



THE NATIONAL
RESEARCH INSTITUTE
PAPUA NEW GUINEA

DISCUSSION PAPER

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TO OPERATION AND EXPANSION
RELATE TO SUBJECTIVE MEASURES OF
ENTERPRISE PERFORMANCE?
EVIDENCE FROM A SURVEY OF SMES IN
PAPUA NEW GUINEA

Vinod Mishra
Francis Odhuno
Russell Smyth

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- Department of Public Enterprises and State Investments
- Department of Treasury
- Independent Consumer & Competition Commission
- Independent Public Business Corporation
- National Information and Communications Technology Authority

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Executive Summary

We examine the relationship between perceived obstacles to operation and expansion and three subjective measures of performance: (a) assessment of business and sales growth in the previous 12 months; (b) expectations about employment growth in the next 12 months; and (c) expectations about growth in the asset base in the next 12 months for a sample of formal small and medium enterprises in Papua New Guinea. We find that the biggest obstacle to having increased business and sales a lot in the previous 12 months is remote location of business. We find that the biggest obstacles to expecting the firm's workforce to increase a lot in the next 12 months are remote location of business and difficulty leasing or buying land. We find that the biggest obstacles to expecting the firm's asset base to increase a lot in the next 12 months are remote location of business and difficulty dealing with banks. Perceiving remote location of business and difficulty leasing or buying land to be more important obstacles to operation or expansion, thus, is negatively correlated with more than one performance measure. We suggest policy recommendations based on our findings.

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Ch. 1 Introduction

Papua New Guinea (PNG) is a lower-middle income country in the South Pacific. PNG is well endowed with natural resources (land, forests, fisheries and minerals) and over the last decade has experienced strong economic growth. Yet, the performance of the small and medium enterprise (SME) sector remains relatively poor. PNG SMEs currently contribute only about 6 per cent of the country's Gross Domestic Product (GDP); SMEs also provide only 10 per cent of formal sector jobs. The poor performance of the SME sector reflects several factors. According to the PNG Development Strategic Plan (DSP) 2010-2030, "the development of SMEs in PNG has not been robust due to many policy and institutional issues, as well as environmental and structural impediments that need to be overcome". The DSP proceeds to note that these "include issues such as policy incoherence, overlapping of rules and complexity of administrative procedures, lack of capacity development and training, lack of access to appropriate technology, lack of access to relevant markets, lack of access to information, including knowledge of potential business opportunities, and perhaps, above all, lack of access to credit" (Department of National Planning & Monitoring, DNPM, 2010, p.100). Similarly, PNG Vision 2050 recognises that the development of SMEs in PNG is being hampered by "an unfriendly investment climate" (DNPM, 2010a). In the latest World Bank's annual "Doing Business", as of June 2015 PNG ranked 145 out of 189 countries in terms of ease of doing business (see World Bank, 2016).

For this reason, the PNG government has reformulated its strategy relating to SMEs, re-inforcing its renewed commitment to support the development of the SME sector. This commitment is reflected in the promulgation of key legislation and policy initiatives in recent years, including the enactment of the SME Corporation Act (2014), which established the Small and Medium Enterprise Corporation (SMEC) that is the lead agency responsible for developing and promoting SMEs. The adoption of both the SME Policy 2016 and SME Master Plan 2016 – 2030 (Ministry of Trade, Commerce & Industry, 2016a,b) further reflects the importance and centrality of SMEs to the PNG economy. If the SMEC, and other agencies charged with promoting SMEs, are to be successful, then better understanding of the relationship between perceived obstacles to SME expansion and SME performance will be crucial.

Previous research for PNG has provided a descriptive overview of problems facing SMEs. Mishra and Smyth (2016) bring much of this material together and provide a synthesis of the challenges to be addressed. This paper extends that research. It uses data collected by Tebbutt Research (2014) on formal SMEs in all 22 provinces in PNG to examine the relationship between the factors that owners/managers of SMEs perceive to be obstacles to the operation or expansion of their business and their perceptions of business and sales growth in the previous 12 months as well as expectations about asset and employment growth in the next 12 months¹.

¹Formal SMEs are businesses that are formally registered with the Investment Protection Authority. Tebbutt Research (2014) also surveyed 521 unregistered SMEs, but the raw data for this subsample is not

We contribute to the literature in the following important ways. First, there is very little literature at all that attempts to link perceived barriers to performance to measures of performance for SMEs. We add to this scant literature using a bigger dataset than employed in previous studies. Second, there is virtually no quantitative evidence linking barriers to operation or expansion among SMEs in South Pacific countries in general, and PNG in particular, to firm performance. We provide the first such evidence for PNG at a time when the PNG government is reviewing its SME strategy. Our results are important from the perspective of SME policy. Tebbutt Research (2014) identified a long list of factors that SMEs potentially regard as barriers to operation or expansion. By showing which of these factors are negatively correlated with recent sales performance and expectations about asset and employment expansion and the relative size of the marginal effects, we provide policy makers in PNG with a means to pinpoint the most important obstacles to operation and expansion.

The rest of the paper is set out as follows. The next section sets the scene through providing an overview of SMEs in PNG. Section 3 briefly reviews the existing relevant literature. The data and method are described in Section 4. The results are presented in Section 5. The final section summarizes the results and discusses the policy implications of our findings.

currently available for public use. For this reason, we do not consider, in this paper, SMEs in the informal sector.

Ch. 2 The PNG SME context

(a) Overview of SMEs in PNG

We begin through providing a descriptive overview of SMEs in PNG. To do so, we draw heavily on the survey of 1117 formal SMEs in urban and rural areas across the 22 provinces in PNG conducted between October and December 2013 by Tebbutt Research (2014). This survey was commissioned by the World Bank and the Government of PNG as part of the SME access to finance project. The findings from the Tebbutt Research (2014) survey provide the only detailed statistical snapshot of SMEs in PNG¹. For our purposes, using the findings from the Tebbutt Research (2014) survey has the added advantage that this is the dataset that we employ in our formal econometric analysis below.

Table 1: Location of formal SMEs in PNG by Sector

Sector	Percentage
Retail trade	35
Hospitality and tourism	14
Motor vehicle related retail	9
Transportation	8
Construction	7
Wholesale trade	4
Professional services	3
Farming	3
Manufacturing	3
Other	14
	100

Source: Based on Tebbutt Research (2014, pp.46, 165).

Tebbutt Research (2014) defined an SME as a business that is formally registered, has between three (3) and 150 paid employees, has maximum borrowings of PGK 1.5 million and annual turnover between PGK 100,000 and PGK 15 million². All four conditions must be satisfied for a business to be an SME. Based on this definition, Tebbutt Research (2014) estimates that there are between 28,323 and 32,692 formal SMEs in PNG³. Table 1 shows the location of formal SMEs across sectors. Just under half of all formal SMEs (49

¹ A more recent survey of SMEs was conducted in 2015. However, it was of limited scope in that a questionnaire was sent to 41 finalists filtered from a sample of 80 SMEs that entered the Kumul Game Changers Competition. Of the 41 target respondents, only 31 completed the survey (see Ganesh et. al. 2015), further limiting its use for detailed statistical analysis.

² As of March 2016 1 PNG Kina= 0.33 USD.

³ In the remainder of this paper, when referring to percentage of SMEs, we are referring to percentage of 28,323

per cent) are located in retail trade or hospitality and tourism.

Table 2: Key measures of formal SMEs in PNG

Measure	
Median number of staff	15.4
Median number of unpaid staff	1.2
Percentage with any unpaid staff	31
Percentage indigenous-owned SMEs	80
Percentage with majority female ownership	9
Percentage with at least one female owner	35
Percentage with one owner	64
Average years of operation	8
3 or less years of operation (%)	28
Highest education of respondent in Tebbutt Research (2014) surveys (%)	
• University	32
• Trade	18
• Primary school	12
• No formal education	2

Source: Based on Tebbutt Research (2014, p.163)

Based on the Tebbutt Research (2014) estimates, formal SMEs have a collective turnover of PGK 20.8 billion and provide employment for 434,634 paid staff and 33,868 unpaid staff¹. Table 2 summarizes some key measures for SMEs in the formal sector in PNG. The median number of staff in formal SMEs was 15.4. Just under one-third of SMEs (31 per cent) had unpaid staff and the median number of unpaid staff was 1.2. Four-fifths of SMEs were indigenous owned. Just under one in ten (9 per cent) were majority female owned and 35 per cent had at least one female owner. About two-thirds (64 per cent) of SMEs are sole-owned and the average years of operation was 8 years. Among owners/managers who responded to the Tebbutt Research (2014) survey, 40 per cent had completed university or technical/trade school.

(b) Policies toward SMEs in PNG

SMEs have featured in various PNG strategic documents in recent years, such as PNG DSP 2010-2030 and PNG Vision 2050. One of the key overarching objectives of PNG DSP 2010-2030 is: “Develop and promote SMEs in PNG” (DNPM, 2010, p.100). In order to realize this objective, PNG DSP 2010-2030 and PNG Vision 2050 specify a number of strategies at a high level, such as expand microfinance and facilitate SME access to credit; reduce red tape and lower the cost of running a business; establish a specific SME training institute; facilitate technological transfer required by SMEs through promoting research and development (R&D); assist SMEs to increase market access and assist SMEs to enter export markets.

