and Japan. Frog Bikes has a team of 50 sales representatives worldwide who earn commissions on sales. Additionally, the company sells products online through its website, which only accounts for less than 0.5% of the total sales.

Frog Bikes offers a comprehensive range of top quality lightweight bikes at affordable prices ranging from GBP 100 to GBP 500 (equivalent to about €120 to €590). It is linked to more than 400 independent retailers in the UK and connects with over 1,000 stores worldwide. By February 2017, it recorded 95% of total foreign sales from the European market, especially from France and Germany, while the rest was equally distributed between Asia, Australia and Africa.

The product has a highly innovative design (that is, radical innovation), with more than 15 models with different sizes and colours. According to the owner and founder, Jerry Lawson, the company spends on average 5% of its turnover on R&D expenditure. The average commercialisation success rate of its innovative bikes in the market is 85%. In other words, 85% of its innovations which are launched in the market meet their initial targets. Some of Frog Bikes' product innovation derives from its cooperation with Brunel University (UK). This involves R&D to design a product based on the corresponding anatomy of the child and the measurement of the bike, rather than merely scaled down versions of adult bikes as other kids' bike manufacturers do. The new design reduces the Q-factor (the space between the pedals), allowing children to push more directly down when cycling, so converting more of their energy into motion. Their bikes are much lighter than other children bikes in the market, because they are designed incorporating a light but strong aluminium frame. This offers light weight without compromising performance and strength. In addition, their bikes include cycling components imported from Shimano and Tektro, the leading manufacturers in the industry. Frog Bikes is the first company in the world to apply this level of scientific rigour to the design of kids' bikes.

The innovation idea came from the founders and owners, Jerry and Shelley, who are active cyclists and have a large network in this context. The couple identified the market opportunity when they were looking for lightweight bikes for their two small children who are both keen cyclists, which gave them the motivation to design and manufacture lightweight children bikes which differentiate them in the market. First, they understand the needs of kids, how to attract them and their parents and what features of the existing products need to be improved. Following on from the first prototype, the bikes were robustly tested by their children and their friends to ensure the quality and the comfort of the bikes.

The business opportunity was identified by Jerry Lawson when he found considerable demand for this type of product during his market research. There have not been any providers offering such an innovative design in the world. The company has a special bike design, to reflect their partnership with the British professional cycling [Team Sky](#) that competes in the Union Cycliste Internationale (UCI) World Tour.

Frog Bikes' vision is not only to become the leader of lightweight children bikes but also to develop as a green business. The company uses recycled packaging and generates electricity for their own use in

their office (Start-ups, 2015). Moreover, they have developed a programme called ‘Leapfrog’, which provides the opportunity to purchase second hand ‘Frogs’, with the objective to keep old bikes out of land-fill and to promote the recycling of Frog bikes.

Prior to the establishment of Frog Bikes, Jerry Lawson had a successful career as a senior executive in fast moving consumer goods (FMCG) companies. He worked at UK FMCG retailer Tesco for 13 years with notable highlights, including setting up a cross-retail organisation in the US and the establishment of Tesco Mobile - a joint venture between Tesco and O2. He established a new division at The John Lewis Partnership that consolidated functions between John Lewis and Waitrose.¹ As other experiences, he managed Consumer Electronics Europe at Amazon. His working experience and relationships gained from his professional and personal network have been very helpful in expanding Frog Bikes business to the international market, especially within Europe.

Frog Bikes’ management board consists of Jerry Lawson and his wife, Shelly Lawson, and key staff members including one Head of Finance manager, one Head of Marketing, one Head of R&D, and the Factory General Manager. All key decisions on business management are discussed among this team. Even though the board meetings are often informal, the board has a formal business plan that incorporates a 3-5 year internationalisation strategy. The whole management board is involved in the planning and each board member has a feed into the strategy which is renewed every six months to keep up with changes in the market. The employees of Frog Bikes come from a number of different countries including Germany, Brazil, India, Pakistan, the US and Canada. However, 80% of the team originate from European countries.

The company has grown fast from inception, with an average annual revenue growth of 85%; and 4 to 5% annual growth of profitability. The year-on-year sale growth rate in the UK market is 70%, and as much as 100% in France and Germany. It has generated an annual turnover of more than GBP 5 million (equivalent to about €6 million) and multiplied the number of employees by five since the start-up.

Frog Bikes has won a number of prizes and awards since its establishment including, for example, [Export Business of the Year Award](#) in November 2015 sponsored by the Start-Ups Association. It was one of the finalists in the National Business Awards for New Business of the Year 2013 and 2014 and was nominated as Bike Brand of the Year by Bike Biz (UK) in 2014.

