As a start-up you have no real value. You have to convince people. In order to do that, you have to build up lots of evidence through winning competitions and generating press attention, to build up credibility through different sources. This is very difficult to do if you don’t have any protection, because once disclosed, you are unable to get a patent.

Peter Brewin, Concrete Canvas, 2013
Abstract

In this chapter, which comprises a series of eight product innovation case studies, compares the approaches of various designer-inventors to managing IP. The case studies range from music instruments to healthcare products. The chapter examines the inventors’ perceptions of the significance of IP in conjunction with other key business development factors. This discussion of the conditions within which design-led start-ups develop, is followed by an in-depth analysis of the key business development attributes including IP such as patents, design rights, and trade marks, as well as finance, complementary assets, and market-related factors.

This generates an understanding for the development principles behind the individual start-ups, which are analysed in comparison to each other, and in consideration of the degree to which the businesses have grown in terms of value. The chapter culminates in the development of a reference framework.

Following on from Artica, this chapter examines seven other design-led start-up businesses of slightly varying nature in order to carry out a comparative analysis of what key issues design-led start-ups are faced with, and how they tackle these challenges. Although each of these ventures is closely linked to postgraduate studies conducted at the Royal College of Art (RCA), and that most of the designer-entrepreneurs involved have participated in a business incubation scheme (Fig. 2.1), either as part of the Design London incubator, or the InnovationRCA incubation scheme, the experience gained varies significantly between the designer-entrepreneurs involved. Some made full use of mentoring and funding, whilst others took advantage of office space only. Concrete Canvas, the oldest venture under examination, preceded both incubation schemes. Here the founders made use of advice and access to premises only. Other variations were due to the stages at which the incubator scheme was at different times. In the beginning, when it was named Design London, applicants could apply as individuals; however, later they needed to apply as interdisciplinary teams. The incubator management underwent staffing changes over the years. Design London was set up in 2007 and became InnovationRCA in 2011. It then moved from Imperial College to the Battersea site of the Royal College of Art. Despite the diversity of design business cases, there has been a growing suspicion that the entrepreneurs’ choices of IP may be affected by the way in which the incubator is managed, and by the guidance provided. Even sponsorship may have influenced the priorities at times. Design London was funded by the National Endowment for Science, Technologies and the Arts (NESTA) and the Higher Education Funding Council (HEFCE), and InnovationRCA receives sponsorship from Dyson. To verify the degree to which design-led businesses have been influenced through the incubation process, three case studies that did not go through an incubation scheme can be found in Chaps. 4–6: Haberman Associates; Magmatic; and Sebastian Conran Associates. These three are mature businesses, the study of which allowed for longitudinal insights (Fig. 2.2) into the modus operandi of a design-led start-up business.
In conjunction with the incubator case studies, semi-structured interviews were held—mostly in person—over the period of 30–90 min. In line with Grounded Theory principles, initial questions were broad and open, and subsequently became progressively focused. Emphasis was placed on the phenomenon of design-led start-up successes and failures, with a view on how IP was managed. Notes were taken, interviews were recorded and transcribed upon completion of each interview. Where geographical distance and time pressures did not allow for physical meetings, conversations were conducted via phone or Skype. Speaking to interviewees in person was important to be able to react to their answers to open questions, and deepen the conversations. Although the initial conversations were largely led by the interviewees to allow them to ‘encourage unanticipated statements and stories’ (Charmaz 2014, p. 65) was prepared a priori, and used to verify that a consistent set of data was collected. Charmaz refers to this as an interview guide (2014, p. 62ff).

Most designer-entrepreneurs affiliated with either of the two incubators were interviewed two or three times, which provided an opportunity to discuss insights and hypotheses, but also to critically verify data obtained through secondary sources such as news feeds and articles. Expert interviews were carried out with business coaches, incubator managers, lawyers, and investors (angel investors and venture capitalists) to critically review the views and assumptions shared by the designer-entrepreneurs.
As pointed out above, this series of incubator case studies is complemented by case studies with established designer-inventors (Chaps. 4–6). The approach to these case studies differed ever so slightly. This round of interviews conducted in conjunction with longitudinal case studies helped to extend the scope of the inquiry beyond the Design London/InnovationRCA incubator, so that the incubator settings can be taken into account as a possibly influencing factor in the development of start-ups. How the different stages of data collection connected in terms of time frames, can be seen in Fig. 2.3.

2.1 Design London/InnovationRCA

The first incubator projects such as RoboFold did not need to apply as an interdisciplinary start-up team. This requirement was introduced in 2008. The SafeView project outlined in the introduction of this study was pitched in 2009. It made it into the second round of the competitive selection process, but failed to enter the boot camp, which constituted the final stage of the selection process at Design London. The case studies in this chapter were guided by the underlying question what concerns designer-entrepreneurs entertain at the outset of their start-up business development. The order in which the cases are presented in this chapter, reflects the chronology of interviews.
The incubator case studies was interrupted by a one-year intermission due to an engagement in a design right infringement investigation which was commissioned by the UK IPO. Some of the insights gained during this project which comprised a quantitative survey are discussed in this book. However, since this investigation focused on design rights in the UK only, no chapter has been dedicated to these findings.

### 2.1.1 Cupris

**Business Proposition and History**

Cupris was founded in 2011. This initiative began as a multi-disciplinary collaboration between Paul Thomas, who has a degree in Engineering and Product Design, and his business partner Julian Hamann, an ENT (Ear Nose and Throat) surgeon. The initial idea came from Hamann, who detected deficiencies in the way in which ENT cases were handled in the UK. This meant that there was a perceived market need that motivated this development.

The aim behind Cupris was to develop mobile diagnostic equipment (Fig. 2.4), software and services involving the patient in the diagnostic process. The ambition was to streamline the delivery of healthcare at a reduced cost in the UK. The company’s launch product was a smartphone-enabled otoscope that allowed for general practitioners to conduct the diagnosis and to consult with the ENT specialist remotely. GPs and patients were to take images on their smartphone and to upload

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**Fig. 2.4** Otoscope by Cupris first and latest version, TYM 2.0 [reproduced with permission]
them to a database. They were then to be given questionnaires which help the ENT specialist to analyse the patient’s problems remotely. Transfers to hospitals and specialist doctors could thus become unnecessary.

Cupris entered the InnovationRCA incubator in 2012. In the same year, an investment offer was considered, but rejected due to the fact that the investor requested a majority stake. Despite the prospective investor’s experience in medical innovations, the founders decided against the investment and support, relying instead on the funds and support obtained upon entry to the incubator. In 2014 two new members joined the team, a business development manager and a programmer. The latter two were recruited to the team to pursue the development of a platform which was to connect patients to medical advisors. This platform was intended to be an additional asset to complement the physical product. In 2014 the team had begun to run free trials in university hospitals. The purpose of this was two-fold: to obtain useful insights through customer-feedback in order to optimise the product and the system around it, and to build a customer-base for potential future sales.

IP Held, Problems and Benefits
The founders filed the first patent in 2011, almost a year prior to entering the incubator. At the time, little consideration was given to the brand name and the logo. The trade mark was initially unregistered. It was later changed, and the new version was registered in June 2016 as an image. The name Cupris was registered in May 2016. Filing a design patent or a registered design for the design of the product was not an option because the physical shape remained subject to development throughout the first couple of years. The form of the product was seen as secondary, since the focus was on the overall concept as well as the function and on the implementation of the technology. A competing innovation was detected in the US in 2012. Instead of filing for PCT, the founders filed their first patent only in the UK, and a second one in 2014. The competing innovation could be successfully challenged.

Analysis
Although the first patent was filed pre-maturely, patent searches led to insights related to overseas competition, and allowed for an informed strategic response. Paul Thomas was a serial entrepreneur. Despite his experience with earlier ventures, risks and anxieties persisted. £10 K were set aside for defending IPRs in court if needed.

Having a patent application on file, helped to secure a place on the incubator scheme and it enhanced bargaining power. As the twelve-month post-filing period had not elapsed when the team entered the InnovationRCA Incubator, Cupris could make use of the incubator’s consultancy service in order to decide whether or not to take their first patent global, or to extend its scope through withdrawing and re-filing the patent. If patents are filed prematurely, inventors have 12 months to consider withdrawing and refining the patent application. This will reset the filing date potentially extending the period of exclusivity. However, it comes at the risk that a third party files a competing patent application in the meantime.

The team behind Cupris chose to limit the scope of their first patent to the UK thereby saving costs, and to file a second patent two years after the first. Both
patents were filed within the UK only. Cupris was motivated by a perceived market-need involving technology-development, platform development and concept design. Trials conducted within academia were hoped to build a potential customer-base and to further develop the product through participatory design research. This was aimed at generating demand within their future target market. Cupris combined service design aspects with the product development. The focus on patenting was comparatively strong, although the entrepreneurs’ confidence in the IP was limited. Design registrations remained ignored, partly due to the lack in suitability. Informal IP was given little significance, although secrecy was used where possible.

Long-Term View
Following several years of development, Paul Thomas reported in 2018 that Cupris had secured additional funding after exiting InnovationRCA. This included a grant from UK’s Technology Strategy Board (TSB, later known as Innovate UK) and a grant of nearly £1 m from the UK National Health Service (NHS). This allowed for significant team growth. A CEO (Chief Executive Officer) was recruited from Imperial College Business School, and a CTO (Chief Technology Officer) joined the team. But employing eight people proved too costly in the long run, and faced with tough competition in the healthcare service sector, the founders saw themselves forced to cut back after three years. The service design element including the platform development had to be de-emphasised, and the company shifted their focus back to the product. Only the two founders remained involved, with neither drawing a salary. Julian Hamann had continued his work as a surgeon, and Paul Thomas had started a design consultancy to make a living. The investors had retained their stakes, and a round of crowd-funding in 2017 helped to secure and additional £500 K allowing the founders to keep the business afloat. By 2018 the cumulative funding was estimated to be in the region of £2 m.

The patents which Cupris had filed in the UK helped to fend off a competitor who sought to secure a competing European patent. Despite this, Paul Thomas explained that the main benefit of the patent lay in attracting investors. The product revision, which involved adding a bespoke camera and lights to the otoscope, rendered the existing patent largely obsolete. Product adjustments are needed none-the-least because the smart phone technology is constantly evolving. Sales figures had remained modest, and in 2018 Cupris was looking abroad hoping to tap into new markets.

