Open to competition? Competitive density and the growth of young New Zealand ventures

Abstract

Drawing on 180 survey responses from young, New Zealand-based ventures, we investigate effects of the number of perceived serious competitors on venture growth. We find empirical evidence for an inverse U-shaped relationship between competitive density and young venture growth. We further find that persistent innovation – requiring both initial innovative intent and a recent record of innovation – not only promotes young growth but also moderates the relationship between competitive density and young venture growth. Overall, the study shows that the growth of young ventures committed to persistent innovation is less affected by competitive dynamics compared to non-innovators.

Keywords: Competitive density, innovation, growth, young ventures

1. Introduction

Differentiating a young venture from its competition is a complex entrepreneurial task (Argyres et al., 2015; Wright and Marlow, 2011). Entrepreneurs can choose which market they enter and how to position their venture for growth. Often in this process, they are not considering competitive dynamics for their growth strategy to reduce the uncertainty of the entrepreneurial endeavour (Sarasvathy, 2001). However, neglected or not, competition remains a dynamic and capricious external force that shapes the growth prospects of young ventures. Notably, as young ventures must specialise for long-term growth, and rarely go head-to-head against established firms, more competitors in a market mean more rivals chasing finite opportunities to fill interstices between the offerings of established firms (Penrose, 1959). In contrast, competition might be helpful for young ventures by providing reference points for the entrepreneurial offering that can support their growth (Deephouse and Suchman, 2008). This makes competitive density a mixed blessing for young venture growth: while some established firms in a market might be helpful in creating market interstices, denser competition might become harmful as it reduces opportunities to specialise.

The effects of that external factor, competitive density, on young venture growth also depend on the internal factor of the entrepreneur's strategic choices, specifically regarding innovation. Aldrich and Martinez (2001) argue that innovative ventures follow different growth pathways from non-innovators. They point out that innovation grants temporary escape from the growth-inhibiting outcomes of competition that occur when many ventures compete to serve the same part of the market. However, precisely because that escape is temporary and the resulting advantage transient, it has been argued that it becomes increasingly important in pursuing growth for entrepreneurs to commit to persistent innovation (Deschryvere, 2014). Still others, though, point out that the positive effect of innovation may be overrated for SMEs, and urge more empirical research to understand its role in growth (Cefis and Orsenigo, 2001). Overall, despite or perhaps because of these sometimes conflicting insights, little is still known about how entrepreneurs should consider their approach to competition in strategy making (Wright and Marlow, 2011). And while previous research has investigated the respective effects of competition on young venture strategy (Block et al., 2015) and on innovation (Deschryvere, 2014) separately, these dynamics have not been investigated jointly. This in turn invites a related question of how competition will affect the growth of young ventures pursuing different innovation strategies.

To fill this gap, this article aims to test empirically how competitive density, measured as the number of serious competitors, impacts the growth opportunities of persistently innovative and non-innovative young ventures respectively. To this end, we develop hypotheses regarding three relationships: competitive density and growth, innovation and growth, and how competition might affect persistent innovators' growth less than that of non-innovators. In this study, persistent innovation requires both initial innovative intent and a recent record. We find all three hypotheses supported.

Building on Penrose's (1959) argument, we adopt the number of serious competitors as a measure of the competitive density faced by young ventures. Using a sample of 180 young ventures from New Zealand (NZ), we first show an inverse U-shaped relationship between the number of serious competitors and young venture growth, with moderate levels of competition being most beneficial. Secondly, we demonstrate that persistently innovative ventures grow more than non-innovative ones. And thirdly, we show that competitive density affects persistent innovators and non-innovators differently, as persistent innovators are less influenced by competitive forces.

The article is structured as follows. In the next section we discuss the theoretical background for developing the three hypotheses. Then, we provide an overview of the research method, followed by the discussion of the results. We conclude by considering limitations and suggesting further research.

2. Literature review and development of hypotheses

2.1. The effects of competitive density on the growth of young ventures

The growth prospects of a young venture are influenced by how many competitors it contends with. But the relationship is not simple. On the one hand, while in general more competitors tend to benefit the economy, effects on individual ventures are largely negative since more competitors intensify the contest for differentiation, making growth harder for young ventures through two mechanisms. First, as Penrose (1959) noted, most young ventures strive to avoid competing head-to-head with established firms by instead filling interstices between them. Since all firms have to specialise to ensure long term success, the available opportunities for differentiation decline as the number of competitors increases (Penrose, 1959). Second, more competitors also erode differentiation faster, if customers faced with more choices find it harder to understand differences between offerings (D'Aveni et al., 2010). Through both mechanisms, large numbers of competitors raise competitive pressures, making meaningful differentiation more difficult to achieve and maintain. Young ventures in particular are frequently ill-equipped to operate amidst very dense competition, for want of resources, managerial skills, internal processes and market reputation (Fern et al., 2012). This age susceptibility is borne out by Coad et al. (2018). Using data from Swedish firms during 1998–2008, they show that high levels of market entry reduce the growth of young ventures especially, yet for businesses older than 40 years, higher levels of market entry are positively associated with growth. Overall, these arguments suggest that young ventures should avoid competition whenever possible.

On the other hand, two other mechanisms may make low competitive density unfavourable to young venture growth. First, markets with low competitive density may lack a functioning structure in several senses. A lack of reference points or of comparable business activity may confuse customers about value propositions, making it harder for relative newcomers to gain market legitimacy (Deephouse, 1999). Low incumbent competitive density may also be a sign of sluggish market demand, which increases uncertainty for the entrepreneur (Haveman, 1993). Moreover, growth-oriented young ventures often rely on a

functioning market infrastructure. In a further sense, besides reliable regulatory settings, such infrastructure includes a certain level of competitive activity: low competition can suppress investment in market infrastructure and capability development and hence reduce the growth opportunities of all firms (Deephouse and Suchman, 2008).

