Scottish Enterprise Commercialisation Programme Review

Working Paper 9: Company Journey by Branscomb Stage

Scottish Enterprise

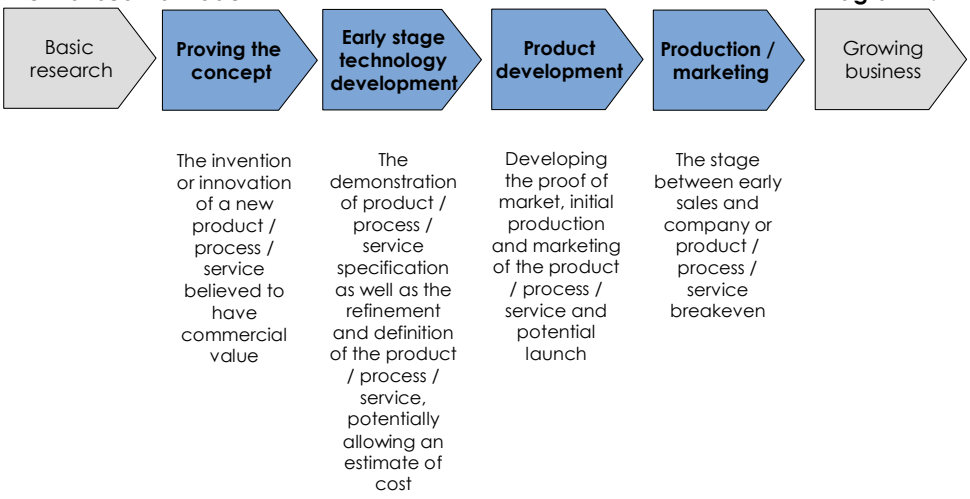
1 Company Journey by Branscomb Stage

This working paper summaries the company journey from the generation of a concept that has commercial value to a position where the company has passed breakeven and is in the growing business stage.

1.1 Method

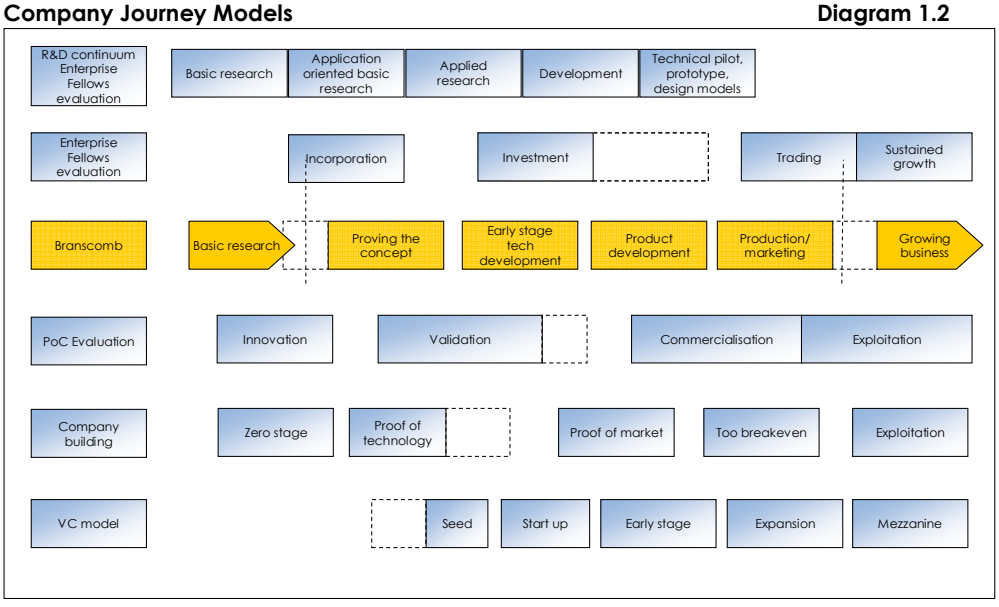
In order to analyse the journey of technology based companies the five stage Branscomb model was used. This model outlines the journey from an idea that has commercial potential to a growing or mature business maximising sales and generating a profit. The model, with definitions at each stage, is outlined in Diagram 1.1 below.

The Branscomb Model **Diagram 1.1**



While the Branscomb model has been used, it is recognised that this is a simplification of the journey of new or technology based businesses. It is also one of a number of different models, which are outlined in Diagram 1.2 below.

Company Journey Models **Diagram 1.2**



The Branscomb model has been used as it represents a consistent framework around which a core set of questions could be asked. This way greater detail on the company

journey could be collected in a consistent manner in a way that meant something to the businesses. At each stage the core question set covered:

- company objectives for the stage
- who the companies worked with during the stage
- the time taken to meet the objectives for the stage and associated costs
- the finance sources used to fund the activities at each stage
- how the finance was used
- what the key barriers were during the stage and how these were overcome

Within each of these topics a prompt hierarchy was used. This essentially breaks the possible answer sets into two areas:

- the first covering the headline response (these were used to prompt companies if they were having difficulty answering questions)
- the second covering more specific answer under each of the different prompts

For ease of analysis the findings in this working paper cover the headline responses in bold, with the specifics of that response in normal text[1].