SMEs are also referred to in the National Strategy for Responsible Sustainable Development (NSRSD) for PNG (DNPM, 2014), which is the renewed government plan. It emphasises the role of SMEs in promoting inclusive green growth through realizing “triple

¹ Unpaid staff mainly refers to family members working in the firm or farm.

bottom line” economic, social and environmental returns. The NSRSD suggests that SMEs should be given incentives to participate in sustainable growth initiatives. Such incentives could include “appropriate tax regimes and incentives, business support programmes that are tailored to the needs of the sector and access to public sector technological expertise and R&D” (DNPM 2014, p.44).

In October the 2014, the SMEC was established, which replaced the Small Business Development Corporation as the lead agency charged with developing SMEs. The SMEC has been placed under the office of Prime Minister Peter O’Neill and a 22-member council, headed by the prime minister and including ministers from key portfolios such as Treasury, planning, finance, education and tourism, will oversee the SMEC’s work.

A new SME Policy 2016 and accompanying SME Master Plan 2016-2030 were adopted in February 2016 to drive the operational requirements of delivering the specific targets or desired outcomes of PNG Vision 2050 and PNG DSP 2010-2030 (Ministry of Trade, Commerce & Industry, 2016a,b). The priority objectives for the SME sector, according to these new policy documents, are to increase, by 2050: the number of SMEs to 500,000; the level of SME employment to 2 million jobs; and the share of SME’s contribution to 50 per cent of GDP. It is hoped that achieving these targets will facilitate increased ownership of the country’s economic sector by PNG citizens from its current level of 10 per cent to 70 per cent. For the SMEC to effectively implement the new policy and master plan it is important to identify which impediments to operation and expansion, as identified by Tebbutt Research (2014) survey respondents, are hindering performance of SMEs in PNG

(c) Subjective measures of performance of SMEs

In the Tebbutt Research (2014) survey, SME owners/managers in formal SMEs were asked about their perception of their own firm’s business and sales growth in the past 12 months and expectations with respect to employment growth and asset size growth in their business over the next 12 months. Respondents were generally very optimistic on all three measures. We use these measures to proxy performance in our modelling below.

In the Tebbutt Research (2014) survey, SME owners/managers were asked about their subjective assessment of the business and sales growth in their own organizations in the past 12 months. Respondents were asked to answer on a five-point scale, ranging from 1 (decreased a lot) through to 5 (increased a lot). The results are reported in Table 3. Overall, 80 per cent indicated an increase (32 per cent indicated that their business and sales growth increased a lot and 48 per cent indicated that their business and sales increased to some extent but not a lot), 12 per cent indicated no change and just 5 per cent indicated a decline in business and sales.

Table 3: Subjective assessment of sales performance over last 12 months

Response	Frequency	Percent
Refused	2	0.18%
Don’t know	8	0.72%
Decreased a lot	16	1.43%
Decreased some	53	4.74%
Stayed the same	139	12.44%
Increased some	541	48.43%
Increased a lot	358	32.05%

Source: Tebbutt Research (2014).

Table 4: Expectations about workforce over next 12 months

Response	Frequency	Percent
Refused	1	0.09%
Don't know	21	1.88%
Decrease the size a lot	4	0.36%
Decrease the size some	13	1.16%
Stay at the same size	304	27.22%
Increase the size some	503	45.03%
Increase the size a lot	271	24.26%

Source: Tebbutt Research (2014).

SME owners/managers were also asked whether they were planning to change the size of their workforce over the next 12 months. Respondents were asked to answer on a five-point scale, ranging from 1 (decrease a lot) through to 5 (increase a lot). The results are reported in Table 4. Just under one quarter (24 per cent) were planning to increase the size a lot, 45 per cent were planning to increase the size to some extent but not a lot, 27 per cent planned to leave the size of their workforce unchanged, while 2 per cent planned to cut their workforce.

Table 5: Expectations about asset size over next 12 months

Response	Frequency	Percent
Refused	2	0.18%
Don't know	17	1.52%
Decrease business assets a lot	2	0.18%
Decrease business assets some	9	0.81%
Stay at the same level	175	15.67%
Increase business assets some	579	51.84%
Increase business assets a lot	333	29.81%

Source: Tebbutt Research (2014).

Finally, SME owners/managers were asked whether they were planning to expand their asset base over the next 12 months. Respondents were asked to answer on a five-point scale, ranging from 1 (decrease a lot) through to 5 (increase a lot). The results are reported in Table 5. Overall, 30 per cent of respondents were planning to increase their business assets a lot, 52 per cent were planning to increase their business assets to some extent but not a lot, 16 per cent planned to maintain their assets at the same level and just 1 per cent planned to reduce their assets.

(d) Perceptions as to main constraints on performance of SMEs

Mishra and Smyth (2016) provide a detailed review of the challenges facing SMEs in PNG, drawing on the summary findings from Tebbutt Research (2014) and other sources. Here we focus on responses to the question on obstacles to operation or expansion, which represents our measure of perceived barriers to expansion in the modelling below. In the Tebbutt Research (2014) survey, respondents were given a list of 27 possible obstacles to business operations and expansion and asked to indicate whether each possible obstacle was a major, moderate or minor obstacle for their firm or not an obstacle at all. The results are reported

in Table 6.

Among the 27 possible obstacles, at least one quarter of respondents commonly identified 10 major obstacles to business operations or expansion. The top 10 major obstacles for SMEs were difficulty leasing or buying land (a major obstacle for 38 per cent); access to finance, loans, capital (a major obstacle for 37 per cent); government corruption (a major obstacle for 37 per cent); tax rates (a major obstacle for 36 per cent); difficulty dealing with banks (a major obstacle for 34 per cent); difficulty transporting or moving goods across the country (a major obstacle for 32 per cent); unfair practices of competitors (a major obstacle for 29 per cent); political instability (a major obstacle for 26 per cent); government regulation (a major obstacle for 26 per cent); and customers not paying on time or not at all for services purchased (a major obstacle for 25 per cent).

While the above descriptive statistics have established basic facts about SME owners/managers perception of various constraints to business operation and expansion, our regression analysis below provides a more detailed view of the relationships between the perceived constraints and subjective firm performance indicators.

Ch. 3 Existing literature

There is a large literature that examines the problems of SMEs, or perceived problems of SMEs, based on surveys of SMEs owners or managers, across a number of countries. In this section, we provide an overview of the literature related to measures of SME performance, obstacles to performance and the relationship between obstacles and performance.

a) Measures of SME Performance

There is a consensus that business performance should be measured using both financial and non-financial criteria (Chong, 2008); that is, using objective and subjective data. As such, definitions of firm performance and the variables used to measure performance vary widely (Murphy, Trailer & Hill, 1996). Some studies use traditional accounting-based measures of performance—like static or growth measures of annual sales or income, profitability or reinvestment in the business. Reddy (2007), for example, used the difference between the arithmetic mean of business income for two prior years and the arithmetic mean of income for two subsequent years to measure business success or performance. Mateev & Anastasov (2010) and Hashi & Krasniqi (2011) used average growth in sales over a period of time, while Soriano & Castrogiovanni (2012) used static indicators like return on assets to measure profitability and revenue per employee to measure productivity, both for a single year.

Table 6: Obstacles to operation or expansion of business

Nature of Obstacle	Not an obstacle	Minor obstacle	Moderate obstacle	Major obstacle
Access to finance/loans/capital	309 (27.66%)	162 (14.5%)	226 (20.23%)	410 (36.71%)
Generating revenue/sales	426 (38.14%)	335 (29.99%)	219 (19.61%)	134 (12%)
Finding and maintaining a skilled work-force	399 (35.72%)	329 (29.45%)	213 (19.07%)	174 (15.58%)
Access to technology (computers, Internet)	389 (34.83%)	286 (25.6%)	213 (19.07%)	216 (19.34%)
Electricity - reliability, availability, and cost	436 (39.03%)	287 (25.69%)	163 (14.59%)	228 (20.41%)
Water/Sewer services - reliability, availability, and cost	505 (45.21%)	280 (25.07%)	137 (12.26%)	192 (17.19%)
Phone service - reliability, availability, and cost	496 (44.4%)	310 (27.75%)	140 (12.53%)	170 (15.22%)
Lack of experience running a business/ managing projects	500 (44.76%)	328 (29.36%)	195 (17.46%)	93 (8.33%)
Access to professional business services, like accountants or lawyers	439 (39.3%)	278 (24.89%)	213 (19.07%)	177 (15.85%)