1.2. Description of global value chain member 1: Tektro Ltd.

Tektro Ltd. was founded in 1986, specialising in manufacturing brakes, disc pads, brake pads for bikes and accessories. Its headquarter is based in Chang-hua, Taiwan. With over 30 years of experience in the bike industry, Tektro has established three additional branches, two in China (Wuxi and Shenzhen), and one in the US. In Chang-hua, there are 500 employees, 400 in Wuxi, 300 in Shenzhen and 10 in the US. The total employees of all the branches hence add up to over 1,200 people.

Their products and services have been distributed all over the world. Tektro has established a strong international network with distributors in the EU (for example, Netherlands, Bulgaria, Czech Republic, Finland, France, Switzerland, Sweden, Portugal), Asia (for example, Korea, India, Philippines, Thailand), South Africa, US, New Zealand, and Australia. However, its main clients are based in the EU, accounting for 70% of the total sales.

1.3. Description of global value chain member 2: Shimano

Shimano is a Japanese multinational manufacturer of cycling components, fishing tackle and rowing equipment. Founded in 1921, the company is headquartered in Sakai, Japan. By 2016, the company has 53 consolidated subsidiaries around the world including Asia (for example, Malaysia, Singapore,

¹ The John Lewis Partnership has 86,700 permanent staff, incorporating 48 John Lewis shops across the UK, 353 Waitrose supermarkets (www.waitrose.com), an online and catalogue business, johnlewis.com, a production unit and a farm. The business has annual gross sales of over GBP 11 billion (about €12.6 billion), which makes it one of the UK leading retailers. See <https://www.johnlewispartnership.co.uk/about.html>

Thailand, Philippines, Cambodia, China, Taiwan), Europe (Belgium, France, Germany, Denmark, Finland, UK, Sweden), North America (for example, US, Canada), Australia, New Zealand, South America (for example, Uruguay, Argentina, Brazil), with a total number of employees of over 13,000 people. Shimano's primary manufacturing plants are in Kunshan, China; Malaysia; and Singapore. Its paid-in capital is JPY 35.6 billion (equivalent to €29.3 billion). The total net sale of the year 2016 was JPY 322,998 million (or €2.7 billion) (Shimano, 2016).

Shimano has a strong reputation for its brand worldwide, especially regarding cycling components. By December 2016, cycling components accounted for more than 80% of Shimano's total annual sales, while fishing tackle was around 19.6% and the rest was from rowing equipment. According to its balance statement, by the end of 2016, the majority of sales was generated from Asian (35%) and European markets (37%), followed by Japan (12%), North America (11%) and other markets (4%) (Shimano, 2016).

1.4. Description of global value chain member 3: Jagwire

Jagwire was founded in 1984 and is the market leader in control cables for bicycles. Its headquarter is based in Taiwan. The company is mainly involved in the production and sales of control mechanical cables in the bicycle industry. Its main products include cable kits, brake rotors, brake pads and bicycle accessories. According to the interviewee, by February 2017, the company has a European branch in Belgium (with a team of eight people), Taiwan (80 employees), China (three locations), an office in Vietnam, and a new office in the US. Its clients are bicycle manufacturers mainly based in Europe and China. Each branch has its own factory to serve the 'local' market. For example, the branch in Belgium serves the EU market, whilst the China branch serves the Chinese and other Asian markets. Within the European market, sales in Germany account for about 40% of the total sales, and in the Netherlands for 20-25%. The company has gained steady growth since 1998, with an annual growth rate of about 5%. In 2010, the European branch started adopting a more aggressive approach in the market, which enabled it to gain a higher stable growth rate of about 20% annually.

2. Internationalisation activities of the born global enterprise

2.1. Overview of the international activities of Frog Bikes

Frog Bikes started to internationalise just three months after its foundation in 2013. By the end of 2013, the company had already exported to 12 countries. From inception until February 2017, the company was actively involved in importing materials and components from 25 different countries and exporting to 35 countries worldwide. In addition, it has strong international collaboration with over 1,000 stores in different countries internationally, and works actively with a Chinese factory in manufacturing bicycles for Frog Bikes. Hence, internationalisation plays a very important role in maintaining Frog Bikes' sustainability.

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

The owner's motivation to export originates from the international market demand for the lightweight children bikes. Their original business plan was to focus on the UK market in the first year and launch their products to foreign markets in the second or third year after its foundation. However, Jerry identified a great opportunity to generate sales in the foreign markets when they were approached by some clients from Scandinavia (Denmark, Sweden, Finland, and Norway). This motivated them to change their business plan and start exporting immediately, because of the existing huge demand, which gave Frog Bikes more opportunities to approach customers. Opportunities in international markets were identified by their data from market research, their active involvement in tradeshow, international exhibitions, the sponsoring of Team Sky (a well-known international racing team), and networks in the cycling industry.