Moreover, as a second mechanism, low competitive density can also diminish the learning opportunities that are often critical to young ventures' growth. Young ventures can learn from observing their competitors, thereby avoiding costly and growth-stifling mistakes (Lévesque at al., 2009) and instead reaping opportunities that are particularly valuable in such early stages of development. Plummer and Acs (2012) demonstrate that low competitive density reduces opportunities for knowledge spillovers from incumbents to young ventures.

We have thus seen opposing risks suggesting both too little competition and too much can impede young ventures' growth. Somewhat negatively, these also afford a rationale that moderate competitive density fosters their growth. But more positively, another line of argument directly gives reason to believe that moderate competitive density helps young ventures grow. Moderate competition lets entrepreneurs creatively pursue growth by leveraging off an existing market without becoming overly exposed to hostile competitive forces. Moderate competition may, therefore, best enable young ventures to be 'legitimately different' – different but credible to customers (Deephouse and Suchman, 2008). The combined rationale above leads us to formulate our first hypothesis:

> *Hypothesis 1: There is an inverse U-shaped relationship between competitive density and a young venture's growth, such that compared to low and high density, moderate density will be associated with higher venture growth.*

2.2. Persistent innovation and young venture growth

Innovation lifts the growth potential of young ventures (Coad, 2009). Innovation lets young ventures escape competitive pressure and create sheltered niches and strong customer links (Swaminathan and Delacroix, 1991). Indeed, the positive link between innovation and growth has been investigated from multiple perspectives (e.g. Coad et al., 2018; Deschryvere 2014; Gronum et al., 2016). Using data from Australian SMEs, Gronum et al. (2016) find that innovation breadth, measured by the count of different types of innovation, is an important driver for business performance as it enables business model refinement. As SMEs engage in

more types of innovation, they tend to be more able to align with customer demands, which increase their performance. Moreover, the results of innovation tend to be unevenly distributed. Innovation plays a more important role for businesses that aim to achieve fast growth (Coad and Rao, 2008). Similarly, Freel and Robson (2004) had found successful innovation positively related to the growth of small businesses, while unsuccessful innovation was negatively related. However, the fact remains that even successful innovation is often costly, and the stimulus to sales takes considerable lag time. Both the latter points suggest that small firms are often better served by ongoing, incremental innovation to reduce risk. Based on this, we reason that the positive effects of innovation on young venture growth would be particularly strong if young ventures sustain, and thus spread out over time, their commitment to innovation.

Indeed, there is further reason to believe that young venture growth is aided by a sustained commitment to innovation. Cefis and Ciccarelli (2005) demonstrate that while recent innovation can improve short-term profitability, persistent innovation seems to be more important for achieving long term success and profitability. This is because sustained innovation is more likely to yield productivity improvements, which tend to be long-lasting, while one-off innovation only improves growth short term. Going rather further, Deschryvere (2014) provides evidence that only persistent innovation is associated with growth. His study also shows that successful innovation encourages investment in R&D and future innovation, which are themselves associated with subsequent growth. Young firms often lack the market knowledge to innovate successfully, and the insights gained from past innovation may facilitate learning and nurture a more systematic understanding of the external environment (Batra et al., 2018). Hence, pursuing persistent innovation helps develop internal capabilities that sustain growth.

At the same time, the evidence on growth effects also suggests that older, more established firms tend to have advantages in sustaining innovation. Cefis and Orsenigo (2001), for instance, found that innovation persistence tends to be more common in larger firms. However, their cross-country study also revealed important regional differences in innovation persistence by small firms, which might depend on favourable contextual conditions. This is again because innovation persistence is costly and smaller firms often lack the resources, accumulated technological capability and strategic priorities to keep innovating (Roper and Hewitt-Duanda, 2008). Overall, this literature suggests that persistent innovation

positively influences the growth of young ventures, even though innovation is difficult to achieve for small firms, which leads to our second hypothesis:

> *Hypothesis 2: Amongst young ventures, there is a positive linear relationship between persistent innovation and venture growth.*

2.3. Different effects of competitive density on persistent innovators and non-innovators

Starting to combine the streams of argument behind Hypotheses 1 and 2, there are persuasive reasons for believing that the innovativeness of young ventures and competitive density interact in influencing young venture growth (Aldrich and Martinez, 2001). Specifically, the growth of persistent innovators should be less affected by high levels of competitive density since such firms possess three advantages. First, the investment in innovation, with all its uncertainty, fosters a strategic commitment to the pursuit of growth opportunities irrespective of the level of competitive density. Entrepreneurs who commit to continuous investments in innovation will focus more on internal capabilities to pursue opportunities for differentiation and less on their competitors (Sarasvathy, 2001). Hence too, persistent innovators will have strong strategic intent to leverage innovation into growth – which may strengthen the link between innovation and growth (Roper and Hewitt-Duanda, 2008).

Second, persistent innovators also have more chances to grow with the market, rather than directly competing for a share of a finite market and existing customers (Lévesque et al., 2009). Moreover, they should be able to manage competitive density strategically as they only release innovation when required to sustain differentiation from competition. Henrekson and Johansson (2010) find that the most successful young ventures thus manage innovation release to keep the competitive density conducive to achieving fast venture growth. The level of competitive density thus becomes to some extent chosen rather than imposed.

Finally, persistent innovators may also create a platform for capability development. Theories of the advantage of early market entry have often pointed towards self-escalating competitive dynamics following innovative market entry. Once an innovation has been successfully implemented, ventures get opportunities to invest in developing further internal innovation capabilities (Deschryvere, 2014). These capabilities particularly matter in fast moving markets where differentiation has become more transient (D'Aveni et al., 2010); and ventures tend to become less susceptible to fluctuating competitive density as they build such

capabilities. In summary, multiple arguments predict fundamentally different effects of competitive density on growth pathways between persistent innovators and non-innovators. Specifically, this leads us to formulate our final hypothesis.

