



Targeted support for high growth firms: Theoretical constraints, unintended consequences and future policy challenges

Ross Brown

School of Management, University of St Andrews, St Andrews, UK;
e-mail: ross.brown@st-andrews.ac.uk

Suzanne Mawson

School of Management, University of Stirling, UK

Received 18 June 2014; in revised form 26 March 2015; published online 24 November 2015

Abstract. High growth firms are now a major focus within enterprise policy. This paper provides a theoretically informed analysis of the rationale and effectiveness of targeted public sector support designed to develop these firms. Drawing on empirical research undertaken in the UK, this paper challenges the appropriateness of the theoretical assumptions embodied in these state-backed support instruments. It outlines the nature of these programmes and provides a critique of some of their inherent weaknesses, revealing that the assumptions underpinning these programmes are often flawed. The paper examines the limitations of their selection procedures, the thematic nature of support and exit dynamics. It found that offering early stage firms intensive levels of resources may have important (and detrimental) unintended consequences previously overlooked by policy makers. The paper offers some suggestions for how policy instruments could be better attuned to the needs of these growth-oriented firms.

Keywords: Entrepreneurship, high growth firms, incubation, accelerators, enterprise policy

Introduction

In recent years, high growth firms (henceforth HGFs) have captured the imagination of scholars and policy makers (Acs et al., 2008; Coad et al., 2014; Lee, 2014).⁽¹⁾ While the goal of generating new start-ups remains a central (if questionable) part of enterprise policy (Atherton, 2006; Fritsch and Storey, 2014; Shane, 2009), in recent years policies promoting HGFs have assumed equal, if not greater, importance within entrepreneurship policy frameworks (Mason and Brown, 2013; Smallbone et al., 2002). These firms – famously christened ‘gazelles’ by Birch (1981) – have been subjected to considerable empirical scrutiny by scholars (Henrekson and Johansson, 2010). This work has overwhelmingly found HGFs to be a critically important Schumpeterian stimulus which drives up competition, increases firm entry and exits, generate exports, increases productivity and enhances overall economic competitiveness (Brown and Mawson, forthcoming; Du and Temouri, 2015; Mohr et al., 2014). However, it is their prodigious ability to generate ‘jobs’ which has most attracted them to policy makers (Coad et al., 2014).

This paper specifically examines public policies which are ‘targeted’ to firms with high growth potential. According to some, one of the biggest challenges faced by policy makers is ‘to address the obstacles faced by *potential* HGFs, those with the potential to achieve high growth, but which have not done so’ (Lee, 2014: 184). During the last decade or so, a key policy response has been the introduction of ‘targeted’ SME policies (Smallbone et al., 2002),

⁽¹⁾A HGF is defined by the OECD as ‘an enterprise with average annualised growth (in number of employees or turnover) greater than 20% per annum, over a three year period, with a minimum of 10 employees at the beginning of the growth period’ (OECD, 2008: 61).

often in the shape of public sector-funded *growth accelerators*, which intensively support potential HGFs (OECD, 2010, 2013). These initiatives have become central aspects of both national and sub-national entrepreneurship policy within many advanced economies (OECD, 2013; Roper and Hart, 2013), especially in the UK (Brown et al., 2014; Patton et al., 2003; Smallbone et al., 2002). In many instances, these interventions are modelled on the traditional business ‘incubators’ which are focused on ‘the “hatching” and development of new firms’ (Bergek and Norrman, 2008: 20). Indeed, business incubation has now become a well-accepted component of the UK government’s business support policies and a tool used to promote regional development (Hannon and Chaplin, 2003; Smith and Zhang, 2012). A crucial element delineating these newer growth accelerators from traditional incubators is the client group they focus upon: accelerators work with existing and established firms with significant growth potential, whereas incubators are focused on producing and assisting start-ups.