Their next market destinations were France and Germany because these are the growing markets in Europe, providing many opportunities to acquire potential clients. Then, the company targeted Australia, Asia and Africa. The diversification of the target markets aims to reduce the risks as well as to expand its brands and sales to a wider range of countries, especially after the post-Brexit referendum. By the end of 2016, Frog Bikes started to approach the US market where the scale of demand offered a major opportunity for the business to grow. However, this required a substantial commitment of resources and market research, to enable Frog Bikes to assess the viability of entering the US market. At the same time, the company had to consider adjusting the design of their lightweight bikes to match the technical requirements and regulations of the US products.

An overall motivation for Frog Bikes' exporting was to boost the firm's growth by expanding its sales networks into thousands of stores worldwide. Alongside this, the motive to import stemmed from the reputation of their brand to incorporate innovative materials from their suppliers in Japan and Taiwan, thereby contributing to the enhancement of their design and the quality of their products. The manufacturing of Frog Bikes is heavily dependent on their own factory in Wales and the factory in China which assembles all the components. As their factory was founded in August 2016, most of the existing production is still in collaboration with the factory in China at the time of drafting this case study (March 2017).

3. Global value chains of the born global

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

Frog Bikes is intensively engaged in global value chains because of its interdependency with both suppliers and clients from different countries worldwide. The company works with Team Sky, which engages in 20 to 30 international races, which helps to promote Frog Bikes in different countries. They also won a grant funded by a European scheme to support the construction of their new factory in Wales. This enabled Frog Bikes to enhance its capacity and flexibility in supplying its products to European markets and reduce its dependency on the manufacturer in the Far East.

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

Regarding the inward internationalisation process, Frog Bikes imports materials and components from 25 different countries. The biggest importer that works with Frog Bikes is the Shimano company, Japan: 70% of Frog Bikes' products have Shimano's components. Shimano has its own branches across Europe including the UK, which makes it easier for Frog Bikes to cooperate with them. Besides Shimano and Tektro, Frog Bikes deals with other suppliers who manufacture some of the 150 components that typically form a bike. Hence, except for Shimano, which significantly contributes to build up Frog Bikes' brand, the company is not heavily dependent on any other suppliers. They work with many multinational brands, which enable some flexibility in their supply chain. The company has two manufacturing arms, one in China and one in South Wales. The company pays a fee to the Chinese company to cover the cost of production and assembly.

The coordination and governance of the cooperation between Frog Bikes and its suppliers and partners are quite informal, mainly involving communication via emails, phone and skype meetings. They contact their suppliers weekly via phone and emails. Physical meetings take place more infrequently, for example in the framework of specific negotiations, company visits or tradeshows.

The nature of the relationship depends on which partner Frog Bikes is working with. For example, the relationship between Frog Bikes and Shimano is informal and not binding with any fixed contracts or tenure. The specific relationship only starts whenever Frog Bikes places an order to Shimano and pays 30 days before shipping. On the other hand, Tektro does not only supply components but also cooperates in designing the products. For example, Tektro and Frog Bikes co-designed a tailored made component for Frog Bikes' products.

At the same time, the governance and control of the relationship with its partners is mainly dependent on the size of the partner company. Large companies tend to be more dominant in the relationship, while smaller companies tend to be easier to work with, being more flexible in terms of payments and collaborate more closely in design and production.

Regarding outward internationalisation, Frog Bikes works with independent retailers in different countries. By following this strategy, Frog Bikes can have control of their brands and the stores that they want to collaborate with. The sales team of Frog Bikes identifies their retailers by examining a list of the best independent bicycle stores in their target markets based on their market research data and information from their networks. On some occasions, Frog Bikes has been contacted by international retailers with requests for details about their products. Frog Bikes does not have any distributors because they want to have autonomy and control on their offerings. Even though the company has an online sales channel, it discourages customers to buy online as it is essential for the children to try the product to select the most suitable one. Instead, all of the online orders will link to their nearest store or retailer. The products will then be shipped to the stores, using two logistics companies that are based in the EU, the Far East and the US. The governance issues between Frog Bikes and its retailers are very balanced and follow the 'good will' strategy. The retailers earn margin on their sales and collaborate well with Frog Bikes. By early 2017, about 70% of Frog's sales go through independent retailers across the globe, which contributes significantly to their turnover.

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

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

This section analyses the existing relationship between Frog Bikes and its global value chain partners: Tektro, Shimano and Jagwire.