Remote location of business	605 (54.16%)	233 (20.86%)	139 (12.44%)	136 (12.18%)
Difficulty transporting or moving goods across the country	368 (32.95%)	187 (16.74%)	194 (17.37%)	360 (32.23%)
Political instability	352 (31.51%)	263 (23.55%)	208 (18.62%)	285 (25.51%)
Government regulation	293 (26.23%)	279 (24.98%)	248 (22.2%)	294 (26.32%)
Difficulty leasing or buying land	306 (27.39%)	185 (16.56%)	198 (17.73%)	425 (38.05%)
Difficulty dealing with banks	272 (24.35%)	215 (19.25%)	242 (21.67%)	384 (34.38%)
Lack of marketing/advertising experience and services	390 (34.91%)	337 (30.17%)	205 (18.35%)	182 (16.29%)
Poor office or work space - too crowded, not well lit.	553 (49.51%)	249 (22.29%)	157 (14.06%)	157 (14.06%)
Tax rates	240 (21.49%)	216 (19.34%)	246 (22.02%)	403 (36.08%)
Having enough or the right equipment	407 (36.44%)	289 (25.87%)	249 (22.29%)	166 (14.86%)
Keeping up with demand for services with existing resources	385 (34.47%)	304 (27.22%)	265 (23.72%)	162 (14.5%)
Keeping up with company growth	441 (39.48%)	349 (31.24%)	218 (19.52%)	106 (9.49%)
Crime/Security	475 (42.52%)	254 (22.74%)	143 (12.8%)	239 (21.4%)
Government corruption	245 (21.93%)	219 (19.61%)	226 (20.23%)	418 (37.42%)
Customers not paying on time or at all for services purchased	393 (35.18%)	257 (23.01%)	176 (15.76%)	284 (25.43%)
Unfair practices of competitors	321 (28.74%)	253 (22.65%)	214 (19.16%)	323 (28.92%)
Exchange rates for imports and exports	394 (35.27%)	184 (16.47%)	208 (18.62%)	265 (23.72%)
Access to international or domestic markets	388 (34.74%)	234 (20.95%)	190 (17.01%)	262 (23.46%)

Source: Tebbutt Research (2014).

Using accounting-based measures of SME performance can, however, be problematic. Many SMEs lack adequate comparable records; hence, most accounting-based measures often do not produce comparable results. Hence, the use of non-financial indicators and subjective measures of firm performance are often used. Foreman-Peck, Makepeace, & Morgan (2006) highlight that another reason for employing subjective measures is the lack of data that SMEs are willing, or obliged, to publicly share. Enterprise performance measures like assets, equity, sales/turnover or their growth are, therefore, often ascertained from survey responses of the enterprises' owners/managers (see e.g. Gibson & Cassar, 2005). These subjective evaluations of enterprise owners/managers are sometimes supplemented by non-financial measures of firm performance like the number of employees or growth in employment (see Bartlett & Buckvič, 2001). But, as Gibson & Cassar (2005) have argued,

reported number of employees may be interpreted differently, given various categories of employees with varying skills. Hence, subjective measures, such as subjective evaluation of employment growth by firms' owners/managers seem to be less prone to such interpretation difficulties.

b) Obstacles to SME Performance

Firm-level surveys have provided a rich resource for research on the constraints of firms in developed and developing countries. There are many studies for developed countries (see eg. Gill & Biger, 2012; Irwin & Scott, 2010; Madrid-Guijarro et al., 2009; Pasanen, 2003); post-socialist or other transition economies (see eg. Bah et al., 2011; Bartlett & Bukvič, 2001; Benzing et al. 2005; Danis & Shipalov, 2002; Doern, 2011; Krasniqi 2007; Xheneti & Bartlett, 2012) and low and middle income countries (see eg. Benzing et al. 2009; Demirbas et al. 2011; Hadjimanolis 1999; Hussain & Yaqub, 2010; Levy, 1993; Manzur & Nayeem, 2008; McCormick et al., 1997; Robson & Obeng, 2008; Satta 2003; Wijewardena & De Zoysa 2005). These studies generally identify similar obstacles to performance. Many of them are similar to those identified in the Tebbutt Research (2014) survey for PNG as outlined in Table 6. Benzing et al. (2009) summarizes the findings for developing countries. These authors point out that in developing countries the main obstacles to SME expansion are an unstable economic and political environment, complex taxation, overregulation, high levels of corruption, poor law and order, limited access to finance and capital, inability to hire reliable employees and lack of managerial skills to cope with complex organizational processes.

Most of these studies, however, only have a small number of respondents (e.g. Benzing et al. 2009 – 139 SMEs in Turkey; Hadjimanolis 1999 – 40 SMEs in Cyprus; Hussain & Yaqub, 2010, 26 SMEs in Pakistan; Satta 136 SMEs in Tanzania). Others rely on case studies of only a handful of firms (see Pasanen, 2003 and studies cited there in; Doern, 2011).

c) Relationship between SME performance and obstacles

Most of the literature merely surveys owners/managers of SMEs about the factors that they perceive to be hindering performance. In other words, most studies just report, and discuss, findings similar to Table 6, reproduced from Tebbutt Research (2014). Relatively few studies have regressed perceived barriers on firm characteristics to examine what firm characteristics are correlated with whether the owner/manager perceives there to be barriers (Demirbas et al. 2011; Robson & Obeng 2008). Some studies regress measures on innovation activity on perceived barriers to innovation (Madrid-Guijarro et al, 2009). There are very few studies that regress measures of performance or expectations about future growth on perceived barriers. Exceptions are Bartlett and Bukvič (2001), Krasniqi (2007) and Xheneti and Bartlett (2012) who regress firm growth on perceived barriers to expansion.

Of the studies that examine the relationship between perceived barriers to expansion and firm growth, Xheneti and Bartlett (2012) find a positive association between corruption and firm growth in Albania, suggesting that an ability to cope with a “grey economy” (Yang & Sun, 2010) can be conducive to SME growth in post-socialist countries. Bartlett and Bukvič (2001) found that SME growth was negatively related to the presence of perceived financial and institutional barriers in Slovenia. Krasniqi (2007) reached similar conclusions for SMEs in Kosovo, finding that SME growth was negatively related to the presence of environmental barriers such as high taxation, perceived unfair competitive practices and lack of finance.

d) Obstacles to SME Performance in PNG and South Pacific countries

Compared with the large literature on SMEs in other parts of the world, the literature on SMEs in PNG and other South Pacific countries is limited. Leokana (2014) conducted case studies to examine barriers to success among SMEs in the Solomon Islands.. He identified access to capital, lack of infrastructure, lack of entrepreneurial and management skills and economic and political instability as impediments to expansion.

There are few studies that have surveyed owners/managers of SMEs in South Pacific countries about the problems that they face. Naidu and Chand (2012a) surveyed owners/managers of 247 SMEs in Fiji about the problems that they experienced. They then regressed firm profits on perceived problems and found the strongest negative relationship between barriers to accessing finance and firm profitability. Naidu and Chand (2012b) surveyed owners/managers in 200 SMEs in the manufacturing sector in Fiji and Tonga about the financial problems that they face. Singh et al. (2010) contains a detailed study of issues faced by SMEs in the internationalisation process in Fiji and Samoa. Based on the study by Singh et al. (2010), it appears that many of the more general challenges impeding SMEs future expansion also hinder internationalisation. Among these, the most prominent are capital shortages/access to bank loans, transportation problems, lack of government support/lack of support from government agencies and lack of human capital.

Specifically for PNG, in addition to Tebbutt Research (2014), in an early study Yusuf (1995) surveyed 220 entrepreneurs in PNG, Vanuatu, Polynesian Western Samoa, Marshall Islands and Fiji. That study found that indigenous and non-indigenous entrepreneurs had different views on critical success factors. Indigenous entrepreneurs placed emphasis on access to capital, while non-indigenous entrepreneurs did not see access to capital as being as important, reflecting that non-indigenous entrepreneurs often have good networks and reputation capital. These studies are discussed in more detail in Mishra and Smyth (2016).

To summarize, there is a large literature that has surveyed SMEs about the obstacles that they face that are hindering performance. The findings from such studies, however, are limited because they are often based on small samples and do not link the perceived obstacles to expansion to performance or expectations/ intentions with respect to expansion. Apart from Tebbutt Research (2014), there is virtually no empirical evidence for PNG. We address these gaps in the literature. Our study is based on a relatively large survey of SME owners/managers, we link perceived obstacles to operations and expansion to subjective measures of performance and we provide the first such evidence for SMEs in PNG.

Ch. 4 Data and method

(a) Data

As noted above, the study uses data from the SME survey collected by Tebbutt Research (2014). Tebbutt Research (2014) surveyed 1117 formal SMEs in urban and rural areas across the 22 provinces in PNG between October and December 2013¹. After removing missing data, we were left with 953 formal SMEs in the dataset. In Table A2 we outline various characteristics of the full sample along side the same observable characteristics for the culled sample used for analysis in this study. More specifically we compare the distribution of firms across various regions and provinces, across rural and urban sectors, across ownership structure and across the age of the firm and find no systematic difference between the sample used for analysis and the full sample collected by Tebutt Research (2014).

Ideally, we would like to have used a traditional measure of firm performance, such as profit after tax, but such measures were not available². Other potential measures of performance in the dataset, such as turnover and assets are better regarded as measures of firm size. A further problem was that turnover was not reported as a continuous variable, but as a range variable, such that if we were to use it, we would need to take the mid-point range, which would potentially bias the results.

Hence, as measures of performance, we employ data on SME owners/managers perceptions of their firm's business and sales growth in the previous 12 months and expectations about employment growth and asset size over the next 12 months. Each response is on a five-point scale and is as reported in Tables 3-5.