The biggest difficulty when spoken to in 2018, was to find a new CEO with business managerial experience. Despite having been involved in a start-up for well over half a decade, the managerial skillset and mindset had remained a challenge for the two founders. So did quality manufacturing. Whilst Cupris sought to expand the product portfolio by adding a thermoscope, an endoscope and a dermatoscope to their offering, producing and trading the redesign of the original product had been far from easy, and securing a profitable distribution network remained the priority.

In 2018 Paul Thomas expressed a degree of regret about engaging in the service-and platform development, a very resource-intense endeavour. Cupris engaged third
parties for preparing and filing grant applications. This helped to sustain focus on product development and operations. Despite their troubles, the founders have managed to retain a large proportion of the shares, combined around 40%. The rest was given to investors in exchange of funding.

Review
This case points at possible benefits related to the re-filing of a patent. What can be learned from Cupris is that an early patent application can help to secure seed funding and a place on a business incubation scheme, and the second to articulate the technology in better detail. Unless withdrawn, the first patent provides the venture with a priority date. Although it can be withdrawn and re-filed, within the first twelve months, this would set the priority date back to the second filing date. Whilst this extends the patent’s maximum lifespan by up to a year and it allows for the inclusion of additional details and patent claims, there is a risk lying in the fact that a third party may file a competing patent prior to the re-filing date, thus securing priority. Knowledge of a potentially competing innovation discouraged Cupris from pursuing the process of withdrawal and re-filing. Instead a follow-up patent was filed to increase the chances to secure exclusivity within the UK. However, it is important to note that the first patent can undermine the second. There needs to be a sufficient degree of novelty involved in the second by comparison to the first patent.

It is no secret that focus group feedback and early customer trials can help to align the innovation development with the expectations and preferences of the target audience, in this case future medical practitioners. But the process can be disruptive to the start-up development. The Cupris case suggests that facilitating co-creative research and developing a service element may be very resource intense.

Payroll tends to be a large cost factor. Without sufficient revenues, it maybe prudent to keep the team size small, and to outsource certain developments. Although tech companies are often expected to invest revenues in growth rather than generating profits, growing sales can be more important than growing the team.

2.1.2 Seaboard

Business Proposition and History
Roland Lamb, a jazz musician who converted to product design upon enrolling for an MA with the RCA in 2008, invented the SEA interface (Sensory, Elastic and Adaptive). This touch sensory system that can be moulded into various shapes,
enables the seamless transition between discrete and continuous input. It is capable of capturing three-dimensional gestures and gives the user a tactile feedback. Lamb progressed to a project-based Ph.D. and with his studies still underway, he entered the Design London Incubator in early 2011. His start-up was built around the Seaboard, a new musical instrument based on the design of a piano keyboard. The Seaboard’s patented concept enables performers, composers and producers to exert real-time control of all the major characteristics of sound. Rather than simply hitting a key with the finger, the pressure can be altered in terms of location and intensity. The pitch can thus shift seamlessly between notes. Volume and timbre can also be varied. Lamb spearheaded the product development from the start as CEO of Roli Labs. Having stated that payroll can be financially compromising, if not to say risky, Roli Labs (later to become Roli) had no less than 20 employees by January 2013. How could Roland Lamb afford this? Roli’s newsletters in 2013 and 2014 made it clear that the first product, the Seaboard GRAND Limited First Edition (Fig. 2.5), had not sold out within the first year or two of trading. It became available for pre-order in 2013, and was still offered for purchase in 2015. Considering the price of US$8888.88 and the fact that less than 88 products were sold, one can deduct that a turnover of US$1 million had not been reached by the end of 2015.

A document published online on 30 August 2012 (acquired by The National Archive on 02/01/2013) revealed that Lamb sought to raise £300,000 worth of equity funding whilst predicting rapid growth and promising ‘strong returns either through a major refinancing in 18–24 months or at exit through a flotation or sale to a major music industry leader in four-to-six years’ (The National Archives 2013). Although sales may have developed rather slowly in the beginning, Lamb was extremely successful in fundraising.

He was thought to have raised around TSB grants (UK Technology Strategy Board) totalling around £500,000 during the early stages of the business development. Like Design London incubation offers, TSB grants were handed out for developments related to patentable or patent-pending inventions. TSB also required a degree of match-funding. However, investments raised upon entry into the
incubator, as well as in-kind time-commitments could be factored in to satisfy TSB’s grant requirements.

Whilst Roland Lamb carried on intensively promoting his invention through PR, his success streak did not end. In 2014 US-based online publisher TechCrunch reported that Roli had ‘acquired JUCE, a long-time C++ framework which has, over the last few years, come to be used by most of the leading audio companies’. Julian Storer, who founded the firm that developed Juce, joined Roland Lamb’s firm. The acquisition followed a $12.8 m (£8.8 million) investment, which Roli had secured earlier that year (Business Insider UK 2016), and a second series A investment round allowed Roli to raise an additional $3.7 m. It is likely that the acquisition of Juce could not have happened without the investments. However, investment rounds can be pursued with an acquisition in mind. As much as Roland Lamb could use equity investment as match-funding in pursuit of TSB grants, he may have acquired this series A investment on the condition that he would acquire Juce and thus enhance the company value. In May 2016 TechCrunch reported that Roli had raised an additional $27 m (£18.6 m) of VC (venture capital) investment in a series B funding round (TechCrunch 2016). By then the company had not only expanded to the US, the Seaboard had been introduced to 15 countries in total. In October 2017, TechCrunch reported that rap musician Pharrell Williams was amongst the Roli investors and took on a role as Chief Creative Officer (TechCrunch 2017). The cumulative funding secured, is stated by TechCrunch as $50 m in 2017, and this suggests that the non-equity and debt finance that was secured in addition to the series A and series B investments mentioned above listed by TechCrunch amounted to at least $5 m. In the process of the series B investment round, the company was estimated at a value of £60 million ($80 million) (TechCrunch 2017). It is important to point out that Roli acquired not only Juce, in 2015 the company took over Blend, an Open Collaboration Network for music creators, and the year after Roli acquired FXpansion, a developer of instruments and effects for software platforms. Both companies were small firms, the acquisition of which nonetheless tightened Roli’s appropriability regime.

**IP Held and Problems and Benefits**

Lamb confirmed that he “found it very difficult to bear the costs of early patents” (Lamb 2013). Nonetheless he managed to file his first patent within about six months of conceiving the idea. For Lamb a patent was not only a way to secure exclusive access to the technology, it was also a way to underline the fact that he is fully committed to the project and willing to sustain his commitment long-term. This is thought to have helped to attract the interest of investors and collaborators. Lamb admitted that a patent was “not always enforceable but this statement of commitment [was] relevant” (Lamb 2013). Rather than focusing on funding alone, it is worth contemplating what the funds that are sought are to be used for, and how they benefit the business.

Unlike most other designer-entrepreneurs who joined Design London, Roland Lamb managed to keep all the equity during the inception period. The seed funds obtained in conjunction with the Design London incubator scheme allowed him to
pay his start-up team, mostly freelancers, instead of shredding equity at the outset. Business partners were carefully chosen, and shares in equity have been reserved for investors.

With a comparably simple first patent (European Patent, Fig. 2.6a) that was filed in 2009 (followed by a PCT filing in 2010), Roland Lamb filed a second patent, a UK patent, in 2013. The latter was significantly more sophisticated (Fig. 2.6b). Ongoing product developments appear to have led to technological insights which could be harnessed through this follow-up patent. The acquisition of other music businesses led to additional inventive steps and a further expansion of the IP portfolio.

The shape of the Seaboard surface was registered as a design with the Office for Harmonization of the Internal Markets (OHIM, now known as EU IPO) in 2011. The design registration dates two years after the filing of the patent (see Appendix B). Thus Lamb made sure that the registration would be filed no more than one year after the patent was published, and also no less importantly, one year after the design was disclosed to the public during the RCA degree show. This meant that the one-year grace period for designs in the UK and in Europe was used fully. Through delaying the design registration to the maximum degree possible, Lamb maximised the possible lifespan of his registered design.

**Fig. 2.6** Cover pages of patent applications
Trade marks can be secured for names and shapes of names or logos. The word Seaboard has been registered as a US trade mark (see Appendix B). Securing the trade mark as a word as opposed to a shape allows flexibility in terms of the design. It has significantly greater scope. For single-product companies (as opposed to spinouts and established firms), the brand value is typically attached to the product rather than the inventor or the inventing firm. The name of Roland Lamb’s company changed numerous times during the early stages of the PR campaign. It changed from Lambde to Sea Labs to Roli Labs to We are Roli to Roli Ltd. Until the venture is known within the target market, company name changes seem less important provided that the product name differs from the company name. With start-ups the focus of attention is usually directed to the product, not to the inventing firm. The word Seaboard remained unchanged.

Analysis
A patent helps the designer-inventor build confidence, which is beneficial when pitching for funds, or when negotiating equity shares, even though the patent on its own is unlikely to convince an investor. For Lamb the patent was vital to secure exclusivity on the market. He rejected offers from the industry to license the invention, instead he chose to market directly to customers and distributors. The US constitutes one of the largest markets. Therefore Lamb filed a patent for the US in addition to the European patent. Not only distribution and sales, production was also integrated to secure independence and to increase the profitability. Lamb claimed that ‘The Seaboard has cost parity with other keyboard devices but can be priced above them, meaning healthy margins.’ (The National Archives 2013) To

![Seaboard product range](image)

**Fig. 2.7** Seaboard product range with the Block Studio Edition at the bottom, a modular system, that allows to extend the range of keys and to attach effects modules.
test the market, a limited edition of 88 products was launched, in reference to the 88 keys of a grand piano, along with standard versions of the Seaboard which were smaller and cheaper. Several years later the Seaboard Grand made way for a collection of products (Fig. 2.7) including hard and software products, Seaboards of varying sizes, as well as accessories.

**Review**

In reference to the incubation period, Lamb explained that “…through the process [he] learned a lot about IP, and about product design and about the relationship between IP, product design and entrepreneurship. So those things have all come together” (Lamb 2013). Roland Lamb readily adopted the role of CEO. He appeared to have acquired the knowledge and expertise needed to fulfil this role.

At the time of the interview in 2013, Roland Lamb had only two patents pending, which, like Cupris, were complementary patents. However, Lamb secured the possibility to expand his patent portfolio internationally, with the US as a key target market. Inventions incepted by designer-entrepreneurs who are not experienced engineers, are likely to be in need of much development. Therefore the initial patent may be comparatively generic with potential weaknesses. Provided that sufficient novelty can be attached to a complementary follow-up patent, a first patent can be used to attract investors and grants, and to secure the sums needed to further develop technologies.