Shimano was approached initially by Frog Bikes in 2013 because of their well-known brand and hi-tech involvement in manufacturing cycling components. As Shimano components play an important role in shaping the lightweight bikes, they are an irreplaceable supplier to Frog Bikes

Frog Bikes initiated the cooperation with Tektro in 2013. The supplier was identified because of its reputation in the bike industry globally. The main reason for Frog Bikes to establish this relationship was to have a supply of brakes for their manufacturing process. The cooperation is managed informally, mainly via skype, phone and emails. From Frog Bikes' side, the head of the purchasing team is responsible for contacting Tektro. On average, Frog Bikes places an order every month to Tektro and contacts them once a week to tighten the collaboration. The head of the purchasing team can speak Chinese fluently, which is a great advantage in developing and enhancing the relationship.

The cooperation between Frog Bikes and Jagwire was initiated in 2015 when Jagwire identified Frog Bikes as a potential client. At that time, Frog Bikes has already been known in international markets as a young successful start-up in the bike industry with lots of potential. Hence, Jagwire approached Frog Bikes to propose a business relationship by supplying cables, brakes and shifting. Jagwire is one of the many other suppliers of which cables and brakes contribute to manufacture Frog Bikes. However, because of their good collaboration, Frog Bikes would like to maintain and build a long term relationship with Jagwire.

In communicating with the above suppliers, Frog Bikes has taken advantage of ICT (that is, email, phone, skype calls) in all the discussions and meetings. In addition, social media is an important communication channel that Frog Bikes uses in maintaining its contact within its network in the bike industry.

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

Given that Frog Bikes aims to develop innovative products, Shimano and Tektro are Frog Bikes' most important suppliers of components. Shimano's products contribute to improving the image and quality of Frog Bikes, resulting in the design of the lightweight bikes. For example, every Frog hybrid bike comes with a Shimano Alivio Rapid fire 8-speed gear shifter. The Alivio shifter is much smoother and easier to operate in comparison to other brands, which are fitted to 90% of kids' bikes.

Similarly, Tektro plays an important role in providing brakes for Frog bikes. For example, Tektro's brakes are adjustable and of a very high quality, which enhances reputation and adds value to Frog Bikes. Another high-quality supplier, Jagwire, provides Frog Bikes with cables and small parts associated with those cables.

4.3. Governance issues and formalisation of the cooperation

Regarding Shimano, the cooperation is only formalised when Frog Bikes places purchasing orders. The relationship is dominated by Shimano because of its status in the industry combined with its significant contribution to the manufacture of Frog bikes. Since it is a large company, with many clients, it is not always easy for Frog Bikes to work with such a big player in the industry. The relationship between Shimano and its clients is mainly established via its foreign office based in Belgium and more than 40 intermediary [distributors](#) based in Europe, Asia, Africa and Middle East. As Shimano is influential in the industry who deals with a number of suppliers and retailers, they are often in a more favourable position in such cooperation. While Frog Bikes aims to establish a sustainable, long-term relationship because of their dependence on Shimano's components, there is no

formal commitment from Shimano in terms of something like a framework contract managing their relationship more generally, independent of specific orders. In other words the relationship is, essentially, a supplier-buyer one, based on individual purchasing orders. The communication is only established when there is an order from Frog Bikes, normally by email, online and discussions by phone or Skype. This is mainly because Frog Bikes' orders account for a very small part of Shimano's market share, whereas Shimano's main focus is on high end professional bikes in the industry.

The cooperation between Frog Bikes and Tektro is informal and mainly by telephone communication. The relationship is balanced between the two parties, based on a very strong collaboration and interaction. The purchasing team from Frog Bikes gets in touch with Tektro on a regular basis.

The cooperation between Frog Bikes and Jagwire is based on an equal relationship. The sales team from Jagwire Europe visits Frog Bikes twice a year and the partners often meet at bicycle shows. The cooperation is intended to be long term, hence it is not simply a supplier-buyer relationship but more mutually supportive, for example in enhancing the design of the components from Jagwire. However, the governance of the cooperation is informal because there are no binding contracts except for a price agreement with respect to each order that Frog Bikes places.

4.4. Evolution of the cooperation over time

The cooperation between Frog Bikes and Shimano has been working well since its establishment. Although there does not seem to be conflicts on any major issues, the relationship with Shimano does not appear to have been strengthened over time. Shimano was the first supplier that Frog Bikes approached because it plays a significant role in shaping the design of lightweight bikes for kids. Without Shimano, Frog Bikes would face direct competition in the market. In addition Frog Bikes gains customer satisfaction and product quality because of the cooperation with Shimano. Frog Bikes places an order regularly every two to three months with Shimano as it is more cost-effective to somewhat bundle their demand. However, despite of having been regular customers for several years, Frog Bikes does not receive any more beneficial treatment and still needs to follow a formal procedure when placing the order. For example, Frog Bikes has to pay 100% of the cost in advance and wait for about 100 days, including 60 days of manufacturing and 30 days for shipping.

