


# Measuring economic trends and benefits of CSG development on local businesses

**Small and Medium Enterprises (SME) Study – Trends and Benefits**

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## Disclosure

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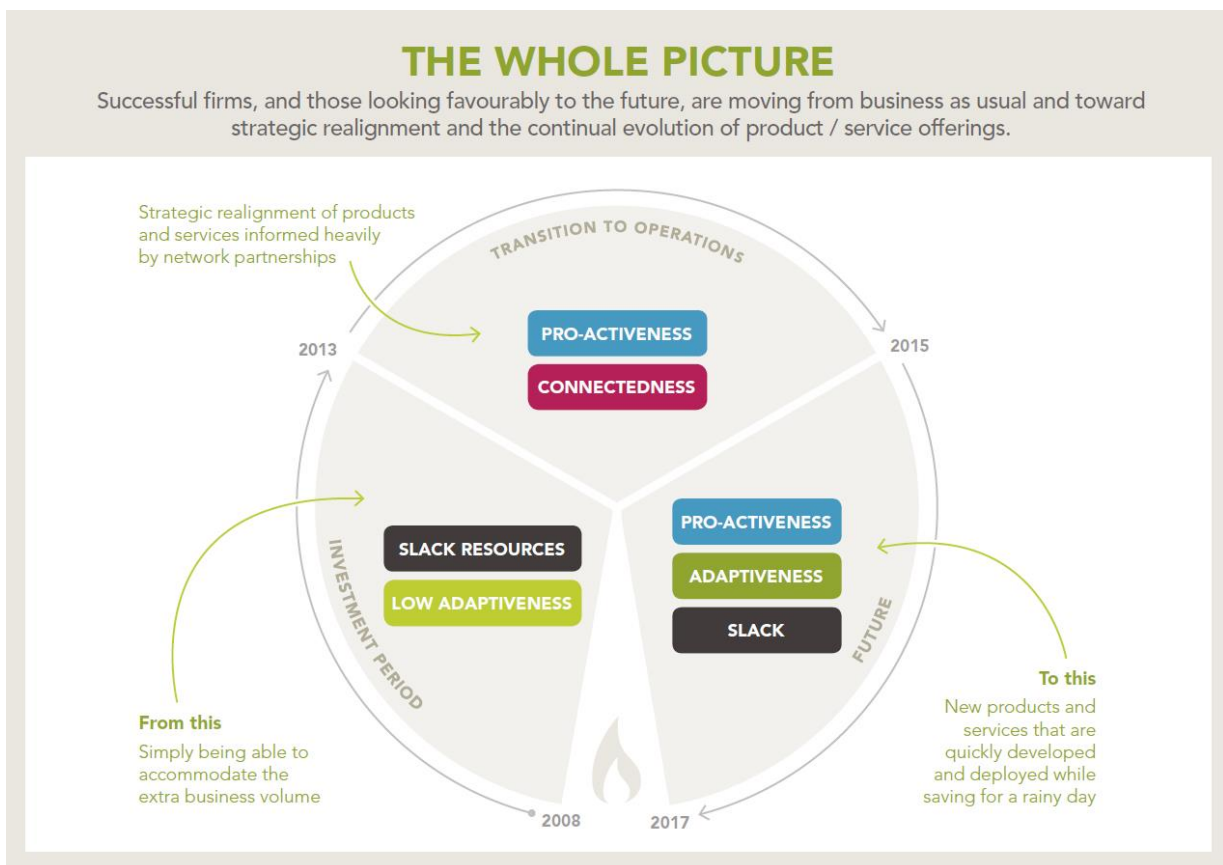
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## Executive Summary

This report outlines the factors that influence performance of small businesses in Queensland towns affected by Coal Seam Gas (CSG) development across three time periods: investment (2008–2013), transition to operations (2013–2015) and estimated future performance (to 2017). The report focused on the concept of organisational resilience, which we define as the capacity to respond, adapt and transform in response to changes in the business environment. We surveyed 400 firms by phone about their performance, and gauged their perceived strength across eight resilience factors. The analysis herein tests for statistically significant relationships between these resilience factors and performance in each of the different time periods.

During the investment period we found **slack** (spare resources, including financial and human) was the biggest determinant that drove performance satisfaction (combined sales, sales growth, and profitability and market share) and contributed to higher growth prospects.

In the transition to operations period, which is typified by declining investment in construction in the regional areas by the CSG companies, a strategic factor that we call **pro-activeness**, was a major reason that businesses were able to maintain growth. This aspect relates to how the firm strategically repositions their product and service offerings. We also found that a networking function called **connectedness** largely explains how firms maintained high levels of turnover, even when controlling for firm size and age. Connectedness refers to close coordination with network partners to develop plans and approaches to address change within the business environment.

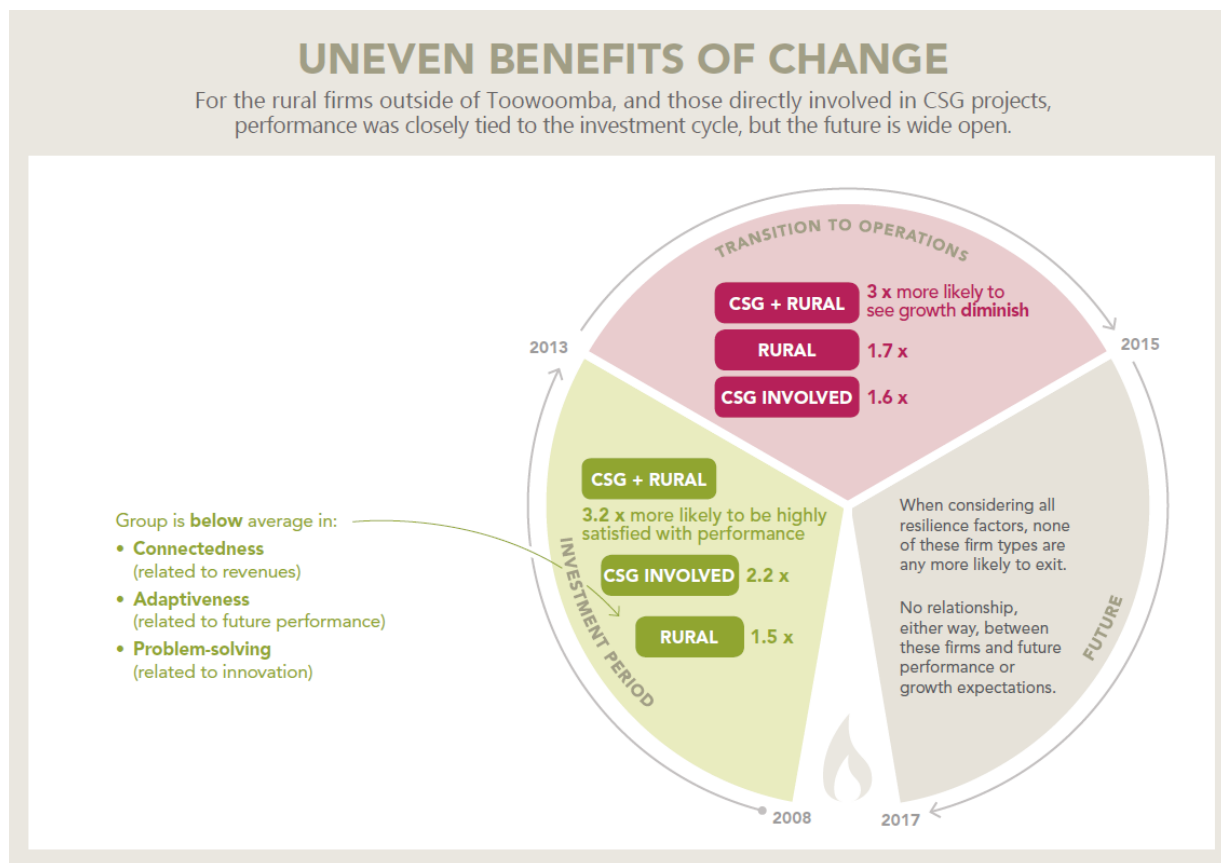


In terms of future prospects, **pro-activeness** takes a lead role. Firms scoring above average in pro-activeness are 5 times more likely to expect high performance in the future and 2.5 times as likely to perceive healthy growth prospects. In addition, we find that **adaptiveness** – which is the ability to shift and reconfigure the business to meet new challenges in a swift and adept manner – relates strongly to positive expectations of future performance. High performance satisfaction is expected in 2017 is 3.5 times more likely for firms that reported above average adaptiveness. Coming full circle, **slack** – the SME Study – Trends and Benefits

financial and human resources that may enable responses to opportunities and changes in the environment – appears to be a leading reason that businesses in this region foresee remaining viable (i.e., not exiting the business) two years into the future.

We also found that performance is unevenly distributed. In the investment period, firms directly tied to CSG projects were over twice as likely to have higher performance satisfaction scores as others. Rural firms (those outside the Toowoomba / greater Brisbane region) were 1.5 times more likely to be highly satisfied with performance during the CSG investment period. Firms that were both rural and CSG-involved were 3.2 times more likely to report high performance satisfaction in 2013. We found these same firms to be hardest hit in the transition to operations period, with CSG-involved firms being 1.6 times, and rural firms 1.7 times, more likely to have diminished growth prospects. Firms that were both rural and CSG-involved were 3 times more likely than all other firms to have diminished growth prospects.

Yet, despite the CSG-involved and rural firms being disproportionately affected during the investment and transition periods, the future appears to be wide open for them. Neither CSG-involved firms nor rural firms are any more likely than other firms to foresee low prospects for future growth, have expectations for poor performance, or plan to exit from the business within the next two years in our full models. However, the subset of firms that were both CSG-involved and rural may be to be twice as likely to exit the business, but this is only true when ignoring the influence of resilience factors. This helps to show just how important resilience is in terms of organisational longevity.



However, we did observe that rural firms may lack in two key resilience areas: they are 1.6 times more likely to be below average in **connectedness**. This factor is important, seeing that connectedness is shown to be important predictor of high revenues in the transition to operations period. Rural firms were also 1.8 times more likely to be below average in **adaptiveness**, which is strongly related to future performance expectations. Although not directly tied to performance outcomes, survey responses also indicate this group is below average in innovative problem-solving skills. This implies that rural firms might have difficulty solving unexpected problems, particularly if solving these problems requires

diverging from existing processes or counterintuitive thinking. When we tested for differences for the subset of firms that were CSG-involved and also rural, we found no specific differences in their resilience scores.

Taken together, these findings suggest that high levels of performance in the future are obtainable by all small firms in the region; however, there is still room for improvement. Firms should focus on developing higher-order strategic planning capabilities that will aid them in reshaping product and service offerings to capture more business. Longer term, firms should strive to build up reserves (slack) and increase the number and quality of network partnerships in order to survive and increase revenues. In terms of policy implications, we noted there may be room to provide, or expand, services that coach small firms in various areas of resilience in order to improve their prospects. This improvement, in turn, will hopefully lead to more prosperous regional communities.

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# 1 Introduction

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Organisational resilience – the capacity to respond, adapt and transform in response to changes in the business environment – is now recognised as an important capability that enables businesses to prepare, recover and adapt to a range of disruptions including economic fluctuations. Considering the dramatic increase in the number and revenue of regional Queensland businesses resulting from capital investments in coal seam gas (CSG), we chose to investigate how resilience factors enable small businesses to perform well in light of these positive economic changes. We also wanted to understand what factors engendered success when economic times are less favourable, like those associated with the ‘transition to operations’ phase of the CSG projects, and which related to bright future prospects.

To accomplish this goal we created a means to measure and assess organisational resilience. We then surveyed 400 small and medium enterprises (SMEs) in regional Queensland about a range of factors including business performance, their competitive situation, innovation levels and resilience capabilities. Analysis of the survey responses found eight organisational resilience capabilities that firms may exhibit: anticipation, slack, innovative problem-solving, improvisation, flexibility, connectedness, adaptiveness and pro-activeness. We were able to show that the certain of these resilience factors positively relate to performance in the peak investment period, the transition to operations period, and to future prospects. We also conduct a series of tests to compare resilience capabilities across groups, such as those firms involved in the CSG supply chain or not. In conclusion, we developed recommendations for business practice and strategy and for government policy.

## 2 Methods

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This study aimed to identify and measure organisational resilience capabilities that contribute to performance of small businesses throughout the CSG investment cycle and into the future. This section provides the reader with an overview of the methods used. Further detail is in Appendix 6.2, *Analysis methods*.

### 2.1 Survey instrument

We adopted a survey methodology to capture information from a large number of firms operating in regional, southern Queensland. The survey was split into several sections, which considered general characteristics of the business, resilience, innovation, competitive situation and financial performance. The survey is based on a highly regarded small business research instrument developed originally by the Centre for Business Research (CBR) at Cambridge University (UK) [1], to which we added resilience questions.

### 2.2 Measuring resilience

We reviewed prior research on organisational resilience to find existing scales (see 6.2.1, *Literature review*). From this review, it became apparent that prior work on organisational resilience had focused on catastrophes, and little had been done to understand how firms respond to economic fluctuations. Thus we conducted a step-by-step process to develop a scale to measure organisational resilience, which included expert consultation. This process yielded 55 survey questions which we added to the survey (see 6.2.2, *Resilience scale development*).



After administering the survey we interrogated the resulting data to find clusters of questions that reflected resilience capabilities commonly held by the firms in the sample. This approach yielded eight resilience capabilities that we named anticipation, slack, innovative problem-solving, improvisation, flexibility, connectedness, adaptiveness and pro-activeness (see 6.2.6, *Variables*). These resilience variables are central to the analysis contained in this report.

## 2.3 Sample

We used a combination of primary industry trade materials and purchased databases to develop a list of 2,388 potential small businesses in regional Queensland. The survey was administered to executive managers and business owners of small firms by a computer-aided telephone interviewing (CATI) system through a subcontractor. The campaign duration was from November 16<sup>th</sup>, 2015 to December 17<sup>th</sup>, 2015. We ended the campaign after receiving 400 responses, achieving a 43.9 per cent response rate based on 512 direct refusals. Out of this overall sample 24.5 per cent of the sample (98 firms) said that they were directly involved in CSG industry projects. The location of firms in the sample is shown below in the heat maps contained in Figure 1, Figure 2 and Figure 3.