Noteworthy is the fact that Roland Lamb filed the patents as a person, not as a company. This means that the initial patents are tied to him rather than the company. Even if the company is granted an exclusive unlimited license, this can be a way for an inventor to secure one’s stakes in a company, because the latter is intrinsically dependent on the inventor. Although Roland Lamb’s second patent lists a co-inventor, this too is tied exclusively to him as a person which means that he is the sole owner. There can be responsibilities attached to patent ownership such as the responsibility to fund the litigation of infringement. However, this risk can be mitigated or fully waved as part of the license agreement. Another draw-back in conjunction with filing patents as a person is that investors and strategic partners may shy away from engaging with the company. Like most other inventors featured in this book, Roland Lamb engaged a law firm for filing his patents. This is why he may have struggled with the costs which typically amount to a four-digit sum. Although one can file directly without engaging an attorney, this is normally not recommended, because the way in which a patent is written, and the way in which patent claims are laid out is important for the scope and validity of a patent.

Initially Roland Lamb’s investments in IPR were limited to the most essential, but he timed the filings to perfection. It is important to note that academic degree shows are a form of public exposure, and rights to the
designs need to be acquired in due time to prevent their possible invalidation. Grace periods apply in some jurisdictions, but not in others. Focusing on the most essential forms of IP (technology patent, trade mark, design right), allowed Roland Lamb to integrate production without relying (too much) on external suppliers. In 2013, the Seaboard was said to be manufactured mostly in-house (Lamb 2013).

The acquisition of a software firm and other start-ups significantly increased the level of independence and it tightened the appropriability regime around the firm. A few strategic steps which went hand-in-hand with successful fund-raising efforts and three acquisition of small firms. This facilitated business growth and helped to establish Roli as a very promising newcomer in the sector of musical instruments.

2.1.3 KwickScreen

Business Proposition and History
KwickScreen is a portable retractable room divider, originally designed to prevent germs from spreading across hospital wards (Fig. 2.8). Later the divider screen, which uses a special patented material along the top and bottom edges for stability, was marketed as a product to increase the patients’ privacy and comfort. The product was invented by Michael Korn, who graduated with MA at the RCA in 2007 and filed a patent for his invention the year after. KwickScreen launched its product in 2010 and joined the Design London incubator in January 2011. In 2007 Korn was joined by Denis Anscomb, who holds a degree in Mathematics, and had worked as a finance director prior to joining KwickScreen.

KwickScreen grew without the need for equity funding. In 2012 the two founders had four people working for them. The technology development was initially part-funded by the NHS who had ‘a pot of money that was for products that were looking at infection isolation.’ (Anscomb 2013) Instead of concentrating on equity investment, KwickScreen focused on manufacturing and sales. Steady business growth indicated the gradual success of the business. Having received revenues of around £100 K in their first year of trading (2010), KwickScreen reached a turnover of just under £1 million in 2013.

IP Held and Problems and Benefits
Korn stated that “Having a patent has been crucial. Where we needed to engage manufacturers, and get them to invest their time and effort in making a product, they needed to know that this was not a product that somebody else could then make and copy.” (Korn 2011).
Anscomb expressed a slightly different position about the value of the patent than his business partner—although Korn’s public praise of the patent value may also be a defensive PR message rather than a genuine reflection of his opinion. According to Denis Anscomb, “It is not only the cost of the patent, it is the cost of defending the patent, that makes it ridiculous to think, it would ever stop anyone from copying”. (Anscomb 2013) During the first few years KwickScreen benefited from the strategic relations with a larger company, after securing the exclusive use of Rollotube, the material needed to build the product. Although KwickScreen registered a design and a trade mark in addition to their patent, Anscomb highlights the fact that “All the other intellectual property that we would put around KwickScreen is kind of insignificant compared to the fact that we have an exclusive worldwide license to use this [material] for screens…” (Anscomb 2013) Like Roli, the team behind KwickScreen secured their trade mark only for the product, not for the company. A company name does not even exist here.

**Analysis**

As in the previous cases, the confidence in the patent is low here. As no equity investment was sought, the need for a patent seemed less strong than in the cases discussed so far. Corporate relations, trade channels, access to materials and manufacturing was the focus of attention here. Anscomb admitted that “It is very difficult to know the best route at an early stage. Most investors would probably not touch something that is so early stage that it hasn’t got a patent.” (Anscomb 2013) Working without equity investment eases the pressure of pursuing a patent. Exclusive access to third party IP can be equally beneficial as a patent. The benefit here is that the IP policing and defence can be covered by a third party. The dependency on a different company’s stability can be disadvantageous. In KwickScreen’s case the licensor was
larger, and perceived as more stable than KwickScreen (Anscomb 2013). Hence, the exclusive license constituted a strong asset at the outset.

Whilst critical of patents in general, Anscomb appeared to be positive about having one. Due to the costs involved, KwickScreen did not invest in international patents. However, when interviewed in 2013, Anscomb admitted that “now, if I had the option, I would have an American patent, and I would have a European patent. But, at the time, it was just too expensive, and very few products ever become successful, and the likelihood is that you are wasting your money” (Anscomb 2013).

Here the dilemma could be clearly felt. Filing for patent is costly, and possible benefits are hard to assess at the outset. Once a company starts trading, the patent maintenance costs can be offset against sales. Until then, the decision whether or not to patent appears a gamble. What the KwickScreen case highlights, is that the need for a patent partly depends on the degree to which a designer-entrepreneur needs to source equity investment. Identifying the need for investment is important for taking the right decision with regards to IPR, as is the prediction of future export interests. The optimal timing of the patenting process depends on the development pace, and the distance from market. However, these factors are even more difficult to predict than the funding needs. Most designer-entrepreneurs initially underestimate the time that is needed to render a start-up profitable.

KwickScreen was very sales-oriented and used a bootstrap approach as opposed to an investment-oriented aspirational approach to develop. This means that external funding needs were reduced as much as possible in order to sustain a high level of independence. According to Anscomb the team borrowed only five thousand pounds from the incubator initially, but soon repaid the debt. To push sales in the early stages, the duo bought a van to carry out sales visits at individual hospitals. Production was done in-house rather than outsourced. Anscomb also stated that KwickScreen developed a bespoke customer management system to track progress in relation to new business. The coding of this software named Romulus was outsourced, and eventually the system was licensed out to clients. The license fees received were re-invested into further system developments.

**Long-Term View**

Following several years of development, Anscomb reports that KwickScreen has developed further, with KwickScreen established as a premium product in the healthcare screen market. A factory self-owned production in North London caters for potential growth, although the market is perceived as of limited size. Sales are strong in the UK, and also in the US where a network of distributors takes care of the sales management. Due to the comparatively low population density in the US, each distributor is allocated a specific state for trading. Sales in Europe are more modest due to a higher level of competition.

In 2018, six years after the initial interview, KwickScreen employed twenty people who took care of production, sales and marketing. Whilst the Rollotube material, which stabilises the screens at the top and at the bottom, was initially supplied by a third party based on an exclusive arrangement, KwickScreen negotiated the rights to manufacture the material in-house against a royalty fee. This
allowed to enhance the manufacturing quality, and once the patent expired, KwickScreen was perfectly equipped to produce the material independently without having to pay any royalties. Although competitors could then hypothetically have copied the product without infringing any patent rights, KwickScreen had an advanced product, production facilities, and the distribution network to sustain their market dominance. KwickScreen developed bespoke patterns, some of which were registered as designs to modify and customise the screens. By 2018 revenues have increased well beyond £1m per year.

Meanwhile Romulus was redeveloped from scratch. The business proved to be difficult to scale because each CRM system had to be customised. The team set up a standalone company and called the new development Index. Anscomb successfully applied for incubation in an accelerator based in California, US. Although faced with much more competition, Index is aimed at a market much larger than KwickScreen. Index taps into corporate email systems to monitor progress with respect to evolving customer relations. Data from the web can also be harvested to identify the best possible points of contact within a specific firm. Despite modest revenues at the time the growth potential surrounding Index is thought to be considerably larger than that of KwickScreen.

Review

Focusing on sales rather than IP helped the entrepreneurs behind KwickScreen to expedite the route-to-market. KwickScreen benefited from comparatively large equity-free grants provided by the NHS.

The exclusive license for a patented material from an established firm was perceived as better security than the patent that was owned for the product, because established firms are usually better equipped to litigate possible infringement. Such a strategic partnership can be very valuable. KwickScreen and Roli are similar in that both production and distribution were done in-house. This secures a degree of independence. However, it also means that a lot of effort needs to be invested into marketing, sales and distribution.

Romulus/Index developed gradually with little pressure alongside KwickScreen. Pursuing complementary inventions can be beneficial provided that the second development is not too resource intensive, and supports the first.

The registered designs which were secured in conjunction with KwickScreen were seen as not particularly significant to the product success. Being able to diversify and customise the room dividers was beneficial, but the risk of infringement was thought to be low. The main purpose of securing design registrations for the print patterns was to satisfy the expectation of the NHS who provided development grants in the early stages. The products are marketed through the product names. The name KwickScreen was registered as a name, not a shape, to warrant for a larger scope. For a name to qualify for trade marking, it is important that the name is not a description of the product.
2.1.4 Concrete Canvas

Business Proposition and History
Concrete Canvas is the oldest company within this series of examples. Its inception preceded both the Design London and InnovationRCA incubators. The name relates to a material invention that can be deployed for multiple purposes. It is a flexible cement-impregnated fabric invented in 2006 by Peter Brewin and Will Crawford, who met at the Royal College of Art. In 2004 the team had patented a concrete shelter designed for disaster zones (Fig. 2.9). However, the design duo were unable to successfully market this concept to the military and to NGOs. Following an initial prototype paid for by the UK military, no orders followed. Having struggled to secure any early sales, the inventors extended the application of their material to ditch lining, slope protection, roofing. Concrete Canvas spun out of the Royal College of Art in 2004. Following their MA graduation the two founders retained access to RCA premises for a six-month period, during which they were supported by InnovationRCA, which at the time functioned as a support unit to strengthen the strive towards design innovation and entrepreneurship at the college. Following the filing of a second patent for impregnated fabric in 2006, Concrete Canvas secured around £200 K through grants, competition awards and angel investments. A large proportion of the funds had to be invested in patents. Through collaborating with third parties, including a distributor in the US, the company could test possible applications of the material and tap into a variety of market sectors and segments. Through shifting focus from the product to the material used the range of possible options could be widened. Concrete Canvas proved particularly successful in the construction industry (Figs. 2.10, 2.11 and 2.12).