The cooperation between Frog Bikes and Tektro has developed successfully since its establishment. Besides its supplier-buyer relationship, it also has the characteristics of a partnership because they have successfully collaborated in developing a new product together. Frog Bikes only needs to pay a deposit of 20% when placing the order and the rest is paid when it is shipped. Frog Bikes has a multifaceted agreement with Tektro including engaging in designing and manufacturing. For example, Tektro has made a product that was specifically designed for Frog Bikes and they obtained an IP agreement on this product.

The relationship between Frog Bikes and Jagwire is more recent than the other two examples (see above). There have not been any significant changes in the cooperation although there are plans to establish a long-term relationship. Communication with Jagwire is mainly via emails, skype or phone. There is no formal procedure of communication and Jagwire is ready to support Frog Bikes when needed, for example, if there are any problems in delivering the products, or technical issues.

4.5. Results of the international cooperation for the different enterprises

The cooperation with Shimano has significantly contributed to the innovative nature of Frog Bikes. The use of Shimano's components has helped to boost the sales of Frog Bikes in foreign markets in 40 countries. The company grew very quickly in the first year of foundation, entering 10 foreign markets. The reputation of the quality and brand name from Shimano and Tektro has contributed to raise the profile of Frog Bikes in the international market. In terms of employment, this cooperation has enabled Frog Bikes to recruit two additional sales representatives to be responsible for the international market, four people in Canada, 10 in the US, two people in Denmark, two in Norway, one in Sweden, five in France, four in Germany, one in Spain, five in the UK and one in the Far East. The cooperation with Shimano during the last four years has either directly or indirectly contributed to

the growth of Frog Bikes, whose total number of employees has increased from 15 to 48. However, in terms of knowledge and learning, Frog Bikes does not gain any benefit from Shimano because they do not have a chance to get involved in the production decisions. The other reason is that Shimano is such a large company; therefore, it is not easy to engage with them in design or production. They simply supply the components for manufacturing Frog Bikes' products.

Despite its significant impact on Frog Bikes, it is hard to observe any changes regarding Shimano's performance as the result of the cooperation. The main reason is that Shimano is such a big player in the cycling industry and has a great influence on many companies. The number of transactions with Frog Bike accounts for only a small part of their sales. In addition, their brand is very well-known, hence they are not open to learning, sharing knowledge or collaborating with Frog Bikes in the new product development process.

The situation is different with Tektro where the relationship has generated mutual benefits. Frog Bikes has gained from Tektro sharing their knowledge and technology, while collaborating in designing a special product for Frog Bikes. As a result, Frog Bikes now has an R&D team. Furthermore, the cooperation with Tektro has enabled Frog Bikes to gain credibility when launching a new product specifically produced for them by Tektro. This created the joint branding which includes both Tektro's and Frog Bikes' logos. This not only contributes to enhancing the sales for both companies but also to knowledge sharing between the two businesses during the new product development process. In addition, Tektro has gained knowledge from Frog's cooperation with Brunel University, particularly with regard to design processes. For example, Tektro has learned how to differently design bike components for kids and the company is now interested in focusing more on the kids market, something which it did not specifically manufacture for in the past.

The cooperation with Jagwire has brought about some benefits to Frog Bikes, particularly in Europe, where Frog Bikes can operate flexibly without having to carry large stocks. This is because Jagwire is able to make rapid changes in order to meet the needs of Frog. For example, it is much easier for Frog Bikes to work with Jagwire in the European branch and this saves administrative time and procedures compared with working with the Chinese or Taiwanese factories. All orders are shipped directly from Belgium, which is convenient in terms of shipping time and where regulations are less restrictive than in the case of Chinese or Taiwanese factories. Finally, Jagwire's well-known brands contribute to enhancing the quality and image of Frog Bikes. At the same time Jagwire appears to have benefitted from the cooperation with Frog Bikes in terms of research and design of components for the kids market. The cooperation with Frog Bikes has enabled Jagwire to explore this new market in Europe. The company has increased sales turnover by 5% when cooperating with Frog Bikes and 3% of production volume.

5. Main challenges to engage in international and international cooperation activities

5.1. External and internal-to-the company barriers

Frog Bikes' biggest internal challenges in managing their internationalisation are in relation to the utilisation of their resources to access the target destinations and exploit those markets.