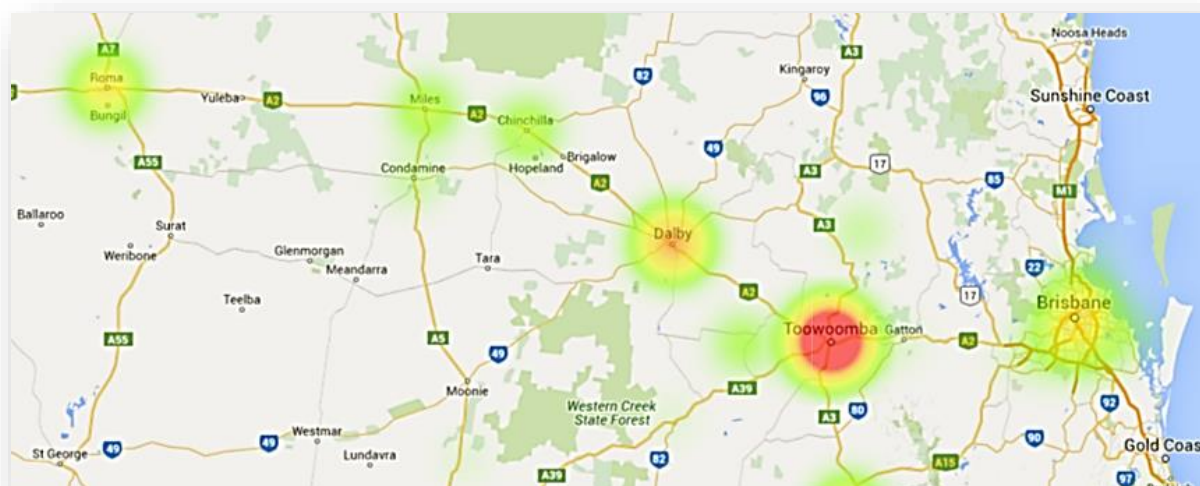


Figure 1 – Location heat map of small businesses, n=400

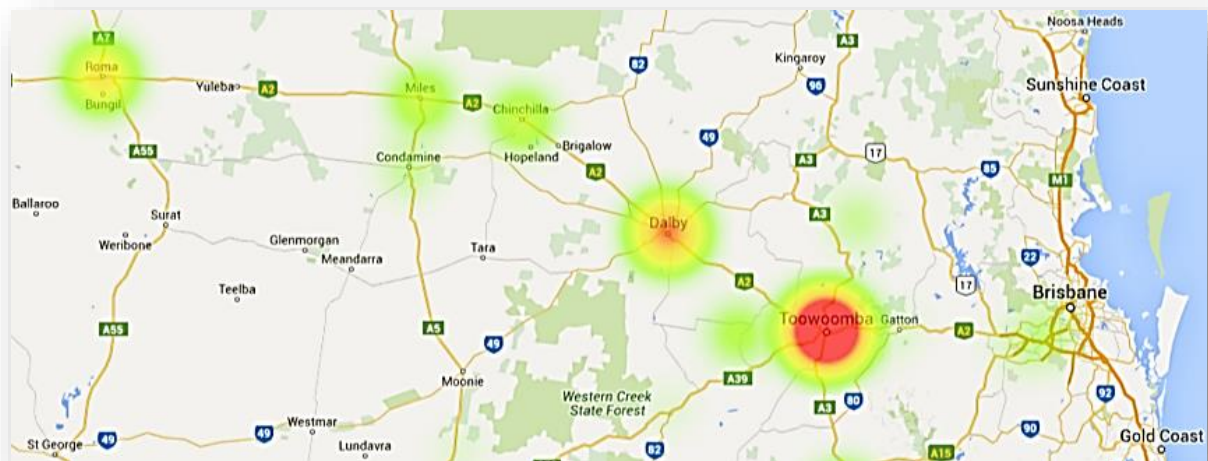


Figure 2 – Location heat map (excluding Brisbane firms), n=343

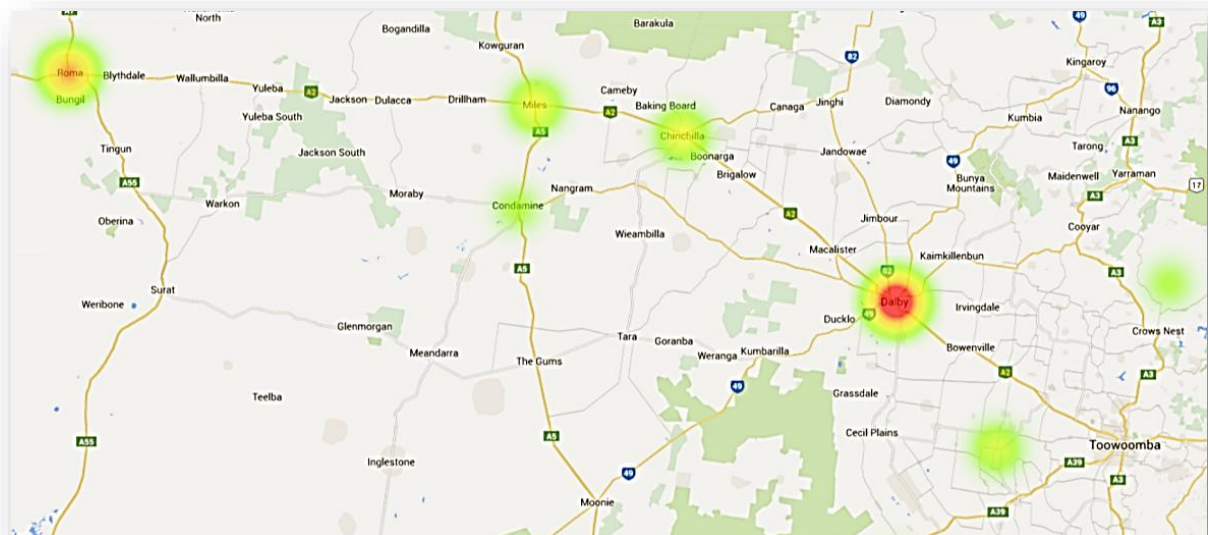


Figure 3 – Location heat map of 'rural' firms (control variable), n=196 firms (excluding greater Brisbane and Toowoomba)

## 2.4 Modelling

We used regression models to establish the relationship between resilience factors and performance across three time periods:

- investment (2008–2013),
- transition to operations (2013–2015), and
- estimated future performance (to 2017).

In these models, we controlled for a range of factors including industry position, direct CSG involvement, rural location, firm size and firm age (see Section 6.2.6, *Variables*). The significant relationships discussed in this report are present even when controlling for all of these other confounding factors.

To further inspect the significant relationships revealed by the regression models, cross-tabulations were conducted. Cross-tabulations yield odds that provide a more intuitive understanding of the relationships between variables. For example, we will quickly describe how cross-tabulations result in the following finding: *firms with above average pro-activeness are 4.8 times more likely to predict high performance satisfaction in 2017*. First, we made a binary variable that reflects a firm being either above, or below, average in their pro-activeness. Second, we created a binary variable reflecting either high performance satisfaction in 2017 (either 4 – *satisfied*, or a 5 – *very satisfied*, on the measurement scale we used), or not (1, 2 or 3 on the scale). Third, a statistical test found that a significantly higher number of firms that had above average pro-activeness also had high 2017 performance expectations. So to calculate the odds of this co-occurrence, we divided the probability of being *above average* in pro-activeness and having high performance in 2017 (89 firms/108 firms=0.91), over the probability of being *below average* in pro-activeness and having high 2017 performance (30 firms/159 firms =0.19). This calculation leads to the finding that, firms with above average pro-activeness are 4.8 times more likely to predict high performance satisfaction in 2017 ( $.91/.19 = 4.8$ ). A full explanation of the modelling approach is contained in Section 6.2.5.

### 3 General findings on performance

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#### 3.1 Performance satisfaction

We investigated firm performance across four criteria: sales, sales growth, profitability and market share. These measures are actually reflections of performance as gauged by the executives or owners we surveyed, as they pertain to their particular industry segment. These measures tend to correlate very strongly with actual fiscal performance [2]. Figure 4 indicates that firm owners were generally positive about their performance, with a clear peak in 2013 for each type of performance. However, Figure 5 shows a slight downward trend when considering average performance satisfaction over time.

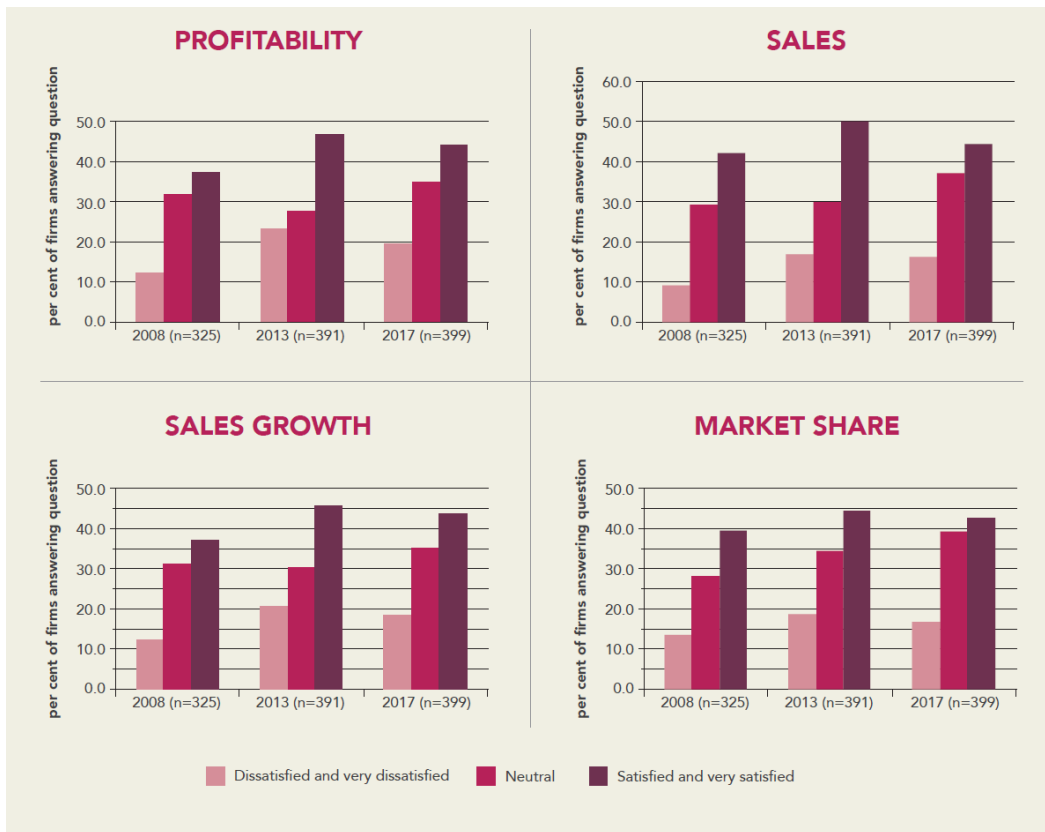


Figure 4 – Satisfaction with performance aspects, n=400

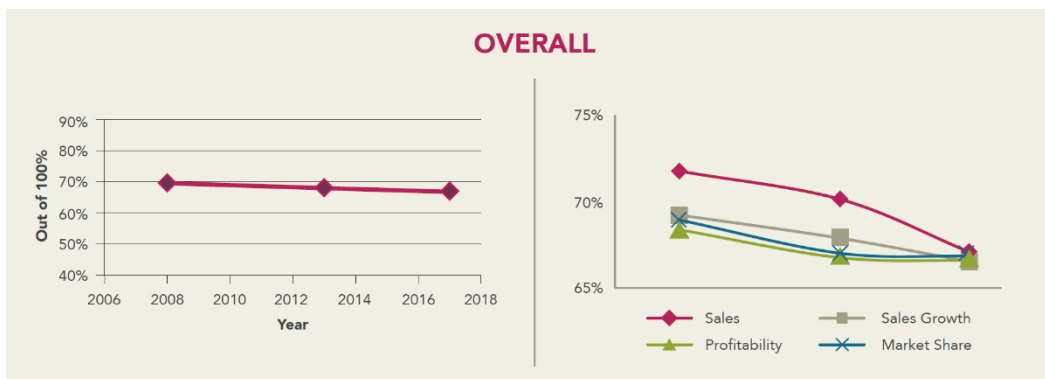
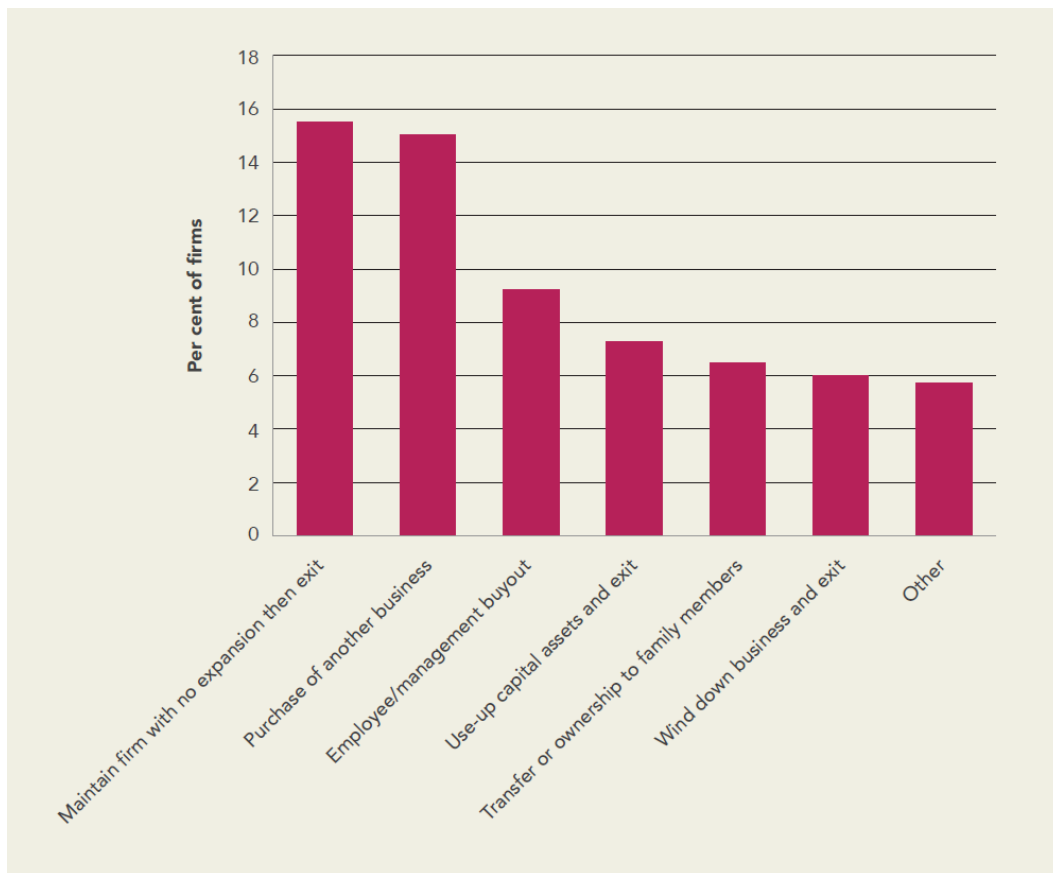


Figure 5 – Average performance satisfaction, n=400

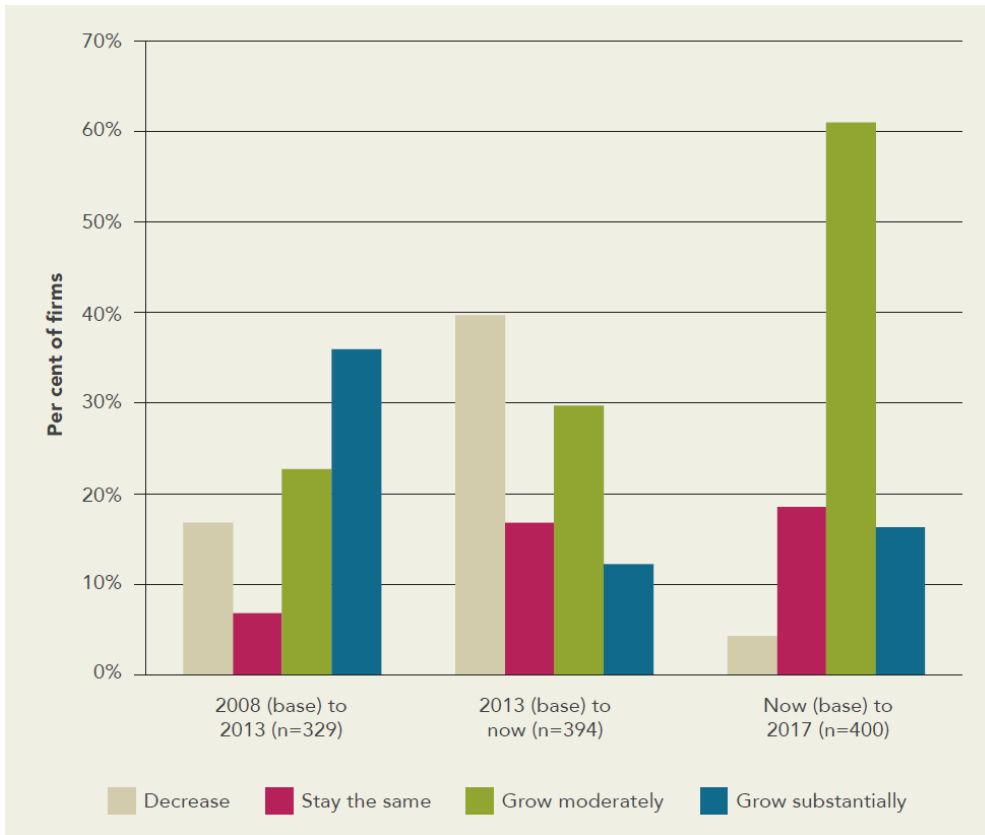
### 3.2 Business prospects

To investigate business prospects, we considered the likelihood of firm exit (closing the business) and growth intentions (see Figure 6). We asked respondents about the likelihood of them exiting their business through a range of approaches and found that between six and 15 per cent of firms had contemplated one of these approaches. The first bar on the chart corresponds with a similar question asked by the ABS. Based on that question, a recent report from the ABS showed that approximately 10 per cent of firms on the Western Downs exited their business in any given year[3]. We asked about additional forms of exit, to those reported by the ABS, which may contribute to our slightly higher percentage. We find that approximately 40 per cent of firms may be considering exit, but that fewer than a quarter rated themselves ‘highly likely’ to exit in any of the seven categories we asked about.