To measure owners/managers perceptions of obstacles to operation/expansion we use responses to the 27 possible obstacles listed in Table 6. All responses were on a four-point scale. We also control for a range of firm characteristics and characteristics of the owner/manager who answered the survey; namely, the age of the respondent, education of the respondent, number of owners, if there is female ownership, if indigenous owned, if foreign owned, years of operation, if the firm belongs to an industry organization, if the firm has a computer, if the firm has a landline phone, if the firm has a mobile phone, if the firm has internet access, if the firm has mains electricity and if the firm has a website as well as re-

¹ The Tebbutt (2014) survey was collected following a public tender and with the cooperation, and support, of the Department of Industry and Commerce in PNG and the World Bank. It followed best practice in obtaining a representative sample. Detailed information on how the sample was selected is provided in Tebbutt Research (2014, pp.30-40).

² Profit is measured as sales minus costs. Given that many SMEs in PNG operate from their family homes and/or employ family members as unpaid workers, it is very hard for them to estimate the true cost of running the business and hence their measure of profit may be biased. Probably keeping this in mind, Tebbutt Research (2014) did not attempt to ask the profit of the firm.

gional fixed effects. Ideally we would also control for industry fixed effects. While Tebbutt Research (2014) collected data on the industry in which the SME was located (see Table 1 and Tebbutt Research 2014, pp. 46, 165), the data made available to us did not contain this information in usable form. Descriptive statistics for the controls are provided in Table A1.

(b) Method

Each of our measures of firm performance are ordered. Hence, we estimate an ordered logit model, in which we regress each subjective measure of firm performance on the perceived obstacles to operation or expansion and the controls for owner/manager characteristics, firm characteristics and location dummies. The basic specification is of the form:

$$\text{Performance}_i = \beta_0 + \sum_{j=1}^{27} \beta_{ij} \text{Obstacle}_{ij} + \sum_{k=1}^N \gamma_{ik} \text{Controls}_{ik} + \varepsilon_i$$

Here Performance_i is the firm's i subjective measure of performance; Obstacle_{ij} is the firm i 's perceived obstacle to operation/expansion plan j and Controls_{ik} is a vector of control variables for the firm/respondent. In all cases we first report the coefficients and z values for perceived obstacles to operation or expansion. We then report the marginal effects for perceived obstacles to operation and expansion. As a robust check on the ordered logit results, we also estimate each specification using ordinary least squares (OLS). The OLS results are reported in Table A3. In terms of sign and significance, the coefficients on the OLS estimates are very similar to the ordered logit results that we report in the main text.

Ch. 5 Results

Table 7 reports the ordered logit coefficients and z values for each of the perceived obstacles to operation or expansion where the dependant variable is alternatively the owner/manager's assessment of business and sales growth in the previous 12 months and expectations about the size of the workforce and the firm's asset base in the next 12 months. While we do not report the results, each specification contains a full set of controls for firm and respondent characteristics and regional fixed effects. The model chi-square in each specification is highly significant, suggesting that our empirical specification has a good overall fit to the data.

We find that there is a statistically significant negative relationship between the owner/manager expecting the asset base to expand over the next 12 months and perceiving the following to be obstacles to operation or expansion: remote location of business, difficulty dealing with banks and having poor office or work space.

We also find that there is a statistically significant negative association between the owner/manager reporting that they perceived that business and sales expanded in the previous 12 months and perceiving the following to be obstacles to operation or expansion: generating revenue/sales, remote location of business, difficulty leasing or buying land, keeping up with company growth and government corruption.

Finally, we also find a significant negative relationship between expecting the size of the firm's workforce to expand over the next 12 months and perceiving the following to be obstacles to operation or expansion: remote location of the business, difficulty leasing or buying land, unfair practices of competitors and exchange rates for imports and exports.

Table 7: Ordered logit results

VARIABLES	Ordered Logit Coefficients		
	Sales last 12 months	Employment next 12 months	Assets next 12 months
Access to finance/loans/capital	-0.064 (-0.987)	-0.017 (-0.263)	0.070 (1.079)
Generating revenue/sales	-0.189** (-2.367)	-0.001 (-0.011)	-0.103 (-1.298)
Finding and maintaining a skilled workforce	0.016 (0.214)	0.111 (1.548)	0.018 (0.241)
Access to technology (computers, Internet)	-0.001 (-0.010)	-0.062 (-0.852)	-0.034 (-0.461)
Electricity - reliability, availability, and cost	0.075 (0.890)	-0.038 (-0.458)	-0.030 (-0.352)
Water/Sewer services - reliability, availability, and cost	-0.098 (-1.119)	-0.047 (-0.546)	-0.010 (-0.114)

Phone service - reliability, availability, and cost	-0.000 (-0.001)	0.100 (1.272)	0.072 (0.915)
Lack of experience running a business/managing projects	-0.054 (-0.665)	-0.006 (-0.070)	0.036 (0.440)
Access to professional business services, like accountants or lawyers	0.037 (0.494)	0.022 (0.300)	0.109 (1.412)
Remote location of business	-0.251*** (-3.575)	-0.151** (-2.220)	-0.157** (-2.220)
Difficulty transporting or moving goods across the country	-0.002 (-0.034)	-0.094 (-1.532)	-0.088 (-1.421)
Political instability	0.003 (0.033)	-0.065 (-0.790)	0.027 (0.327)
Government regulation	0.169* (1.943)	-0.002 (-0.020)	0.145* (1.699)
Difficulty leasing or buying land	-0.151** (-2.525)	-0.150** (-2.539)	-0.032 (-0.543)
Difficulty dealing with banks	0.090 (1.377)	0.026 (0.405)	-0.135** (-2.051)
Lack of marketing/advertising experience and services	-0.033 (-0.438)	0.034 (0.459)	0.041 (0.537)
Poor office or work space - too crowded, not well lit	0.024 (0.337)	0.038 (0.545)	-0.118* (-1.662)
Tax rates	0.079 (1.191)	-0.033 (-0.503)	0.002 (0.024)
Having enough or the right equipment	0.027 (0.349)	-0.045 (-0.601)	-0.070 (-0.919)
Keeping up with demand for services with existing resources	0.102 (1.277)	0.136* (1.701)	-0.008 (-0.105)
Keeping up with company growth	-0.219** (-2.574)	-0.070 (-0.837)	-0.094 (-1.095)
Crime/Security	-0.029 (-0.470)	0.024 (0.381)	-0.088 (-1.398)
Government corruption	-0.122* (-1.770)	0.150** (2.186)	-0.010 (-0.148)
Customers not paying on time or at all for services purchased	-0.051 (-0.843)	-0.061 (-1.021)	0.076 (1.252)
Unfair practices of competitors	0.003 (0.045)	-0.108* (-1.734)	0.107* (1.701)
Exchange rates for imports and exports	-0.022 (-0.285)	-0.131* (-1.737)	-0.108 (-1.415)
Access to international or domestic markets	0.025 (0.316)	0.190** (2.405)	0.120 (1.491)
Mu(1)	-5.418*** (-7.824)	-6.735*** (-8.275)	-6.287*** (-6.447)
Mu(2)	-3.924*** (-6.000)	-5.271*** (-7.687)	-4.772*** (-6.371)
Mu(3)	-2.707*** (-4.205)	-2.022*** (-3.160)	-1.655** (-2.461)

Mu(4)	-0.275 (-0.432)	0.152 (0.239)	0.943 (1.406)
Observations	953	953	953
Firm/Respondent Controls	Yes	Yes	Yes
Regional Dummies	Yes	Yes	Yes
Log Likelihood	-1071.063	-1036.499	-948.733
Pseudo R2	0.047	0.044	0.043
LR Chi2(44)	105.03***	95.34***	85.85***

Notes: z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Overall, over the three measures of performance there is a negative relationship between performance and the owner/manager perceiving remote location of business to be an obstacle in all three cases. Furthermore, there is a negative relationship between performance for two measures (business/sales and size of workforce) and perceiving difficulties with leasing or buying land to be obstacles to operation or expansion of SME businesses.

We find that in a limited number of cases that there is a positive relationship between perceived obstacles to operation or expansion and measures of performance. There is a positive association between perceiving government regulation to be an obstacle and both perceived business and sales growth in the previous 12 months and expectations with respect to expanding the asset base in the next 12 months. There is also a positive association between perceiving corruption to be a problem, keeping up with demand for services with existing resources and perceiving access to markets to be a problem and expectations that the firm's workforce will expand over the next 12 months. The findings for the positive relationship between perceiving government regulation to be a problem and our measures of performance and between corruption being a problem and plans to expand the workforce are consistent with the results in Hashi and Krasniqi (2012) and Xheneti and Bartlett (2012). As Xheneti and Bartlett (2012, p.618) explain the result for corruption:

“One possible explanation for this finding is that the more businesses perceive corruption to be a burden, the better they have learned to cope with it, despite their negative perceptions about it. Another possible explanation is that corruption acts as a mechanism to ‘grease the wheels’ of commerce and that firms which make corrupt payments, although having a negative perception of the problem, grow faster than those firms that do not make corrupt payments”.