IP Held and Problems and Benefits
Brewin (2013) described Concrete Canvas’ patents as “absolutely vital”. “If people invest in a start-up, they want to see that there is the capability to protect the technology”. By 2013 Concrete Canvas owned four different patents giving rise to a portfolio of forty patent filings in total. The word Concrete Canvas was secured as a trade mark in a wide range of countries including Europe and the US. This helped the

Fig. 2.9 The Concrete Canvas Shelter prototype. The material is fire resistant. [reproduced with permission]
Fig. 2.10  The Concrete Canvas material [reproduced with permission]

Fig. 2.11  Concrete Canvas used for slope protection [reproduced with permission]

Fig. 2.12  Water is applied and once dried the canvas hardens. [reproduced with permission]
entrepreneurs to strengthen their market position which was further enhanced through the contractual arrangements which Concrete Canvas entered with third parties. Peter Brewin (2013) stated that patents are important when talking to potential customers and the press because “… there is a limit to what you can do under non-disclosure agreement … and also, it is important to generate a lot of press, and we were entering a lot of design competitions”. Concrete Canvas secured the first significant sales in 2008, and the company broke even the following year. Then the company began to established itself. When trading independently in the UK, Concrete Canvas relied on licensees in the US and Canada, where they also entertained R&D arrangements. A few years later the product could be ordered for $13–15 per sm on Alibaba with a minimum order of 300 sm. Whilst relying on licensing alone for business growth is usually not recommendable, the Concrete Canvas case confirms that licensing can help to expand the business into territories to which the designer-entrepreneur has no direct access. Exclusive IP can be very important when entering strategic partnerships with multinational corporations, and if successful, such relationships can significantly increase the credentials of a start-up. Brewin explains that “… there is a certain amount of weight having some large multinationals standing behind you, as well, in terms of being able to protect our IP.”

Brewin addressed a fundamental aspect related to the significance of IPR at the outset:

As a start-up you have no real value. You have to convince people. In order to do that, you have to build up a lot of evidence through winning competitions and generating press attention, to build up credibility through different sources. This is very difficult to do if you don’t have any protection, because once disclosed, you are unable to get a patent. Brewin (2013)

Secrecy in the run-up to patents is very important. As soon as patentable knowledge is publicly shared, it can no longer be secured through patents. Even if a patent is filed in such a case, competitors can easily get the patent invalidated in court. Patents can be used to signal exclusivity and the capacity to innovate. If aligned strategically with the right route-to-market options, patents can help to increase market power. The possibility of licensing out novelties may also be attractive incentives for investing in patents. By 2013 Concrete Canvas had become an established firm.

Long-Term View
Knowledge and experience, and the way this is shared and exchanged with customers can be an important development aspect. The strategic sharing of knowledge is referred to as open innovation. Brewin explained that the development of new applications for Concrete Canvas were often incentivised by the firm’s distributors. The latter were approached by customers with specific challenges that could be addressed through the use of Concrete Canvas. The technical support provided by the team behind Concrete Canvas could be combined with a collaborative approach to resolving the difficulties experienced by the distributors’ clients. Following initial case analyses, entirely new applications such as roofing or sealing of tanks could be
developed. Brewin (2013) described Concrete Canvas as “a new plan for construction rather than a product in itself.”

Concrete Canvas is a typical technology-push venture, which means that the idea surrounding the technology preceded its application. According to Brewin the technology-push incentive existed from the outset, even during the phase of exploring the idea of a sheltering solution (Brewin 2013). During this early phase, the company was helped by one of their suppliers, Walkerpack, who provided Concrete Canvas with free access to a disused factory. Accessing complementary assets without incurring costs is of great benefit to a start-up that is strapped for funds.

Review
What the Concrete Canvas case highlights is that collaborative development arrangements including strategic partnerships can pave the way towards assets needed for production and distribution. Distribution-related assets are particularly beneficial in conjunction with technology-push ideas, for which the market is usually unclear at the outset. Developing innovations in exchange with the market tends to increase adoption rates, and can accelerate the route-to-market.

Exclusive IP can be essential in pursuit of strategic partnerships, because it secures the inventor’s advantageous position within the stakeholder network. It is important to sustain secrecy until the patent application is filed. NDA’s are thought to be of limited benefit when trying to prevent third parties from using developed ideas and concepts. Both aspects, access to assets as well as collaborative arrangements, which in this case involves open innovation, benefit from the ownership of exclusive IPR because IPR secures the designer-entrepreneur’s position within the collaborative framework.

The fact that the word Concrete Canvas could be secured as a trade mark may be surprising, because descriptive terms can usually not be registered as words, only as trade mark image. But granting exclusivity to this term does not disadvantage competitors because the material is one of a kind. Securing a trade mark as a name is generally preferred, as it allows infinite visual permutations. A trade marked image or icon (logo) can relatively easily be by-passed through altering the visual appearance of the word. If the name is secured per se, it prevents competitors from using it in any shape or form for marketing purposes.

Open innovation: This term was coined by Henry Chesbrough from the Hass School of Business, University of California, to describe the coordinated and intentional sharing of knowledge for strategic purposes. Knowledge flows can be inbound and outbound. Open innovation principles will be discussed in greater depth in Sect. 3.6.
**Complementary assets**: This expression was introduced by David Teece in 1986 in reference to resources that are needed in support of either developing and producing a novelty, or in order to take the latter to market. The concept of complementary assets will be further examined in relation to appropriability regimes in Sect. 3.1.

### 2.1.5 RoboFold

**Business Proposition and History**

In 2007 Gregory Epps, the company founder of RoboFold, invented a sheet-metal forming process that does not require mold-tools (Fig. 2.13). Aluminium sheets are first scored using CNC cutting and this allows for them to be bent along curved lines using 6-axis industrial robots. The movements of the robotic arms are controlled through bespoke software components, which were developed in a software application called Grasshopper3D. These components can be used in combination with Rhino3D, a common computer-aided design application software. Epps patented the process in 2007. Thereafter RoboFold has built on approximately £140 K of investment obtained from the Design London incubator and family members. A combination of consultancy work, commissions and workshops enhanced the company’s economic stability. But equity returns were still due in July 2013, and in 2018 Gregory Epps confirmed having shifted emphasis away from RoboFold.

Not being able to patent the software needed to coordinate the metal folding process, was a big disadvantage for the designer-entrepreneur because it made it more difficult for the inventor to secure exclusivity. Software patents are available in the US, but not in most European countries. Even in the US they are not considered to be very robust, because they can be easily circumvented or challenged. Process patents are often regarded as comparatively weak for the same reason. In a seminal study known as the Yale Survey, Levin et al. concluded that

![Fig. 2.13 Metal-folded solution developed by RoboFold on commission by Zaha Hadid Architects for the Venice Biennale 2012 [reproduced with permission]](image-url)
'For new processes... patents were generally rated the least effective of the mechanisms of appropriation' (Levin et al. 1987, p. 794). This disadvantage in relation to IP incentivised Epps to apply a creative approach to his business model. RoboFold offered workshops and developed software components in collaboration with customers (Fig. 2.14).

Where possible, secrecy was used to sustain exclusivity. Attempts to get sponsorship from the company behind Rhino3D failed. The added value or ROI (return on investment), which the corporation would have gotten from supporting RoboFold, was presumably perceived as too low. Although, the imbalance in the market-power was of disadvantage to RoboFold, Epps promoted his invention alongside this established firm at trade fairs and conferences. Similarly to Artica, this case shows how an imbalance in market power can pose threats and limit opportunities to form strategic partnerships with existing incumbents. Concrete Canvas was in a better position by comparison to Artica and RoboFold, because it had no direct competitor. Epps promoted his RoboFold process at colleges and universities in and around London. This helped to nurture customer demand, not unlike Cupris, who engaged academic for first trials. However, like Cupris, RoboFold failed to establish a strong market position through these co-creative developments. The reasons why the co-creative approach failed, varied between the two cases. For Cupris there was too much competition to dominate the market environment, RoboFold was too niche a product, and thus did not generate enough traction.

Fig. 2.14  Robotic Lattice Smock, a steel facade which was exhibited in New York 2014; a collaboration between RoboFold and Andrew Saunders [reproduced with permission]
IP Held and Problems and Benefits

Epps filed his process patent in 2007, just prior to his graduation. The software needed for the process could not be patented within Europe because The European Patent Convention excluded computer programs. However, exclusive access to the process itself was hoped to suffice to sustain exclusivity. Epps had extended the process patent to various EU countries as well as to the US. This came at a high cost. In order to avoid shredding too much equity during the very early stages, Epps chose to pay for the patent filing and the maintenance, rather than to rely on the financial support of the RCA.

Review

Epps considered his process patent as a necessity in line with his exit strategy. He explained that “developing a technology creates potential value and that potential is protected by a patent…” (Epps 2013). However, one could argue that this potential value is as probabilistic as is the IP to which it relates, so the protective quality is of a speculative nature. Only sales provide reliable credibility, in particular where innovations are aimed at emerging markets. On the other hand, without exclusive IP, the venture’s value growth and scalability can be limited in proportion to the sales and marketing efforts.

Epps registered a number of trade marks, but had to resort to figurative ones, because the word RoboFold constituted a descriptive term. Therefore it did not qualify for a trade mark. Only its specific figurative representation could be secured. However, none of the trade marks on register resembled the one used in RoboFold’s marketing materials. Changes to the visual identity seem common in the early stages of a business development, as entrepreneurs gradually build a full understanding of the business characteristics and of possible brand positioning options. There seems little benefit in focusing on branding in the very early stages of a design-led start-up business development.