1.2 Who are the Commercialisation Companies?

The commercialisation companies covered a range of different business types, industrial sectors, sizes and ages. Before covering the journey of the firms it is appropriate to look at the key characteristics of the firms.

Overall, 95% of the companies were private limited companies. There were small proportions of companies falling outside of this group including private unlimited companies (3%), sole traders (1%) and pre incorporated entities (1%).

The majority of the companies had been trading for over three years (64%). The remaining companies can be classified as:

- trading for between 2-3 years (16%)
- trading between 1-2 years (11%)
- trading for less than 1 year (7%) or pre trading (2%)

The age of the businesses is reflected in the Branscomb stage, with around one third falling within the growing business stage (34%) and a further quarter in the production/marketing stage. Around one fifth of the companies (18%) were at the product development stage, while 15% were in the Technology Development stage. Just 7% of the companies were at the initial proving the concept stage.

The companies surveyed were almost entirely small businesses (94%), breaking down as:

- 56% in the micro category (less than 9 employees)
- 38% in the small category (between 10 and 49 employees)

Just 5% of the companies were classified as medium sized businesses (employing between 50 and 249 staff) and one company was large (employing over 250 staff).

[1] Note that the headline and specific responses are calculated from the same base. This means the specific response is not a subset of the headline response, but a response in its own right

1.3 Experience of Commercialisation Company Management Teams

Company business and management teams are seen as vital components in growing successful businesses. The company survey included a question on the past business experience of the current management team and any business oriented training that they had participated in.

Overall, 85% of the companies suggested that their current management team had some form of previous business experience. This experience can be split into two broad areas:

- **general business experience**, including:
  - previous start up experience (74%)
  - previous direct management experience (67%)
  - previous experience of generating sales for new products/processes/services (63%)
- **innovation specific experience**, including:
  - previous experience of invention or innovation (65%)
  - developing a market for a new product/process/service (64%)
  - developing prototypes for new products/processes/services (60%)
  - protecting Intellectual Property for new products/processes/services (60%)

This suggest that there is a great deal of previous business experience across the 100 companies management teams. However, this does not provide information on the experience of the management team at the pre incorporated and start up stage. As the companies have developed they will have increased the size of their management team as investors are brought on board and as new staff are recruited to drive the business.

It is also important to note that sales is one of the more generic business areas that was cited by a lower proportion of companies and that the more specific innovation or technology focused experience was cited less than more generic business experience.

In relation to training, the majority of companies (62%) suggested that their current management team had attended some form of training around business start up and growth in the past. Again, this can be split into two broad areas:

- **general business experience**, including:
  - management training/advice (38%)
  - start up training/advice (35%)
  - sales training (31%)
  - training in marketing or market research (28%)
- **innovation specific experience**, including:
  - training in Intellectual Property protection (21%)
  - training in developing prototypes for new products/processes/services (19%)

The overall finding suggests that the company management teams have accessed training but it is apparent that this training is split over a wide range of areas, both generic and specific to technology based businesses. The generic training was cited the most, though this still represents less than a third of the companies with innovation specific training cited less.

1.4 Proving the Concept Stage

The proving the concept stage can be defined as the invention or innovation of a new product/process/service that is believed to have commercial value. It represents the first stage on the Branscomb model.

1.4.1 Company objectives

The key company objectives at this stage covered a wide range of areas. The main responses centred on:

- **research and development** objectives (83%), focused on:
  - testing the feasibility of ideas (68%)
  - developing a prototype (38%)
  - overcoming technical problems (34%)
- **developing new products/processes/services** (50%), focused on:
  - developing new products (44%)
- **understanding the market** (50%), covering:
  - investigating routes to market (37%)
  - understanding the size of the domestic market (34%)
- **accessing funding** of some sort (45%)

This stage is therefore focused on testing the feasibility of ideas and developing new products. However, it is striking that half the firms are looking to understand the market, while less surprising that just under half are looking for funding. At this stage sales and access to external private sector support are a low priority with around 1 in 10 companies suggesting these as objectives.

There are some differences across the different groups of commercialisation companies, including:

- companies with a life sciences focus were more focused on R&D objectives and accessing funding than companies with an enabling technology focus
- companies who accessed university delivered projects were more likely to have a focus on R&D objectives and less of a focus on understanding the market
- companies who had engaged with four interventions were more focused on R&D objectives, understanding the market and accessing funding than companies who accessed one intervention

1.4.2 Company Support

The companies were asked who they worked with at the proving the concept stage to meet their objectives. The main responses covered:

- **the public sector** (75%), focused on:
  - Scottish Enterprise(69%)
  - Scottish Government (36%)
- **other businesses** (45%), focused on:
  - customers (33%)
- **universities/colleges** (44%), mainly covering:
  - Scottish universities (40%)

There are differences across the different groups of commercialisation companies, including:

- companies with a life sciences focus were using Scottish Universities more than companies with an enabling technology focus

- companies who accessed university delivered projects were more likely to use a Scottish university than companies who accessed wider support projects
- a greater proportion of companies who had engaged with four interventions were working with other businesses and Scottish universities than companies who accessed one intervention

1.4.3 Timescales

Companies were asked how long the proving the concept stage lasted.