One of these barriers is related to the lack of human capital with sufficient language skills to approach clients and access information in a variety of target markets. The language barrier and the lack of in-house language capacity are particularly relevant in relation to Frog Bikes' expansion into non-English speaking markets. In the same vein, Tektro and Jagwire are also concerned about the language skills of their human capital as this sometimes causes misunderstanding or slow responses to clients, which constrains their international activities.

Another potential obstacle for Frog Bikes is to find the right retailers to work with in different countries. For example, the firm encountered lots of difficulties in Russian and Polish markets. In Russia, Frog Bikes' main concerns relate to distribution issues and the extremely high import duties, difficulties that they experience despite of having a local team to support them to interact with the Russian sales representatives. In Poland, they found it difficult to find a Polish team capable of good English and able to support them to access the local market knowledge. It was extremely challenging for the company to connect with the 'right' local people (that is, potential Polish sales representative in the biking industry) who could actually help to solve the problems. As a reaction, Frog Bikes approached the Department for International Trade (DIT) office in the UK to receive help in expanding in Poland; however, nothing came out from this. As a result of this overall situation, the company has not been able to enter the Polish market despite the potential that it offers them.

This highlights two key issues. First of all, the lack of awareness of Frog Bikes on any public support scheme that could help it to access new markets. Secondly, the company's need to establish better relationships with well-known brand suppliers in order to enhance the reputation and quality of its products. This is an important reason for concern for the owner-manager, as it affects the sustainability of the business.

In the case of Jagwire, the company is concerned about the limited size of their warehouse, which constraints their ability to hold stocks to supply their customers. In addition, Jagwire has to deal with the tough competition from low cost manufacturers in the market.

The biggest external challenge that Frog Bikes encounters is the exchange rate. Most of their suppliers want to be paid in US dollars or Euros, which means that the depreciation of pound sterling has resulted in higher input costs. In addition, the Brexit vote has not only significantly devalued the pound sterling but also brought about a lot more uncertainty and concerns, as it is difficult to anticipate any changes in terms of trading agreement between the UK, the EU and other countries, which may result in different market trends.

Another barrier to exporting is related to the technical requirements in different countries. Whilst the UK and the EU share the same international standards (ISO), the US' technical standard is different, requiring much testing which is expensive. For instance, it costs USD 20,000 (equivalent to €18,300) to test a bike, which increases the total cost of production. Similarly, Australia/New Zealand require a slightly different standard, which put Frog Bikes through many tests to ensure their products match the technical requirements in those countries. As another example, the light standard in the bikes in France is different to the German standard, and there are not many light manufacturers who make products that are acceptable in both markets. Therefore, Frog Bikes has to design a product, which will be accepted in many markets, requiring a high level of collaboration to achieve a design that matches different standards. This increases the burden on Frog Bikes in terms of time and cost.

Another specific issue that concerns Frog Bikes' founder is the maintenance of a good relationship with Shimano. Shimano could potentially develop some products specifically for Frog Bikes, which is important because it would increase the competitiveness of Frog's products in international markets.

At the same time, there is a problem in the relationship with Shimano related to advance payments for each order, particularly when the 100 day gap for production and shipping makes it hard for a small company like Frog Bikes to manage its cash flow.

5.2. Solutions adopted by the companies to solve these challenges

Regarding the challenge of access to human capital, Frog Bikes has recruited some international staff to manage their international sales teams. For example, as of February 2017, Frog Bikes were looking for Italian and French native speakers to help them access these two markets. According to the CEO, it is essential to have native speakers to drive in their new markets and to build international sale teams in those countries. It contributes to improving trust with clients in foreign countries and gives them greater opportunities to approach potential clients.

Similarly, Jagwire has a strategy of recruiting different native speakers to their international team to communicate in different languages. This has been a very effective tool for the company to enter foreign markets.

With regard to the fluctuating exchange rates, Frog Bikes' response is to hedge their foreign exchange in order to eliminate risks associated with global transactions. Additionally, the company intends to sell more bikes in the countries where the Euro and the US dollar are important. The use of 'strong currencies' helps to minimise the risk from foreign exchange rate fluctuations. To deal with the uncertainty in the business environment such as the effect of the Brexit vote, or the new presidency in the US, Frog Bikes has decided to increase their prices in order to cover the risks and is aiming to diversify their destination markets. This will minimise the financial risks which are out of the firm's control.

As a reaction to the issues related to the different ISO standards, Frog Bikes aims to manufacture the products which meet the most common standards and then adapt them to different markets if required. Similarly, Tektro mainly bases their product design on European and US standards as these cover their main markets and represent the major trends in a number of countries.