> *Hypothesis 3: The curvilinear (inverse U-shaped) relationship between competitive density and young venture growth will be positively moderated by persistent innovation, such that ventures that are persistent innovators will be less affected by competitive density.*

3. Research method and results

3.1. Sample and variables used

Our sample was 180 survey responses from NZ-based ventures younger than 10 years – an appropriate cut-off point used in similar studies (Coad et al., 2016a). Ventures averaged 6 years of age. Coad (2017) argues that the age-related effects on many small firms disappear after about 7 years, so higher average age could have raised concerns about sample appropriateness. The sample was obtained from a multinational credit rating agency and complemented using the KOMPASS business database. To compare the growth performance of innovators with non-innovators across various industries we selected ventures from high-tech and non-high-tech industries in manufacturing and business services. We excluded the primary, retail and tourism industries and non-employing ventures. The overall response rate was about 18%. The final sample provided a good split between service and manufacturing ventures operating in high- and non-high-tech sectors.

The survey was paper-based and personally addressed to the founder/CEO of the venture. It was sent out in three waves, which let us investigate for response bias between early and late responders by using a multinomial logic model with the wave membership as a dependent variable and the same predictors as our main model. No significant predictor emerged. Further t-tests for differences between early and late responders regarding individual variables also failed to disclose significant results, providing no evidence of response bias.

The survey questions concerned the ventures' competitive environment and financial performance over a 3-year time period. Table 1 summarises our empirical measures. As the dependent variable we used the difference between the logarithm of current turnover and the

logarithm of the turnover 3 years ago (measured in nominal NZD), a widely used relative indicator of expanding venture activity (Coad et al., 2016b), i.e.

$$Turnover\ growth(i,t) = \log(Turnover(i,t)) - \log(Turnover(i,t-3))$$

To investigate the relationship between competitive density and young venture growth, and the impact on that of innovation, we focused on two main variables. First, we used the number of serious competitors perceived by an entrepreneur or CEO to measure competitive density. This measure has been employed by studies on the effects of competitive density on small businesses (Gronum et al., 2012; Freel and Robson, 2004). It has the advantage of emphasising the key decision maker in strategy formation, albeit at the expense of more objective measures of competitive density on the industry/sector level (Ireland et al., 2009). Moreover, the measure is also appropriate for capturing the competition amongst young ventures for differentiation as described by Penrose (1959). Competition amongst young ventures to differentiate within interstices left unserved by larger firms increases with the number of ventures pursuing such opportunities. Capturing this competitive force, as experienced by the key decision maker, is particularly advantageous during early venture development, when decision making tends to be concentrated in the founder and thus favours our subjective measure (e.g. Block et al., 2015; Ucbasaran et al., 2010).

Second, to capture whether the young venture is a persistent innovator we combined two measures, one from date of foundation and one recent. To assess the founding intent to compete as an innovator, respondents were asked whether the venture was established to implement a new business idea/invention/concept. Three answers were possible: ‘Yes’, ‘No’ and ‘Do not know’. A binary measure was created by excluding ventures indicating the last option. As to recent implementation, we asked CEOs if the venture had introduced innovations that were new to the market in the last 3 years – another common metric when investigating growth among young and small ventures (Cozza et al., 2012). Only if both answers were yes did we count the firm as a persistent innovator.

Innovation persistency itself mattered for two reasons. First, Aldrich and Martinez (2001) argued that many intending innovators actually start off as reproducers, to gain a foothold in the market. Hence, the intention to innovate, while important (and in our model necessary for a value of 1), cannot alone capture the commitment required for the innovator

growth pathway. Second, Deschryvere (2014) shows that persistent innovation, rather than one-off innovation, is crucial for venture growth.

>>> Insert Table 1 about here <<<

We also measured control variables. Similarly to prior studies of the growth dynamics of SMEs (Zapkau et al., 2014), we controlled for industry effects by specifying the sector affiliations (not shown in table) using official NZSIC 2006 industry codes, obtained from the credit rating agency. We checked whether the industry code that respondents supplied was a valid description by verifying the name and, if available, checking the website of the venture. To control for prior conditions we measured the turnover of the ventures 3 years earlier and its square term. Further, we controlled for collaboration intensity. Since Ang (2008) demonstrated that competition influences the growth of well-established business through collaboration, the relationship between competition and growth in young ventures, too, might be impacted by collaborative intensity. We assessed collaborative intensity by adding the number of types of collaboration partners. The 5 possible types were: Suppliers; Customers; Higher Education/Research Institutes; Private Research Institutes/ Consultants; and Firms in the same line of business. The measure is the venture's number of partner types, from 0 to 5. This measure has been used in a previous study on small and young ventures (Paruchuri and Awate, 2017).

Because ventures interacting with more/fewer customers in achieving sales will experience different levels of competitive density, we measured ventures' customer dependency, a variable Freel and Robson (2004) found to be positively associated with business growth. Respondents indicated their venture's share of sales made to the top 5 customers as a percentage of the previous financial year's total sales (1 = <10%, 2 = 10–24%, 3 = 25–49%, 4 = 50–75%, 5 >75%). Following Freel and Robson (2004), our measure for customer dependency takes the value 1 if a venture makes more than 75% of its turnover from its largest 5 customers and 0 otherwise.

Table 2 shows the correlations between key variables. We also calculated the variance inflation factors (VIF) of all the variables, and included the VIF of the individual variables in the main model with the industry dummies present. The mean VIF was 1.66, and the highest individual value was 2.46. This suggests multicollinearity was not a concern.