The most frequently cited timescale by the businesses covered 6-12 months, with just under a third of businesses saying this was how long it took them to progress to the next stage of development. However, there is wide variation in this with around 54% of the companies suggesting this stage took over 1 year.

While the above analysis provides some idea of the different timescales cited by businesses for the proving the concept stage, it is appropriate to look at the average time across all the companies. The average across all the companies was 16 months. Looking at the average by the different types of companies, sizes, focus and origin some notable differences arose including:

- a longer average for energy companies at 25 months (in effect over 2 years)
- a marginally longer average for companies who had been trading for three plus years at 19 months

There were no real difference in timescale between spin out companies or non spin outs, different sized companies and companies who accessed university projects and non university projects.

1.4.4 Costs

Companies were asked what the costs were associated with meeting their objectives at the proving the concept stage.

The two most frequently cited costs at the proving the concept stage were £50,001-£100,000 and £100,001-£200,000 cited by 25% of companies each. However, 10% of companies suggested that the cost was over £1,000,000.

While the above analysis provides some scale to the funding requirement for the proving the concept stage, it is appropriate to look at the average across all the companies. The average cost for the proving the concept stage amounted to around £303,000. Looking at the average by the different types of companies, sizes, focus and origin some notable differences arose including:

- a higher average cost for energy companies at £545,000 and a lower average for the small number of companies without a specific Scottish Enterprise enabling technology focus (£83,000)
- a higher average cost for the small number of pre trading organisations at £535,000
- a lower average cost for current medium sized companies at £71,700
- a higher average cost for companies accessing no university projects at £346,300
- a higher average cost for spin outs at £581,900
- a higher average cost for companies who had accessed 2 commercialisation programme interventions at £529,200 and a lower cost for companies who accessed 6 interventions (£136,700)

1.4.5 Finance sources

In order to understand the sources of investment in the companies, the origin of the funding for the proving the concept stage was asked.

The main sources of funding cited by the companies included:

- the **public sector** (75%) including:
  - Scottish Enterprise (65%)
  - Scottish Government (38%)
- **own money** (55%), mainly through:
  - own money/back pocket (53%)
- The **private sector** (48%), covering:
  - angel investors (26%)
  - banks (21%)
  - venture capital firms (13%)

Around a fifth of companies funded this stage through **company linked finance**, such as cash flow or overdraft facilities.

There were some differences across the different companies who had accessed the commercialisation programme, including:

- a greater proportion of companies with a life sciences focus were accessing private sector funding than companies with an enabling technology focus
- a greater proportion of companies who accessed four interventions cited private finance sources than companies who accessed one intervention
- companies who accessed university delivered projects cited the private sector and company linked money less as sources of finance than companies who had accessed wider support projects

While the public sector is a main source of finance, the values above represent sources of funding rather than the scale of funding. The questionnaire didn't cover the scale of funding across the different groups, but the discussions with the companies suggest SE provides a matching role or a top up to wider funding sources.

Qualitative discussions with companies did provide some insights into the scale of funding. Two key examples are outlined below:

- one company accessed a Scottish Government SMART grant of £40,000, with a top up £15,000 being provided by Scottish Enterprise
- another company accessed a SMART award of £70,000, with additional funding from the Edinburgh Technology Fund of £30,000

In the first example Scottish Enterprise contributed 27% of the £55,000 total.

1.4.6 Use of finance

The main uses of finance at each stage were explored with the companies, looking at just what they needed the resources for.

The main use of the finance accessed at the proving the concept stage was used to:

- pay **personnel** (88%) including:
  - salaries (86%)
- pay for **equipment** (65%) including:
  - instruments and equipment (61%)
- cover **overheads** (55%)

Around two fifths (38%) of the companies were using the money to pay for Intellectual Property protection. There was little use of money for staff training (11%) or external technical or business support (16% each).

1.4.7 Barriers

Companies were asked about the main barrier at the proving the concept stage. The main barrier was then probed in greater detail.

The main barrier cited by the companies focused on **access to key variables** (53%) – largely translating into lack of finance (44%). This was the most commonly cited barrier by some way with the next main barrier being technical uncertainties, cited by 29% of companies at the proving the concept stage.

A broad range of other barriers were cited but these were mentioned only by a small number of companies in each case (less than 10% of the companies surveyed).

There were no major differences in the main barrier cited by companies with either a life sciences or enabling technology focus, or companies who accessed either a university or non university project. However, a higher proportion of companies who accessed four interventions cited lack of finance as a main barrier than companies who accessed one intervention.

Focusing on the main barrier – lack of finance – there were a number of specific points raised about this issue. While this does reflect access to finance for some companies it also incorporates:

- the time taken to actually get funders to commit to investment – and the effort in getting the funding in place
- the time taken for the money to actually be moved from the funder to the company – slowing development
- the limits finance places on the ability of businesses to recruit the best people for key posts

A number of companies were asked if more money quicker would have accelerated their business growth. While all businesses suggested more money would always be welcome a number questioned if this might have made them less disciplined in their operations and actually led to slower progress. It is also important to note that a large proportion of the businesses surveyed had successfully progressed through this stage, suggesting that finance is a barrier rather than a brake on progress.