Regarding the challenge of advance payment, Frog Bikes' solution is to find a way to improve the relationship with their partners and also the banks in order to get a better rate. For example, Frog Bikes does not have to pay a deposit to its supplier, Kenda, before the shipment of their order. Another example is the case of Tektro, to whom Frog Bikes only has to pay 20% of the total value of their order for deposit. Their good relationship with the HSBC bank was significant to the operations of the company, supported Frog Bikes in covering the advance payments, and enabled the company to have greater flexibility with their cash flow. The other method is to have insurance on their advance payments, to avoid the risk of late payment from the clients.

Tektro uses an insurance company to cover the risks of late payment from clients. As in the case of Frog Bikes, the solution is to improve the communication skills of their staff to deal with clients. Sometimes, there are problems because of the conflicts between the clients' requests and the company's opinion from the perspective of a manufacturer. Hence, the solution is only reached by negotiating with clients.

Considering the challenges of tough competition from low cost manufacturers, Jagwire aims to focus on the quality of their products and services to win customers. In addition, the company tries to keep prices stable and avoid short notice changes in the terms with their clients. The company also keeps sufficient stocks of products to provide to their clients in case of urgency. This enables their clients to have maximum flexibility and to meet any quick amendments of orders. In order to increase their efficiency, Jagwire plans to expand their warehouse to increase their capacity.

6. External support to internationalisation and international cooperation

6.1. Main identified needs for external support

According to Frog Bikes, their main needs for external support are related to their access to new markets and include access to human resources in order to meet the demands for international sales. As Frog Bikes is growing, it is essential that they increase sales by entering new markets and identifying new clients. However, this takes considerable resources as well as time for the company to work out how to go about this without external support. In addition, the founder also emphasised the need to have an initiative that supports the costs of recycling their packages, which helps to relieve the company's burden and foster the growth of their green business. This would consequently contribute to enhance Frog Bikes' image and sustainability in the international market.

Similarly, Jagwire and Tektro also aim to enter more markets and expand their international activities abroad, even though the companies are currently large. Their main needs are to have tax relief to support their internationalisation.

6.2. Use of external support

Frog Bikes has benefited from a Welsh support scheme to build their new factory in Wales. In the deal that Frog Bikes negotiated, they are obliged to generate at least 30 new jobs in the local area in the next three years after its factory's foundation as a criterion to have Welsh support to build the new factory (Wales Online, 2016). The new factory started to operate in August 2016. In addition, the company is also applying for support for R&D from the EU scheme, such as the 'Growth and Prosperity', and an award from the Welsh Assembly for GBP 25,000 (€30,000) to employ eight more staff. Frog Bikes also gains benefits in terms of R&D and patenting from the UK government. For example, the company receives a tax incentive when they sell a Frog bike which includes a patented component in the market.

In the same vein, Tektro also obtained government support when they started to expand their markets with access to finance to open up a distribution centre in Portugal. Like Tektro, Jagwire was also sponsored by the Belgian government to attend some international trade shows in places such as Germany and Asia.

6.3. Assessment of this external policy support

According to Frog Bikes' founder, the government funded scheme to build the new factory in South Wales has significantly contributed to enhancing the internationalisation of the company. The company will receive cash back of GBP 100,000 (equivalent to €114,000) over the next two years, if they can guarantee to employ 28 people in two years (as a criterion to get the refund). The main strengths of this support are not only cash back, but also consultancy from a professional team to support and follow up with Frog Bikes. The UK government's support in terms of patenting and R&D also brought a lot of benefits to the company in terms of tax.

The company did not gain any further support, for example, in access to information on the target markets, finding international partners, or approaching potential clients in the foreign markets.

Recycling is another issue that is expensive to Frog in terms of both time and money, as they needed to rely on a third company for those functions. This area is largely missing from current government support, especially for SMEs.

Furthermore, according to Frog Bikes' founder, SMEs are typically not aware of existing public support schemes because of limited information and a lack of promotion on the different types of support available from the government. One of the main reasons is related to the time- and cost-intensive processes to seek for external support from the government, whereby the company would need to invest lots of time and resources in preparing for the application process with very low or

unknown chances of success. Finally, the owner-manager emphasised that even though financial support brings lots of value to small firms, Frog Bikes is not aware of many financial support especially to manufacturing firms, because of the lack of tailored public support addressing to specific needs of small firms in separate sector..

Both Tektro and Jagwire have taken advantage of public schemes relating to the promotion of their activities abroad such when they are entering new markets and/or attending trade shows. At the same time, neither Tektro nor Jagwire rely much on public sector support because of their utilisation of their own resources and global value chain partners instead. However, both companies are keen on having further support in terms of tax incentives to support their internationalisation.