>>> Insert Table 2 about here <<<

3.2. Multiple regression analysis

We performed a hierarchical multiple regression analysis with robust standard errors (Table 3). In our first model, we entered the control variables. The results seemed plausible. We controlled for industry effects by including dummy variables for industry affiliation. We also included dummy variables for the founding year to control for the young ventures being nested in cohorts (Hofer and Sliwinski, 2006). Second, we added previous venture size measured as the logarithm of turnover 3 years ago (which had a negative sign), and the quadratic term (positive). Our results are comparable to similar studies (e.g. Brenner and Schimke, 2015; Ipinnaiye et al., 2017). Third, as indicated above, we added a variable controlling for collaborative intensity. Finally, to control for differences in the competitive density that result from engagement in different product markets, we added the variable measuring customer dependency.

Model 2 tests Hypothesis 1 by adding the independent variable competitive density and the quadratic term to assess the existence of an inverse U-shaped relationship to young venture growth. The coefficient for the direct relationship is significant and suggests that a 1% change in competitive density is associated with 0.24% change in young venture growth. The addition of this curvilinear effect is significant and increases the F-statistic. Thus adding the inverse U-shaped relationship does increase the model's explanatory power. The negative coefficient suggests that for each unit rise in competitive density the slope decreases by 10.2% [2* (-0.051)]. We further computed a Sasabuchi test and the Fieller confidence intervals. The results show that: (a) the arch is significant and (b) the maximum of the inverse U-shaped relationship falls on a plausible value (Lind and Mehlum, 2010). This analysis further supports the existence of the hypothesised inverse U-shaped relationship. Moreover, the adjusted R^2 is comparable to other studies of growth drivers of small and young ventures (e.g. De Massis et al., 2015). Finally, the analysis revealed that the maximum of the inverted U shape is 10, which in our study represents the ideal number of competitors for young venture growth. This number is comparable to Block et al.'s (2015) finding that the ideal number of competitors of a young venture to engage in a differentiation strategy is around 6 at venture formation. All these results support Hypothesis 1.

In a second step (see Model 3), we added the moderating variable for persistent innovativeness. The coefficient for the direct effect is positive and suggests that persistent

innovators have an 11.8% higher growth rate than non-innovators. We therefore find support for Hypothesis 2.

In our final step (Model 4), adding the interaction terms between competitive density and persistent innovation improved the model, and the Sasabuchi test became more significant. Moreover, the Fieller confidence interval reduced – further evidence that the final specification yields a better fit. The negative sign for the term Competitive density x Persistent innovation and the positive sign for Competitive density^2 x Persistent innovation suggest that persistent innovators are less affected by competitive density than non-innovators. That is, the inverse U relationship between competitive density and turnover growth is more pronounced for non-innovators, and the growth prospects of persistent innovators are less influenced by high competitive density. Thus, Hypothesis 3 is also supported.

>>> Insert Table 3 about here <<<

We also created graphs showing the regression lines to help us interpret the tested interaction effects. Figure 1 shows the graphs for the three regression lines. Graph (3) shows the general curvilinear relationship between competition and growth for all businesses. Comparing graph (1), businesses that did not persist at innovation, and graph (2), businesses that persistently innovated, reveals that this effect is driven by businesses that did not persistently innovate. Building on this, we compared both the average growth rate and the proportion of growing to non-growing businesses between persistent innovators and non-innovators. Persistent innovators had grown by 24% on average, compared to 9% for non-persistent innovators. Moreover, 40% of non-persistent innovators had falling turnover compared to 25% of persistent innovators. Hence, the visual inspection of the data provided the reassurance that we had interpreted the effects correctly.

>>> Insert Figure 1 about here <<<

3.3. Robustness checks

We performed several robustness tests. First, we specified models with alternative control variables (not shown). Because being exposed to export markets affects opportunities for growth (Zapkau et al., 2014) and maybe also perceived competitive density (Freel and Robson, 2004), we specified an additional model containing a binary variable for engagement

in export markets. Moreover, because in competitive environments investment in future innovation is often critical for sustained growth (Geroski, 1993) we also specified a model that controlled for engagement in R&D activities. After controlling for size and industry, this variable exhibited no effect on growth rate. This result aligns with findings that SMEs often face difficulties leveraging R&D investments into growth (Demirel and Mazzucato, 2012). Overall, incorporating these control variables did not change the effects in the previous section.

Second, we specified individual models for the two innovation measures that we used to determine whether a young venture is on a persistent innovator pathway, namely the innovation intent at founding and recent innovation activity. Both display a positive, but smaller effect on turnover growth when compared to the combined measure, which suggests that persistent innovation has a stronger effect on young venture growth. However, only innovation intent moderates the relationship between competitive density and venture growth. This result provides further evidence that the growth pathways of ventures that start as innovators are differently influenced by emerging competition, as argued by Aldrich and Fiol (1994). Moreover, to address the issue that young ventures begun with innovative intent may face worse odds of survival, we checked how the proportion of these businesses varied with business age. About one in three ventures 8–9 years old were started with innovative intent, which is comparable to the overall proportion of 37.33% of these ventures. Thus ventures begun with innovative intent are still well represented in the older cohorts. This could be because we did not distinguish by radicalness of innovation. Many young ventures tend to be conservative innovators, and conservative innovation might not alter their survival chances.

Third, we investigated the main effects shown in the analysis above by implementing nearest-neighbour matching for the key variables of interest, namely initial innovative intent, innovation in the last 3 years, and moderate competitive density. While the two innovation measures are binary and hence can be used in a treatment effect model, the measure for moderate competitive density had to be constructed. Our measure took the value of 1 if competitive density fell within the Fieller confidence interval around the peak of the inverse U, and 0 otherwise. The measure indicates whether the venture is experiencing a moderate level of competition that should be associated with higher turnover growth. To conduct the matching procedure, we used the variables set out in the results section. Table 4 shows the average treatment effect of innovative intent, innovation in the last 3 years and moderate

competitive density on both relative and absolute turnover growth. The results support the regression analysis in that moderate density and persistent innovation have a positive influence on turnover growth.