1.5 Technology Development Stage

The technology development stage covers the demonstration of product/process/service specification as well as the refinement and definition of the product/process/service, potentially allowing for an estimation of cost. It represents the second stage on the Branscomb model.

1.5.1 Company objectives

The key company objectives at this stage covered a wide range of areas. The main responses centred on:

- **prototype development** (75%), focused on:
  - proving the prototype works in the real world (65%)
  - proving that the prototype can be produced on a large scale (49%)
- **understanding the market** (65%), focused on:
  - wanting to understand what end users would pay (40%)

        - wanting to understand the size of the export market (38%)
        - wanting to understand the size of the domestic market (36%)
- **access funding** (49%), focused on:
        - accessing Scottish Enterprise finance (39%)
        - accessing equity investment, through venture capitalists or angel investors (36%)

Around two fifths of the companies (39%) suggested that **developing intellectual property protection** was a main objective – focused on actually getting protection in place (36%). A similar proportion were looking at **testing the product/process/service** (38%) and **developing sales** (36%).

There were some differences across the different types of company who had participated in the commercialisation review, including:

- companies with an enabling technology focus cited understanding the market and generating sales more as objectives than did companies with a life sciences focus
- companies who accessed university delivered projects cited understanding the market less than those who did not access a university focused project
- a greater proportion of companies who accessed four interventions cited accessing funding, understanding the market and developing sales than companies who accessed one intervention

1.5.2 Company support

The companies were asked who they worked with at the technology development stage to meet their objectives. The main responses covered:

- **the public sector** (86%), focused on:
        - Scottish Enterprise (81%)
        - Scottish Government (43%)
- **other businesses** (56%), focused on:
        - customers (39%)
        - other Scottish businesses (26%)
- **universities/colleges** (31%), mainly covering:
        - Scottish universities (26%)

There are differences across some of the different groups of commercialisation companies, including:

- a greater proportion of companies who accessed four interventions worked with customers, Scottish universities and private sector R&D companies than companies who accessed one intervention
- a greater proportion of companies with an enabling technology focus cited understanding the market and developing sales than life sciences companies

1.5.3 Timescales

Companies were asked how long the technology development stage lasted.

The most frequently cited timescale by the businesses covered 6-12 months, mentioned by almost half of the firms (45%). A further 28% suggested that the stage lasted between 13-18 months, though 10% suggested that this stage lasted for over 2 years.

While the above analysis provides some idea of the different timescales cited by businesses for the technology development stage, it is appropriate to look at the

average time across all the companies. The average across all the companies was 14 months – marginally down on the first stage. Looking at the average by the different types of companies, sizes, focus and origin some notable differences arose including:

- a longer average for energy companies at 18 months
- a longer timescale for companies who had been trading for at least 2 years at 21 months
- a longer timescale for companies who had accessed 4 commercialisation projects at 17 months

There were no major differences across:

- the different sizebands
- the companies who had received support from a university project or non university project
- the spin out and non spin out companies

1.5.4 Costs

Companies were asked what the costs were associated with meeting their objectives at the technology development stage.

The main scale of cost at the technology development stage was £50,001-£100,000, though 9% of the companies at this stage suggested that they used finance of over £1,000,000.

While the above analysis provides some scale to the funding requirement for the technology development stage, it is appropriate to look at the average across all the companies. The average cost for the technology development stage amounted to £417,000 – up on the previous stage. Looking at the average by the different types of companies, sizes, focus and origin some notable differences arose including:

- a higher average cost for energy companies at £881,300 and a lower average for the small number of companies without a specific Scottish Enterprise enabling technology focus (£83,000)
- a higher average cost for companies trading for up to 2 years at £606,100
- a higher average cost for small companies (employing between 10 and 49 staff) at £592,300
- a lower average cost for companies who accessed non university projects at £346,300
- a higher average cost for non spin out companies at £427,000
- a higher average cost for companies who had accessed 4 intervention at over £1million

1.5.5 Finance sources

In order to understand the sources of investment in the companies, the origin of the funding for the technology development stage was asked.

The main sources of funding cited by the companies included:

- the **public sector** (83%), including:
    - Scottish Enterprise (71%)
    - Scottish Government (51%)
- The **private sector** (61%), driven by:
    - angel investors (36%)
- **own money** (39%), driven by:
    - own money/back pocket (36%)

Just over a third of the companies used **company linked finance** (36%), with firms sales being the main part of this (cited by 31% of the companies at this stage).

Again, there were differences across the different companies that had engaged with the commercialisation programme, including:

- a greater proportion of the companies who accessed four interventions accessed private sector finance, but a higher proportion of companies who accessed one intervention used company linked finance
- companies who did not access university delivered projects cited the private sector and company linked money more as sources of finance than those who accessed university projects

While the public sector is a main source of finance, the values above represent sources of information rather than scale of funding. The questionnaire didn't cover the scale of funding across the different groups, but the discussions with the companies suggest SE provides a matching role or a top up to wider funding sources.