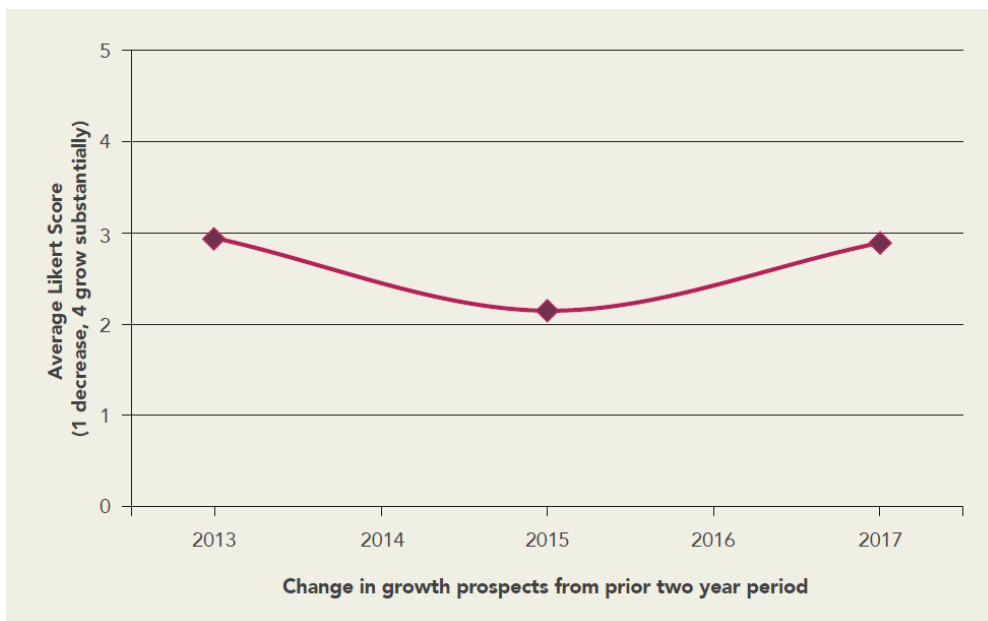
**Figure 6 – Likelihood of firm exiting the business within the next two years, n=400**

Figure 7 compares growth intentions between different time periods. Reflecting on the change in growth between 2008 and 2013, 59 per cent of firms reported some level of growth. Comparing 2013 to when firms were surveyed (late 2015), 42 per cent reported some level of growth. Looking forward to 2017, many firms were optimistic, with 77 per cent intending to grow moderately or substantially.



**Figure 7 – Business prospects as compared with various baselines, n=400**

Figure 8 shows the overall average growth prospects for the sample in each time period. There is a slight dip in the 2015 period, meaning that on average, firms were likely to stay the same size during the transition to operations period.



**Figure 8 – Average growth prospects, n=400**

## 4 Impact of resilience on performance

### 4.1 Firm performance during the investment period

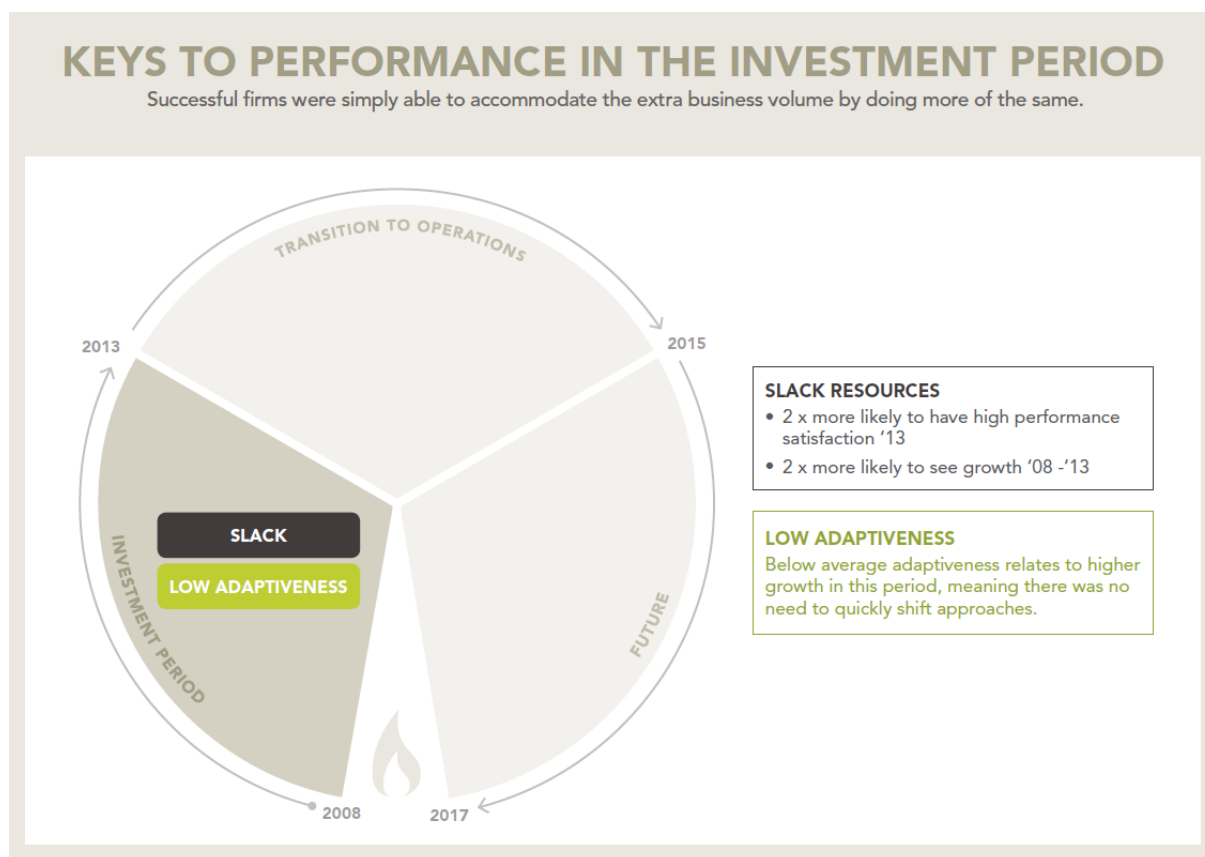


Figure 9 – Keys to performance in investment period

In the peak investment period of the CSG industry (2008–2013), one of the most important predictors of performance was simply having spare capacity to capture new business opportunities. We term this factor *slack*. It relates to spare resources (including financial) that allow firms to capture work associated with the influx of CSG-related investment. Firms with higher than average slack were 2.1 times more likely to have growth intentions (2008–2013) and 2.1 times more likely to be highly satisfied with performance in 2013 (a combined measure of satisfaction score for sales, sales growth, and profitability and market share). See Figure 9, above, and Figure 10, at right.

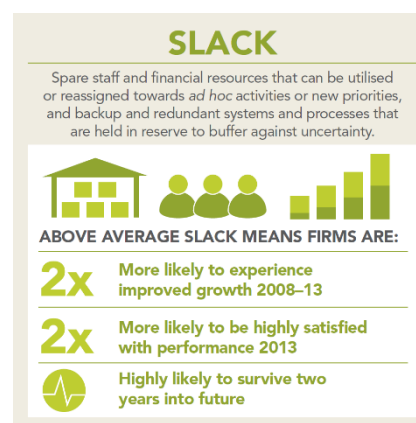


Figure 10 – Slack

We also found that a resilience factor, which we termed *adaptiveness*, is negatively related to business prospect growth during this period. This factor has to do with reconfiguring the business quickly to capitalise on opportunities. Taken together, these findings imply that long-term investments in things



like spare capacity – rather than short-term adaptation – is a more important consideration for positive performance in the investment period.

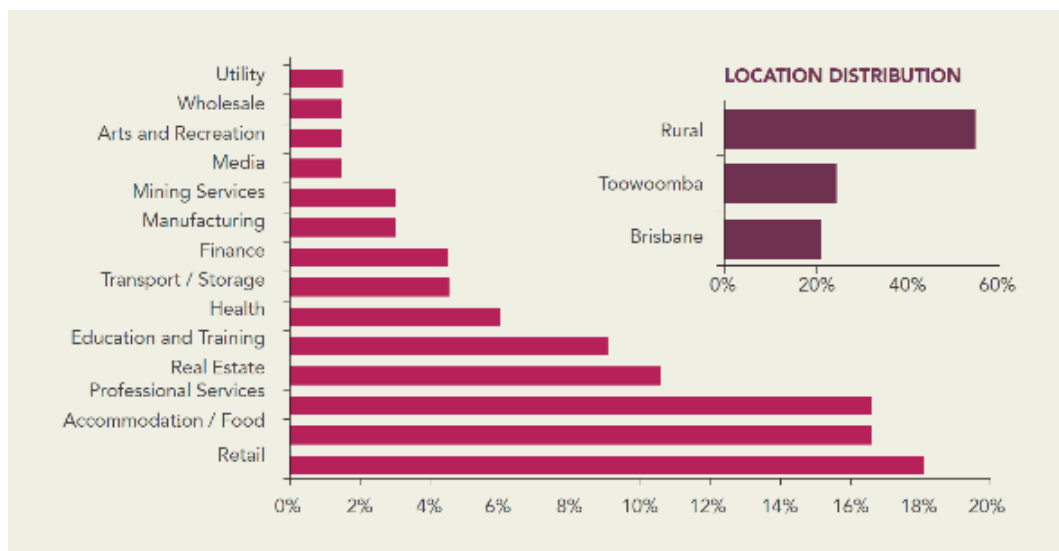
In terms of control variables, firms directly involved in the CSG projects were 2.2 times more likely to have high 2013 performance satisfaction scores. Rural firms (which we designate as those outside Toowoomba) were 1.5 times more likely to have higher 2013 performance satisfaction scores. Rural firms that were also directly involved with CSG were 3.7 times more likely to have high performance in 2013. Larger firms were more likely to see growth opportunities from 2008 to 2013. Finally, younger firms may have benefited more than older firms in terms of business prospect growth. This outcome reveals that investment in CSG benefited those firms that were directly involved in the CSG supply chain; however, it also benefited rural firms strongly and, in general, larger and younger firms.

We also determined that problems finding and bidding on tenders might have a negative impact on performance in 2013 (see Table 1).

**Table 1 – Tenders**

Variable	Definition	Components
Tenders	Trouble finding and winning bids	Finding opportunities to place tenders on CSG projects Unsuccessful project tenders

**Error! Reference source not found.** shows the breakdown of 66 firms (17% of the sample) that were established during the investment period. The majority of these firms are in the retail, accommodation and food services and professional services areas. Out of all of the industry segments that new firms occupy, accommodation and food services businesses were the only group that was significantly more likely to be established during the investment period (2.4 times more likely than all other industry segments).



**Figure 11 Breakdown of firms established during investment period**



## 4.2 Firm performance during transition to operations

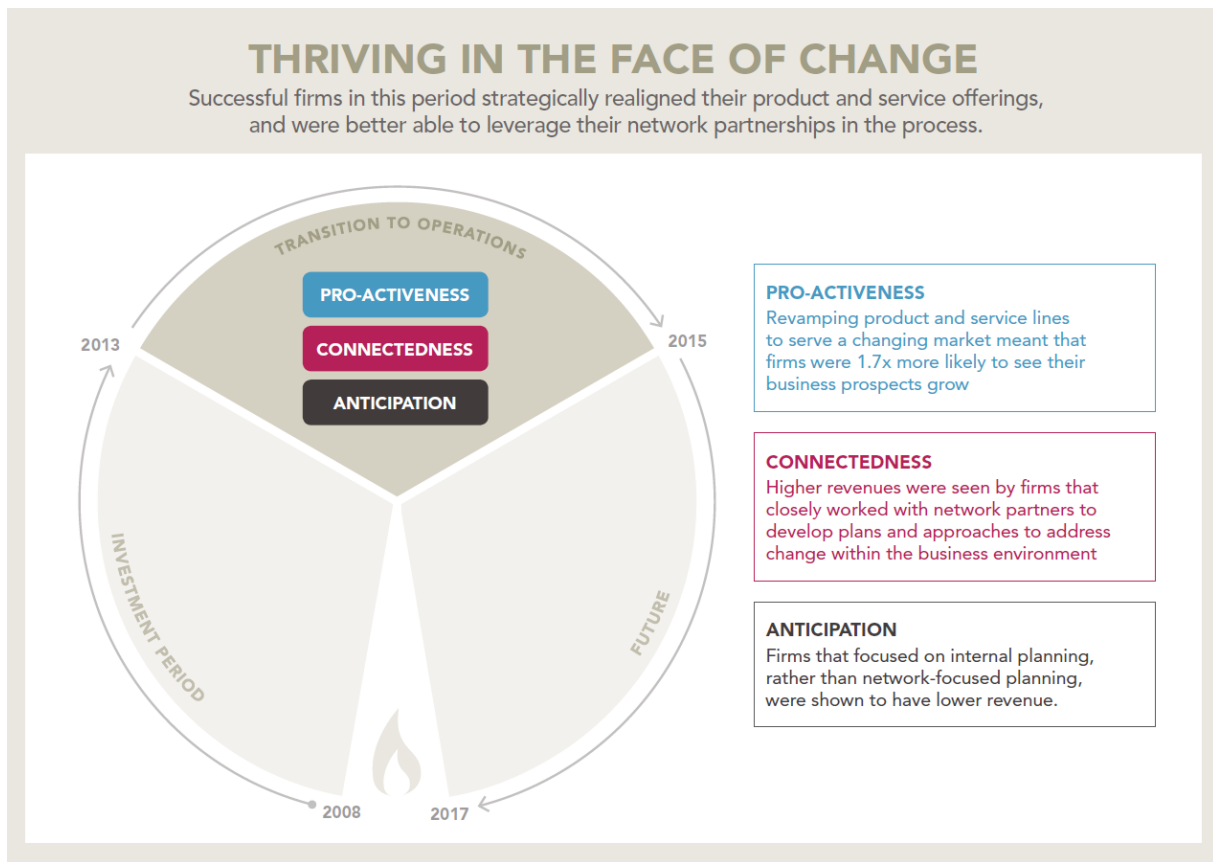


Figure 12 – Keys to performance in ‘transition to operations’ period

We considered the period from 2013 to 2015 to be a period of declining CSG investment. This period was characterised by a reduction in construction activities in many of the regional areas as CSG firms transitioned to operations.

In terms of growth prospects during this period, a resilience factor related to strategic repositioning appears to be very important. We call this factor *pro-activeness*. Being above average in pro-activeness means that firms were 1.7 times more likely to see an increase in business prospects in the period 2013–2015 (see ).

We also found that two constraint factors had a negative impact on growth in business prospects. They are *tenders* and *external* factors (Table 2). However, the negative effects of these factors on business prospects are much weaker than the positive contribution of pro-activeness.



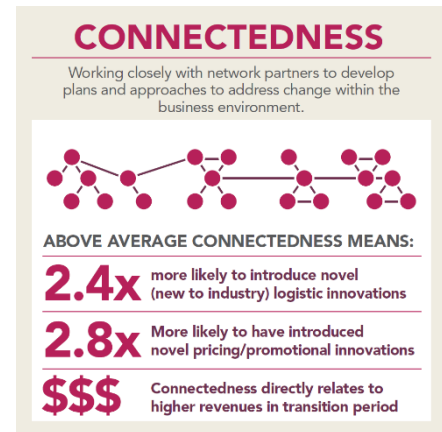
Figure 13 - Pro-activeness

**Table 2 – Constraints negatively affecting performance in the transition to operations period**

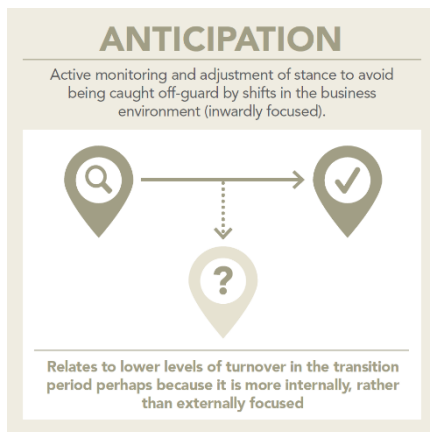
Variable	Definition	Components
<b>External</b>	External trouble, including competitors, customers, and regulators	Meeting customer expectations Increasing competition Environmental regulations and compliance Government regulations and compliance
<b>Tenders</b>	Trouble finding and winning bids	Finding opportunities to place tenders on CSG projects Unsuccessful project tenders

In terms of control variables, firms directly involved in CSG projects were 1.7 times more likely to see a *decrease* in growth prospects than other firms during this period. Similarly, rural firms were twice as likely as other firms to see their business prospects diminish. CSG-involved rural firms were three times more likely to see decreased growth prospects.

To assess performance in the transition period, we also analysed the factors predicting higher revenues (alternatively, turnover) in 2015. We found that *connectedness* – a factor relating to managing network partnerships – is the most important factor after firm size (see Figure 14). It is important to note that connectedness and firm size do not correlate strongly. This means that smaller firms can exhibit high levels of connectedness; it is not simply a function of firm size.



**Figure 14 - Connectedness**



We also found that another factor – *anticipation* – had a **negative relationship to turnover**. Anticipation has to do with active monitoring of the business environment to avoid being caught off-guard. This factor seems to be focused toward the short-term and on the internal machinations of the firm, in comparison to connectedness, which consists of active management of external network partnerships (see Figure 15).