>>> Insert Table 4 about here <<<

Finally, given the study design, we cannot rule out a reverse directional model. However, our interpretation of the results agrees with current theorising on the impact of initial innovation and competitive density on the growth of young ventures (Ortega-Argilés et al., 2011). While we can contribute to this literature, we could not eliminate the effects of entrepreneurial market learning in the process of venture creation. Entrepreneurs learn, and this learning will affect their perception of competitive density. Hence, there is a danger that such learning effects have impacted the competitive density measure, which was evaluated simultaneously with turnover growth. To mitigate this and check whether our results are robust in light of this reasoning, we specified a model with the reverse path, where we estimated the effect of initial innovative intent and young venture growth on competitive density. None of the F-statistics for the additional steps had a significant effect in the reverse model, nor did any of the variables. These results afford additional reassurance for the models tested in the main analysis.

Overall, the multiple regression analyses were largely confirmed by the robustness checks. Moreover, we have shown that the results for the main variables of interest, and the control variables, fit well with existing empirical work on the growth of young ventures. We therefore find continued support for all three hypotheses.

4. Discussion

Existing literature suggests an interesting interplay of effects on young venture growth between competitive density and persistent innovation. While both the effects of competitive density on young venture strategy (Block et al., 2015; Ucbasaran et al., 2010) and persistent innovation on young venture growth (Deschryvere, 2014) have received attention in the literature, they have not been investigated jointly. Our study helps fill the related gap of understanding how competition will affect the growth of young ventures pursuing different innovation strategies.

First, we find an inverse U-shaped relationship between competitive density and young venture growth. Finding support for Hypothesis 1 provides empirical evidence for earlier theoretical work on strategically trading off low market dynamism and restricted demand on the one hand, and ruinous competition on the other. We show that, in general, young ventures' growth benefits from a moderate level of competitive density, as having some legitimate competition confirms that the pursued opportunity is worthwhile and, at the same time, leaves some uncontested scope to differentiate. Previous work has often highlighted the benefits of barricading young ventures from competition (Santos and Eisenhardt, 2009). Our study adds that entrepreneurs might benefit from paying more attention to the competitive density in a targeted market niche as growing a young venture is best achieved amongst moderate competitive density. Given that entrepreneurs are prone to competitive neglect in building their businesses especially in dynamic markets (Sarasvathy, 2001), this adds an important nuance to existing knowledge of the relationship between competitive density and young venture growth.

Moreover, we also find support for Hypothesis 2, namely that persistent innovation has a positive effect on young venture growth. Persistent innovation emerges as more important than other activities, notably collaboration. Entrepreneurs are often counselled to grow their young ventures by growing their networks (Wiklund et al., 2009). For instance, Ang's (2008) study finds an inverted U relationship between competitive density and collaboration for established SMEs, suggesting that firms exposed to high or low competitive density collaborate less than counterparts facing moderate competitive density. The author argues that the latter have more incentives to mitigate negative pressures from competition through collaboration, which in turn benefits their growth (Ang, 2008). However, our study suggests that while collaboration can indeed foster growth in young ventures, a focus on innovation might be more beneficial. The benefits of collaboration disappeared when we added the effect of persistent innovation, which suggests that entrepreneurs need to continue to productise knowledge gained from being in a market. We therefore contribute to the ongoing theoretical discussion about the importance of innovation for young venture growth by supporting earlier findings that commitment to innovation positively impacts on venture growth (Deschryvere, 2014; Gronum et al., 2016). Our study adds that in early stages of venture growth building new offerings is often more important than building new networks. Given that young firms are often resource-constrained and cannot pursue different strategic activities simultaneously, this is an important insight for practitioners.

Extending on these insights, by supporting Hypothesis 3 we also provide evidence that growth pathways of innovators and non-innovators are differently affected by competition. Persistent innovators enjoy clear advantages in navigating dynamic competitive environments compared to non-innovators. High competitive density is generally considered negative for young ventures that do not differentiate (Spulber, 2009). Previous research has also explained why low competitive density might impede growth for non-innovators. First, they may have imitated a product offering that was relatively unattractive to customers from the outset (Block et al., 2015). Second, the scarcity of competitors may impoverish their learning and imitation opportunities in growing the venture (Lévesque et al., 2009). However, empirical comparisons between persistent innovators and non-innovators are rare (Argyres et al., 2015; Semadeni and Anderson, 2010). We offer missing empirical support for these arguments by showing that non-innovators benefit more from operating in markets with moderate competitive density than persistent innovators.

By contrast, the growth of persistently innovative young ventures is less affected by competitive density. Previous work has emphasised the need for young ventures to shield their market from competition (Santos and Eisenhardt, 2009). Our study instead suggests that persistent innovation lets young ventures grow with the market and without detriment from high competitive density. These findings are in line with research on the categorisation of innovation and new organisational forms pointing towards such positive effects of competition for the diffusion of innovation (Lévesque et al., 2009). Our paper shows that persistent innovation in the face of increasing competitive density allows young ventures to take more control of their competitive environment because it diminishes the ill effects of high competitive density on growth.

The present study has important practical implications. Entrepreneurs contemplating establishing ventures and formulating strategy to navigate complex and uncertain environments often ignore competition (Khan et al., 2014). However, our study shows that levels of competition impact growth, so competition should be a deliberate consideration. Notably, low levels of competitive density in an entrepreneur's prospective (or indeed already-entered) market will impede growth whether they innovate persistently or not. Therefore the entrepreneur should be wary of differentiating heavily as this might make finding customers harder. Intending innovators, in particular, should focus on overall market growth rather than the challenges they would traditionally fear from high competitive density.

Imitators, on the other hand, need to know that while moderate competition is desirable, for maximising growth, high competitive density is not.