Qualitative discussions with companies did provide some insights into the scale of funding. Three key examples are outlined below:

- one company accessed venture capital finance of £250,000 (with no other funding source used)
- another company accessed £400,000 of venture capital finance and £100,000 of Scottish Enterprise finance
- another company accessed venture capital investment of £450,000, £100,000 of Scottish Enterprise investment and a Small Firm Loan Guarantee worth £185,000 at this stage

In these examples Scottish Enterprise contributed 33% of the second example total of £500,000 and 13% of the third example total of £735,000.

1.5.6 Use of finance

The main uses of finance at each stage were explored with the companies, looking at just what they needed the resources for.

The main use of the finance accessed at the technology development stage was used to:

- pay **personnel** (94%) including:
  - salaries (92%)
- pay for **equipment** (66%) including:
  - instruments and equipment (61%)
- cover **overheads** (58%)
- pay for **intellectual property protection** (47%)

Again there was little use of money for staff training (11%) or external technical (25%) or business support (16%).

1.5.7 Barriers

Companies were asked about the main barrier at the technology development stage. The main barrier was then probed in greater detail.

The main barrier cited by the companies focused on **access to key variables** (70%) – largely translating into lack of finance (67%). This was the most commonly cited barrier by some way and up on the previous stage, with technical uncertainty being the second main barrier, cited by just over a quarter of the businesses (27%).

Again, a broad range of other barriers were cited but these were mentioned only by a small number of companies in each case (only changes in the market at 13% was mentioned by more than 10% of the firms).

Focusing on the main barrier – lack of finance – the issue at this stage was more closely associated with the traditional lack of finance – with this being cited by most companies suggesting this as a barrier. While the time and slow release of funds were both mentioned at this stage the focus was on lack of funds and the limited funding to recruit the best people to develop the business.

At this stage there were differences in some of the secondary barriers across the different companies who make up the commercialisation programme, including:

- a greater proportion of companies who accessed four interventions cited lack of finance as a main barrier than companies who accessed one intervention
- companies who accessed university delivered projects were more likely to cite market factors (covering changes in the market and competitors developing similar products/processes/services) and lack of skills (especially finance and technology skills) than companies who accessed other types of support
- a higher proportion of companies with an enabling technology focus cited lack of finance as a barrier than life sciences companies

1.6 Product Development Stage

The product development stage covers developing the proof of market, initial production and marketing of the product/process/service up to and including a potential launch. It represents the third stage of the Branscomb model.

1.6.1 Company objectives

This stage is characterised by a wide range of objectives covering ongoing technology development, pricing, market analysis and the generation of sales. Taking the responses in order of important this breaks down as:

- **developing sales** (72%)
- **market factors** (63%), focusing on:
    - investigating routes to market (48%)
    - understanding the size of the domestic market (45%)
    - understanding the size of the export market (40%)
- **developing appropriate pricing** (57%), focusing on:
    - wanting to develop appropriate pricing structures (47%)
    - wanting to understand what end users would pay (45%)
- **further technology validation/refinement** (48%)
    - wanting to refine/tweak the product/process/service (37%)
    - wanting to enhance the product to meet market need (35%)
- **accessing funding** (45%), focusing on:
    - accessing equity investment, through venture capitalists or angel investors (40%)
    - accessing Scottish Enterprise support (30%)

Branding/marketing (43%) was also mentioned by just under half of the companies, while wider **external analysis** was cited by around a quarter of the firms (23%).

Again, there were some differences between the different firms who make up the commercialisation programme, including:

- a greater proportion of companies with an enabling technology focus were looking at developing appropriate pricing and investigating routes to market than life sciences companies
- companies who accessed university delivered projects were more likely to cite access to funding as an objective than non university projects and cite branding/marketing less
- a greater proportion of companies who accessed four interventions cited refining/tweaking the product/process/service than companies who accessed one intervention – though they also cited developing sales and investigating the market more as well

1.6.2 Company Support

The companies were asked who they worked with at the product development stage to meet their objectives. The main responses covered:

- **the public sector** (84%), focused on:
  - Scottish Enterprise (81%)
  - Scottish Government (27%)
- **other businesses** (51%), focused on:
  - customers (40%)
  - suppliers (22%)

Again, there were some differences between the different firms who make up the commercialisation programme, including:

- a greater proportion of companies who accessed four interventions suggested they worked with customers at this stage than was said by companies who accessed one intervention
- companies who did not access university based projects were working more with other business and private sector supports than companies who had worked with university based projects
- a greater proportion of life sciences companies were working with Scottish Universities than companies with an enabling technology focus

1.6.3 Timescales

Companies were asked how long the product development stage lasted.

The most frequently cited timescale by the businesses covered 6-12 months, mentioned by almost half of the firms (45%). A further 24% suggested that the stage lasted between 13-18 months, though 10% suggested that this stage lasted for over 2 years.

While the above analysis provides some idea of the different timescales cited by businesses for the product development stage, it is appropriate to look at the average time across all the companies. The average across all the companies was 15 months – up by one month on the previous stage.