**Figure 15 - Anticipation**

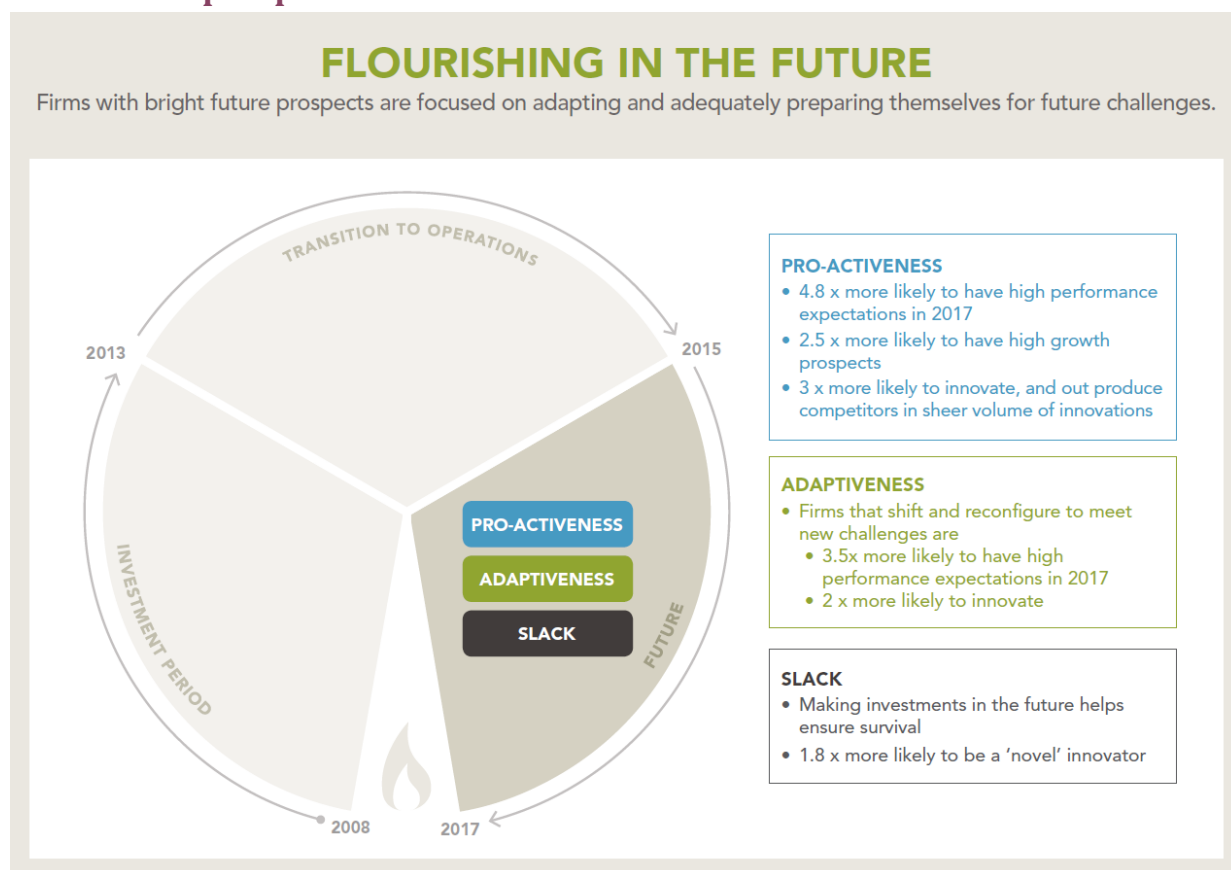
Taken together, these results indicated that higher revenue (alternatively, turnover) in 2015 was related to externally-facing stability; that is, how connected the firm is to the rest of the industry rather than internal processes exhibited by the anticipation variable. This difference may reflect the important role that strong network partners play during periods of economic decline in helping firms to shape and focus their strategy to the most appropriate business targets. In contrast, staying internally-focused in terms of anticipating changes and identifying opportunities appears to relegate firms to a lower turnover. This finding remains the same even when controlling for firm size and age.

In terms of control variables, higher turnover is related to a constraint that we termed *markets* (Table 3). This is most likely a reflection of the inherent difficulties in seeking higher revenues from foreign markets, since the construct reflects firms’ difficulties with foreign exchange rates and troubles accessing overseas markets, which are likely outgrowths of strategies to deal with struggling growth in traditional markets. However, this effect size we found is relatively small. Also, there is no special relationship between higher levels of turnover and being a rural or CSG-involved firm. Finally, firm size and firm age have a positive relationship to turnover, as expected.

**Table 3 – Market constraints**

Variable	Definition	Components
<b>Markets</b>	Trouble with market-related factors	Access to overseas markets Overall growth of market demand in main product markets Exchange rate

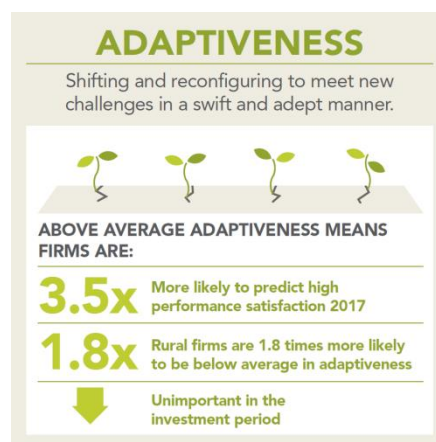
### 4.3 Future prospects



**Figure 16 – Resilience factors relating to future prospects**

To test the relationship between resilience and future prospects, we developed models that tested the impact of various factors on performance satisfaction in 2017 (combined satisfaction score of sales, sales growth, and profitability and market share), the change in growth prospects from 2015–2017, and whether the firm will **not** exit in the next two years (i.e., survive).

Performance expectations in 2017 are strongly predicted by *adaptiveness* (refer to **Error! Reference source not found.**) and *ro-activeness* (refer to ). Above average pro-activeness means that firms are 4.8 times more likely to have high performance expectations in 2017, and above average adaptiveness means that firms were 3.5 times more likely to have such expectations in this dimension. In terms of controls, the *external* and *tender* constraints (refer to Table 2) in this period are negatively related to the performance in 2017; however, the effect is very weak in comparison to the positive effect of the resilience factors.



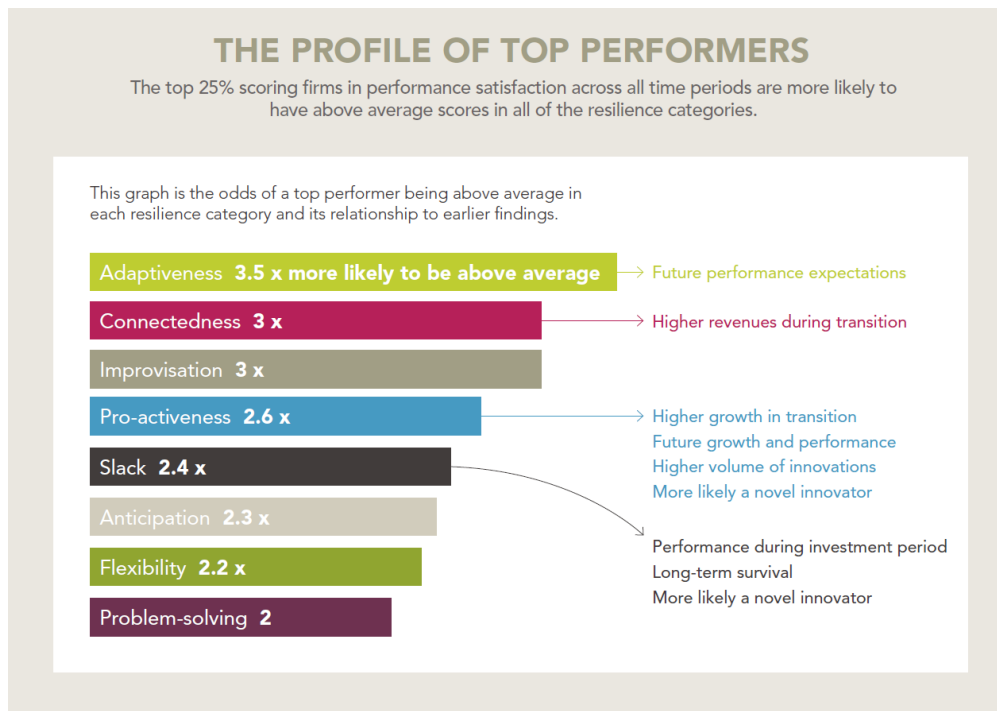
**Figure 17 - Adaptiveness**

High growth in business prospects during the period 2015–2017 is also explained by *pro-activeness* in our models. Above average pro-activeness means that firms are 2.5 times more likely than others to have high growth prospects. Significant control variables in this model include a negative effect regarding *external constraints* (refer to Table 2) and a positive relationship to *market constraints* (refer to Table 3). Once again, these effects are weak in comparison to pro-activeness.

We also asked businesses if they were planning to exit from their business within the next two years. In this model, we added additional predictors, such as the change in business prospects during the transition to operations period (2013–2015) and overall performance satisfaction (a composite measure of performance satisfaction among four sub-components across 2008, 2013, and 2017 timeframes). However, these factors are not significant, and it appears that *slack* alone (refer to Figure 10) is the most important factor in predicting survival. No control variables gained significance in this model. Neither CSG-involved firms, nor rural firms, are any more likely to exit the industry than other firms, according to this model.

#### 4.4 Resilience profile of top performers

To create the resilience profile of top performers, we created two overall performance variables. One variable measures overall growth in business prospects across all periods while the other one measures performance satisfaction levels in all periods. We then created a variable representing the top 25 per cent of performers in each category and compared these variables against being above average in each resilience factor (refer to Section 2.4). We then calculated the odds of being above average in each resilience category **and** being in the top 25 per cent in overall growth and overall performance. The results for top 25 per cent growth largely mirror the results of the models revealed in the prior sections. The overall performance satisfaction across all time periods shows top-performing firms are much more likely to be above average in all resilience categories. For instance, firms in the top 25 per cent in overall performance satisfaction are 2.26 times as likely to have above average anticipation levels. The results are shown below in Figure 18.



Odds calculated from cross-tabulations, SPSS v.22  
Chi-Square tests of differences significant at  $p < .05$  level, *n.s.* = not significant

**Figure 18 - Analysis of top performers**

## 4.5 Resilience differences

In addition to the results presented earlier, we conducted a deeper analysis of statistically significant differences between resilience factor scores and various groups. Factors that were significantly related to performance in the prior models on performance are **bolded for clarity**.

### 4.5.1 Rural firms

Firms outside large city centres are much more likely to be below average in several key resilience areas. These include:

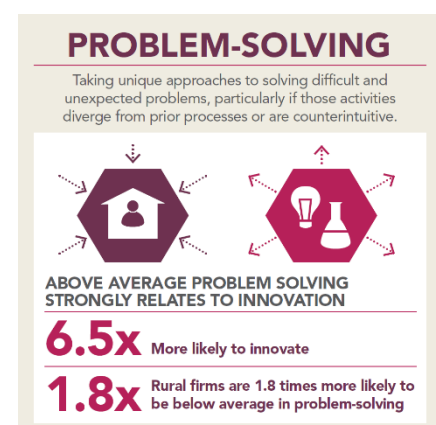
- Rural firms are 1.6 times more likely to be below average in **connectedness**.
- Rural firms are 1.8 times more likely to be below average in **adaptiveness**.

These findings are particularly problematic since the models show these factors to be important to turnover and future performance satisfaction, respectively.

We also found problem-solving to be lacking.

- Rural firms are 1.8 times more likely to be below average in problem-solving capabilities (Figure 19).

Although we noted that problem-solving was not directly tied to performance in any of the prior models, being above average strongly relates to innovation, making it 6.5x more likely.



**Figure 19 – Problem-solving**

### 4.5.2 CSG-related firms

We also found that firms directly involved in CSG projects are 1.6 times more likely to have above average *flexibility* (Figure 20). Nevertheless, it should be noted that we did not find flexibility to be directly related to performance in the models.



Figure 20 – Flexibility

### 4.5.3 Industry differences

This section outlines any specific resilience differences across industry categories. Differences that were significantly related to performance in the prior models are **bolded**.

- Manufacturing firms are twice as likely to be below average in improvisation.
- Retailers were 2.5 times more likely to be above average in improvisation.
- Wholesalers were 3.6 times more likely to be below average in **anticipation**.
- Accommodation / food services were twice as likely to be below average in problem-solving.
- Transportation and storage firms were
  - 3.7 times more likely to be below average in problem-solving
  - 3.5 times more likely to be below average in **pro-activeness**
  - 3 times more likely to be below average in **anticipation**
- Professional services firms were
  - 2.3 times more likely to be below average in **slack**
  - 2.1 times more likely to be below average in improvisation ( Figure 21).
- Financial sector firms were
  - 2.5 times more likely to have below average problem-solving
  - 2.3 times more likely to have below average **adaptiveness**.

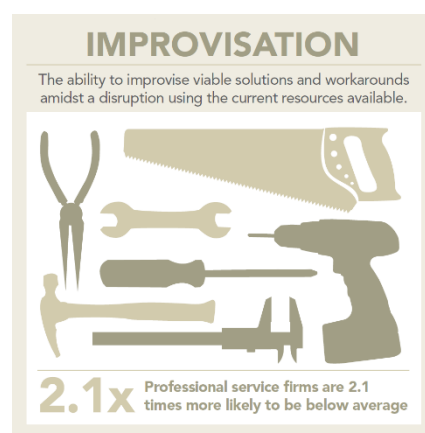
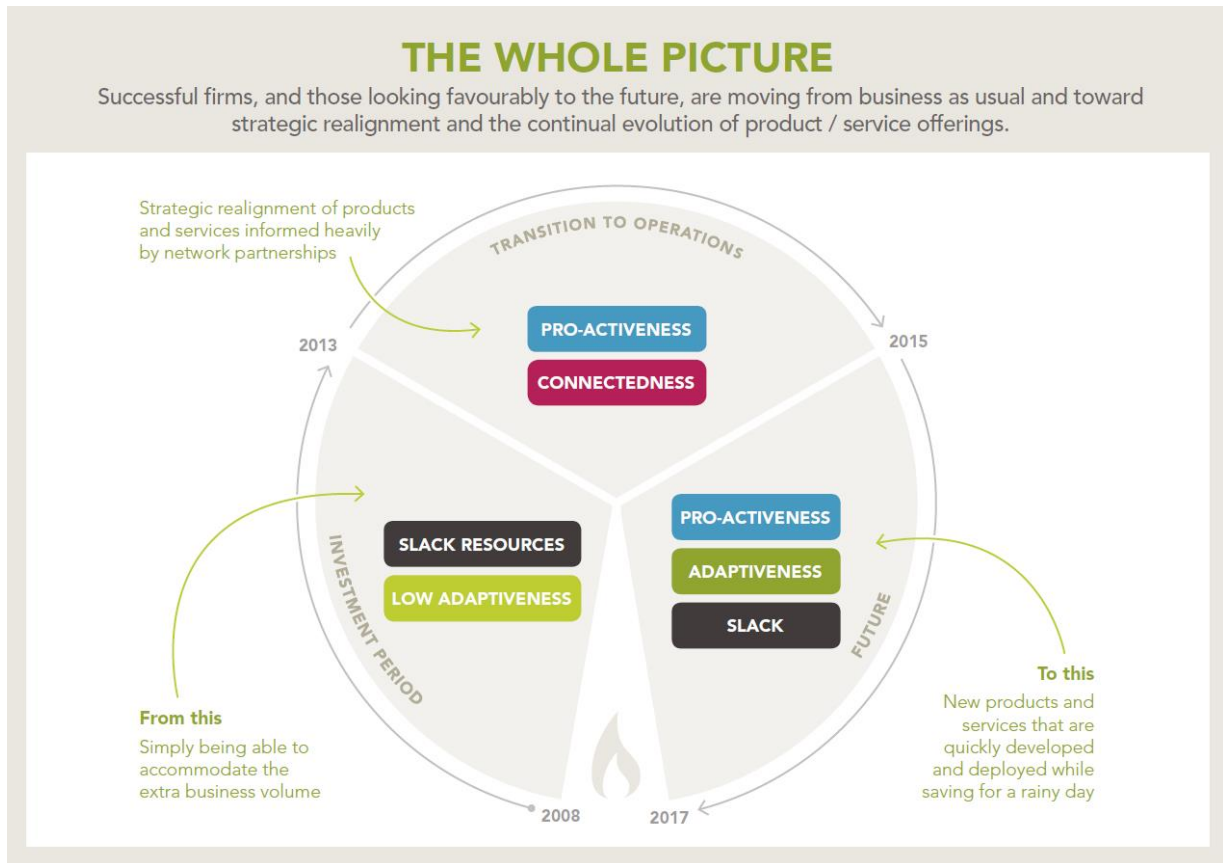


Figure 21 – Improvisation

## 5 Discussion and conclusions

### 5.1 Bringing it all together



**Figure 22 – Keys to performance across all time periods**

We found that different resilience factors are significant in different periods. In general, resilience factors transition from being less sophisticated in the investment period to being more strategic as time moves forward. In the investment period, simply being able to capture the ample business opportunities requires extra capacity and little adaptation.

However, to flourish during the transition to operations period, firms needed to exhibit pro-activeness toward developing new product and service niches and to rely on network partners in this process.