Finally, the study carries practical implications for NZ's young ventures in particular. NZ is a small, open market economy, far from its trading partners (Chetty and Blankenburg Holm, 2000). Furthermore, with a population of just 4.71 million (Statistics New Zealand, 2016), growth of firms and indeed of the economy often requires going overseas. Ventures operating in such small, remote economies typically face low competitive density (Gal, 2009), and so might have fewer incentives to innovate (Nachum et al., 2008). Our findings, however, suggest that persistent innovation pays off for these ventures, better equipping them to weather dense competition. Dense competition is relevant because NZ policy makers have increasingly opened up their small home market to foreign competitors through free trade agreements (MFAT, 2016). It is also relevant if the firms do go into offshore markets. Whether staying at home or expanding overseas, young NZ ventures therefore need to recognise the potential benefits of innovation not only directly on growth (relatively well known) but also (more subtly) as these interact with competitive density. Implications also exist for NZ policy makers when considering the impact of opening up home markets. Our study suggests that the innovation capacities of young ventures need to be considered as these are required to shelter such ventures from the effects of increasing competitive density. Moreover, the opening of the domestic market also needs to go hand-in-hand with nurturing the innovation capabilities of domestic businesses for sustained innovation. Policy makers will need to balance the opening of markets with the capability development with the young ventures.

5. Limitations and further research

Being early empirical work, this study has limitations that invite further research. Like other studies in the field, ours relied on a cross-sectional dataset, though in the analysis we addressed the resulting limitations in multiple steps. First, we included past turnover as a prior condition for young venture growth and controlled for the founding years of the different cohorts, thus assuming that the processes of interest would have stabilised across the different cohorts. Fixing these cohort-specific effects, however, sacrificed insights into individual ventures' growth pathways. Future research could collect data at multiple times, and/or focus on a particular industry and use qualitative interview data to better understand the interplay between emerging competition and venture growth.

A second limitation shared with other cross-sectional studies is that we could only collect data on firms that had survived to be surveyed. Given our focus on young ventures, it can be expected that some ventures failed to gain traction and had to exit – were 'weeded out'. This limitation impacts recent start-ups more than businesses with a foothold in the market already (Ucbasaran et al., 2010). Future research could collect longitudinal data to better capture the effects of competition on the survival chances of early start-ups. In this regard, Block et al. (2015) suggest that the number of competitors affects entrepreneurial strategy making, yet the link to performance remains unexplored.

Moreover, our perceptual measure of competitive density precludes assessing the competitive pressure within a market category. While the measure has been widely used in studies of entrepreneurial decision making in young and small businesses (Block et al., 2015; Ucbasaran et al., 2010), clearly scope exists for future studies to collect data at the market category level. Finally, our study does not distinguish innovation by its radicalness. This is a significant limitation since young ventures are particularly vulnerable to the risks from more radical innovation. Case studies of the interplay between degrees of innovation by young ventures, their evolving competitive environment and growth, would be a helpful next step.

References

Aldrich HE and Fiol CM (1994) Fools rush in? The institutional context of industry creation. *Academy of Management Review* 19(4): 645–670.

Aldrich HE and Martinez MA (2001) Many are called, but few are chosen: An evolutionary perspective for the study of entrepreneurship. *Entrepreneurship Theory and Practice* 25(4): 41–56.

Ang SH (2008) Competitive intensity and collaboration: Impact on firm growth across technological environments. *Strategic Management Journal* 29(10): 1057–1075.

Argyres N, Bigelow L and Nickerson JA (2015) Dominant designs, innovation shocks, and the Follower's Dilemma. *Strategic Management Journal* 36(2): 216–234.

Batra S, Sharma S, Dixit MR and Vohra N (2018) Does strategic planning determine innovation in organizations? A study of Indian SME sector. *Australian Journal of Management* 43(3): 493–513.

Block JH, Kohn K, Miller D and Ullrich K (2015) Necessity entrepreneurship and competitive strategy. *Small Business Economics* 44(1): 37–54.

Brenner T and Schimke A (2015) Growth development paths of firms: A Study of smaller businesses. *Journal of Small Business Management* 53(2): 539–557.

Chetty S and Blankenburg Holm D (2000) Internationalisation of small to medium-sized manufacturing firms: A network approach. *International Business Review* 9(1): 77–93.

Cefis E and Ciccarelli M. (2005) Profit differentials and innovation. *Economics of Innovation and New Technology* 14(1-2): 43–61.

Cefis E and Orsenigo L (2001) The persistence of innovative activities: A cross-country and cross-sectors comparative analysis. *Research Policy* 30(7): 1139–1158.

Coad A (2009) *The Growth of Firms: A Survey of Theories and Empirical Evidence.* Cheltenham, UK: Edward Elgar Publishing.

Coad A (2017) Firm age: A survey. *Journal of Evolutionary Economics* 28(1): 1–31.

Coad A and Rao R (2008) Innovation and firm growth in high-tech sectors: A quantile regression approach. *Research Policy* 37(4): 633–648.

Coad A, Daunfeldt SO and Halvarsson D (2018) Bursting into life: Firm growth and growth persistence by age. *Small Business Economics* 50(1): 55–75.

Coad A, Segarra A and Teruel M (2016a) Innovation and firm growth: Does firm age play a role?. *Research Policy* 45(2): 387–400.

Coad A, Frankish JS, Roberts RG and Storey DJ (2016b) Predicting new venture survival and growth: Does the fog lift? *Small Business Economics* 47(1): 217–241.

Cozza C, Malerba F, Mancusi ML, Perani G and Vezzulli A (2012) Innovation, profitability and growth in medium and high-tech manufacturing industries: Evidence from Italy. *Applied Economics* 44(15): 1963–1976.

D'Aveni RA, Dagnino GB and Smith KG (2010) The age of temporary advantage. *Strategic Management Journal* 31(13): 1371–1385.