Looking at the average by the different types of companies, sizes, focus and origin some notable differences arose including:

- a longer average for energy companies at 22 months (in effect just under 2 years)
- a longer timescale for companies who were pre trading at 24 months
- a longer timescale for companies who had accessed a university based commercialisation project at 18 months
- a longer timescale for companies who had accessed either 5 or 7 interventions (each covering 18 months)

There were also no major differences across:

- the spin out and non spin out companies
- companies of different size

1.6.4 Costs

Companies were asked what the costs were associated with meeting their objectives at the product development stage.

The main scale of cost at the product development stage was £100,001-£200,000, cited by 23% of companies, though 17% of companies suggested the cost was above £1,000,000 (with 2% of these companies suggesting costs of over £3,000,000).

While the above analysis provides some scale to the funding requirement for the product development stage, it is appropriate to look at the average across all the companies. The average cost for the product development stage amounted to £539,600 – up on the previous stage. Looking at the average by the different types of companies, sizes, focus and origin some notable differences arose including:

- a higher average cost for energy companies at £608,000 and a lower average for the small number of companies without a specific Scottish Enterprise enabling technology focus (£83,300)
- a higher average cost for companies trading for up to 2 years at £606,100
- a higher average cost for small companies (employing between 10 and 49 staff) at £775,700 and lower cost for micro businesses at £272,500
- a higher average cost for companies who accessed university projects at £764,600
- a higher average cost for spin out companies at £675,000
- a higher average cost for companies who had accessed 4 intervention at over £1.16 million

1.6.5 Finance sources

In order to understand the sources of investment in the companies, the origin of the funding for the product development stage was asked.

The main sources of funding cited by the companies included:

- the **public sector** (80%), including:
  - Scottish Enterprise (70%)
  - Scottish Government (43%)
- the **private sector** (69%), driven by:
  - angel investors (39%)
  - bank loans (32%)
- **own money** (43%), driven by:
  - own money/back pocket (37%)
- **company linked finance** (41%), driven by:
  - firms cash flow (33%)

Again, there were some differences between the different firms who make up the commercialisation programme, including:

- a greater proportion of companies with an enabling technology focus used company linked finance to fund this stage than life sciences companies
- companies who did not access university delivered projects were more likely to be using company linked finance and their own money than companies who accessed university based projects

- a greater proportion of companies who accessed four interventions were using private sector funding than companies who accessed one intervention

While the public sector is a main source of finance, the values above represent sources of information rather than scale of funding. The questionnaire didn't cover the scale of funding across the different groups, but the discussions with the companies suggest SE provides a matching role or a top up to wider funding sources.

Qualitative discussions with companies did provide some insights into the scale of funding. A key example is outlined below:

- one company accessed £187,000 of Scottish Government SPUR funding, £187,500 Small Firm Loan Guarantee money, £362,000 of Venture Capital funding and £362,500 of Scottish Enterprise money

In this example Scottish Enterprise has contributed 33% to a total investment of £1,1 million.

1.6.6 Use of finance

The main uses of finance at each stage were explored with the companies, looking at just what they needed the resources for.

The main use of the finance accessed at the product development stage was used to:

- pay **personnel** (93%) including:
  - salaries (88%)
- cover **overheads** (67%)
- pay for **equipment** (59%) including:
  - instruments and equipment (52%)
- pay for **intellectual property protection** (47%)

Again there was little use of money for staff training (19%), though it was up on the previous stages, or external technical (28%) or business support (17%).

1.6.7 Barriers

Companies were asked about the main barrier at the product development stage. The main barrier was then probed in greater detail.

The main barrier cited by the companies focused on **access to key variables** (49%) – largely translating into lack of finance (44%). This was the most commonly cited barrier by some way but down on the proportion citing this barrier at the previous stage, with **market factors**, the second most commonly cited barrier, suggested by 40% of the companies. This was largely driven by the market not being ready to apply the product/process/service, cited by 27% of the companies at this stage.

There were some differences across the range of different companies surveyed, including:

- a greater proportion of companies who accessed four interventions cited lack of finance as a barrier than companies who engaged with one intervention
- a greater proportion of enabling technology businesses cited lack of finance as a barrier than life science companies
- a greater proportion of companies who accessed a university based project cited lack of finance as a barrier than companies who accessed other projects

Again, a broad range of other barriers were cited but these were mentioned only by a small number of companies in each case. However, changes in the market (16%) and lack of skills (31%) driven by sales and marketing skills (18% and 15% respectively) also start to be mentioned by more companies – though they do remain in the minority.

Focusing on the main barrier – lack of finance – the issue at this stage was more closely associated with cash flow issues and a more traditional lack of finance, as well as difficulties getting access to equity funding as a result of a lack of sales.

Again, there were some differences between the different firms who make up the commercialisation programme, including:

- companies who accessed university delivered projects were more likely to cite access to finance and wider market factors as barriers than companies who did not access university based projects

1.7 Production / Marketing Stage

The production/marketing stage covers the early stage between product launch and product/process/service or company breakeven. This represents the fourth and final Branscomb stage before the company can be classed as a growing business.