In principle RoboFold could have focused on the development of designs, which in turn could have been secured through registered design rights. However, identifying useful designs and sizeable markets for these, is far from easy because every product line (furniture, architectural cladding, automobile components etc.) constitutes a line of business with its own individual market environment and challenges. Instead of focusing on specific products, Epps generated income through consultancy and one-off projects. Participatory design methods were used to further develop a business-to-business service provision which helped to attract clients.
Long-Term View

Whilst understanding the value of IPR in terms of growth prospects, Epps critiqued the early-stage version of the Design London Incubator for an exaggerated focus on investors. He argued that sales should have been given greater attention and explained that “if you get sales, you get investment”. Epps (2013) further explained that he “found investors particularly unpleasant at times”. This point concurs the views of some of the other designer-entrepreneurs spoken to. The involvement of investors can be a mixed blessing. Whilst the investors’ influence on the decisions can potentially be compromising, their networks can help designer-entrepreneurs to connect with industries and to secure access to complementary assets. The reason why the role of investors is of interest, is because their potential strategic involvement and because the funds made available through investors are closely connected to the availability and value of IPR, patents in particular.

Epps sought to build his business around a licensing strategy, which inevitably requires exclusive ownership of IP. But the markets surrounding RoboFold were not sufficiently clear. A wide variety of applications were under consideration, from the automobile industry and boiler covers to furniture and architecture, making the market environment seem very uncertain. Although the diversity of applications of processes and materials can be beneficial to the venture’s growth prospects, diversity can likewise impair the focus of attention, and this can significantly decelerate business developments.

2.1.6 Squease

Business Proposition and History

Squease was founded in 2009 by a team of four, Sheraz Arif, Andy Brand, Menno Kroezen, Katrien Ploegmakers, who invented an inflatable pressure vest that can be hidden within a trendy hooded top (Fig. 2.15). The product was aimed at people with sensory difficulties such as autistic children, who can use Squease to reduce anxiety in public environments. Following advice from patent lawyers and business mentors, the founders considered filing a patent, but encountered difficulties, one of which related to patentability. The principle of using pressure to reduce anxiety was known, which was why the inventors had to ask themselves which aspects were sufficiently novel to qualify for a patent. The main novelty was the layout of the pressure elements, the interconnecting air chambers. However, the team soon came to realise that their chances of securing a patent for the Squease application in general, i.e. for the use of an inflatable device to modify the behaviour in people with sensory processing difficulties, would be extremely limited. The patent application underwent various stages of iteration, but the costs involved in continuing their patenting strategy as well as the potential risk of failing with their patent application were judged as too high for the founders to choose the patent route. In agreement with their investors, the team behind Squease decided to discontinue their patent application. In the UK, patents can be withdrawn within twelve months from filing, i.e. before a patent application is
publicised. This is often done to conceal an invention from potential competitors or imitators.

Instead of patenting, the team behind Squease deployed other means to secure a prominent position within the market environment. Squease initiated a rental scheme that allowed potential buyers to rent the product for a few weeks for a small fee prior to making the purchase. If the product was then bought, the rental costs were taken off the purchase price. Liaising with customers in this way not only helped to educate the market, it also kept the team behind Squease motivated—“when you hear a mum say: ‘My child can sleep now.’ Or: ‘He can now eat.’ It is really powerful feedback. That is valuable” (Arif 2013). Squease also developed a supply chain. Without that, and without a distribution network, imitators would always find it difficult to compete. The team of inventors protected their invention through filing a Registered Community Design (now: EU Registered Design) and through securing a trade mark for the word Squease. However, protective measures focused not so much on exclusive IP. Instead Squease counted on their speed to market, the complexity of their product as well as on their complementary assets, i.e. their suppliers and distributors, in order to secure their market advantage. Establishing market dominance in this way can be difficult for a design-led start-up, but niche markets and emerging markets behave differently from established markets. Established markets are often controlled by incumbents to too high a degree to allow for newcomers to edge their way in. In Squease’s case, speed to market was sustained not only through development pace, but also through the
market uncertainty, which made it unattractive for potential competitors to imitate the invention. Squease traded their product online, and also secured distributors abroad, including in South Africa and Australia. Despite the limitations in the market size, Squease were not far from break-even in 2013. So they were significantly faster in pursuing their route to market than most of the other start-ups examined in this chapter. Their pace was somewhat comparable to KwickScreen. Avoiding the patent route and relying on a bootstrap strategy helped to reduce development costs, which in turn made it easier to reach profitability. In 2018 the business was stable with part of the team working in the Netherlands, and the others working in the UK. With modest but stable revenues, all active team members could draw a salary sufficient to make a decent living.

**IP Held and Problems and Benefits**

In 2013 Arif stated that filing a patent application had served to attract potential investors. To the question whether or not one needs a patent in order to secure investment, Arif responded that the patent provided a degree of comfort despite the fact that theirs was still in the early stages of the application stage. Most angel investors who engaged in conversations, did not ask what exactly the patent protected, within which context it was filed, and how easy it would be to enforce.

Arif is not the only designer-entrepreneur to question the legal value of a patent. He argues that “if you have the money to invest in a patent as a start-up, you probably do not have enough money to enforce it later.” (Arif 2013) However, the Squease pressure vest would be very difficult to reverse-engineer, due to the complexity in its design. And yet Squease was not without competitors. At the time of the interview, the inventors were already aware of a variety of weighted vests and blankets designed for the same purpose as Squease. The product that seemed particularly similar in terms of its concept and functionality, was the T.Jacket, a garment developed and taken to market in 2011 by Dr. James Teh, an engineering graduate from the National University of Singapore. Although the T.Jacket was invented two years after Squease, the geographic distance makes it likely that this is a case of an inadvertent parallel invention, a process which Levin et al. (1987) refer to as the ‘near duplication of R&D effort by [a] rival firm’. Novelty searches are important steps in the process of innovation because more often than not similar concepts emerge independently from each other in different locations. The concept behind the T.Jacket is very similar to Squease: a hoody that conceals a technology that exerts adjustable air pressure onto the wearer’s torso, and which is aimed at an audience with psychological disorders. As the team behind Squease dropped their patent, T.Ware had freedom to operate. Squease is noticeably cheaper than the T.Jacket, about half to a third of the purchase price, however, the latter benefits from an app that allows the device to be controlled via smart phones. In 2018 Andy Brand confirmed having been aware of T.Jacket, and that Squease did not take any action, since the competitor seemed largely inactive. Despite its rapid route-to-market, the team behind Squease found it difficult to scale the business, perhaps due to the niche characteristics of the target markets involved. Niche markets are easier to dominate, but more difficult to grow than mainstream markets.
Review
The Squease vest did not lend itself to patenting, at least not at the outset. Once on the market, the right to patent for a product ceases due to the public disclosure involved, unless the patent relates to a hidden or a newly added feature. Some countries grant a grace period, which sustains patentability for a certain period of time, usually for up to a year. A patent can be of psychological benefit, it builds confidence. As Squease was aimed at a largely underdeveloped niche market, the chances for imitators to become a threat were very limited. The market may have been too small and too uncertain to attract large firms to enter. The complexity of the design and the focus on a niche market is thought to have helped to protect the innovation to a degree. In niche markets the necessity of exclusive IPR is much reduced.

Like KwickScreen, the founders shifted their focus very early on from IP to manufacturing and sales. Both products were introduced to the market comparatively fast, but scaling the businesses proved challenging. The availability of complementary assets, or the lack thereof, the nature of the novelty as well as various other business development attributes are strongly interlinked.

Squease was triggered by a perceived need for a product to help children with autism. Unlike most other products discussed in this chapter, it was not a technology-push initiative at the outset. The Squease case makes it clear that there is a difference between need-pull and demand-pull, concepts which will be discussed in detail in Sect. 3.4. In this case, initial research revealed a need where there was no market demand. One should not underrate the fact that Squease had a significant impact on the quality of lives of its customers and their families. Whilst business success is largely measured in terms of revenues and market performance, admittedly also in this book, societal impact can also be seen as a measure for success. The non-economic transformative capabilities of design-inventions become particularly significant in the context of social innovation.

Market uncertainty: Clarysse and Kiefer (2011, p. 131), authors of the book ‘The smart entrepreneur’, explain that ‘the clear presence or absence or target markets and/or solidly protectable IP are indicators of environment uncertainty.’ They further refer to ‘The value chain and sales process [as] indicators of environment complexity’ (authors’ italics). What is worth taking note of is that the more novel a design concept is, the greater the chance for it to be surrounded by a high level of market uncertainty. Radical innovations can be launched within niche markets or emerging markets to establish credentials such as proof of concept before releasing them into mainstream markets.
Speed-to-market: Clarysse and Kiefer (2011, p. 132f) differentiate between first-to-market and speed-to-market. The former means requires designer-entrepreneurs to conceal their intentions until they are ready to launch a product in order to exploit a hidden market opportunity. Speed-to-market is achieved through ‘creating an offering that is easy for customers to adopt’ (authors’ italics). The latter can be achieved through removing obstacles, e.g. through enhancing compatibility with other products or platforms, through pricing strategies, through customer support, or through enhancing user-friendliness etc. As Clarysse and Kiefer rightly point out, first-to-market does not guarantee market dominance. Nor does speed-to-market. Both concepts are often paired with continuous innovation, where-by complementary inventive steps are pursued following a successful product-launch. Omitting a patent-route may help to accelerate the route-to-market.

2.1.7 Orbel

Business Proposition and History
Orbel Health is a hand sanitiser aimed at use in hospitals to reduce the risk of bacterial infections such as MRSA. It dispenses a disinfectant solution from a small palm-sized container that can be clipped on to the clothing of a health care professional (Fig. 2.16). This allows for the disinfectant to be available at any given time with no time required to attend to a stationary wall-mounted dispenser. The

Fig. 2.16 The Orbel Health hand sanitiser [reproduced with permission]
fluid dispenses through a number of balls which rotate as the healthcare practitioner’s hand slides across. It requires only one hand to get the device to release the disinfectant fluid, leaving the other hand free to perform other actions.

Orbel is the second oldest RCA incubator business examined in this chapter. Having started developing his invention in 2005/2006, Adam Sutcliffe, the inventor, pitched twice for incubation at Design London. In 2007 he applied on his own and failed to get accepted. In the following year he joined forces with Damian Soong, an Imperial College MBA graduate, and succeeded. In 2010 the venture exited the Design London incubator and completed its first successful trial with the National Health Service. The following year the team of two secured angel investment from the London Business Angel Consortium (LBA). Sutcliffe advocated the registration of designs and argued that “You are less likely to get investors to invest without seeing something” (Sutcliffe 2013).