Looking to the future, pro-activeness plays a critical role – as does adaptation – in order to fluidly transform business offerings in a new business environment. Astute firms will also consider investing in spare capacity (i.e., slack, including saving financial resources) to deal with future shifts in the business environment (see Figure 22).



## 5.2 Implications for business

This section discusses the implications of our findings, with a particular focus on helping businesses prosper through innovation.

### 5.2.1 Building up slack resources

Slack is a consistent predictor of performance in both the investment period and in the future. Slack also predicts survival beyond the next two years.

Primarily, we suspect that slack resources are useful to buffer against uncertainty in demand in the marketplace. On one hand, carrying excess capacity can help to ensure that the firm is ready to take advantage of opportunities that arise (as we have shown to be true in the investment period). On the other hand, having financial reserves helps to ensure survival over lull periods of demand for goods or services. It can also provide firms with breathing room in terms of making business decisions (Table 4).

**Table 4 – Slack**

Variable	Definition	Characteristics of success
<b>Slack</b>	Spare staff and financial resources that can be utilised or reassigned toward <i>ad hoc</i> activities or new priorities, and backup and redundant systems and processes that are held in reserve to buffer against uncertainty	<ul style="list-style-type: none"> <li>• <b>Buffer against high demand:</b> Invest in spare capacity to buffer against demand uncertainty – if you can afford to.</li> <li>• <b>Rainy day:</b> Keep liquid financial resources to help smooth out lulls in demand.</li> <li>• <b>Invest in innovation:</b> Firms with more slack spend wisely on new product, service, logistic, and process innovations.</li> </ul>

Another advantage of slack is its contribution to innovation. This is because slack can be leveraged during lull periods toward developing innovations [4], [5]. In fact, upon further inspection of the data, firms with above average slack are 1.8 times more likely to be *novel* innovators – that is, introducing any of seven types of innovation that are new to the industry and to the firm. They also produce significantly more product, logistic, services and process innovations than other firms. Hence, investing in slack can have indirect benefits to performance by underwriting the innovation activities of the firm.

### 5.2.2 Strategic repositioning

We found that performance is clearly tied to the ability to make adjustments to product and service offerings, as shown by the repeated role of pro-activeness in our models. Firms that change their product or service offerings are much more likely to outperform others.

We inspected the above average values in the pro-activeness variable to assess its intersection with innovation. We found that above average pro-activeness relates to being an innovator (3x more likely). It also relates to introducing significantly higher numbers of all seven types of innovation that we measured. Furthermore, the likelihood of introducing a *novel* version (new to the industry) of each type of innovation is also higher in almost every case. The likelihood of a novel version of each type of innovation is displayed below parenthetically:

- New or significantly improved product (1.9x)
- Technological improvements in supply, storage or distribution systems for manufactured



- product (2.6x)
- New or significantly improved service (1.3x)
- New or significantly improved process to deliver products or services (2x)
- New organisational / managerial processes or business strategies (n/a)
- New media or techniques for promotion or pricing strategies (3.2x)
- Significant changes to the business model or corporate strategy (1.4x).

Interestingly, adaptiveness – an important predictor of high performance expectations in 2017 – does not display a similar relationship to innovation. Firms with higher than average adaptiveness are twice as likely to introduce innovations (including any type with any degree of novelty). However, none of the aforementioned relationships to specific types of innovation were present in our analysis. This does not mean that adaptiveness is not important. Instead, it may mean that adaptiveness is the other side of the re-positioning equation that operates hand-in-hand with the more innovation-focused pro-activeness capability. Firms with above average adaptiveness are 7.5 times as likely to also be above average in their pro-activeness levels. Some recommendations regarding pro-activeness and adaptiveness are shown in Table 5.

**Table 5 – Adapt and transition into new product and service areas**

Variable	Definition	Characteristics of success
<b>Pro-activeness</b>	Forward looking investments and strategies that seek to gain competitive dominance	<ul style="list-style-type: none"> <li>• <b>Be aggressive:</b> Strive to introduce new products and new services into the market before competitors do.</li> <li>• <b>Treat threats as opportunities:</b> Address strategic threats to your current business and transforming them into new business opportunities.</li> <li>• <b>Be strategic:</b> Invest the necessary time and resources to enable your firm to quickly recognise and gauge the impact of shifts in the marketplace.</li> <li>• <b>Change your business:</b> Modify your firm’s organisational structures to support new business opportunities.</li> </ul>
<b>Adaptiveness</b>	Shifting and reconfiguring to meet new challenges in a swift and adept manner	<ul style="list-style-type: none"> <li>• <b>Shift things around:</b> Deal with adversity in the industry by being malleable and adaptive.</li> <li>• <b>Be resourceful:</b> Use existing resources to adapt to change.</li> <li>• <b>Be dependable:</b> Never let your customers down – always strive to deliver value to your clients in the face of all obstacles.</li> </ul>

### 5.2.3 Networking

Firms should try to improve their networking capabilities, as this factor is directly tied to higher revenues. Further inspection of this relationship (as it pertains to innovation) reveals that a firm with above average connectedness will be twice as likely to innovate, in general, and more likely to produce higher numbers of innovations in all seven innovation categories.

The specific types of novel (new-to-industry) innovations that network partnerships support yields insights into how they translate into higher revenues for the firm. Firms with above average SME Study – Trends and Benefits

connectedness are 2.4 times more likely to introduce novel logistic innovations. These innovations improve the efficiency with which goods and services are transported and stored. Furthermore, average connectedness means that firms are 2.8 times more likely to have introduced novel pricing / promotional innovations. This latter category of innovations helps to leverage the network to the fullest extent. For instance, cross-promotional efforts and package deals with other firms can help to ensure that a business is in constant demand through enticing new customers to engage. Recommendations are made below in Table 6.

**Table 6 – Ensure that your firm is better connected within the industry**

Variable	Definition	Characteristics of success
<b>Connectedness</b>	Working closely with network partners to develop plans and approaches to addressing change in the business environment (more outwardly focused)	<ul style="list-style-type: none"> <li>• <b>Diversify:</b> Work on developing diverse and heterogeneous network partnerships to spread risks and improve the effect of your marketing budget.</li> <li>• <b>Build robust and long-lasting relationships:</b> Spend the time to understand your value proposition to your network partners and actively manage those links to improve them.</li> <li>• <b>Be pro-active:</b> Connected firms pro-actively plan their business activities by including their customers and suppliers in the conversation – especially in terms of managing changes in the business environment.</li> <li>• <b>Test your assumptions:</b> Connected firms conduct scenario planning exercises to test and reveal weaknesses in their current plans in order to improve them.</li> </ul>

### 5.3 Policy implications

This section distils the findings into potential policy implications that could be considered by state government, regional councils as well as CSG firm procurement functions.

#### 5.3.1 Helping regional firms to become more resilient

We found that firms in regional towns such as Dalby, Chinchilla and Miles have witnessed a decrease in growth prospects in the transition to operations period. That comes as no surprise. One potential reason for this downturn is not simply that CSG-related work has subsided. Rather, this group was found to be below average in several key resilience factors related to high performance. For instance, *connectedness* was found to be below average; this factor relates to higher turnover at the height of the downturn. Also, *adaptiveness*, which relates to high expected performance satisfaction in 2017, was found to be well below average in this group of firms. Furthermore, these firms were shown to be below average in *problem-solving*, which is directly related to innovation. We make some high-level recommendations regarding potential ways to bolster these areas in the table below (see Table 7). Many of these recommendations could be implemented by regional councils or the state government in order to improve the viability of regional firms.

**Table 7 – Improvement areas for regional small businesses**

Variable	Definition	Potential policy implications
<b>Connectedness</b>	Working closely with network partners to develop plans and approaches to addressing change in the business environment (more outwardly focused)	<ul style="list-style-type: none"> <li>• Marketing-related support to firms regarding how to leverage network partners in terms of cross-promotional approaches, and help with gaining a better understanding of market signals in terms of pricing strategies and bidding for contracts.</li> <li>• Development of collaborative partnerships or alliances to share costs of transport, logistics, and storage in order to offer a broader service offering to potential clients.</li> <li>• Support local industry associations and chambers of commerce.</li> <li>• Promote greater awareness of procurement portals and other forms of networking to increase awareness of partnership and bid opportunities.</li> <li>• Emulation by CSG firms of the North Sea Cost Reduction In the New Era (CRINE) strategies that would engender a more collaborative and connected supply chain, including but not limited to clearer communication of mid-term plans such as drilling sequences, consolidated functional requirements for products and technology, and common pre-qualification processes.</li> <li>• Providing a single point of promotion for networking events in regional areas</li> <li>• Formal collaboration partnerships between state, federal and local government with CSG firms focused on supplier development.</li> </ul>
<b>Adaptiveness</b>	Shifting and reconfiguring to meet new challenges in a swift and adept manner	<ul style="list-style-type: none"> <li>• Development and dissemination of successful case studies of firms in the region that have adapted and found new ways to use their existing resources.</li> <li>• Providing training for business owners in business skills such as planning and financial management.</li> </ul>
<b>Innovative problem-solving</b>	Taking unique approaches to solving difficult and unexpected problems, particularly if those activities diverge from prior processes or are counterintuitive	<ul style="list-style-type: none"> <li>• Hosting more innovation-related events for rural firms, including best-practice seminars and case studies of how innovation can improve business outcomes.</li> <li>• Providing seminars on topics such as design-driven innovation and lean launch pad to build these capabilities in local business owners.</li> <li>• Investment in innovation hubs / connection points that support regional businesses to access faster internet, web-based seminars / platforms.</li> </ul>

### 5.3.2 Enabling long-term viability of regional small businesses

In addition to the above improvement areas, we know the strongest predictor of performance in the future relates to *slack*, and especially to *pro-activeness*. We offer recommendations in Table 8 about potential policy implications.

**Table 8 – Adapt and transition into new product and service areas**

Variable	Definition	Potential policy implications
<b>Pro-activeness</b>	Forward looking investments and strategies that seek to gain competitive dominance	<ul style="list-style-type: none"> <li>• Subsidised business model / strategy support to firms, perhaps via university connections</li> <li>• Change management advice</li> <li>• Market / industry / competitor landscape analysis tools that allow firms to monitor business environment changes</li> <li>• Macro-economic trend analysis</li> <li>• CSG firms can engage with chambers of commerce and local industry associations to communicate emerging changes in the industry and likely future needs</li> <li>• Promotion and adoption of business benchmarking tools</li> </ul>
<b>Slack</b>	Spare staff and financial resources that can be utilised or reassigned toward <i>ad hoc</i> activities or new priorities, and backup and redundant systems and processes that are held in reserve to buffer against uncertainty	<ul style="list-style-type: none"> <li>• Industry-level, subsidised, investment mechanisms and loans help firms that lack liquidity to invest in new product / service areas</li> <li>• Industry-level collective investment in supply buffers and spare facilities that can be tapped into depending on need</li> </ul>

## 5.4 Limitations of the current research and next steps

This section discusses the limitations and future prospects for this research area.

### 5.4.1 Limitations of the current research

This research measured performance using self-reported satisfaction measures. These measures tend to correlate very strongly with actual fiscal performance [2] and, hence, there is no reason to be concerned about internal validity of the findings. However, future studies should strive to match survey data with Australian Bureau of Statistics data, such as tax receipts (information fed through from the Australian Taxation Office [ATO]). Further, it would be beneficial to understand the how firms responded to these economic fluctuations in real time, but it was not possible to gather longitudinal data across the various time periods in this study.

### 5.4.2 Outreach and communication of results

We are committed to the timely and accurate dissemination of the findings of this study. We currently plan to communicate these results via these formal outlets:

- An executive summary document containing results of this report will be sent directly to participants of the study
- Presentations at the regular meetings of chambers of commerce of the Western Downs Region
- A presentation by A/Prof John Steen at the annual 2016 APPEA conference: Verreyne, M., Steen, J. & Ford, J. (2016, 5-8 June). How do local small businesses adapt to the arrival of major

oil and gas projects? The Queensland gasfields case. The APPEA 2016 Conference and Exhibition, Brisbane, Australia.

- Participation at the upcoming conference on regional resilience supported by the University of Southern Queensland’s (USQ) Institute for Resilient Regions (15 June 2016)
- A press release that will be prepared by the UQ Business School Marketing team
- A written piece for the online magazine *The Conversation*, and the UQ Business School Magazine *Momentum*
- Academic journal articles.

**5.4.3 Expanding the current research stream**

The results from this initial study provide us with directional indicators for future research. This report highlights important linkages between the capabilities of resilient firms and their ability to sustain their performance through economic changes.

However, there is much more to do to uncover the specific mechanisms underlying these capabilities. The table below shows links between current findings and new research questions as well as potential methods to answer them. In doing so, the broad outlines of a future research programme come into view (Table 9).

Based on this preliminary research agenda we will file an expression of interest (EOI) with the CCSG by 20 April 2016 to expand our resilience through an ARC Linkage grant.

**Table 9 – Preliminary research agenda on resilience**

<b>Finding(s)</b>	<b>New questions</b>	<b>Research approaches</b>	<b>Potential outcomes</b>
<b>Slack</b> supports investment period performance, may be the single biggest reason for long-term survival	How does slack help firms pro-actively take advantage of opportunities that economic fluctuations present?	The research could use as basis the well-known ability-motivation-opportunity (AMO) structure to discriminate between firms from different industries, those that have acquired more resources and those that can draw on ongoing profit margins. This is best done using a case study design.	Greater insight into the different elements of slack that most support expansion and survival Detailed case study exemplars for training and outreach
<b>Slack</b> is tied to novel (new to the industry) innovations and higher numbers of product, logistic, services and process innovations	How do firms leverage specific types of slack toward new innovations? How do these slack-based innovations translate to performance?		

Finding(s)	New questions	Research approaches	Potential outcomes
<b>Connectedness</b> supports turnover in transition to operations period	What are the specific network relationship structures that support performance? How do small firms leverage their networks to achieve higher revenues?	Network mapping of regional firms industrial connections	Identifying the most influential players in regional industrial networks: <ul style="list-style-type: none"> <li>• Those most likely to serve as relationship brokers and idea connectors.</li> <li>• An explanation of which positions in the network make the rest of the network vulnerable to disruptions.</li> </ul>
The role of <b>pro-activeness</b> in terms of dealing with declining economic conditions, and having strong positive outlook on future performance. Strong ties between <b>pro-activeness</b> and <b>innovation</b> of all types, and new to industry versions.	How exactly do firms focus their innovation efforts in an economic downturn?	Case studies focused on innovation during economic downturns	Additional clarity on the mechanisms behind strategic planning in small businesses Detailed case study exemplars for training and outreach
Nearly 20 percent of our sample is new firms <b>incepted</b> during the investment period, many of these being accommodation and food services.	How do new small firms form during periods of high economic activity? How does increased economic activity in rural areas give rise to technologically sophisticated service firms and similar scientific and engineering-type firms?	Case studies of new firms focused on how they find footing and business niches during an uptick of economic activity	New insights into which firms are seeing opportunities, and which do not Insights into how new firms mobilise and gain finance
<b>Top performers</b> exhibit higher levels of all resilience capabilities	Which forms of resilience work together? What is the relationship between slack and pro-activeness? How are anticipation and connectedness related?	Leveraging existing data, in conjunction with new ABS financial data, and perform path analysis to determine more nuanced relationships within various resilience factors (including moderation and mediation)	Insight into the multiplicative or substitutive qualities of various resilience capabilities More specific insights into the impact of outcomes like revenue and profits via ABS data

## 6 Appendices

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### 6.1 References

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## 6.2 Analysis methods

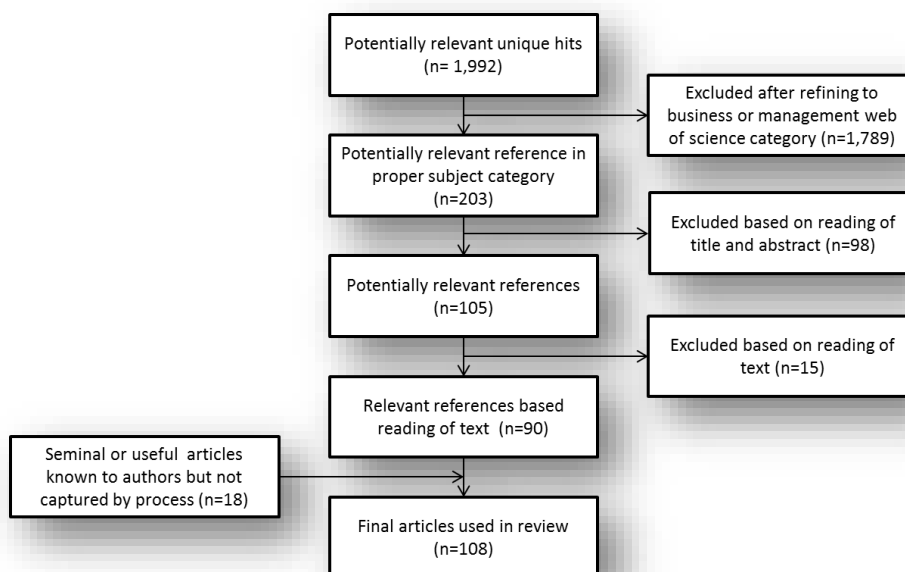
### 6.2.1 Literature review

To analyse the literature on organisational resilience, we conducted a formal literature review. First we developed a search string matrix (Table 10). Key words divided into two categories. The search labels from category A (resilience) were combined with the search labels from category B (variants of organisation), which yielded 10 search strings. See Table 10.