1.7.1 Company objectives

The key company objectives at this stage covered a wide range of areas. The main responses centred on:

- **sales** (95%), focused on:
  - maximising new domestic and export markets (62% respectively)
  - maximising the potential of existing domestic markets (57%)
  - maximising the potential of existing export markets (52%)
- **market position** (69%), focused on:
  - moving ahead of competitors (33%) and becoming market leader in their sector (31%)
- **business improvement** (57%), focused on:
  - helping the business to grow or expand (52%)

While there is an almost universal focus on sales, around two fifths of the companies are looking at **product/process/service improvement** (38%). This represents a mix of refinement and tweaking (33%) and enhancing the product to meet market need (24%).

Again, there were some differences between the different firms who make up the commercialisation programme, including:

- companies who accessed university delivered projects were more likely to cite refining/tweaking the product/process/service than those companies who accessed non university projects

1.7.2 Company support

The companies were asked who they worked with at the production/marketing stage to meet their objectives. The main responses covered:

- **the public sector** (77%), focused on:
  - Scottish Enterprise (75%)
  - Scottish Government (16%)
- **other businesses** (48%), focused on:

- customers (36%)
- suppliers (25%)

At this stage there is a stronger focus on **private sector supports** (36%), driven almost entirely by private sector consultants (27%), though it still represents the minority of companies.

Again, there were some differences between the different firms who make up the commercialisation programme, including:

- companies who did not access university delivered projects were more likely to be working with other businesses than those companies who worked with university delivered projects

1.7.3 Timescales

Companies were asked how long the production/marketing stage lasted.

The most frequently cited timescale by the businesses covered 6-12 months, cited by around 43% of companies, with a further quarter (24%) suggesting the stage takes between 13-18 months to complete. There is still a small proportion (2%) who suggest that this stage takes over 5 years to complete.

While the above analysis provides some idea of the different timescales cited by businesses for the production/marketing stage, it is appropriate to look at the average time across all the companies. The average across all the companies was 13 months – slightly shorter than the previous stage. Looking at the average by the different types of companies, sizes, focus and origin some notable differences arose including:

- a longer average for energy companies at 15 months
- a longer timescale for companies who had accessed a university based project at 15 months
- a longer timescale for companies who had accessed either 4 or 7 interventions (covering 17 and 20 months respectively)

There were also no major differences across:

- the spin out and non spin out companies
- company size
- company age

1.7.4 Costs

Companies were asked what the costs were associated with meeting their objectives at the production/marketing stage.

The main scale of cost at the production/marketing stage was less than £50,000, cited by 22% of companies, with a further 17% suggesting it was between £50,000-£100,000. Just 9% of firms suggested that the costs were greater than £1,000,000 but less than £3,000,000.

While the above analysis provides some scale to the funding requirement for the production/marketing stage, it is appropriate to look at the average across all the companies. The average cost for the production/marketing stage amounted to £345,500 – lower than the previous stage. Looking at the average by the different types of companies, sizes, focus and origin some notable differences arose including:

- a higher average cost for energy companies at £450,000
- a higher average cost for companies trading for up to 3 years at £375,000

- a higher average cost for medium sized companies (employing between 50 and 249 staff) at £787,500 and lower cost for micro businesses at £176,000
- a higher average cost for companies who accessed university projects at £449,500
- a higher average cost for non spin out companies at £347,400
- a higher average cost for companies who had accessed 4 intervention at over £732,500 and 7 interventions at £975,000

1.7.5 Finance sources

In order to understand the sources of investment in the companies, the origin of the funding for the production/marketing stage was asked.

The main sources of funding cited by the companies included:

- the **public sector** (76%), largely driven by:
  - Scottish Enterprise (71%)
- the **Private sector** (60%), including:
  - angel investors (36%)
  - venture capital firms (26%)
  - bank loans (24%)
- **company linked finance** (45%), almost entirely driven by:
  - firm cash flow (41%)

Companies still suggest they are putting their **own money** into the business (41%), largely from their own back pocket/own money (41%). It is unclear if this is reinvestment of any surplus or salary, or of this represents wider investment in the company through remortgaging or other personal finance sources.

Again, there were some differences between the different firms who make up the commercialisation programme, including:

- companies who accessed university delivered projects were citing the private sector as a source of finance, but citing company linked finance less than companies who engaged with non university projects

While the public sector is a main source of finance, the values above represent sources of information rather than scale of funding. The questionnaire didn't cover the scale of funding across the different groups, but the discussions with the companies suggest SE provides a matching role or a top up to wider funding sources.

1.7.6 Use of finance

The main uses of finance at each stage were explored with the companies, looking at just what they needed the resources for.

The main use of the finance accessed at the production/marketing stage was used to:

- pay **personnel** (88%) including:
  - salaries (86%)
- cover **overheads** (72%)
- pay for **equipment** (42%) including:
  - instruments and equipment (40%)
- pay for **intellectual property protection** (37%)

Again there was little use of money for staff training (16%), or external technical (30%) or business support (19%).

1.7.7 Barriers

Companies were asked about the main barrier at the production/marketing stage. The main barrier was then probed in greater detail.