De Massis A, Kotlar J, Campopiano G and Cassia L (2015) The impact of family involvement on SMEs' performance: Theory and evidence. *Journal of Small Business Management* 53(4): 924–948.

Deephouse DL (1999) To be different, or to be the same? It's a question (and theory) of strategic balance. *Strategic Management Journal* 20(2): 147–166.

Deephouse DL and Suchman M (2008) Legitimacy in organizational institutionalism. In: Greenwood R, Oliver C and Suddaby R (eds) *The Sage Handbook of Organizational Institutionalism*. Los Angeles, California: Sage: pp. 49–77.

Demirel P and Mazzucato M (2012) Innovation and firm growth: Is R&D worth it? *Industry and Innovation* 12(1): 45–62.

Deschryvere M (2014) R&D, firm growth and the role of innovation persistence: Analysis of Finnish SMEs and large firms. *Small Business Economics* 43(4): 767–785.

Fern MJ, Cardinal LB and O'Neill HM (2012) The genesis of strategy in new ventures: Escaping the constraints of founder and team knowledge. *Strategic Management Journal* 33(4): 427–447.

Freel MS and Robson PJ (2004) Small firm innovation, growth and performance evidence from Scotland and Northern England. *International Small Business Journal* 22(6): 561–575.

Gal MS (2009) *Competition Policy for Small Market Economies*. Cambridge, Massachusetts: Harvard University Press.

Geroski PA (1993) Antitrust policy towards co-operative R&D ventures. *Oxford Review of Economic Policy* 9(2): 58–71.

Gronum S, Steen J and Verreynne ML (2016) Business model design and innovation: Unlocking the performance benefits of innovation. *Australian Journal of Management* 41(3): 585–605.

Gronum S, Verreynne ML and Kastelle T (2012) The role of networks in small and medium-sized enterprise innovation and firm performance. *Journal of Small Business Management* 50(2): 257–282.

Haveman HA (1993) Follow the leader: Mimetic isomorphism and entry into new markets. *Administrative Science Quarterly* 38(4): 593–627.

Henrekson M and Johansson D (2010) Gazelles as job creators: A survey and interpretation of the evidence. *Small Business Economics* 35(2): 227–244.

Hofer SM and Sliwinski MJ (2006) Design and analysis of longitudinal studies on aging. In: Birren JE and Schaie KW (eds) *Handbook of the Psychology of Aging.* 6th ed. Burlington, Massachusetts: Elsevier, pp. 15–37.

Ipinnaiye O, Dineen D and Lenihan H (2017) Drivers of SME performance: a holistic and multivariate approach. *Small Business Economics* 48(4): 883–911.

Ireland RD, Covin JG and Kuratko DF (2009) Conceptualizing corporate entrepreneurship strategy. *Entrepreneurship Theory and Practice* 33(1): 19–46.

Khan SA, Tang J and Joshi K (2014) Disengagement of nascent entrepreneurs from the start-up process. *Journal of Small Business Management* 52(1): 39–58.

Lévesque M, Minniti M and Shepherd D (2009) Entrepreneurs' decisions on timing of entry: Learning from participation and from the experiences of others. *Entrepreneurship Theory and Practice* 33(2): 547–570.

Lind JT and Mehlum H (2010) With or without U? The appropriate test for a U-shaped relationship. *Oxford Bulletin of Economics and Statistics* 72(1): 109–118.

MFAT [Ministry of Foreign Affairs & Trade] (2016) Free Trade Agreements. Available at: https://www.mfat.govt.nz/en/trade/free-trade-agreements/ (accessed 18 August 2016).

Nachum L, Zaheer S and Gross S (2008) Does it matter where countries are? Proximity to knowledge, markets and resources, and MNE location choices. *Management Science* 54(7): 1252–1265.

Ortega-Argilés R, Potters L and Vivarelli M (2011) R&D and productivity: Testing sectoral peculiarities using micro data. *Empirical Economics* 41(3): 817–839.

Paruchuri S and Awate S (2017) Organizational knowledge networks and local search: The role of intra-organizational inventor networks. *Strategic Management Journal* 38(3): 657–675.

Penrose, ET (1959) *The Theory of the Growth of the Firm.* Oxford: Oxford University Press.

Plummer LA and Acs ZJ (2012) Localized competition in the knowledge spillover theory of entrepreneurship. *Journal of Business Venturing* 29(1): 121–136.

Roper S and Hewitt-Dundas N (2008) Innovation persistence: Survey and case-study evidence. *Research Policy* 37(1): 149–162.

Santos FM and Eisenhardt KM (2009) Constructing markets and shaping boundaries: Entrepreneurial power in nascent fields *Academy of Management Journal* 52(4): 643–671.

Sarasvathy SD (2001) Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of management Review* 26(2): 243–263.

Semadeni M and Anderson BS (2010) The Follower's Dilemma: Innovation and imitation in the professional services industry. *Academy of Management Journal* 53(5): 1175–1193.

Spulber DF (2009) Competition among entrepreneurs. *Industrial and Corporate Change* 19(1): 25–50.

Statistics New Zealand (2016) Population Clock. Available at: http://www.stats.govt.nz/tools_and_services/population_clock.aspx (accessed 18 August 2016).

Swaminathan A and Delacroix J (1991) Differentiation within an organizational population: Additional evidence from the wine industry. *Academy of Management Journal* 34(3): 679–692.

Ucbasaran D, Westhead P, Wright M and Flores M (2010) The nature of entrepreneurial experience, business failure and comparative optimism. *Journal of Business Venturing* 25(6): 541–555.

Wiklund J, Patzelt H and Shepherd DA (2009) Building an integrative model of small business growth. *Small Business Economics* 32(4): 351–374.

Wright M and Marlow S (2011) Entrepreneurial activity in the venture creation and development process. *International Small Business Journal* 30(2): 107–144.