The result for perceiving that keeping up with demand for services with existing resources and accessing markets are obstacles and expecting that the firm's workforce will expand also makes sense. These results suggests that those firms which feel that existing resources are not adequate and that they are having trouble accessing markets are expecting to expand their labour inputs in the next 12 months in order to overcome these problems.

We do not find a significant relationship between subjective perception of crime/security and any of the three subjective measures of firm performance. This result is not particularly surprising, at least in the current PNG context. While there are some previous studies (e.g. Levantis & Gani, 2000; Levantis & Manning, 2002; ADB, 2012) which indicate that businesses consider crime and security issues as the biggest constraint to doing business in PNG, the more recent data collected by Tebbutt Research (2014) suggest that crime and security issues are not particularly problematic for the majority of SMEs in PNG. In the Tebbutt Research (2014) study, 43 per cent of SME owner/managers reported that crime

and related security issues were ‘not an obstacle’ to their business operations, 23 per cent reported that crime/security was only a ‘minor obstacle’, while 13 per cent considered it to be a ‘moderate obstacle’ to their business operations. Moreover, even though the remaining 21 per cent of SME owners/managers considered crime and security to be a ‘major obstacle’, overall, only 8 per cent reported crime to have been the biggest challenge in the last 12 months.

Table 8: Marginal Effects [Dependent Variable: Sales in last 12 month]

VARIABLES	Decreased lot	Decreased somewhat	Stayed same	Increased somewhat	Increased lot
Access to finance/loans/capital	0.001 (0.957)	0.003 (0.979)	0.005 (0.986)	0.004 (0.982)	-0.013 (-0.989)
Generating revenue/sales	0.003** (2.031)	0.008** (2.265)	0.015** (2.346)	0.012** (2.274)	-0.038** (-2.383)
Finding and maintaining a skilled workforce	-0.000 (-0.214)	-0.000 (-0.214)1	-0.001 (-0.214)	-0.001 (-0.214)	0.003 (0.214)
Access to technology (computers, Internet)	0.000 (0.010)	0.000 (0.010)	0.000 (0.010)	0.000 (0.010)	-0.000 (-0.010)
Electricity - reliability, availability, and cost	-0.001 (-0.869)	-0.003 (-0.885)	-0.006 (-0.889)	-0.005 (-0.884)	0.015 (0.891)
Water/Sewer services - reliability, availability, and cost	0.002 (1.078)	0.004(1.108)	0.008 (1.117)	0.006 (1.107)	-0.020 (-1.120)
Phone service - reliability, availability, and cost	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.000 (-0.001)
Lack of experience running a business/managing projects	0.001 (0.656)	0.002 (0.663)	0.004 (0.665)	0.003 (0.663)	-0.011 (-0.666)
Access to professional business services, e.g. accountants or lawyers	-0.001 (-0.490)	-0.002 (-0.493)	-0.003 (-0.493)	-0.002 (-0.493)	0.008 (0.494)
Remote location of business	0.004*** (2.661)	0.011*** (3.251)	0.020*** (3.518)	0.016*** (3.225)	-0.051*** (-3.614)
Difficulty transporting or moving goods across the country	0.000 (0.034)	0.000 (0.034)	0.000 (0.034)	0.000 (0.034)	-0.000 (-0.034)
Political instability	-0.000 (-0.033)	-0.000 (-0.033)	-0.000 (-0.033)	-0.000 (-0.033)	0.001 (0.033)
Government regulation	-0.003* (-1.747)	-0.007* (-1.886)	-0.013* (-1.927)	-0.011* (-1.905)	0.034* (1.955)
Difficulty leasing or buying land	0.002** (2.130)	0.007** (2.403)	0.012** (2.501)	0.010** (2.410)	-0.031** (-2.544)
Difficulty dealing with banks	-0.001 (-1.299)	-0.004 (-1.355)	-0.007 (-1.372)	-0.006 (-1.362)	0.018 (1.381)
Lack of marketing/advertising experience and services	0.001 (0.435)	0.001 (0.437)	0.003 (0.437)	0.002 (0.437)	-0.007 (-0.438)
Poor office or work space - too crowded, not well lit.	-0.000 (-0.336)	-0.001 (-0.337)	-0.002 (-0.337)	-0.002 (-0.337)	0.005 (0.337)
Tax rates	-0.001 (-1.138)	-0.003 (-1.175)	-0.006 (-1.189)	-0.005 (-1.182)	0.016 (1.194)

Having enough or the right equipment	-0.000 (-0.347)	-0.001 (-0.348)	-0.002 (-0.348)	-0.002 (-0.348)	0.005 (0.349)
Keeping up with demand for services with existing resources	-0.002 (-1.216)	-0.004 (-1.261)	-0.008 (-1.273)	-0.007 (-1.263)	0.021 (1.280)
Keeping up with company growth	0.003** (2.164)	0.009** (2.444)	0.017** (2.542)	0.014** (2.459)	-0.044*** (-2.594)
Crime/Security	0.000 (0.467)	0.001 (0.469)	0.002 (0.470)	0.002 (0.469)	-0.006 (-0.470)
Government corruption	0.002 (1.615)	0.005* (1.723)	0.010* (1.759)	0.008* (1.739)	-0.025* (-1.778)
Customers not paying on time or at all for services purchased	0.001 (0.826)	0.002 (0.838)	0.004 (0.842)	0.003 (0.839)	-0.010 (-0.844)
Unfair practices of competitors	-0.000 (-0.044)	-0.000 (-0.044)	-0.000 (-0.045)	-0.000 (-0.045)	0.001 (0.045)
Exchange rates for imports and exports	0.000 (0.284)	0.001 (0.284)	0.002 (0.285)	0.001 (0.285)	-0.004 (-0.285)
Access to international or domestic markets	-0.000 (-0.315)	-0.001 (-0.315)	-0.002 (-0.315)	-0.002 (-0.316)	0.005 (0.316)
Observations	953	953	953	953	953

Notes: z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Comparing the Tebutt Research (2014) survey results with the results of a survey conducted more than a decade earlier (Levantis & Manning, 2002) suggests that, overall, the rate of crime and violence in PNG has either stabilized or has been even reducing over time. The data on crime rates supports this view. While the crime rate remains high, and there is considerable variation across provinces, evidence from victimization surveys and from the Royal Papua New Guinea Constabulary suggest that crime has stabilized in recent years and that in 2010 there was an overall reduction in crime rates compared with 2000 (Lakhani & Willman, 2014). This is probably the reason why crime and law and order problems are no longer regarded as the biggest constraint to doing business in PNG. Instead, it is now just the fifth biggest challenge with only 7 per cent of firms in the Tebutt Research (2014) survey suggesting that an improvement in the crime situation, with more police to stop crime/violence, should be seen as a top priority to help their businesses.

On the basis of the results in Table 7 we can conclude that there is a statistically significant positive or negative relationship between each of the perceived obstacles to operation or expansion and our measures of performance. However, we are not able to tell anything about the magnitudes. To address this, in Tables 8-10 we report the marginal effects.

Table 8 reports the marginal effects where the dependent variable is perceptions as to sales in the last 12 months. Consider the extremes (decreased a lot and increased a lot). The biggest barrier to having increased sales a lot is remote location of business. A one-unit increase in the severity of this obstacle (1= not an obstacle to 4= major obstacle) reduces the probability that sales increased a lot by 5.1 percentage points. Among the other obstacles, a one unit increase in perceiving that keeping up with company growth, generating revenue/sales, difficulty in buying or leasing land and government corruption are obstacles reduces the probability that sales increased a lot by 4.4 percentage points, 3.8 percentage points,

3.1 percentage points and 2.5 percentage points respectively. The marginal effects for sales having decreased a lot are much smaller (0.2-0.4 percentage points), but remote location of business again has the biggest effect on sales decreasing a lot (0.4 percentage points). Table 8 suggests that a one unit increase in the severity of perceiving government regulation is a problem reduces the probability that sales decreased a lot by 0.3 percentage points and increased the probability that sales increased a lot by 3.4 percentage points.

Table 9 reports the marginal effects where the dependent variable is expectations about the workforce in the next 12 months. The biggest barriers to expecting employment to expand a lot are remote location of business and difficulty leasing or buying land. A one-unit increase in the severity of each obstacle reduces the probability that the workforce is expected to increase a lot by 2.6 percentage points. The comparable magnitudes for exchange rates for imports and exports and unfair practices of competitors are 2.3 percentage points and 1.6 percentage points respectively. Of the obstacles that are positively correlated with expectations about expanding the workforce, a one unit increase in the severity of perceiving access to markets, government corruption and meeting demand from existing resources are problems increases the probability that the owner/manager expects the workforce to increase a lot by 3.3 percentage points, 2.6 percentage points and 2.4 percentage points respectively. This result can be interpreted as the SME considering that it needs a bigger workforce in order to address these obstacles to expansion.