Despite their growing importance, little is known about the assumptions underpinning these targeted policy initiatives or their effectiveness (OECD, 2013). Therefore, the focus of this paper is to assess the rationale and effectiveness of public-sector growth accelerator programmes in the UK and the wider EU, where broadly similar approaches have been adopted (OECD, 2013). The paper argues that the intellectual foundations underpinning much of the current policy support for HGFs are heavily predicated on the resource-based view (RBV) of the firm (Barney, 1991, 2001), which is increasingly at odds with our growing understanding of the discontinuous and non-linear nature of rapid firm growth (Coad et al., 2013; Eisenhardt and Martin, 2000; Teece, 2007). A lack of adequate theoretical discussion surrounding business incubation and acceleration has been noted by a number of observers (Bruneel et al., 2012), despite the fact that these business support mechanisms are ‘theoretically compelling’ and in need of conceptual development and refinement (Hackett and Dilts, 2004: 74). This paper challenges the appropriateness of these underpinning theoretical assumptions, particularly when applied to the nature of public sector assistance, and posits that a theoretical framework based on the concept of *dynamic capabilities* (Teece, 2007) may be more appropriate for – and beneficial to – accelerators.

In addition to its theoretical contribution, this paper also has important implications for public policy. Given the vast sums of public expenditure committed to enterprise policy (Nightingale and Coad, 2014; Storey, 2006), unravelling the effectiveness of these accelerator interventions is important. Academic research has an important role to play in contributing to a stronger evidence base, both empirically and theoretically, so that entrepreneurship policies are properly designed, executed and evaluated (Blackburn and Smallbone, 2008; Cowie, 2012; Mason, 2009a). Indeed, given the current backdrop of austerity, some argue that ‘it is more prescient than ever to examine interventions so that cost-effective policy paths can be developed’ (Williams, 2013: 3).

The central research question underpinning this paper is: *What is the rationale of public sector growth accelerator programmes and how effective are these in facilitating rapid firm growth?* To answer this complex question the paper draws on two pieces of research. First, it utilises empirical insights from a major programme of research on HGFs conducted between 2008 and 2012. During this research programme, over 50 Scottish HGFs were interviewed about their growth processes and the role of public sector support agencies in supporting them.⁽²⁾ These firms were predominantly small-medium-sized enterprises (SMEs), aged between five and 25 years old, operating across a wide variety of industry sectors and spatial

⁽²⁾The sampling framework for this research was as follows. Adopting the OECD criteria, HGFs were identified using the business database FAME. This resulted in a sample of 725 HGFs being identified for the three-year time period between 2007 and 2009. A representative sample of 90 HGFs was selected for interview, taking into account sector, age, spatial location and size. Foreign-owned firms and company closures were deselected, as were firms lacking the time to participate or refusals. This resulted in a total of 52 firms who were interviewed between 2010 and 2013. To avoid problems of self-selection bias,

contexts. Business services were the single largest sector in this cohort. However, few HGFs are overtly ‘high-tech’ with many represented in a very wide range of sectoral activities (Mason et al., 2015). Indeed, a notable feature of HGFs is their ‘pervasive heterogeneity’ (Coad, 2009).

Second, the paper draws on a comparative assessment of support instruments and policy approaches in different OECD countries (OECD, 2013). As part of this research, 12 interviews were conducted by the authors with UK and EU policy makers, to examine the nature of support programmes for HGFs and the impact of these interventions. The programmes assessed included the UK government’s flagship high growth programme the Growth Accelerator and in Scotland the Companies of Scale programme, the High Growth Start-Up Unit and the High-Growth Spin-Out programme (formerly the Proof of Concept Fund operated by Scottish Enterprise) were all examined. Representatives from the Danish Growth Houses operated by the Danish Business Authority, the OECD and NESTA were also consulted as part of this research exercise.

The paper’s structure is as follows. It begins with a review of the literature, before assessing the evolving policy context and how this is re-shaping the nature of both incubator and business accelerator programmes. It then provides a critique of the features underpinning the public sector accelerator programmes examined by the authors. A discussion of the findings is then outlined and the paper concludes with policy recommendations and the identification of issues meriting further research.