The main barrier cited by the companies focused on **lack of skills** (53%) – covering both marketing (37%) and sales skills (32%). The next main barrier covered **market factors** (53%), covering a range of areas notably:

- difficulty selling the product (29%)
- market not ready to apply the product/process/service (24%)
- changes in the market (16%)
- competitors developing similar products/processes/services (13%)

Lack of access to key variables (45%) was also cited by just under half the companies at this stage, centred on cash flow problems (24%) and lack of finance (24%). At this stage it is less access to finance and more the ability to get money in through sales that causes the problem. Some of this will be being driven by the recession, with some companies suggesting that they will have less problems if the market were to pick up, though in other cases it appears to represent lack of skills in generating sales.

Again, there were some differences between the different firms who make up the commercialisation programme, including:

- a greater proportion of companies who accessed university delivered projects cited lack of finance and lack of skills as problems than companies who did not access university based projects

1.8 Growing Business Stage

The growing business stage is when a company has broken even, is maximising turnover from the innovation and generating a profit. It represents the phase after the Branscomb stages have been completed.

1.8.1 Company objectives

The key company objectives at this stage covered a wide range of areas. The main responses centred on:

- **sales** (88%), focused on:
  - ramping up sales in existing and new domestic and export markets (all four cited by 59% of companies)
- **product development** (41%), focused on:
  - enhancing the product to meet market need/demand (31%)
  - refining/tweaking the product/process/service (28%)
- **generation of alternative income streams** (31%), focused on:
  - exploiting Intellectual Property though licensing (16%)
  - developing other turnover streams through contract research (13%)

1.8.2 Company support

The companies were asked who they worked with at the growing business stage to meet their objectives. The main responses covered:

- **the public sector** (76%), focused on:
  - Scottish Enterprise (73%)
  - Scottish Government (15%)
- **other businesses** (46%), focused on:
  - customers (42%)

Around a fifth of the companies are working with **universities/colleges** – especially Scottish Universities (21%). This could be on further product development or the starting process for further new product development.

At this stage there is light use of **private sector supports** (18%), driven almost entirely by private research & development companies (12%), though it still represents the minority of companies.

1.8.3 Costs

Companies were asked what the annual costs of the growing business stage would amount to.

The main two annual costs of the growing business stage were between £500,001-£1,000,000 and £1,000,001-£2,000,000, cited by 19% of companies each. There were still a small proportion of companies who believed the annual costs was between £100,001-£200,000 and between £200,001-£300,000 (each cited by 10% of companies at this stage).

While the above analysis provides some scale to the annual cost of the growing stage, it is appropriate to look at the average across all the companies. The average annual cost for the growing business stage amounted to £768,800 – the highest figure per stage.

1.8.4 Finance sources

In order to understand the sources of investment in the companies, the origin of the funding for the growing business stage was asked.

The main sources of funding cited by the companies included:

- **company linked finance** (66%), driven almost entirely by:
  - company profits or cash flow (66%)
- The **public sector** (50%), including:
  - Scottish Enterprise (44%)
- The **private sector** (41%), including:
  - angel investors (19%)
  - venture capital companies (16%)
  - bank loans (16%)

Around a third of the companies suggest they are putting their **own money** into the business (31%), largely from their own back pocket/own money (28%). It is unclear if this is reinvestment of any surplus or salary, or if this represents wider investment in the company through remortgaging or other personal finance sources.

1.8.5 Use of finance

The main uses of finance at each stage were explored with the companies, looking at just what they needed the resources for.

The main use of the finance accessed at the growing business stage was used to:

- pay **personnel** (100%) including:
  - salaries (90%)
- cover **overheads** (74%)
- pay for **equipment** (42%) including:
  - instruments and equipment (39%)
- pay for **intellectual property protection** (19%)

A greater proportion of finance was being used for staff training (32%), though external technical and business support remained low (each 13%).

1.8.6 Barriers

Companies were asked about the main barrier at the growing business stage. The main barrier was then probed in greater detail.

The main barrier cited by the companies focused on **market barriers** (57%) – covering:

- changes in the market (30%)
- competitors developing similar products/processes/services (20%)
- the market not being ready for the new product/process/service (17%)

The next main barrier covered **access to key variables** (53%), mainly covering cash flow problems (47%). Lack of skills was also a problem cited by around a quarter of the companies (27%). This was mainly focused on marketing skills (20%), but also included wider technology skills (10%).

1.9 Conclusions

Analysis of the company journey using the Branscomb model suggests a number of broad conclusions:

- company management teams have a broad range of generic business experience – though this represents experience at the point of survey rather than at the early stages
- Scottish Enterprise is an important player in helping companies to meet their objectives at all Branscomb stages
- while there is a great deal of consistency across the 100 companies in terms of development – there is clearly a wide range of journeys depending on the type of company and the commercialisation support they access
- companies are taking an average of 58 months to reach the growing business stage – in effect just under five years
- companies have needed to use an average £1.6 million of finance to reach the growing business stage
- public and private sector funding are both important in company growth – though anecdotal evidence suggests that the private sector provides the majority of the funding
- the market plays an important role across the company development – either in understanding it at the early stage, or selling to it in the latter stages