Table 9: Marginal Effects [Dependent variable: Employment in next 12 months]

VARIABLES	Decrease lot	Decrease somewhat	Stay same	Increase somewhat	Increase lot
Access to finance/loans/capital	0.000 (0.261)	0.000 (0.262)	0.003 (0.263)	-0.000 (-0.260)	-0.003 (-0.263)
Generating revenue/sales	0.000 (0.011)	0.000 (0.011)	0.000 (0.011)	-0.000 (-0.011)	-0.000 (-0.011)
Finding and maintaining a skilled workforce	-0.000 (-1.227)	-0.001 (-1.426)	-0.019 (-1.549)	0.002 (1.152)	0.019 (1.551)
Access to technology (computers, Internet)	0.000 (0.786)	0.001 (0.831)	0.011 (0.852)	-0.001 (-0.761)	-0.011 (-0.853)
Electricity - reliability, availability, and cost	0.000 (0.447)	0.000 (0.455)	0.007 (0.458)	-0.001 (-0.442)	-0.007 (-0.459)
Water/Sewer services - reliability, availability, and cost	0.000 (0.526)	0.001 (0.540)	0.008 (0.546)	-0.001 (-0.522)	-0.008 (-0.546)
Phone service - reliability, availability, and cost	-0.000 (-1.076)	-0.001 (-1.203)	-0.017 (-1.273)	0.002 (1.030)	0.017 (1.274)
Lack of experience running a business/managing projects	0.000 (0.070)	0.000 (0.070)	0.001 (0.070)	-0.000 (-0.070)	-0.001 (-0.070)
Access to professional business services, like accountants or lawyers	-0.000 (-0.297)	-0.000 (-0.299)	-0.004 (-0.300)	0.000 (0.296)	0.004 (0.300)
Remote location of business	0.001 (1.489)	0.002* (1.902)	0.026** (2.233)	-0.002 (-1.405)	-0.026** (-2.223)
Difficulty transporting or moving goods across the country	0.000 (1.219)	0.001 (1.414)	0.016 (1.537)	-0.002 (-1.170)	-0.016 (-1.534)
Political instability	0.000 (0.737)	0.001 (0.774)	0.011 (0.790)	-0.001 (-0.721)	-0.011 (-0.790)

Government regulation	0.000 (0.020)	0.000 (0.020)	0.000 (0.020)	-0.000 (-0.020)	-0.000 (-0.020)
Difficulty leasing or buying land	0.001 (1.576)	0.002** (2.091)	0.026** (2.554)	-0.002 (-1.464)	-0.026** (-2.546)
Difficulty dealing with banks	-0.000 (-0.397)	-0.000 (-0.403)	-0.005 (-0.405)	0.000 (0.394)	0.005 (0.405)
Lack of marketing/advertising experience and services	-0.000 (-0.447)	-0.000 (-0.456)	-0.006 (-0.459)	0.001 (0.444)	0.006 (0.459)
Poor office or work space - too crowded, not well lit.	-0.000 (-0.526)	-0.000 (-0.539)	-0.007 (-0.545)	0.001 (0.519)	0.007 (0.545)
Tax rates	0.000 (0.488)	0.000 (0.499)	0.006 (0.503)	-0.001 (-0.481)	-0.006 (-0.503)
Having enough or the right equipment	0.000 (0.576)	0.001 (0.593)	0.008 (0.601)	-0.001 (-0.571)	-0.008 (-0.601)
Keeping up with demand for services with existing resources	-0.001 (-1.298)	-0.002 (-1.545)	-0.024* (-1.705)	0.002 (1.227)	0.024* (1.704)
Keeping up with company growth	0.000 (0.771)	0.001 (0.815)	0.012 (0.837)	-0.001 (-0.752)	-0.012 (-0.837)
Crime/Security	-0.000 (-0.374)	-0.000 (-0.379)	-0.004 (-0.381)	0.000 (0.372)	0.004 (0.381)
Government corruption	-0.001 (-1.483)	-0.002* (-1.887)	-0.026**(- 2.195)	0.002 (1.385)	0.026** (2.191)
Customers not paying on time or at all for services purchased	0.000 (0.910)	0.001 (0.983)	0.011 (1.021)	-0.001 (-0.871)	-0.011 (-1.022)
Unfair practices of competitors	0.000 (1.313)	0.001 (1.570)	0.019* (1.740)	-0.002 (-1.253)	-0.019* (-1.736)
Exchange rates for imports and exports	0.001 (1.315)	0.002 (1.575)	0.023* (1.740)	-0.002 (-1.234)	-0.023* (-1.741)
Access to international or domestic markets	-0.001 (-1.543)	-0.002** (-2.017)	-0.033** (-2.415)	0.003 (1.423)	0.033** (2.414)
Observations	953	953	953	953	953

Notes: z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 10: Marginal Effects [Dependent variable: Asset size in next 12 months]

VARIABLES	Decrease lot	Decrease some	Stay same	Increase some	Increase lot
Access to finance/loans/capital	-0.000 (-0.859)	-0.001 (-1.000)	-0.009 (-1.079)	-0.005 (-1.069)	0.014 (1.081)
Generating revenue/sales	0.000 (0.958)	0.001 (1.168)	0.013 (1.295)	0.007 (1.290)	-0.021 (-1.302)
Finding and maintaining a skilled workforce	-0.000 (-0.237)	-0.000 (-0.240)	-0.002 (-0.241)	-0.001 (-0.241)	0.004 (0.241)
Access to technology (computers, Internet)	0.000 (0.438)	0.000 (0.454)	0.004 (0.461)	0.002 (0.460)	-0.007 (-0.461)

Electricity - reliability, availability, and cost	0.000 (0.342)	0.000 (0.349)	0.004 (0.352)	0.002 (0.352)	-0.006 (-0.352)
Water/Sewer services - reliability, availability, and cost	0.000 (0.114)	0.000 (0.114)	0.001 (0.114)	0.001 (0.114)	-0.002 (-0.114)
Phone service - reliability, availability, and cost	-0.000 (-0.769)	-0.001 (-0.866)	-0.009 (-0.915)	-0.005 (-0.909)	0.014 (0.916)
Lack of experience running a business/managing projects	-0.000 (-0.420)	-0.000 (-0.434)	-0.004 (-0.440)	-0.002 (-0.439)	0.007 (0.440)
Access to professional business services, like accountants or lawyers	-0.000 (-1.001)	-0.001 (-1.250)	-0.013 (-1.408)	-0.007 (-1.398)	0.022 (1.416)
Remote location of business	0.000 (1.194)	0.001* (1.706)	0.019** (2.214)	0.011** (2.136)	-0.031** (-2.231)
Difficulty transporting or moving goods across the country	0.000 (1.004)	0.001 (1.256)	0.011 (1.420)	0.006 (1.394)	-0.018 (-1.423)
Political instability	-0.000 (-0.318)	-0.000 (-0.324)	-0.003 (-0.327)	-0.002 (-0.326)	0.005 (0.327)
Government regulation	-0.000 (-1.088)	-0.001 (-1.433)	-0.018* (-1.694)	-0.010* (-1.668)	0.029* (1.705)
Difficulty leasing or buying land	0.000 (0.507)	0.000 (0.532)	0.004 (0.543)	0.002 (0.541)	-0.006 (-0.543)
Difficulty dealing with banks	0.000 (1.167)	0.001 (1.630)	0.016** (2.048)	0.009** (1.976)	-0.027** (-2.057)
Lack of marketing/advertising experience and services	-0.000 (-0.502)	-0.000 (-0.526)	-0.005 (-0.537)	-0.003 (-0.535)	0.008 (0.537)
Poor office or work space - too crowded, not well lit.	0.000 (1.079)	0.001 (1.414)	0.014* (1.661)	0.008 (1.623)	-0.024* (-1.666)
Tax rates	-0.000 (-0.024)	-0.000 (-0.024)	-0.000 (-0.024)	-0.000 (-0.024)	0.000 (0.024)
Having enough or the right equipment	0.000 (0.772)	0.001 (0.870)	0.009 (0.918)	0.005 (0.913)	-0.014 (-0.920)
Keeping up with demand for services with existing resources	0.000 (0.104)	0.000 (0.105)	0.001 (0.105)	0.001 (0.105)	-0.002 (-0.105)
Keeping up with company growth	0.000 (0.866)	0.001 (1.011)	0.011 (1.094)	0.006 (1.086)	-0.019 (-1.097)
Crime/Security	0.000 (0.996)	0.001 (1.239)	0.011 (1.395)	0.006 (1.381)	-0.018 (-1.402)
Government corruption	0.000 (0.148)	0.000 (0.148)	0.001 (0.148)	0.001 (0.148)	-0.002 (-0.148)
Customers not paying on time or at all for services purchased	-0.000 (-0.939)	-0.001 (-1.135)	-0.009 (-1.252)	-0.005 (-1.233)	0.015 (1.254)
Unfair practices of competitors	-0.000 (-1.090)	-0.001 (-1.436)	-0.013* (-1.693)	-0.007* (-1.680)	0.021* (1.709)
Exchange rates for imports and exports	0.000 (1.003)	0.001 (1.254)	0.013 (1.412)	0.007 (1.397)	-0.022 (-1.419)
Access to international or domestic markets	-0.000 (-1.029)	-0.001 (-1.305)	-0.015 (-1.490)	-0.008 (-1.462)	0.024 (1.494)

Observations	953	953	953	953	953
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Notes: z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 10 reports the marginal effects where the dependent variable is expectations about the size of the asset base in the next 12 months. A one unit increase in the severity of perceiving remote location of business, difficulty dealing with the banks and poor office or work space as obstacles reduces expectations that the asset base will increase a lot by 3.1 percentage points, 2.7 percentage points and 2.4 percentage points respectively. Perceiving that government regulation and unfair practices of competitors are obstacles are associated with expectations to increase the asset base a lot by 2.9 percentage points and 2.1 percentage points respectively. Again, this result might reflect the SME feeling that in response to these obstacles it needs to increase its resource base.