**IP Held and Problems and Benefits**

By the end of 2013 the venture had raised £675 K in total: £75 K in 2007, £250 K in 2011, £350 K in 2013. A design flaw meant that redesign became necessary to prevent the device from dispensing an excessive amount of disinfecting gel. The first design did not hold the balls in place, therefore too much fluid was dispensed. The second patent provides a supporting structure that makes sure that the balls can rotate without being pushed deeper into the container. This is why a second patent had been filed in June 2013 to complement the first (Figs. 2.17 and 2.18). The

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*Fig. 2.17* Orbel, first patent (no. GB2439061), filing date: 19/12/2007 [reproduced with permission]
Orbel case reveals how resource-intense a patent-focused route-to-market strategy can be: By 2013, the two patents required funds of about £120 K per year for patent maintenance alone. The costs built up due to the fact that the patents were filed internationally, covering Europe, the US, Australia, Hong Kong, Japan, Argentina, Australia, South Africa, and China.

**Long-Term View**

In 2013 the product was due to be manufactured in China by a group called Kyosay, who was also considered to become a potential distributor at the time. Giving away control over both upstream and downstream value chain elements (Sect. 1.3.1) can be risky, because inventors can potentially be edged out of the market. Orbel Health’s extensive IP portfolio comprising design rights in four different countries as well as in the EU, and patents in five different countries plus the EU provided the start-up with considerable security within their strategic partnership. As Orbel Health’s initial business partner, Kyosay contributed a strong set of complementary assets through sourcing the production means and material supplies from a company named Ensay. This paved the way towards Orbel’s first filling line in China. In 2013 Sutcliffe had expressed hopes that having a distributor, Pickett’s Health, invest in a minority share of the Orbel Health Limited, would mitigate the risk of strategic partners by-passing the start-up. Strategic partnerships with established firms can help mitigate the risk of IP infringement through third parties, but they can also affect the balance of power quite significantly. A robust portfolio of IP can be of great significance in such a case.
By 2018 things had changed considerably for Orbel Health. Having partnered with Kyosay who provided engineering support and managed the manufacturers, in 2013, Kyosay went into administration in 2016 after sourcing a number of suppliers and manufacturers for Orbel. Without direct contact with their six to eight suppliers, Orbel was at risk of losing their production capabilities, but they managed to sustain communication with Ensay, a material supplier. One of the people involved in the engineering and development offered to manage the supply chain in return for a retainer contract which was the equivalent of his previous full-time salary. Due to small sales at the time, Orbel needed to raise funds to afford the retainer. Soon after, the sales manager in charge at Orbel Health, ceased his efforts due to personal problems. This led to the loss of anticipated sales opportunities. With no sales lined up, the supply chain manager needed to be paid in full despite the lack of need for production. The business declined in the course of a year. As the only remaining director, Adam Sutcliffe eventually assumed the role of the Chair of the Board. Through a chance encounter in 2018, Sutcliffe managed to secure expressions of interest from a potential distributor with a network in the US and Ghana. Prospective sales of several thousands of units helped Orbel Health to regain confidence. However, the two year-period of decline had cost the firm dearly. The storage of production tools needed to be paid for, as did the maintenance of the patent portfolio. Through taking unsecured loans from one of the investors, Orbel Health managed to prevail. Following a number of down-rounds, Sutcliffe’s shareholding had been reduced from 35% to little more than 3.5%. Despite having raised several million dollars of cumulative investment, Sutcliffe still carried the lion share of responsibilities in the business with his original business partner having moved on in pursuit of other opportunities. Support was limited to one shareholder representative and a business development consultant, who had taken on the role of the CEO. Sutcliffe cited management errors as a reason for the slow processes involving success and failure. This slow succession of ups and downs made it difficult for Sutcliffe to take an informed decision whether or not to draw a line and to consider other career options. By the end of 2019, Sutcliffe’s efforts were rewarded, at least to some extent. After his sales contact in the US had set up a distribution chain catering for all hospitals in the state of New York, and many others across the rest of the USA. Following a trial with one of the largest hospital in New York, an order of 60,000 units had been placed. A few months later, after a number of trade shows that had been managed by the US distributor, Sutcliffe reported that he had received purchase orders for 1.5 m units. This growth in demand has led to supply challenges. The Orbel management team made plans to raise investments for upscaling the production in order to increase the number of assembly lines to increase the daily production from 3500 units to 25,000. The COVID-19 epidemic in early 2020 was thought to have expedited the processing of orders on the client side. This rapid increase in orders led to challenges in the quality assurance of the product. On the one hand less time was available to gather customer feedback, investigate potential issues, and to respond to it, on the other it became significantly more difficult to mitigate the risk of production flaws and to ensure that all production lines generate products of identical quality. Despite this,
Orbel had been able to start gathering testimonials. Sales expectations were at 500,000 units/month by the end of April, and about 1 m units/month by the end of August. When spoken to in June 2020, Sutcliffe reported that the company value was thought to grow to about £40 m by the end of 2020—even without further growth—provided that sales volumes remained steady. However, for Sutcliffe to be able to exit successfully, the company value that would still need to increase significantly, because a lot of equity share had to be sacrificed in the course of the rather challenging company history.

Review

Faced with angel investors, Sutcliffe did not have the confidence to take care of the business himself, or to appoint a CEO of his choice. Instead he relied on the investors’ preferences. Working with chairmen and CEOs who were not equipped for their roles slowed down progress and led to shortfalls in the strategy development. The latter is best developed from within.

Sutcliffe compliments the US for embracing failure as a learning experience, as opposed to Europe where failure is seen as a negative. He claims that almost every successful start-up is run by people who had three or four failures. Risk adversity leads to a reluctance to put in checks and measures which would signpost failure at an early stage. Although in 2018 Sutcliffe argued that in hindsight, he should have discontinued Orbel Health after two or three years instead of pursuing it for a decade, the situation changed suddenly a year and a half later. Whilst his ownership had shrunk to a small fraction, his company was now securing growing sales, indeed to such an extent that it became challenging to scale production in line with demand.

When asked about the significance of a varied IP strategy in 2020, Sutcliffe acknowledged that exclusive IP was of utmost importance for him, not only to secure equity investment, but also in order to attract distributors. He claimed that distributors would not be ready to invest in setting up a distribution chain unless they can be confident that exclusivity can be sustained. Sutcliffe did point out that stakeholders are not too worried whether the exclusivity is afforded through design patents or utility patents. The brand was initially less important for Orbel’s shareholders. The use of a consistent product name and design was sufficient to attract an audience. However, brand consistency became crucial later on. Having a trade mark on register proved to be of an advantage.

Before InnovationRCA’s strong emphasis on patents was softened in 2018/2019, Sutcliffe criticised this over-reliance on patents, arguing that “Every form of IP has value in its own right” (Sutcliffe 2013). Sutcliffe expressed the view that a combination of various forms of IP should be at the focus of attention. He explained that one can file for a patent in the early stages in order to secure investment, and then to neglect the patent in favour of registered design rights (Sutcliffe 2013). However, it is important to note
that patents and design registrations are not interchangeable (see Chap. 3). They do not constitute alternative options. Aesthetic qualities are excluded from patent protection, unless ‘the feature relates to a genuine technical effect’ (UK Government 2016, paragraph 219), and the functionality from registered design rights (UK Government, nd b). This beckons the question how shifts in emphasis between technology and product language are best strategised. It is also worth noting that Orbel Health’s position within the strategic partnership with Ensay could have been jeopardised without a solid patent portfolio. The following section offers a comparative analysis of the case studies and this will help establish a set of strategic principles.

**Angel investment:** Angel investments are comparatively small sums of investment which are often sought at an early stage of a development in exchange of equity, i.e. shares in the company. Sums commonly are in the five- to six-digit area. To mitigate risks, angel investors sometimes form syndicates that are led by an experienced lead-investor to be able to build on each other’s experience. Angel investment can be useful, in particular if investors have business relations within the relevant business environment. However, their influence on business decisions can also be compromising. Venture capital investments are significantly larger in size, usually seven-to-eight digits, that are managed by a venture capitalist. Whilst entrepreneurs typically pitch to angel investors during one-off investment pitch events, a venture capitalist would typically monitor the progress of a venture development over a longer period of time, usually a year or two. The venture capitalist takes a percentage of the investment in return for managing the relationship between investors and entrepreneurs.

**Retainer contract:** Such agreements set out a fixed regular payments, usually monthly, in exchange of services provided over a fixed period of time.

### 2.2 Comparative Analysis

Most of the designer-inventors interviewed perceived patents as a prerequisite to initiate a proprietary venture. All interviewees testified that there is a dependency between the acquisition of seed investment and the ownership of patents. However, some decided to abandon a patent-route early-on.

There is a noticeable difference between the businesses who used few or no patents—either because their novelty did not qualify for a patent-route, or because they perceived their patent as flawed—and minimal funding: KwickScreen,
Squease, and those who opted for patenting strategies, which significantly increased the funding needs: Concrete Canvas, Seaboard, Orbel. Those who opted out of patent protection, developed without or with limited equity investment and reduced their funding needs through a bootstrap approach. Income obtained through freelance work or teaching helped some of these designer-entrepreneurs to cover living expenses and other financial needs were limited to the best degree possible. The ventures with minimal funding, KwickScreen and Squease, secured revenues through early sales.

Designer-entrepreneurs who pursued a patent-route, spent much time on developing and implementing patent strategies which appears to have limited the time available for analysing and engaging their target markets. They also focused on raising equity investment with a view on filing for patents in a variety of countries, such as Concrete Canvas and Orbel. Self-funded non-patent ventures seemed to focus on sales earlier. Designer-entrepreneurs in pursuit of a patent route needed to invest a lot of time and resources in managing the IP and forging strategic partnerships. This seems to have slowed down PR and sales efforts, none-the-least because secrecy with respect to the technical novelty is required in the run-up to a patent application (Sect. 3.5).

Despite this, none of the interviewees, not even those who invested in patents, expressed much confidence in the patenting process. The latter is generally perceived as time consuming and cost-intensive. There is a shared understanding that patents cannot be defended by an early-stage start-up if infringed by a third party.

This subsection examines case-study-related observations by comparison. Artica is excluded from this part of the analysis because it was sold to an incumbent during its early development.