**Table 10 – Literature review search strings**

Category A	+ Operator	+ Category B	Resulting string
Resilien* (ce, t, tly, cy)	Near/5	Organi\$ation* (s, al)	TS=(Resilien* Near/5 Organi\$ation*)
		Firm* (s)	TS=(Resilien* Near/5 Firm*)
		Compan* (y, ies)	TS=(Resilien* Near/5 Compan*)
		Entit* (y, ies)	TS=(Resilien* Near/5 Entit*)
		Business* (es)	TS=(Resilien* Near/5 Business*)
		Enterprise* (s)	TS=(Resilien* Near/5 Enterprise*)
		Institut*	TS=(Resilien* Near/5 institut*)
		Team* (s, ing)	TS=(Resilien* Near/5 team*)
		Group* (s)	TS=(Resilien* Near/5 group*)
		System* (s)	TS=(Resilien* Near/5 system*)

We then conducted a search on Thomson ISI Web of Science (Social Sciences Citation Index (SSCI), Language=English) on 25 August 2015. This resulted in 1,992 hits. We refined to Business or Management Web of Science categories. This removed 1789 items leaving 203. Then papers were that did not directly focus on studying, defining, or otherwise directly addressing the phenomenon of resilient organisations, based title or abstract. This removed 98 items leaving 105. Another 15 were removed based on reading of the text leaving 90. Another 18 articles were relevant and / or seminal articles that for whatever reason were not found using this process, making the final tally 108 (see Figure 23).



**Figure 23 – Literature review process**



## **6.2.2 Resilience scale development**

Following the literature review, it became apparent that prior work on organisational resilience had focused on catastrophe and little had been done to understand how firms respond to economic fluctuations. Consequently, we developed a new scale of organisational resilience following a step-by-step process. Drawing on the literature, we listed concepts previously used to measure resilience. We grouped similar concepts together and developed a comprehensive list of questions thought to reflect the spirit of these new constructs. We then asked several experts to review whether the questions we had developed strongly reflected our constructs. We compiled these expert reviews and made changes to the questions; mostly by altering them to provide greater clarity or by deleting them. A final list of 55 questions was ultimately produced which reflected an anticipated 10 different constructs of resilience.

After the survey was conducted, we subjected the answers to the organisational resilience questions to exploratory factor analysis (EFA). This approach statistically grouped the questions we asked into larger constructs, each reflecting different aspects of resilience. Specifically, we used principle component extraction and direct Oblimin rotation in SPSS v.22. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .950 and the Bartlett's Test of Sphericity was significant ( $p < .001$ ), indicating that the sample would yield a stable factor solution.

The EFA approach yielded an eight-factor solution that includes the following sub-scales: anticipation, slack, innovative problem-solving, improvisation, flexibility, connectedness, adaptiveness and pro-activeness. These eight constructs, components, and definitions can be found in Section 6.2.6. These variables form the core of the analysis.

## **6.2.3 Survey**

We adopted a survey methodology to capture information from a large number of firms operating in regional Queensland. The core of the survey was based on a widely tested and highly regarded instrument developed originally by the Centre for Business Research (CBR) at Cambridge University (UK) [1], and used widely in Australia in surveys conducted by The University of Queensland Business School (UQBS). The aforementioned resilience questions were added to the survey instrument. The final survey was split into several sections which considered general characteristics of the business, resilience, innovation, competitive situation and financial performance.

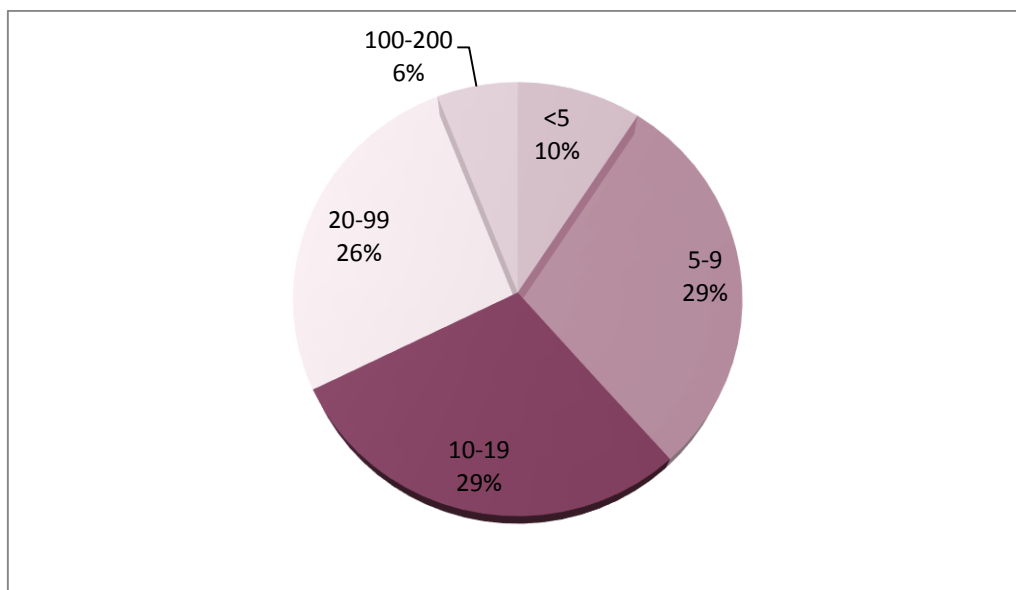
## **6.2.4 Sample**

To curate a sample of firms, we first collected trade show materials from a recent Surat Basin Expo to locate firms operating in the area which may be associated with the CSG industry. We combined this list with an existing UQBS small business CSG-related database. We then purchased a larger database of firms in the area from Impact Lists. This yielded a total of 2,388 potential firms. The survey was administered by a computer-aided telephone interviewing (CATI) system through a subcontractor. We targeted executive managers, including business owners of small firms. We ended our campaign after receiving 400 responses. We achieved a 43.9 per cent response rate, based upon the total of 400 responses and 512 direct refusals that we logged before terminating the survey. Tests for non-response bias revealed no cause for concern. Refer to Figure 1, Figure 2 and Figure 3 for the geographical distribution of the sample.

### **6.2.4.1 Basic descriptive statistics**

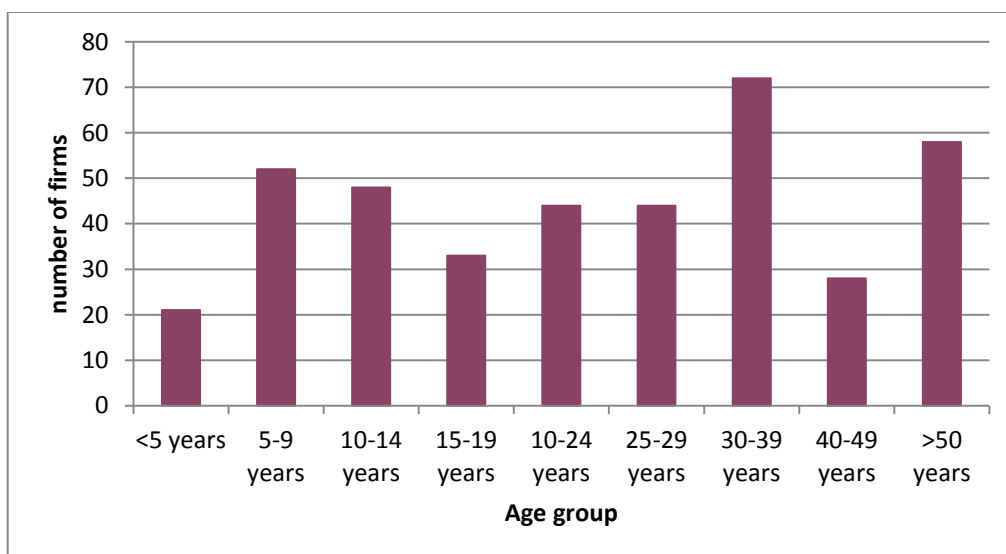
The average firm surveyed employed 25 staff. Most firms employed between five and 19 employees (58 per cent), with only six per cent employing more than 100 staff. While the ABS [3] reports that only

10 per cent of firms on the Western Downs employ more than five staff, two considerations are important. First, we did not survey farms which make up approximately half of the ABS sample. Second, our stratified sampling process focused on allowing us a broader representation across size categories for the purpose of comparisons between groups Figure 24.



**Figure 24 – Firm size (n=400, Mean 25.2, Median 12, Mode 5, SD 36, Min 1, Max 200)**

The average age of the firms in our sample was 30 years (see Figure 25).



**Figure 25 – Firm age (n=400, Mean 29.79 Median 25.00 Mode 30, SD 27.4, Min 1, Max 175)**

In terms of industry, we surveyed a broad range of industries, with a large proportion of our sample coming from professional services, retail, manufacturing and accommodation and food services (see

Figure 26).

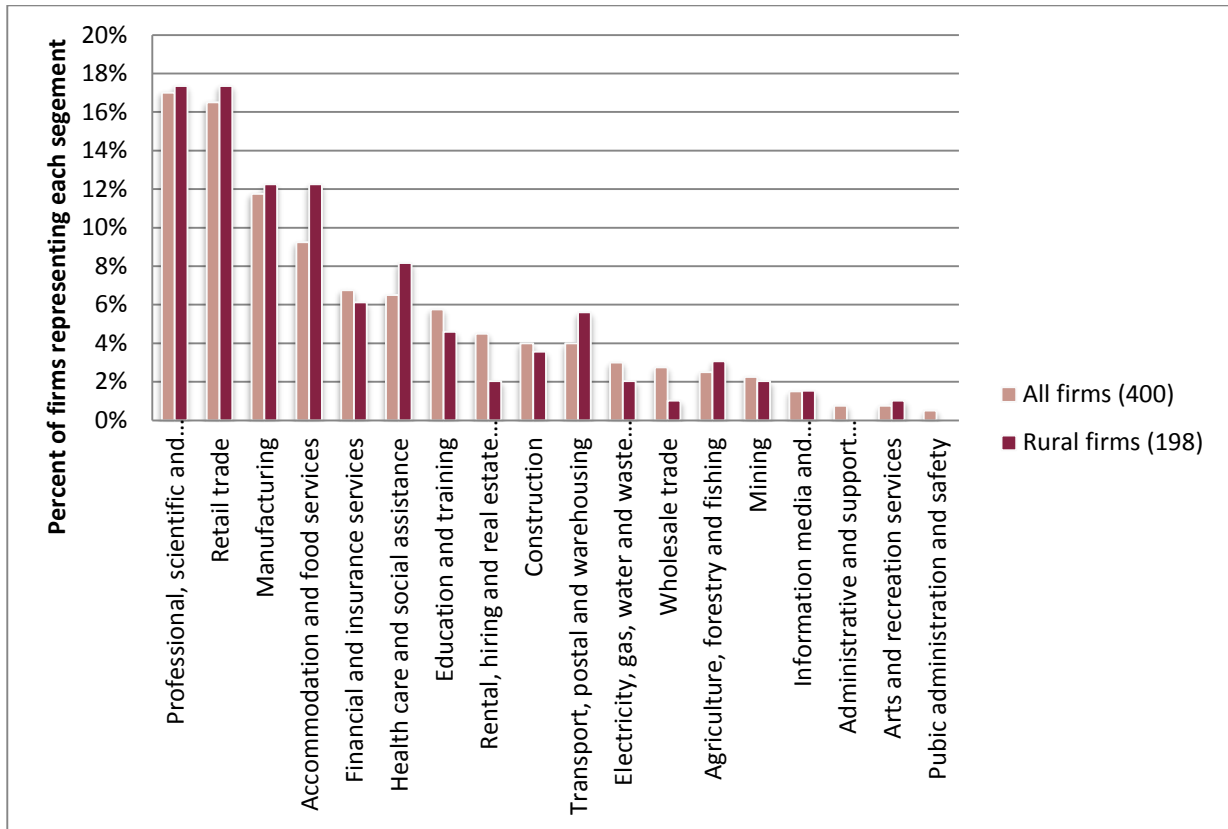


Figure 26 – Industry segments, n=400

Most firms reported turnover in the range of \$1-5 million, with only a very small proportion reporting turnover of above \$100 million (Figure 27).

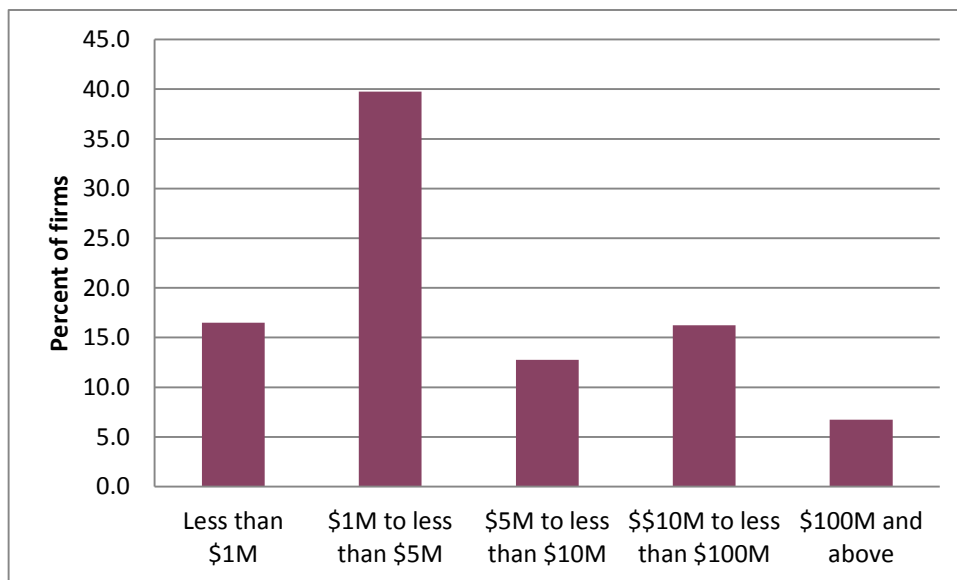
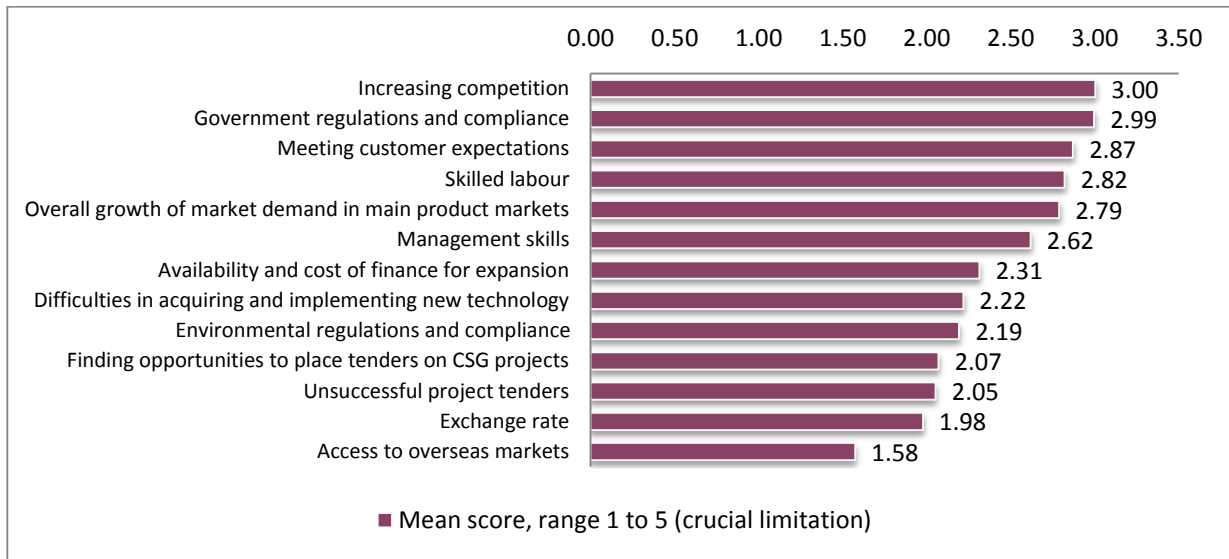


Figure 27 – Turnover ranges, n=368

**6.2.4.2 Barriers to meeting business objectives**

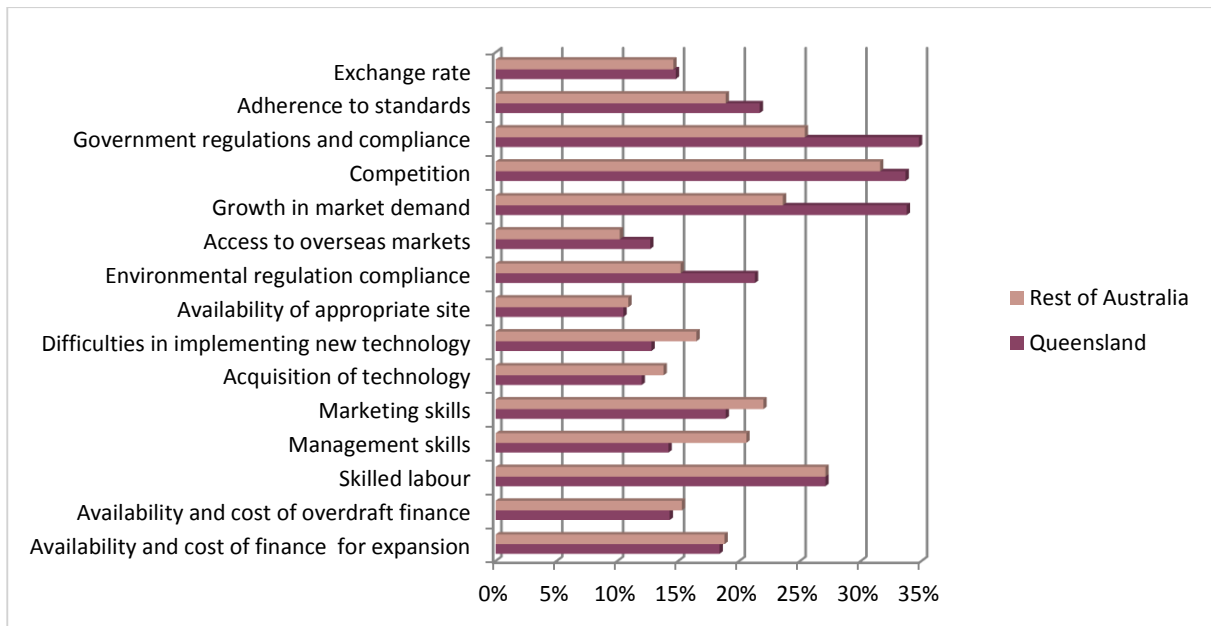
We asked firms to identify the most important barriers to meeting their business objectives. Not surprisingly, increases in competition ranked most highly, followed by regulatory barriers and

challenges in meeting customer expectation. Skilled labour also seemed to be an issue (see Figure 28).