Table 11: Ordered logit results after interacting remote location of business being an obstacle with location dummies

	Ordered Logit Coefficients	
	Specification 1	Specification 2
VARIABLES	Sales last 12 months	Sales last 12 months
Remote location of business	-0.237*** (-2.858)	-0.382** (-2.054)
Rural Business	0.414 (1.135)	
Remote Business	0.956* (1.750)	
Remote Location Being an Obstacle × Rural Dummy	-0.015 (-0.094)	
Remote Location Being an Obstacle × Remote Dummy	-0.303 (-1.469)	
Business outside Port Moresby or Lae		0.187 (0.467)
Remote Location Being a Problem × Business outside Port Moresby or Lae		0.151 (0.774)
Observations	953	953
All other controls	Yes	Yes
Firm/Respondent Controls	Yes	Yes
Regional Dummies	Yes	Yes
Log Likelihood	-1067.758	-1068.771
Pseudo R2	.05	.049
LR Chi ² (48)	111.64***	109.61***

Notes: (1.) In specification 1 the reference group for Rural and Remote dummies is firms located in Urban Areas. (2.) The dataset did not specifically contain information on whether a business is located in Port Moresby or Lae, hence, for specification 2 the, “Business outside Port Moresby or Lae

Dummy” takes a value 0 if a business is located in Urban areas of NCD or Morobe and 1 otherwise.

One might be concerned that rural SMEs be affected differently compared to those located in urban centres. In the main results, reported above, we do not control for whether the firm is located in a rural or urban area. To address this issue, Table A4 in the appendix reports the equivalent of Table 7, but with the addition of rural and remote dummies (urban businesses being reference group). The results remain qualitatively the same after including rural and remote dummies.

Remoteness has a significant and large negative effect on growth of sales. One might think that this effect is true for SMEs located in rural and remote regions, but not for those in Port Moresby and Lae. We test this hypothesis explicitly in Table 11 in two ways. In the first specification we interact remote location being an obstacle with the rural and remote location dummies. Both interaction terms are insignificant. In the second specification, we interact remote location being an obstacle with a dummy variable denoting that the firm is located outside Port Moresby or Lae. In both specifications, both interactions are insignificant. Hence, the negative relationship between remoteness and growth on sales is not stronger for SMEs located outside Port Moresby and Lae and the hypothesis is rejected.

Ch. 6 Conclusion and policy recommendations

We have examined the relationship between perceived obstacles to operation and expansion and three measures of performance; namely, assessment of business and sales growth in the previous 12 months, expectations about employment growth in the next 12 months, and expectations about growth in the asset base in the next 12 months for a sample of SMEs in PNG. While Tebbutt Research (2014) has identified the factors that owners/managers perceive to be obstacles to operation and expansion in formal SMEs, there has been no evidence linking these perceived obstacles to performance measures in PNG. The advantage of so doing is that policy makers can identify which of the perceived obstacles are statistically correlated with business and sales growth and expectations about expansion and the relative magnitude of the effects through the marginal effects. This allows policy makers to give more attention to addressing specific obstacles from among the myriad obstacles that SME owners/managers identified as being obstacles in the Tebbutt Research (2014) survey.

Overall, we find that the biggest obstacle to business and sales growth in the previous 12 months and intentions to expand employment and assets in the next 12 months is regarding the remote location of the business as a problem. This barrier has the largest negative effect on “increase (d) a lot” for all three performance measures. We find that the other biggest obstacle to expecting the firm’s workforce to increase a lot in the next 12 months is difficulty leasing or buying land, while the other biggest obstacle to expecting the firm’s asset base to increase a lot in the next 12 months is difficulty dealing with banks.

Our findings have the following policy implications. First, since conditions are tougher for SMEs in remote locations of the country, policy makers should give priority to improving the network of physical and business infrastructure – roads, bridges, airports/airstrips, sea-ports/wharfs/jetties, water, power/energy and telecommunications – in remote locations in which 83 percent of SMEs are owned by indigenous Papua New Guineans.

Second, our regression results show that difficulty in finding commercial land to buy/lease in PNG is negatively linked to SMEs’ plans to increase their employee base a lot, suggesting that the current policy focus on making land available to, and accessible by, SMEs may be well directed. However, if the government’s policy objective of increasing SME employment to 2 million jobs by 2050 is to be achieved then policy makers should prioritise reducing difficulty in obtaining ownership of, and legal title to, commercial land as one of the most binding constraints as perceived by SMEs. But difficulty in obtaining ownership of, and legal title to, commercial land is not only threatening to derail plans to increase the number of SME staff a lot; it is also severely constraining SMEs’ efforts to increase sales a lot. A further issue is that without land titles, business owners cannot use land as collateral for bank loans, which is linked with our results for perceived difficulty dealing with banks, discussed in the next paragraph. Therefore, the development of a land market and the implementation of laws and regulations that are designed to remove this obstacle should also be prioritized in PNG.

Finally, our regression analysis suggests that, among the perceived finance-related obstacles, the policy focus should be directed towards assisting SMEs in reducing the inhibiting effect of the perceived difficulty of dealing with banks – which is negatively related with firms' plans to increase their asset base a lot. It is not clear what factors contribute to the perceived difficulty dealing with banks– the fact that we do not have data to test this hypothesis suggest an opportunity for further research, which could be achieved by soliciting the views of owners/managers to examine their perceptions on the key elements of what constitutes the main difficulties in dealing with banks. In the absence of such a study, we perhaps it could be symptomatic of poor, or bad, SME-bank relationships, which could be impacting on lending decisions and related issues around access to finance. Indeed, the lending process is very complex; hence, more informed discussions between banks and SMEs owners/managers are necessary to enable each party to understand each other better, especially with a view to reducing personal collateral, guarantee requirements and paper work.

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Appendix

Table A1: Descriptive Statistics of Control Variables

VARIABLE	Descriptive Statistics
Highest level of Education of the respondent	No formal education: 12(1.26%) Primary school: 116(12.17%) High school (10 or 11 years): 207(21.72%) High school (12 or 13 years): 123(12.91%) Technical or trade school: 171(17.94%) Some university: 157(16.47%) University degree: 152(15.95%) Post-graduate: 15(1.57%)
Age of the respondent (in years)	Average years of Education: 11.6 years Mean: 44.15 Standard Deviation: 12.98 Min: 18 Max: 99
Number of owners	Mean: 2.63 Standard Deviation: 10.35 Min: 1 Max: 200
Businesses with majority female ownership	82 (8.60%)
Businesses with majority Indigenous ownership	761 (79.85%)
Businesses with majority Foreign ownership	151 (15.84%)
Businesses which are member of an Industry Association or Group	388 (40.71%)
Businesses that currently use Computer(s)	616 (64.6%)
Businesses that currently use Landline Telephone(s)	496 (52.05%)

Businesses that currently use Mobile Phone(s)	928 (97.38%)
Businesses that currently use Internet	432 (45.33%)
Businesses that currently use Mains electricity	842 (88.35%)
Businesses that currently have a website	220 (23.08%)
The Region in which business is located	Highlands: 290 (30.43%) Islands: 209 (21.93%) Momase: 179 (18.78%) Southern: 275 (28.86%)

Table A2: Representativeness of the selected sample

Variable	Full Sample [N = 1,117]		Selected Sample [N = 953]	
	Frequency	Percent	Frequency	Percent
Distribution of firms across various regions of PNG				
Highlands	335	29.99	290	30.43
Islands	263	23.55	209	21.93
Momase	202	18.08	179	18.78
Southern	317	28.38	275	28.86
Distribution of firms across various provinces of PNG				
ATR Bougainville	52	4.66	47	4.93
Central	25	2.24	23	2.41
Chimbu	48	4.3	38	3.99
East New Britain	53	4.74	38	3.99
East Sepik	46	4.12	36	3.78
Eastern Highlands	45	4.03	34	3.57
Enga	51	4.57	49	5.14
Gulf	9	0.81	8	0.84
Hela	50	4.48	41	4.30
Jiwaka	46	4.12	37	3.88
Madang	54	4.83	50	5.25
Manus	45	4.03	36	3.78
Milne Bay	48	4.3	44	4.62
Morobe	54	4.83	48	5.04
NCD	131	11.73	122	12.80
New Ireland	59	5.28	45	4.72
Oro	47	4.21	42	4.41
Southern Highlands	48	4.3	46	4.83
West New Britain	54	4.83	43	4.51
West Sepik	48	4.3	45	4.72
Western	57	5.1	36	3.78