With the exception of Concrete Canvas, all ventures benefited from a degree of seed funding which was capped at £75 K during the Design London Incubator phase. However, KwickScreen (and Romulus), and Squease—soon converted to a bootstrap approach which meant that they limited their costs to the best degree possible in order to avoid the need for equity investment or debt. Roli, Concrete Canvas and Orbel used an equity-intensive strategy. RoboFold and Cupris sit between both categories with some investment used, but not to the level at which Roli and Concrete Canvas have. The ventures’ funding approaches were first assessed in 2013–2015 with a view on the development stage of each respective venture. The ventures were re-assessed in 2016–2018 through primary and secondary research, and some were re-examined in 2020. The observations point towards a dichotomy between funding-intensive start-ups and those who sought to limit their funding needs as much as possible. Although this relatively small number of inquiries is by no means representative of the design-entrepreneurial scene at large, this dichotomy is a known in the context of creative entrepreneurship. Aspirational businesses tend to use equity funding to grow more aggressively in order to be able to acquire and defend a larger market share than those who build on a bootstrap strategy. The invention itself, the market access prospects may play a significant role in the decision-making.
In Fig. 2.19 the reliance on IPR is assessed in relation to the range of formal IP obtained by individual start-ups. Concrete Canvas, Roli (Seaboard) and Orbel own multiple patents in a variety of territories, multiple registered design rights, and registered trade marks. This shows a high reliance on IP. RoboFold and Squease de-emphasised their formal IP, whereas Cupris and KwickScreen make use of formal IP to some extent.

The table above (Fig. 2.19) shows a relationship between IP reliance and funding needs. The assessment of the former is based on the IP portfolio (mainly patents and design rights), as well as on verbal comments. The coherence between the need for equity investment and the reliance on formal IP points towards a conundrum surrounding IP dependency and finance needs. Designer-entrepreneurs need patents to raise angel investments, and investment is needed to secure patents.

**Insights**

Designer-entrepreneurs are typically confronted with the choice between a bootstrap approach in pursuit of early sales on the one hand, and with a patent-intensive strategy in pursuit of angel investment. Investment needs grow in proportion to the number of countries under consideration for trade.

Designer-entrepreneurs can file an early patent in order to abandon or to de-emphasise it following early-stage investment. In most cases follow-up patents are required to strengthen the protection of developing technology concepts.
2.3 Investors and Funding

The designer-entrepreneurs shared the perception that a patent enhances the chances of securing angel investment, even if a patent remains to be verified. A range of angel investors were spoken to during an investment pitch event at the Dyson Centre in London Battersea on 10 December 2013. The event was organised by the London Business Angel Association (LBA) in collaboration with the RCA.

Three out of four angel investors spoken to stated outright that patents mattered. Two of those three labelled them as pretty important. One of these two further explained that a patent helps making sure that the innovation does not infringe the rights of third parties. This is not perfectly correct, because pending and even and approved patents can be challenged in court, for example on grounds of prior art or lack of novelty. Other criteria came to mention, such as the proximity to market. The latter is of importance, not only because of the investors’ interest in early returns, but also to limit the need for additional investment rounds. With early stage investments, angel investors can expect a greater stake in the business in return for their funds, but additional investment rounds may dilute the shareholding, as was the case with Orbel Health. If a venture is close to market, the need for additional funding rounds is likely to be limited. The fourth angel spoken to, stated that the relevance of patents depended on the sphere, which means that the entire situation needs taking into account. The sphere can be related to Teece’s appropriability regime, an important indicator of a start-up’s success prospects which will be discussed in greater detail in Sect. 3.1. The angel investors’ responses suggest that patents provide an effective indicator that enhances the designer-entrepreneur’s prospect of securing equity investment. Market proximity, which can be measured based on sales, orders, or expressions of interest, increases a venture’s credibility. In line with earlier insights, John Hutton, who joined Cupris as Business Development Manager in 2013 argued that early patenting may delay market entry (Hutton 2013).

Whilst market proximity and patent ownership both matter, the two attributes may stand in conflict with each other during the early stages of a design-led start-up.

As highlighted in the preceding section, angel investment differs from venture capital in that the latter is usually a higher budget covered by a range of investors who are represented by a venture capitalist. One such venture capitalist, Carlos de Pommes (2014), confirmed that “Angel investors do want to see patents, and they get very nervous when they do not see patents. And that is much due to the lack in sophistication of investors, and especially of those angel investors.” He further explained that “… when you hear investors or incubators say: Patents are the most important thing, it is because it is the only tangible thing that they can actually articulate.” (de Pommes 2014) De Pommes highlights the value of secrecy, while Itxaso Del Palacio, another venture capitalist, pointed out in 2013: “I have fourteen start-ups in my portfolio. None of them have filed any patent. None of them!”

By the way, the designer-entrepreneurs’ wide-spread fear of having ideas and concepts adopted by third parties when conveying details to investors is not justified. De Pommes explained that “Companies need to have the strategic intent to
want to do something in this area …” (de Pommes 2014). Angel investors and venture capitalists do not develop ventures themselves, which is why they are not in the position to adopt and exploit the IP of others. “The goal [of investors] is to invest, it is not to start their own companies, and they are not going to take your idea” (Del Palacio 2011). The threat of imitation rests with strategic partners who may turn their back on the inventor.

**Investibility**

Itxaso Del Palacio highlights three key criteria for judging the investibility of a venture:

- Team (Backgrounds, experience, interpersonal relations)
- Target market (Scalability of business)
- Technology

These three areas in combination with finance and IP provide key development aspects, which this book refers to as business development attributes.

Some of the ventures examined in the preceding section sought equity investment, others chose to limit costs to avoid shredding equity. Del Palacio (2013) confirms that “Not everybody needs capital… many ideas are not capital consuming, so you don’t need them… there are other sources of capital.” Del Palacio refers to smart money as alternative, and potentially more valuable funding sources than venture capital (Del Palacio 2013) Focusing on bootstrapping and on deploying a sales-oriented approach can be advisable. In relation to sales, Del Palacio explains: “You are not an entrepreneur because you raise money, but because you make money.” She remains unphased if entrepreneurs claim to have raised high sums, unless there is a track-record of successful sales. Direct sales are crucial because venture capitalists track entrepreneurs and companies over a period of time.

The costs and time required to pursue a patent route can only be justified if the long-term business development trajectory is significantly greater than that which a venture would be experiencing without patent protection. The relationship between business success, i.e. business growth, and patenting, or IPR in general, will be further examined in Chaps. 4 and 5. Judging by the responses of the interviewees, there is little middle ground, which would allow designer-entrepreneurs to mitigate the funding requirements and the associated risks without outright abandoning patent protection. De Pommes explains: “Patents are there to defend your business. But there are other ways to defend your business.” (De Pommes 2014) So what are the alternative routes to defend your business? The above analysis suggests that the designer-entrepreneur has the choice whether to opt for a sales-oriented business development strategy combined with a bootstrap approach, or for a patent-based business development strategy, and pursue an equity-investment route. Whilst sales-driven strategies appear to speed up the route-to-market, it is not yet clear whether or not this limits the potential business growth.
Insights
Angel investors take a keen interest in the possibility of patent protection. Some even expect patents to be in place by default. However, other aspects such as the relationship between the invention and the target market environment matter, too.

For raising venture capital, start-ups need to be further developed, and, ideally, show proof of market, i.e. have a record of sales. Venture capitalists rate proximity to market and market prospects as more significant than patents.

Besides financial resources and knowledge/IP, the team itself, the business scalability (market), and the technology/design per se, form the key business development attributes.

2.4 Design Innovation Strategies and IP

With a view on the dichotomy between sales-oriented strategies on the one hand, and IP-centric strategies on the other, we can examine the likely implications for the route-to-market. Whilst juxtaposing IP and sales orientation, we can differentiate between formal registered IP, i.e. patents and design rights/design patents, and secrecy, a different way of protecting knowledge and IP. Based on the deployment of these different mechanisms, development steps can be mapped out on a time-line in accordance of priorities (Figs. 2.20, 2.21 and 2.22). Separating formal IPR into those which protect technological qualities, namely patents, and those related to the visual qualities (product language), namely registered design right or design patents, produces four development aspects in total: product language, secrecy, technology IP, and sales. The aspect of branding is not considered at this stage, because it typically takes a business considerable amounts of time to develop brand recognition amongst target audiences.

The three schematic simplifications above (Figs. 2.20, 2.21 and 2.22) illustrate ways in which the early-stage development phase may roughly pan out for a start-up. The sales-focused approach (Fig. 2.21) is the most straightforward. The technology-focused approach (Fig. 2.20) may lead to a small patent portfolio, whereas a focus on product-language may lead to a coherently designed product range. The diagrams mark out IPR-related aspects and introduction of sales in yellow.

Securing patents is perceived as time-consuming and costly. If time and seed funds need to be set aside for patenting (usually around US$5–6 K for national patents, and roughly the same amount for PCT applications as well as for
registration in any European country), then less time and finances can be committed to other business development needs such as prototyping, production development, and market research. Registered designs can be obtained significantly cheaper and faster than patents, suggesting that those designer-entrepreneurs who opt for an early patent enter markets later than those who neglect the patenting option in the beginning in favour of a design-driven or sales-driven strategy. However, the
effectiveness of registered design rights requires verification, as there are limited precedences which would reveal how easy or difficult it is to build businesses through design-driven approaches.

It is clear that designer-entrepreneurs need to decide very early, to what extent design developments are worth decelerating to allow for the pursuit of patents. The next section examines the key business development attributes to develop a framework that allows to systemically evaluate the potential benefits of investing time and resources in the development of exclusive product languages in conjunction with innovative start-ups.

2.5 The Development Attributes of an Innovation Business

The strong inter-dependency between IPR investments and funding needs is evident in the responses of the interviewees. However, whilst the designer-entrepreneurs’ presumption that patents are a prerequisite to secure investment is shared by angel investors, it is not shared by venture capitalists. Designer-entrepreneurs who de-emphasise or abandon patents tend to reach markets earlier, which implies that tech-driven strategies harnessed through patents are likely to require more development time by comparison. Complementary assets such as exclusive access to materials (e.g. KwickScreen) and facilities (e.g. Concrete Canvas), and access to distribution networks (e.g. Squease, Orbel) can be equally, if not more significant than IPR. This relates back to the sphere mentioned by one of the angel investors mentioned in Sect. 2.3. At the same time it has to be acknowledged that patents can facilitate the access to complementary assets. At least they may enhance the designer-entrepreneur’s bargaining position, be it just due to the confidence which they help generate amongst the patent owners.

The investors’ expectations towards IP as articulated above have an influence on the perceptions of the designer-entrepreneurs and their mentors, and the director of InnovationRCA, Nadia Danhash, confirmed that the initial focus on patents within the incubator was originally incentivised by NESTA, one of the incubator’s main funding bodies. However, this does not prove that patents are actually beneficial to the venture’s success prospects. A striking proportion of the designer-entrepreneurs interviewed above expressed doubts about the real benefit of patents. All interviewees concurred in claiming that patents were expensive and time consuming to obtain. Furthermore, patent infringement is generally perceived as difficult for micro-scale start-ups to litigate due to the lack of capital.