**Figure 28 – Barriers to meeting business objectives, n=400**

These results are largely consistent with the QBIS 2014 [6] that reports competition, regulation and skilled labour also made up three of the top four categories, with growth in market demand rounding out the top four (see Figure 29).



**Figure 29 – Barriers to meeting business objectives (Queensland 2013 weighted – QBIS report)**

### 6.2.4.3 Innovation performance

Figure 30 shows the distribution of innovations that firms in the survey had introduced in the three years preceding our survey.

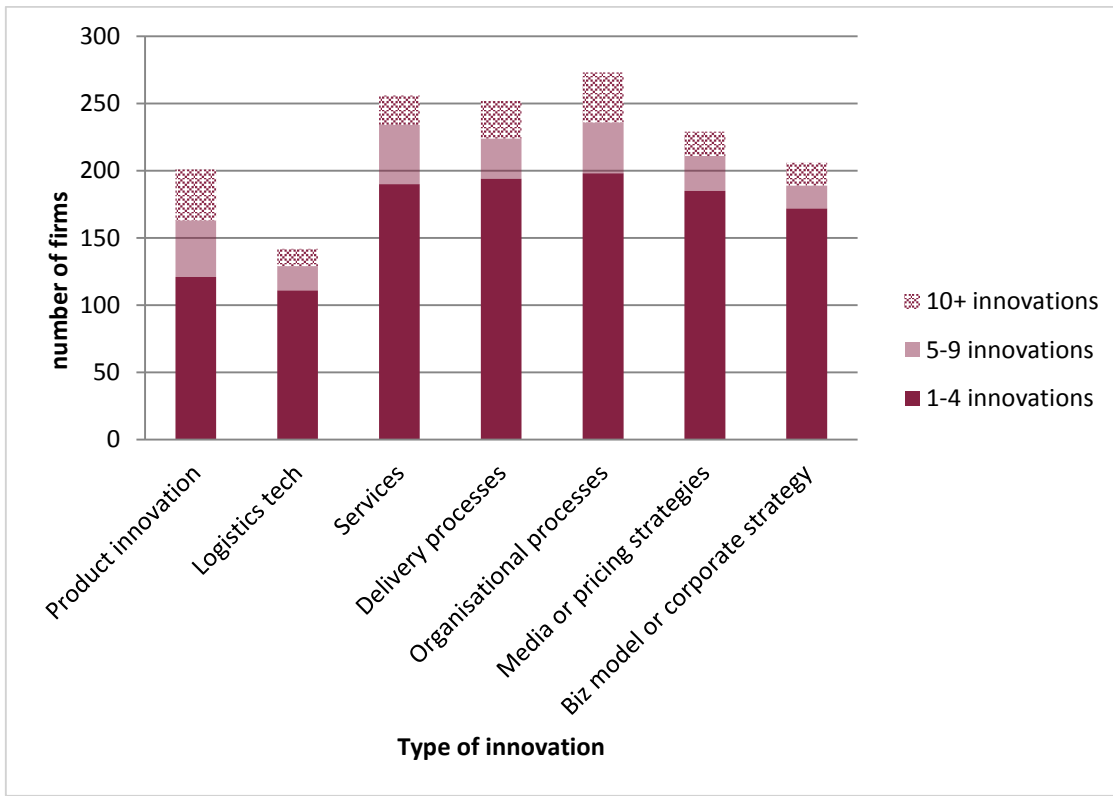


Figure 30 – Innovation by category over the last three years, n=400

### 6.2.5 Modelling approach

We used regression models to identify the way in which resilience factors and a series of control variables were related to performance across three timeframes: investment period (2008-2012); transition to operations (2013-2015); and future (to 2017). Since most of the performance variables are Likert scale, we used seemingly unrelated fractional logistic regressions [7]. This approach transforms the Likert scale dependent variable into fractions varying between 0 and 1, and estimates the beta values for the models simultaneously in order to deal with shared error across various performance models in each time frame. In cases where the dependent variable is binary, as in the case of survival, logistic regression was used. In our models we included all eight resilience factors and several control variables, including firm size, age, and industry (please see the variables list in Section 6.2.6). All models were executed in Stata v.14. The models are shown in Section 6.4 in the Appendix.

To further inspect the significant relationships between variables borne by the regression models and to conduct supplementary analysis beyond the models, cross-tabulations were conducted between binary variables. This approach provides a more intuitive understanding of the relationships between variables. For instance, the reader can identify cross-tabulation results when the narrative takes the form, ‘firms with above average pro-activeness are 4.8 times more likely to predict high performance satisfaction in 2017’. We calculated this in the following manner. Above average pro-activeness can be indicated by a binary variable and this can be compared with a binary variable indicating that the firm has high / very high expected satisfaction performance in 2017. A cross-tabulation investigation reveals a statistically significant relationship (chi-square, 2-tailed values below  $p < 0.05$ ) and from this the odds

ratio (4.8 in this example) is calculated. The analysis was conducted in SPSS v. 22. For the sake of brevity, the raw data for these ancillary analyses are not contained in the Appendix.

Finally, Mann-Whitney mean ranking was conducted to compare count variables with different categories. For instance, we compared the difference between being above or below average in proactiveness to see whether this has a significant impact on the number of product innovations produced. This analysis was also conducted in SPSS v. 22. All variables used in the analysis are contained in Table 11 in the Appendix. A correlation matrix created in SPSS v. 22 for the variables used in the regression models is contained in Section 6.3 of the Appendix.

## 6.2.6 Variable list

**Table 11 – Variable list**

Category	Variable name	Definition / notes
Independent variables	Perf_08T	The addition of 2008 satisfaction scores for sales, sales growth, profitability, and market share measured on a Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied), divided by the highest possible score (20) to obtain a fraction.
	Perf_13T	The addition of 2013 satisfaction scores for sales, sales growth, profitability, and market share measured on a Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied), divided by the highest possible score (20) to obtain a fraction.
	Perf_17T	The addition of 2017 satisfaction scores for sales, sales growth, profitability, and market share measured on a Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied), divided by the highest possible score (20) to obtain a fraction.
	Boom_growT	Using 2008 as a baseline and comparing it with 2013, did your business prospects? Decrease (1), stay the same, grow moderately, grow substantially (4), divided by the highest possible score (4) to obtain a fraction.
	Bust_growT	Using 2013 as a baseline and comparing it with today, have your business prospects? Decrease (1), stay the same, grow moderately, grow substantially (4), divided by the highest possible score (4) to obtain a fraction.
	Future_growT	Which of the following do you feel describes your growth objectives over the next 3 calendar years? Become smaller (1), stay the same, grow moderately, grow substantially (4), divided by the highest possible score (4) to obtain a fraction.
	Survive	A binary indicator if the firm plans on remaining in business two years into the future. It is a binary indicator 1 (yes), 0 (no) indicating a firm did not report a 4 or 5 score (Likert scale ranged from 1 – <i>highly unlikely</i> , to 5- <i>highly likely</i> ) on any of 7 modes of exit.
	Anticipation	Active monitoring and adjustment of stance to avoid being caught off-guard by shifts in the business environment (more inwardly focused) Multi-item EFA derived factor with a Cronbach's alpha of .856, consisting of the following items: We do not take our organisation's successes for granted We maintain and encourage training that goes beyond what the job requires When we face new challenges we put together workable solutions from our existing resources We openly debate the pros and cons of our current strategy and strive to continuously improve upon it We regularly look for even small changes in our circumstances that may adversely affect our business prospects Staff are rewarded for "thinking outside of the box" We simulate or imagine how we will respond to particularly problematic situations Our organisation quickly restores business performance after a disruption Our organisation adjusts and communicates its priorities as our circumstances change
	Slack	Spare staff and financial resources that can be utilised or reassigned towards ad hoc activities or new priorities, and backup and redundant systems and processes that are held in reserve to buffer against uncertainty Multi-item EFA consisting with a Cronbach's Alpha of .731, consisting of the following items: We maintain spare equipment, facilities or production capacity that we can use in times of need We carry a buffer of excess inventory just in case a disruption occurs Our business has a reasonable amount of resources in reserve Not all of available resources are locked up in current business activities We have ample discretionary financial resources

Category	Variable name	Definition / notes
	Problem_solving	<p>Taking unique approaches to solving difficult and unexpected problems, particularly if those activities diverge from prior processes or are counterintuitive</p> <p>Multi-item EFA consisting with a Cronbach's Alpha of .750, consisting of the following items:</p> <p>The job requires staff to deal with ambiguous assignments, for which no previously established procedures exist</p> <p>Staff are encouraged to take risks when trying new ideas</p> <p>The job requires staff to come up with new ways of doing things</p> <p>We accomplish new challenges with resources that were not originally intended to be used this way</p> <p>There is freedom to experiment with new ways of doing things in our organisation</p> <p>By combining our existing resources, we take on a variety of new challenges</p>
	Improvisation	<p>The ability to improvise viable solutions and workarounds amidst the chaos of a disruption using the current resources available</p> <p>Multi-item EFA consisting with a Cronbach's Alpha of .565, consisting of the following items:</p> <p>Our organisation absorbs the impacts of external extreme events</p> <p>We use current resources to respond to a new problem or opportunity</p> <p>We deal with new challenges by applying a combination of our existing resources and other resources inexpensively available to us</p>
	Flexibility	<p>Organisational structures, processes and practices that facilitate shared understanding of operations, challenges and opportunities which provide flexibility to react to changing and ambiguous circumstances that the organisation faces</p> <p>Multi-item EFA consisting with a Cronbach's Alpha of .628, consisting of the following items:</p> <p>Our employees can switch to new jobs with similar responsibilities to their current jobs within a short time</p> <p>Our partnership arrangements allow us to easily adjust our product and/or service offerings</p> <p>People in our firm are cross-disciplinary</p> <p>Our organisation is able to easily quickly address new vulnerabilities when they are recognised</p>
	Connectedness	<p>Working closely with network partners to develop plans and approaches to address change within the business environment (more outwardly focused)</p> <p>Multi-item EFA consisting with a Cronbach's Alpha of .791, consisting of the following items:</p> <p>We work closely with our collaborators or network partners to spread our risks</p> <p>We conduct scenario planning exercises to test our assumptions about our current plans</p> <p>We maintain a very diverse network of partners and collaborators</p> <p>We understand how we are connected to other organisations and actively manage those links</p> <p>We actively plan with our customers how to manage disruptions</p> <p>We proactively monitor our industry to have an early warning of emerging issues that may affect our business prospects</p> <p>We work with others regardless of departmental or organisational boundaries to get the job done</p> <p>We actively plan with our suppliers how to manage disruptions</p>
	Adaptiveness	<p>Shifting and reconfiguring to meet new challenges in a swift and adept manner</p> <p>Multi-item EFA consisting with a Cronbach's Alpha of .760, consisting of the following items:</p> <p>We are confident of our ability to find workable solutions to new challenges by using our existing resources</p> <p>We are able to accommodate disruptions while maintaining our current role in the industry</p> <p>When dealing with new problems or opportunities we take action by assuming that we will find a workable solution</p> <p>We are able to shift things around in the face of adversity and still deliver value to our customers</p> <p>We can always find the 'manpower' to work on special projects</p>



Category	Variable name	Definition / notes
	Pro-activeness	Forward looking investments and strategies that seek to gain competitive dominance Multi-item EFA consisting with a Cronbach's Alpha of .877, consisting of the following items: In dealing with competitors, our business is very often the first one to introduce new products/services, administrative techniques, operating technologies, etc In dealing with competitors, my firm typically initiates actions, which competitors then respond to In general, the top managers of my firm have a strong tendency to be ahead of others in introducing novel ideas or products Our organisation has a history of turning threats into new opportunities We take on a broader range of challenges than our competitors that have similar resources We invest in building new capabilities when we face unique business challenges Aspects of our business are reorganised to capture new opportunities that arise We develop responses to specific threats we face as an organisation We adapt quickly to accommodate changes in our environment or market Our business regularly recognises new business opportunities resulting from changes in the market place
	Anticipation_01	Above average indicator based on mean of 3.97
	Slack_01	Above average indicator based on mean of 3.4013
	Problem_solving_01	Above average indicator based on mean of 3.5240
	Improvistaion_01	Above average indicator based on mean of 3.9624
	Flexibility_01	Above average indicator based on mean of 3.6769
	Connectedness_01	Above average indicator based on mean of 3.6633
	Malleability_01	Above average indicator based on mean of 4.0160
	Proactiveness_01	Above average indicator based on mean of 3.7473
<b>Control Variables</b>	LN_size	Natural logarithm of firm size (employees)
	LN_age	Natural logarithm of firm age (years)
	Industry	The industry segment that the firm operates in A numeric value indicating one of 16 industry positions.
	csg	Firm is directly involved in coal seam gas project(s) Binary indicator, 1 (yes), 0 (no)
	rural	Rural firms excluding Brisbane or Toowoomba office locations Binary indicator, 1 (yes), 0 (no)
	Skills	Trouble acquiring necessary skills, technology and finance 4-item factor with a Cronbach's Alpha of .698 obtained via exploratory factor analysis of business constraints. Specifically, firms impact of various business performance barriers measured on a 5 point Likert scale ranging from 1 (insignificant limitation) to 5 (crucial limitation). The individual scores for each of the following items were added and divided by 4 to arrive at the final variable: Availability and cost of finance for expansion Skilled labour Management skills Difficulties in acquiring and implementing new technology
	External	External trouble, including competitors, customers, and regulators 2-item factor with a Cronbach's Alpha of .728 obtained via exploratory factor analysis of business constraints. Specifically, firms impact of various business performance barriers measured on a 5 point Likert scale ranging from 1 (insignificant limitation) to 5 (crucial limitation). The individual scores for each of the following items were added and divided by 2 to arrive at the final variable: Finding opportunities to place tenders on CSG projects Unsuccessful project tenders