Zapkau FB, Schwens C and Kabst R (2014) Foreign direct investments and domestic employment of German SMEs: The moderating effect of owner management. *Journal of Small Business Management* 52(3): 451–476.

Table 1. Description of variables, means and standard deviations

Variable	Definition	Mean	SD
Turnover growth $_t$	Log-difference of turnover (in nominal NZD) between *t* and *t-3*: Turnover growth(*i*,*t*)=log(Turnover(*i*,*t*))-log(Turnover(*i*,*t-3*))	0.15	0.35
Log turnover$_{t-3}$	Logarithm of total turnover 3 years ago	2.98	0.63
(Log turnover$_{t-3}$)^2	Square of logarithm of total turnover 3 years ago	9.29	3.82
Collaboration intensity	Number of types of collaboration partners. Possible types of partners were: Suppliers; Customers; Higher Education/Research Institutes; Private Research Institutes/ Consultants; and Firms in their line of business. The measure takes values from 0 for ventures without collaboration partners to 5 for ventures collaborating will all types of partners	1.19	1.31
Customer dependency	1 = If more than 75% of sales are to the 5 largest customers; 0 = otherwise	0.39	0.49
Log competitive density	Logarithm of the number of serious competitors	1.75	0.94
(Log competitive density)^2	Square of logarithm of the number of serious competitors	3.93	4.47
Persistent innovation	1 = Venture was started with the desire to implement a new idea and has introduced innovation that was new to the market in the last 3 years; 0 = otherwise	0.24	0.43

Table 2. Correlations of key variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Turnover growth$_t$															
(2) Log turnover$_{t-3}$	-0.36*														
(3) Collaboration intensity	0.21*	0.02													
(4) Customer dependency	0.06	0.05	0.02												
(5) Log competitive density	-0.02	0.13	0.09	-0.02											
(6) Persistent innovation	0.25*	-0.04	0.18*	0.09	0.02										
(7) High-tech Manufacturing	0.04	0.07	0.04	0.11	-0.11	0.11									
(8) Low-tech Manufacturing	-0.14	0.16*	-0.05	0.01	-0.02	-0.08	-0.26*								
(9) High-tech Services	0.13	-0.11	0.15*	0.02	0.03	0.09	-0.29*	-0.47*							
(10) Low-tech Services	-0.03	-0.11	-0.14	-0.12	0.08	-0.11	-0.21*	-0.35*	-0.39*						
(11) Year 4	0.11	-0.09	0.02	-0.01	-0.12	0.04	0.15*	-0.16*	-0.08	0.14					
(12) Year 5	0.14	-0.16*	-0.02	-0.04	0.11	0.16*	-0.03	-0.12	0.16*	-0.02	-0.18*				
(13) Year 6	-0.13	0.05	-0.01	-0.02	0.01	-0.04	-0.07	-0.05	0.05	0.06	-0.15	-0.19*			
(14) Year 7	-0.01	0.01	-0.03	0.13	-0.07	-0.09	0.09	-0.04	-0.03	0.01	-0.12	-0.16*	-0.13		
(15) Year 8	-0.01	0.08	0.07	0.02	0.04	-0.02	-0.08	0.07	-0.01	0.00	-0.15*	-0.20*	-0.17*	-0.14	
(16) Year 9	-0.09	0.19*	0.06	0.03	0.07	-0.01	-0.03	0.08	0.07	-0.14	-0.15*	-0.20*	-0.17*	-0.14	-0.17*

Note. N=180. * p<0.05.

Table 3. Hierarchical regression results

	Turnover growth$_t$			
	Model (1)	Model (2)	Model (3)	Model (4)
Constant term	1.289***	1.369***	1.323***	1.158**
	(0.365)	(0.359)	(0.350)	(0.357)
Log turnover$_{t-3}$	-0.640**	-0.779***	-0.755***	-0.700**
	(0.224)	(0.223)	(0.219)	(0.220)
(Log turnover$_{t-3}$)^2	0.0749*	0.0908*	0.0875*	0.0797*
	(0.0365)	(0.0361)	(0.0353)	(0.0355)
Collaboration intensity	0.0555**	0.0428*	0.0361	0.0339
	(0.0192)	(0.0193)	(0.0192)	(0.0192)
Customer dependency	0.0426	0.0329	0.0239	0.0180
	(0.0503)	(0.0493)	(0.0488)	(0.0485)
Log competitive density		0.240**	0.232**	0.310***
		(0.0808)	(0.0798)	(0.0861)
(Log competitive density)^2 **(H1)**		-0.0510**	-0.0496**	-0.0635***
		(0.0167)	(0.0165)	(0.0177)
Persistent innovation **(H2)**			0.118*	0.598**
			(0.0575)	(0.205)
Log competitive density x Persistent innovation				-0.454*
				(0.189)
(Log competitive density)^2 x Persistent innovation **(H3)**				0.0851*
				(0.0407)
Sector dummies	Yes	Yes	Yes	Yes
Founding year dummies	Yes	Yes	Yes	Yes
Model statistics				
Δ Adjusted R2	.242	.041	.019	.025
Model F-statistic	3.50***	3.77***	3.88***	3.98***
Wald-test		4.70**	4.38*	2.97*
Sasabuchi-test		2.97**	2.83**	3.17***
Fieller confidence interval		[1.70; 3.06]	[1.75; 3.07]	[1.95; 3.05]
Extreme point [exp (log competitive density)]		10.55	10.35	11.46

Note. N=180. * p<0.05, ** p<0.01, *** p<0.001.

Table 4. Nearest-neighbour matching ATE estimation for main effects

	Treated	Control	ATE (Yi = Turnover growth)	ATE (Yi = Growth rate in percent)
Persistent innovation	46	134	0.145**	13.91**
Moderate competitive density	98	82	0.125**	12.05**

Note. N=180. * p<0.05, ** p<0.01, *** p<0.001.

Figure 1. Regression lines by subgroups