In light of the points made by the venture capitalists, we may argue that avoiding the sacrifice of equity when sourcing seed-funding through bootstrapping or smart funding strategies, does not rule out the possibility of securing venture capital funding at a later stage, in particular since venture capitalists do not rate IP quite as high as angel investors do. This means that bypassing IP at an early stage does not automatically limit the potential business growth trajectory.
Patenting can slow down the development of start-ups. Those inventors who de-emphasise the patent route, tend to be more sales-oriented and they generate revenue at an earlier point in time. Patenting is only needed for exclusivity, and only once the public disclosure of technical concepts is immanent. The issue with the start-ups examined in this part of the book, is that they all evolved from academic studies. Therefore the technologies were all exhibited in public during degree shows. Such public exposure can be compromising.

Venture capitalist Itxaso Del Palacio had named three key investibility criteria: team, target market, and technology. To allow for product language-related issues to be captured, we may want to replace the term technology with design proposition or proposition.

The interview transcripts used for the case studies were analysed to verify the designer-entrepreneurs’ most prominent concerns. Concepts were highlighted and marked out in order to verify the number of references. Many of the references fell neatly into these three categories:

References to issues like knowledge, expertise, competencies as well as commitment, credentials etc. could be linked to the team development.

Development pace, development incentive, product development, as well as ideas, concept, novelty can be allocated to proposition. The concept technology was replaced with the term proposition, so that its coverage could be extended to include design. The reason for including design (in the sense of product language) was to not limit the inventive aspect to technology alone.

Public relations, target audience, competitors etc. were concepts that could be associated with target market. At this point we may prefer to drop the prefix target because designer entrepreneurs are not always clear about where and how their design proposition is best applied (Figs. 2.23 and 2.24).

Although most of the key concerns unveiled during the interviews with the seven designer-entrepreneurs can be mapped against the three criteria mentioned by Del Palacio: team, proposition and market, some rather prominent issues cannot be allocated to any of the three areas. The majority of the latter relate to IP on the one hand and finances on the other. Del Palacio’s articulated the three criteria in response to what investors are looking for, i.e. she discussed them in relation to finances. After adding finances as a fourth business development attribute, the vast majority of summative key terms gathered can be accommodated. One area that was less frequently discussed during the interviews was that of assets. Although some

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Fig. 2.23 The identification of variables within this Venn diagram was based on the most simple premise: a design team (or lone inventor) incepts a design proposition, which they (or he or she) take(s) to market.
designer-entrepreneurs, such as the team behind Concrete Canvas, entered strategic partnerships in order to access complementary assets—Concrete Canvas found use in a disused factory—this area did not come to mention as often as any of the others. However, complementary assets are important aspects in relation to appropriability regimes and dominant designs, and were added as a sixth business development attribute in consideration of the possibility that they were overlooked by the designer-entrepreneurs interviewed in Sect. 2.1.

If the five business development attributes team, proposition, market, finance and assets are seen as areas that need constant development and that they are permanently interdependent, a circular diagram as shown on the right-hand side of Fig. 2.24 could be more appropriate than the elongated version shown in Fig. 2.24. However, the interviews conducted in Sect. 2.1 revealed that during the early business development period designer-entrepreneurs had little knowledge and understanding of market characteristics and penetrability, and limited access to assets. In most cases discussed in 2.1, the proposition and the invention-specific knowledge constituted the only selling point at the outset. Therefore the team and the IP constitute determining independent variables, which Creswell refers to as ‘predictors’ (Creswell 2014, p. 52). The situation related spin-outs grown within medium or large corporations, may be very different and much more in line with the diagram on the right-hand side of Fig. 2.25 because these ventures have access to the corporation’s assets, and teams can be configured more freely in relation to the development needs surrounding a proposition, because candidates can be selected from a comparatively large pool of employees. The elongated model will be given preference here, because this book focuses on small independent start-ups that tend to have very limited team building capabilities and limited flexibility in changing team constellations other than recruiting additional team members. At the same time, it must be acknowledged that businesses will function in much less linear
fashion once established. The circular interlinking of business development attributes becomes gradually more appropriate, as a business begins to establish itself as a profit-generating entity with tried and tested operations in place.

To further clarify the nature and interdependencies between business development attributes, it is important to bring the time factor into equation. Business development attributes constitute variables the nature of which changes over time. Creswell (2014, p. 52) specifies the temporal order of variables as one of the two distinguishing characteristics. The other characteristic is the measurement or observation that relates to an individual variable. The significance of individual variables is highly likely to change over time, meaning that the dependencies also change as the venture develops. The value of a patent can depreciate as a patent matures, and the technological context also changes which can lead to technology obsolescence and technology substitutes. This in combination with the fact that more than one independent variable determine individual dependent variables, means that the framework to describe the design business start-up development needs to be multi-linear.

The seven business development aspects shown in Fig. 2.24 can be subdivided into primary and secondary aspects. The team, the knowledge held in relation to the proposition, and the proposition itself can be regarded as primary aspects which are strongly interdependent. Finance needs, the market and complementary assets, as well as IP constitute secondary aspects, which may be largely unknown to the team in the beginning, in particular if the start-up is incepted in an academic context. A potentially significant aspect which has thus far been de-emphasised is that of brand values. Branding does not play a major role in the early stages of a business development, because brand recognition can only be developed over time and through the continued exchange with other industry stakeholders. As highlighted in Sect. 2.1, the name of Roland Lamb’s company changed several times, and so did the shape of Gregory Epps visual trade mark. Until a company is established, there is a degree of flexibility attached to the brand articulation. The latter may prove to be more significant in conjunction with business-to-consumer products, as opposed to business-to-business products. With single-product companies such as the ones

Fig. 2.25  Here three variables were added: IP, finance and assets, the variables in relation to which Del Palacio had discussed the significance of team, proposition and market
discussed in Sect. 2.1, the product brand is typically more significant than the company brand. The ultimate goal behind managing the key business development attributes is business growth. The secondary aspects are characterised through a range of iterations depending on the maturity of the business priorities change, e.g. from strategy development to implementation to strategy management (Fig. 2.26).

It is important to emphasise that this book focuses on the business development attributes of start-ups with a focus on design. It discusses how the required capabilities are developed and acquired over time, and how these affect a start-up’s success-prospects. This means that the variables need to be mapped out on a time-line (Fig. 2.27). Business development attributes develop over time and in dependence of one another.

At the outset, independent small start-ups have little to rely on other than the team, as well as the design proposition that is nourished through the team’s existing knowledge. Team roles and responsibilities depend on the requirements of the proposition and on the knowledge held by individual team members. The selection of team members may depend on their knowledge and expertise. The triangular interrelationship between team, knowledge and proposition is the driving factor at the outset of an independent design-led start-up. An understanding of suitable markets and market niches often evolves gradually over time, and assets are often...
far from reach in the beginning. Finances are needed to secure asset accessibility, and the design proposition determines which markets or market niches are of interest.

The interviews carried out within InnovationRCA suggest that the interdependencies between finance and IP dominate the list of concerns amongst designer-entrepreneurs. The comparative analysis of interview transcripts point towards a strong interrelationship between those two factors. The designer-entrepreneurs perceive patents as a prerequisite for securing angel investment, and conversely angel investment is required to fund this comparatively expensive form of IP. On the other hand, venture capitalists seem more focused on market access and available assets by comparison. This suggests a misalignment of perceptions with respect to what shapes the credentials of a design-led start-up.

The financial needs depend on the IP strategy as well as on product itself, because the latter requires complementary assets (non-financial assets) to become market-ready (materials, production etc.) Conversely one can argue that the more access to complementary assets already exists, the less financial resources are required. This means that finances and access to complementary asset are interdependent variables. The IP strategy and financial needs can also be considered as interdependent, as the availability of financial assets determines what formal IP can be afforded, and in which territories it can be secured. These interdependencies lead to a conundrum which can make decision making difficult. In the course of the remainder of this book, we will discuss scenarios which facilitate the identification of independent and dependent variables, and the clarification of dependencies is critical for strategy developments.
The market environment influences both the sales strategy and possible market positioning. In the long run, the sum of these business development factors determines the market power, which also derives from the control over complementary assets. The latter may be increasingly integrated, as shown in the example of the Seaboard, who acquired Juce, a software platform, in 2014. Business growth depends on the sales strategy, the control over assets, and it results from the level of market power. The purpose of this book is to determine the way in which IP interacts with the other factors mentioned above.

What is worth noting is that the relevance of IP exists from the outset in the form of proposition-related knowledge held within the team. IP strategies are developed and IPR acquired in response to this knowledge. IP is a development aspect that is closely linked to most other business development attributes. The question that arises is how existing and emerging knowledge is best managed in support of the development of the other variables within the business development framework.

**Insights**

All of the inventions discussed in Sect. 2.1 were aimed at more or less radical innovations which means that they were hoped to have a disruptive impact on the respective business environment. The information gathered in conjunction with the case studies in this section suggests that:

- Most designer-entrepreneurs perceive patents as a prerequisite to initiate a proprietary growth business.
- Angel investors share this point of view, whereas venture capitalists highlighted other criteria such as market size, market proximity and market accessibility as more important.
- Patents are expensive and time consuming to obtain.
- Patent infringement was thought to be difficult to litigate for micro-scale start-ups due to the lack of available capital.
- The patenting process is believed to slow down the development of start-ups.
- Inventors who de-emphasised the patent route, tend to be more sales-oriented and are likely to generate revenue at an earlier point in time.
- Some of the case studies revealed that equity investment could be by-passed through boot-strapping. Focusing on first-mover advantages and/or secrecy provided alternative means of building defences against competitors.

Registered design rights and also design patents are easier and faster to obtain than (utility) patents. The question is whether they are robust enough to provide alternative avenue to designer-entrepreneurs. If they are, they could speed up the route-to-market and to reduce initial funding needs. Registered design rights and design patents protect different characteristics of a design proposition, namely the visual rather than the functional. However, if they are
sufficiently robust, they could help to delay the need for patent filing, until a working prototype is developed. They could prevent premature patent filing, and thus mitigate the risk of having to file follow-up patents, as required for Orbel and the Seaboard for example.