Category	Variable name	Definition / notes
	Tenders	Trouble with tenders 4-item factor with a Cronbach's Alpha of .644 obtained via exploratory factor analysis of business constraints. Specifically, firms impact of various business performance barriers measured on a 5 point Likert scale ranging from 1 (insignificant limitation) to 5 (crucial limitation). The individual scores for each of the following items were added and divided by 4 to arrive at the final variable: Meeting customer expectations Increasing competition Environmental regulations and compliance Government regulations and compliance
	Markets	Trouble related to markets 3-item factor with a Cronbach's Alpha of .554 obtained via exploratory factor analysis of business constraints. Specifically, firms impact of various business performance barriers measured on a 5 point Likert scale ranging from 1 (insignificant limitation) to 5 (crucial limitation). The individual scores for each of the following items were added and divided by 3 to arrive at the final variable: Access to overseas markets Overall growth of market demand in main product markets Exchange rate
	Performance_overall	The addition of 2008, 2013, and 2017 satisfaction scores for sales, sales growth, profitability, and market share measured on a Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied). Range 0-60
	Overall_grow	Addition of Boom_grow, bust_grow, future_grow growth prospect ratings. Range 0-12. Boom_grow: Using 2008 as a baseline and comparing it with 2013, did your business prospects? Decrease (1), stay the same, grow moderately, grow substantially (4). Bust_grow: Using 2013 as a baseline and comparing it with today, have your business prospects? Decreased (1), stayed the same, grown moderately, grown substantially (4). Future_grow: Which of the following do you feel describes your growth objectives over the next 3 calendar years? Become smaller (1), stay the same, grow moderately, grow substantially (4).
	Bust_grow	Using 2013 as a baseline and comparing it with today, have your business prospects? Decreased (1), stayed the same, grown moderately, grown substantially (4). Range 1-4
	Innovator	Indicates if a firm introduced any of the six types of innovation Binary 0 (no) 1 (yes)
<b>Additional variables used in cross-tabs /non-parametric testing</b>	Product_ct	Number of new or significantly improved product
	Logistic_ct	Number of technological improvements in supply, storage or distribution systems for manufactured product
	Service_ct	Number of new or significantly improved service
	Process_ct	Number of new or significantly improved process to deliver products or services
	Managerial_ct	Number of new organisational / managerial processes or business strategies
	Promo_ct	Number of new media or techniques for promotion or pricing strategies
	Strat_ct	Number of significant changes to the business model or corporate strategy
	Innovator	Indicates if a firm introduced any of the six types of innovation
	Novel_innovator	Of the innovators, indicates whether <b>any</b> of the six types of innovation were 'new to the industry'
	Novel_product	Indicates firm is novel in this type
	Novel_logistic	Indicates firm is novel in this type
	Novel_service	Indicates firm is novel in this type
	Novel_process	Indicates firm is novel in this type
	Novel_mgt	Indicates firm is novel in this type
Novel_promo	Indicates firm is novel in this type	
Novel_strat	Indicates firm is novel in this type	

### 6.3 Correlation table

Table 12 – Correlation matrix

Variable	Descriptor	N	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		
1 Perf_08T	Performance 2008	325	0.70	0.18																											
2 Perf_13T	Performance 2013	391	0.68	0.20	.280**																										
3 Perf_17T	Performance 2017	395	0.67	0.18	.138*	.221**																									
4 Performance_overall	Performance overall	324	40.83	7.74	.673**	.749**	.635**																								
5 Boom_growT	Investment period growth	329	0.74	0.29	.013	.446**	.131*	.300**																							
6 Bust_growT	Transition to operations growth	394	0.54	0.27	-.179**	-.022	.407**	.085	.176**																						
7 Future_growT	Future growth	400	0.72	0.18	-.051	.042	.403**	.170**	.125*	.333**																					
8 Survive	Survive	375	0.59	0.49	-.018	.034	.036	-.007	.126*	.144**	.055																				
9 Anticipation	Anticipation	400	3.97	0.62	.078	.186**	.274**	.254**	.087	.133**	.182**	-.045																			
10 Slack	Slack	400	3.40	0.82	.135**	.211**	.210**	.270**	.188**	.116*	.135**	.033	.381**																		
11 Problem_solving	Problem-solving	400	3.52	0.71	.031	.126*	.318**	.228**	.065	.181**	.201**	-.040	.572**	.292**																	
12 Improvisation	Improvisation	400	3.93	0.63	.113*	.170**	.249**	.270**	.071	.108*	.231**	-.030	.564**	.360**	.446**																
13 Flexibility	Flexibility	400	3.68	0.70	.059	.153**	.267**	.203**	.107	.151**	.154**	-.061	.568**	.409**	.477**	.453**															
14 Connectedness	Connectedness	400	3.66	0.67	.136*	.229**	.290**	.301**	.081	.140**	.177**	.049	.718**	.424**	.523**	.491**	.576**														
15 Adaptiveness	Adaptiveness	400	4.02	0.65	.152**	.230**	.355**	.348**	.067	.178**	.185**	-.015	.665**	.451**	.509**	.561**	.572**	.620**													
16 Proactiveness	Pro-activeness	400	3.75	0.66	.072	.214**	.355**	.295**	.127*	.201**	.266**	-.030	.747**	.446**	.670**	.547**	.620**	.703**	.682**												
17 LN_size	Size	400	2.63	1.02	.056	.099	.114*	.115*	.160**	.101*	.101*	.138**	.011	.087	.051	.047	.003	.119*	.114*	.107*											
18 LN_age	Age	400	3.03	0.91	-.054	-.052	-.057	-.086	-.060	-.040	-.020	-.068	-.010	.085	-.104*	.071	-.047	.032	-.009	-.041	.171**										
19 Industry	Industry	400	9.15	4.55	.109*	.098	.050	.127*	.074	.058	-.008	.025	.024	-.090	-.007	.004	.010	.045	.033	-.050	-.051	-.002									
20 csg	CSG	400	0.25	0.43	.063	.152**	-.036	.124*	.075	-.159**	-.045	-.098	.046	.051	.114*	.036	.101*	.075	.054	.117*	.043	-.049	-.073								
21 rural	Rural firms	400	0.49	0.50	.078	.070	-.166**	.025	-.036	-.216**	-.056	-.105*	-.077	-.002	-.150**	-.068	-.080	-.107*	-.153**	-.095	-.070	.061	-.011	-.058							
22 Skills	Skills barriers	399	2.49	0.99	.021	-.005	-.029	.000	-.019	-.016	.001	-.037	.058	-.051	.080	.009	-.049	.041	-.030	.048	.013	.073	-.097	.082	-.010						
23 Customers	Customer barriers	399	2.77	0.98	.065	-.099	-.128*	-.072	-.019	-.099*	-.108*	-.068	.004	.078	.020	-.012	-.051	.025	-.013	.031	.023	.196**	-.037	-.042	.083	.478**					
24 Tenders	Tender barriers	400	2.06	1.21	.062	-.081	-.133**	-.058	-.014	-.159**	-.081	-.104*	.011	.030	.070	.006	.034	.042	.004	.086	-.039	-.011	-.174**	.304**	-.031	.278**	.243**				
25 Markets	Market barriers	400	2.11	0.94	-.055	-.091	.022	-.061	-.058	-.029	.071	-.049	.007	.022	.105*	.055	.035	.041	-.004	.072	.027	.029	-.315**	.117*	-.104*	.393**	.320**	.304**			
26 Innovator	Innovator	400	0.90	0.30	.011	.050	.125*	.053	.079	.123*	.104*	.104*	.158**	.087	.278**	.104*	.146**	.194**	.160**	.254**	.163**	.027	-.010	.089	-.116*	.128*	.183**	.171**	.133**		
27 Novel_Innovator	Novel Innovator	361	0.65	0.48	.025	-.003	.089	.046	.004	.064	.110*	-.089	.139**	.104*	.179**	.096	.071	.124*	.092	.193**	.013	.062	-.111*	.092	-.055	.081	.005	.124*	.168**		
28 Product_ct	Product innovation count	381	2.97	5.36	.016	-.008	-.005	-.015	-.007	-.034	.005	.010	.145**	.117*	.142**	.089	.101*	.106*	.121*	.178**	.022	-.014	-.128*	.028	-.006	.072	.094	.088	.142**		
29 Logistics_ct	Logistics innovation count	398	1.24	2.72	.015	-.026	.077	-.018	.013	.089	.022	.081	.177**	.139**	.140**	.064	.123*	.145**	.087	.196**	.028	-.025	-.043	-.013	-.055	.046	.094	.048	.061		
30 Service_ct	Service innovation count	396	2.42	3.46	.087	.022	.091	.060	.070	.075	.051	-.003	.220**	.160**	.221**	.085	.115*	.186**	.204**	.228**	.050	-.033	.046	.002	-.054	.079	.123*	.076	.073		
31 Process_ct	Process innovation count	398	2.48	4.24	-.055	.056	.122*	.039	.132*	.102*	.114*	.103*	.229**	.117*	.135**	.101*	.172**	.195**	.162**	.217**	.089	-.037	.063	-.044	-.082	.080	-.080	-.020	-.045		
32 Managerial_ct	Managerial innovation count	396	2.85	4.12	-.079	.016	.102*	-.007	.096	.112*	.165**	-.016	.186**	.080	.171**	.159**	.133**	.194**	.149**	.181**	.122*	.041	.012	-.050	-.093	.039	.023	-.075	.054		
33 Promo_ct	Marketing innovation count	397	1.98	3.48	-.038	-.007	.080	-.001	.037	.064	.047	.035	.117*	.025	.093	.002	.049	.101*	.057	.126*	.114*	.092	.038	.003	-.077	.066	.057	-.019	.058		
34 Strat_ct	Strategic /business inn. ct.	399	1.54	2.93	-.043	-.012	.127*	-.025	.020	.059	.116*	-.015	.151**	.071	.084	.035	.030	.142**	.068	.140**	.102*	.017	-.040	.026	-.054	.136**	.134**	.054	.172**		
35 Novel_product	Novel product innovation	220	0.53	0.50	-.014	.096	.142**	.114	.075	.124	.106	.030	.098	-.042	.193**	.026	.029	.083	.073	.164*	.060	-.073	-.185**	.039	.153*	-.014	-.114	.036	.020		
36 Novel_logistic	Novel logistic innovation	144	0.44	0.50	-.026	.051	.084	.067	.029	.110	.013	.073	.091	.081	.198*	.089	.023	.187*	.131	.227**	.074	-.168*	-.030	.016	-.077	-.001	-.069	.087	.071		
37 Novel_service	Novel service innovation	260	0.48	0.50	-.052	-.020	-.023	-.072	-.083	.040	.013	-.137*	.066	.106	.115*	.031	-.014	.040	.015	.097	-.008	.010	-.024	-.009	-.017	-.003	.023	.071	.124*		
38 Novel_process	Novel process innovation	254	0.43	0.50	.031	.181**	.078	.128	.056	-.004	.019	-.137*	.053	.057	.147*	-.025	.048	.119	.026	.151*	.001	-.043	-.051	.101	-.012	.056	-.056	.071	.086		
39 Novel_mgt	Novel mgt innovation	277	0.32	0.47	.038	.024	.105	.058	-.097	.032	.089	-.121*	.125*	.116*	.104	.103	.025	.132*	.084	.099	.014	.056	-.014	-.058	-.053	.063	.002	-.027	.028		
40 Novel_promo	Novel promo innovation	232	0.26	0.44	.102	.163*	.056	.184*	.046	.002	.002	-.066	.160*	.177**	.151*	.104	.082	.231**	.085	.195**	.004	.115	.018	.038	-.007	-.038	.044	-.062	.057		
41 Novel_strat	Novel strat innovation	207	0.30	0.46	-.053	-.009	.058	-.009	.039	.063	.046	-.101	.125	.095	.096	.158*	.017	.155*	.095	.118	-.004	.155*	-.128	.087	-.101	.072	.006	.032	.095		

\*\* Correlation is significant at the 0.01 level (2-tailed). \* Correlation is significant at the 0.05 level (2-tailed).

## 6.4 Regression models

Table 13 – Investment period regression models

Investment period	(1) Perf_13T	(2) Perf_13T	(3) Boom_growT	(4) Boom_growT
Anticipation	-0.057	-0.053	-0.093	-0.064
Slack	0.117	<b>0.166*</b>	0.396**	<b>0.565**</b>
Problem_solving	-0.062	-0.076	-0.095	-0.058
Improvisation	0.049	0.093	0.035	0.101
Flexibility	-0.067	-0.118	0.006	-0.110
Connectedness	0.163	0.128	-0.048	-0.185
Adaptiveness	0.154	0.163	-0.195	<b>-0.386*</b>
Pro-activeness	0.124	0.133	0.475 <sup>+</sup>	0.526
LN_size		0.066		<b>0.317**</b>
LN_age		-0.048		<b>-0.248*</b>
Industry		<b>0.026*</b>		<b>0.068*</b>
CSG		<b>0.437**</b>		0.328
rural		<b>0.238*</b>		-0.143
Skills		0.081		-0.009
External		-0.118		-0.029
Tenders		<b>-0.108*</b>		-0.096
Markets		-0.049		-0.091
Innovator		0.068		0.013
Constant	-0.812**	-0.954*	-0.563	-0.220
<i>N</i>	391	390	329	329
pseudo <i>R</i> <sup>2</sup>	.054	.119	.042	.096
<i>AIC</i>	688.138	704.391	613.870	630.901
<i>BIC</i>	723.857	779.748	648.034	703.026
ll	-335.069	-333.195	-297.935	-296.450

\*  $p < 0.05$ , \*\*  $p < 0.01$

Model statistics are single equation logistic statistics

Seemingly unrelated fractional logistics regression models

**Table 14 – Transition to operations regression models**

<b>Transition to operations</b>	(1) Bust_growT	(2) Bust_growT	(3) TurnoverT	(4) TurnoverT
Anticipation	-0.121	-0.209	-0.550**	<b>-0.288**</b>
Slack	0.025	0.088	0.099	0.067
Problem_solving	0.116	0.063	-0.136	-0.118
Improvisation	-0.057	-0.042	-0.049	-0.046
Flexibility	0.069	0.126	-0.145	-0.073
Connectedness	-0.032	-0.090	0.432**	<b>0.296**</b>
Adaptiveness	0.147	0.043	0.026	-0.051
Pro-activeness	0.238	<b>0.348*</b>	0.321*	0.150
LN_size		0.070		<b>0.494**</b>
LN_age		-0.031		<b>0.107*</b>
Industry		0.010		<b>-0.035**</b>
CSG		<b>-0.508**</b>		-0.012
rural		<b>-0.436**</b>		-0.040
Skills		0.099		-0.086
External		<b>-0.130*</b>		-0.017
Tenders		<b>-0.128**</b>		0.053
Markets		0.012		<b>0.154**</b>
Innovator		0.278		0.043
Constant	-1.257**	-0.723	0.199	-1.134**
<i>N</i>	394	393	368	368
pseudo <i>R</i> <sup>2</sup>	.030	.097	.093	.422
<i>AIC</i>	633.805	646.189	570.587	577.607
<i>BIC</i>	669.592	721.691	605.760	651.861
<i>LI</i>	-307.902	-304.094	-276.293	-269.804

\*  $p < 0.05$ , \*\*  $p < 0.01$

Model statistics are single equation logistic statistics

Seemingly unrelated fractional logistics regression models

**Table 15 – Future performance regression models**

<b>Future performance</b>	(1) Perf_17T	(2) Perf_17T	(3) Future_g rowT	(4) Future_gr owT	(5) Survive	(6) Survive
Anticipation	-0.154	-0.154	-0.130	-0.136	-0.413	-0.256
Slack	0.018	0.053	0.022	0.049	0.169	<b>0.610**</b>
Problem_solving	0.134	0.090	0.052	0.039	-0.074	-0.324
Improvisation	0.014	0.013	0.162	0.182	-0.048	-0.009
Flexibility	0.007	0.005	-0.028	-0.039	-0.308	-0.258
Connectedness	0.052	0.018	-0.010	-0.029	0.583*	0.506
Adaptiveness	0.252*	<b>0.205*</b>	-0.006	-0.014	0.001	-0.509
Pro-activeness	0.174	<b>0.235*</b>	0.322**	<b>0.313*</b>	-0.060	-0.092
LN_size		0.037		0.046		0.190
LN_age		-0.007		-0.016		-0.222
Industry		0.010		0.007		-0.008
CSG		-0.116		-0.159		-0.198
rural		-0.149		-0.020		-0.329
Skills		0.028		0.042		0.036
External		<b>-0.140*</b>		<b>-0.148**</b>		-0.228
Tenders		<b>-0.096**</b>		-0.070		-0.048
Markets		0.078		<b>0.128*</b>		-0.106
Innovator		0.165		0.108		0.446
Performance_overall		--		--		-0.006
Bust_grow		--		--		0.215
Constant	-1.154**	-0.880**	-0.451	-0.367	1.153	2.769
<i>N</i>	395	394	400	398	396	319
pseudo <i>R</i> <sup>2</sup>	.145	.169	.067	.084	0.019	0.083
<i>AIC</i>	685.540	702.408	720.203	736.337	540.522	438.137
<i>BIC</i>	721.350	777.959	756.126	812.079	576.354	517.206
<i>ll</i>	-333.770	-332.204	-351.102	-349.168	-261.261	-198.068

\*  $p < 0.05$ , \*\*  $p < 0.01$

Model statistics are single equation logistic statistics

Seemingly unrelated fractional logistics regression models

The survival model is a logistic model, and is included in the seemingly unrelated estimation with the fractional logistic models.