Western Highlands	47	4.21	45	4.72
Distribution of firms across location				
Remote	71	6.36	62	6.51
Rural	184	16.47	149	15.63
Urban	862	77.17	742	77.86
Distribution of firms across the type of business				
Sole trader	814	72.87	693	72.72
Partnership	86	7.70	73	7.66
A privately held company that is owned by shareholders but not listed	147	13.16	131	13.75
A publicly traded company owned by shareholders and listed	28	2.51	22	2.31
A cooperative	17	1.52	14	1.47
Joint venture	21	1.88	17	1.78
Refused	4	0.36	3	0.31
Nationality of the current largest owner(s) of firm				
Indigenous PNG	892	79.86	761	79.85
Naturalised Citizen	48	4.30	40	4.20
Permanent Resident	11	0.98	10	1.05
American /USA	1	0.09	1	0.10
Australian	40	3.58	39	4.09
Chinese	105	9.40	87	9.13
Indian	16	1.43	13	1.36
Philippino	15	1.34	12	1.26
Number of years the Business has been going for				
0 – 5 Years	528	47.27	453	47.53
5 – 10 Years	339	30.35	282	29.59
10 – 20 Years	186	16.65	158	16.58
20 – 30 Years	43	3.85	41	4.31
30+ Years	21	1.88	19	1.99

Table A3: Ordinary Least Square Estimates

VARIABLES	Ordinary Least Square Coefficients		
	Sales last 12 months	Employment next 12 months	Assets next 12 months
Access to finance/loans/capital	-0.011 (-0.387)	-0.004 (-0.166)	0.027 (1.152)
Generating revenue/sales	-0.086** (-2.459)	-0.011 (-0.351)	-0.041 (-1.459)
Finding and maintaining a skilled workforce	0.019 (0.585)	0.046 (1.610)	0.014 (0.541)
Access to technology (computers, Internet)	-0.015 (-0.446)	-0.026 (-0.886)	-0.018 (-0.679)
Electricity - reliability, availability, and cost	0.005 (0.144)	-0.025 (-0.752)	-0.007 (-0.242)
Water/Sewer services - reliability, availability, and cost	-0.024 (-0.632)	-0.010 (-0.295)	-0.003 (-0.108)
Phone service - reliability, availability, and cost	-0.005 (-0.140)	0.038 (1.237)	0.020 (0.699)
Lack of experience running a business/managing projects	-0.021 (-0.581)	-0.004 (-0.137)	0.008 (0.278)
Access to professional business services, like accountants or lawyers	0.015 (0.440)	0.014 (0.459)	0.036 (1.329)
Remote location of business	-0.116*** (-3.706)	-0.044 (-1.605)	-0.051** (-2.036)
Difficulty transporting or moving goods across the country	0.004 (0.143)	-0.037 (-1.506)	-0.027 (-1.213)
Political instability	0.020 (0.533)	-0.034 (-1.018)	0.015 (0.498)
Government regulation	0.056 (1.495)	-0.001 (-0.034)	0.050* (1.676)
Difficulty leasing or buying land	-0.050* (-1.892)	-0.054** (-2.318)	-0.011 (-0.510)
Difficulty dealing with banks	0.043 (1.480)	0.011 (0.413)	-0.043* (-1.820)
Lack of marketing/advertising experience and services	K2-0.006 (-0.166)	0.013 (0.434)	0.010 (0.380)
Poor office or work space - too crowded, not well lit	0.001 (0.025)	0.017 (0.611)	-0.029 (-1.176)
Tax rates	0.032 (1.084)	-0.009 (-0.361)	-0.007 (-0.311)
Having enough or the right equipment	0.018 (0.527)	-0.011 (-0.369)	-0.015 (-0.567)
Keeping up with demand for services with existing resources	0.045 (1.260)	0.045 (1.406)	-0.009 (-0.315)

Keeping up with company growth	-0.107*** (-2.860)	-0.029 (-0.864)	-0.039 (-1.279)
Crime/Security	0.001 (0.050)	0.005 (0.189)	-0.030 (-1.333)
Government corruption	-0.055* (-1.787)	0.051* (1.888)	-0.007 (-0.266)
Customers not paying on time or at all for services purchased	-0.020 (-0.767)	-0.033 (-1.409)	0.018 (0.821)
Unfair practices of competitors	-0.001 (-0.033)	-0.030 (-1.204)	0.044* (1.954)
Exchange rates for imports and exports	-0.014 (-0.412)	-0.048 (-1.592)	-0.034 (-1.241)
Access to international or domestic markets	0.018 (0.503)	0.072** (2.295)	0.040 (1.390)
Constant	4.567*** (15.682)	4.386*** (16.965)	4.147*** (17.691)
Firm/Respondent Controls	Yes	Yes	Yes
Regional Dummies	Yes	Yes	Yes
Observations	953	953	953
R-squared	0.098	0.089	0.084
Adj. R-Squared	0.055	0.044	0.04
Root MSE	0.858	0.762	0.691
F-Statistics (44,908)	2.25***	2.01***	1.90***

Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A4: Ordered logit results after including Rural and Remote dummies

VARIABLES	Ordered Logit Coefficients		
	Sales last 12 months	Employment next 12 months	Assets next 12 months
Access to finance/loans/capital	-0.065 (-1.003)	-0.015 (-0.234)	0.070 (1.078)
Generating revenue/sales	-0.192** (-2.402)	-0.000 (-0.003)	-0.103 (-1.294)
Finding and maintaining a skilled workforce	0.020 (0.274)	0.110 (1.528)	0.017 (0.233)
Access to technology (computers, Internet)	-0.005 (-0.071)	-0.061 (-0.849)	-0.034 (-0.455)
Electricity - reliability, availability, and cost	0.088 (1.039)	-0.041 (-0.495)	-0.030 (-0.363)
Water/Sewer services - reliability, availability, and cost	-0.109 (-1.239)	-0.045 (-0.522)	-0.009 (-0.101)
Phone service - reliability, availability, and cost	-0.004 (-0.046)	0.101 (1.293)	0.073 (0.918)

Lack of experience running a business/ managing projects	-0.059 (-0.726)	-0.006 (-0.071)	0.037 (0.446)
Access to professional business services, like accountants or lawyers	0.045 (0.593)	0.019 (0.250)	0.108 (1.394)
Remote location of business	-0.269*** (-3.791)	-0.146** (-2.124)	-0.155** (-2.180)
Difficulty transporting or moving goods across the country	-0.016 (-0.259)	-0.087 (-1.413)	-0.086 (-1.374)
Political instability	0.005 (0.061)	-0.065 (-0.794)	0.027 (0.325)
Government regulation	0.169* (1.949)	-0.001 (-0.017)	0.145* (1.695)
Difficulty leasing or buying land	-0.137** (-2.262)	-0.156*** (-2.615)	-0.034 (-0.569)
Difficulty dealing with banks	0.085 (1.287)	0.029 (0.442)	-0.135** (-2.037)
Lack of marketing/advertising experi- ence and services	-0.042 (-0.560)	0.039 (0.513)	0.042 (0.553)
Poor office or work space - too crowd- ed, not well lit	0.028 (0.395)	0.036 (0.525)	-0.118* (-1.668)
Tax rates	0.086 (1.296)	-0.035 (-0.532)	0.001 (0.010)
Having enough or the right equipment	0.035 (0.460)	-0.049 (-0.648)	-0.071 (-0.931)
Keeping up with demand for services with existing resources	0.098 (1.232)	0.136* (1.705)	-0.008 (-0.098)
Keeping up with company growth	-0.209** (-2.452)	-0.073 (-0.869)	-0.095 (-1.109)
Crime/Security	-0.021 (-0.342)	0.020 (0.315)	-0.090 (-1.410)
Government corruption	-0.132* (-1.909)	0.154** (2.245)	-0.009 (-0.131)
Customers not paying on time or at all for services purchased	-0.050 (-0.837)	-0.062 (-1.031)	0.076 (1.243)
Unfair practices of competitors	0.002 (0.031)	-0.108* (-1.736)	0.108* (1.705)
Exchange rates for imports and exports	-0.015 (-0.200)	-0.134* (-1.774)	-0.109 (-1.428)
Access to international or domestic markets	0.024 (0.308)	0.192** (2.429)	0.121 (1.497)
Rural Business	0.393** (2.053)	-0.116 (-0.611)	-0.050 (-0.256)
Remote Business	0.278 (0.953)	-0.181 (-0.635)	-0.039 (-0.131)

Constant	-5.264*** (-7.544)	-6.798*** (-8.313)	-6.306*** (-6.442)
Constant	-3.770*** (-5.714)	-5.334*** (-7.728)	-4.792*** (-6.356)
Constant	-2.550*** (-3.924)	-2.085*** (-3.233)	-1.673** (-2.469)
Constant	-0.109 (-0.169)	0.091 (0.142)	0.924 (1.367)
Observations	953	953	953
Firm/Respondent Controls	Yes	Yes	Yes
Regional Dummies	Yes	Yes	Yes
Log Likelihood	-1068.847	-1036.193	-948.698
Pseudo R2	.049	.044	.043
LR Chi2(46)	109.46***	95.95***	85.92***

Notes: z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

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