7. Concluding remarks

7.1. Future plans regarding internationalisation and international cooperation

Frog Bikes plans to enter more new markets to enhance international sales. The new destinations include the US market and a number of European countries because of their huge opportunity. The company would also like to move all of its production to their newly built factory in Wales, to reduce shipping and transaction costs. From a research point of view, the company plans to build an international R&D team to extend the new product development process to meet the requirements of different markets. In addition, Frog Bikes will approach external agents and public organisations, such as the Welsh Assembly, to ask for support services for the development of their international business activities and advice on how to enhance the performance of their factory in Wales.

Frog Bikes will continue to collaborate with Shimano, Tektro and Jagwire because they significantly contribute to shape Frog Bikes' products and ensure a high quality that meets customer needs and gives them a unique competitive advantage over other bike manufactures in the industry. Frog Bikes, hence, will tighten the existing collaboration with its partners and suppliers in order to enhance the new product development and its brand reputation in the international market. Frog Bikes also plans to recruit an additional international sales team, who will support him to enter different markets, such as Russia, Poland, Germany and France.

Jagwire plans to follow the organic growth principle, which enables it to grow gradually and establish additional international collaboration. Jagwire will continue to tighten the relationship with Frog Bikes and will support them when needed with their best services. Similarly, Tektro will focus on diversifying its market destinations and aims for mass production. Tektro will also collaborate with Frog Bikes and support them in their product development to realise mutual benefit between the two parties.

7.2. Conclusions and lessons learned

The international activities of Frog Bikes and its engagement in global value chains have provided a snap shot of the internationalisation of a successful British born global. The case study has demonstrated how a born global developed their internationalisation successfully from inception and how the company has built its international networks to expand sales in foreign markets. The study also reflects the challenges that the firm encountered and how they overcame such barriers. Frog Bikes, as a small start-up, provides a perfect example of how a company responds to challenges and how they managed their international relationships with suppliers, which are big groups and well established in the world market such as Shimano and Tektro.

There are some lessons learned from the case study:

From the perspective of a start-up such as Frog Bikes, it is essential to emphasise their 'innovation mind-set' and 'international orientation', which contributed to their product success. The recruitment of the international sales team and R&D are potential determinants to raise the brand image and reputation of the company. It has helped to enhance international sales and expanded the firm's networks, especially via independent stores. The sponsoring of Team Sky also contributed to raise awareness about Frog Bikes in the world market and enhanced its reputation and trust amongst its international partners and suppliers.

Secondly, the international experience of the owner-manager is another strength, which enabled the firm to manage the difficult relationship with Shimano, a big player in the industry. As a small company, Frog Bikes is in a more difficult position to negotiate and manage the relationship dominated by Shimano. This requires the firm to be flexible and focus on trust building with Shimano. In addition, the collaboration with Tektro in product development also provided Frog Bikes with new knowledge that can be used to improve their products' design and performance and enabled it to expand its networks, resources and research capabilities.

The challenges that Frog Bikes encountered are also different from those mentioned by Tektro and Jagwire. Frog Bikes is more concerned about financial issues, such as cash flow, late payment and the capacity to enter new markets. On the other hand, big companies such as Tektro and Jagwire are more likely to deal with other problems such as the competition from low cost manufacturers.

Despite their different sizes, all companies in the value chain perceive that they do not really obtain support from public policy mainly because they are not aware of the existing support, or the time-consuming administrative work involved in the application processes. Tektro and Jagwire did not take much advantage of public support but rely more on their own resources because they have established themselves as well-known brands in the industry.

Similarly, Frog Bikes did not receive substantial support when it approached the UK Department for International Trade for help to access to their new target markets such as Poland and the US. However, the grant provided by the Welsh government has brought about significant value to the company because it enabled Frog Bikes to build its own factory. This has resulted in less dependence on the contracted factory in China, which used to assemble all components of the bikes for the company.

Another main lesson is that it is essential to build international relationships based on mutual understanding and trust. Regular communication and the exchange of ideas are important to enhance the relationship between those parties. This is the key to enable Frog Bikes to develop and sustain in the international market. This is also the same lessons learned from Tektro and Jagwire in their internationalisation management.

To sum up, the case study of Frog Bikes and its global value chains has exemplified the procedure of how a born global manages its international activities, and how the company deals with the challenges, as well as the kind of support needed during its journey. The different reflections from the perspective of a born global and more established, larger companies have provided valuable lessons on international supply chain value management, especially in the manufacturing industry.

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