Theoretical discussion

Much of the entrepreneurship literature explicitly examining the nature of business incubation has typically eschewed theory (Bruneel et al., 2012; Hackett and Dilts, 2004; Rothaermel and Thursby, 2005). The reasons for this are partly unknown, but may relate to the fact that many theoretical concepts associated with firm development only attempt to explain the endogenous factors that account for firm performance such as competitive strategy (Baum et al., 2001), attributes and behaviours (Barringer et al., 2005), entrepreneurial orientation (Lumpkin and Dess, 1996; Moreno and Casillas, 2008) and levels of human capital (Shrader and Siegel, 2007). Forces exogenous to the firm, such as assistance from policy makers (Brown and Mawson, 2013; Fischer and Reuber, 2003) and other institutional actors (Gertler, 2010), are traditionally downplayed as situational or environmental factors (Welter, 2011), and often deemed to be less critical for firm development and growth than the aforementioned internal factors (Wiklund and Shepherd, 2003).

Previous research has paid little attention to how theoretical concepts can be applied to assess the performance of accelerator programmes. Whilst the academic literature on incubation and acceleration lacks explicit theoretical foundations, there do appear to be a number of theoretical principles implicitly embedded within HGF policy frameworks. A key perspective which appears to underpin the majority of business growth support mechanisms is the RBV of the firm (Gassmann and Becker, 2006; Powers and McDougall, 2005; Rothaermel and Thursby, 2005). The RBV is the dominant perspective within strategic management used to help understand ‘organizational survival, growth and overall

when constructing the sample, care was taken to include firms who had been assisted through various public sector support initiatives, as well as firms who had not been assisted. Roughly speaking, around one-third (i.e. 17) of the sample had not been assisted by Scottish Enterprise. To mitigate the problems of response bias, interviews were also conducted with the account managers in Scottish Enterprise who actively support the interviewed firms. Eleven interviews were conducted with account managers to corroborate the interview responses. This form of data triangulation has been reported to enhance the veracity of the interview responses when interviewing HGFs (Fischer and Reuber, 2003).

effectiveness' (Bryson et al., 2007: 702). Within this perspective, new ventures are typically depicted as resource-constrained entities (Garnsey, 1998), unable to achieve their true potential and develop (or maintain) a competitive advantage (Powers and McDougall, 2005). Within the RBV, firms are seen as 'deficient' in terms of a number of critical 'resources' including, inter alia, innovation activities, funding, managerial know-how and international market knowledge (Gassmann and Becker, 2006). These perceived resource deficiencies explain why financial assistance (e.g. transactional grant support) is a common policy support mechanism – firms are thought to be able to overcome resource limitations by investing in physical infrastructure and human capital, often to alleviate limitations in terms of research and development (R&D) and innovation.

Within most growth accelerator programmes, emphasis on resource provision for R&D is a key priority (OECD, 2010). This stems in large part from the pervasive belief amongst policy makers that high-tech companies are key generators of future growth-oriented firms (Daunfeldt et al., 2014) and thus reducing obstacles to R&D is paramount for successful economic development and growth (Bleda et al., 2013). For example, in the UK the majority of high growth incubator and accelerator models, such as the High-Growth Start-Up Unit operated by Scottish Enterprise, explicitly focus on recruiting technology-based firms. They then augment a firm's existing resource base through grant assistance and tax credits to promote R&D and innovation activity, which in theory leads to commercialisable disruptive technology. This linear approach to innovation is deeply embedded within incubation policy interventions (Tamasy, 2007) and enterprise policies designed to support HGFs more widely (Brown and Mason, 2014).

Linked to the RBV, another important principle underlying most accelerator programmes is the implicit assumption that firm growth is an orderly, incremental process, fundamentally linked to the consistent development and acquisition of physical and managerial resources over time (Penrose, 1959). This incremental view of growth became widely embraced by scholars during the 1970s and 1980s (Churchill and Lewis, 1983; Greiner, 1972). Given the dominance of such business lifecycle models in the literature, until recently 'firm growth was rather naively assumed to follow a path dependent process akin to the growth of humans' (Brown and Mawson, 2013: 281) and is often invoked when examining incubation models (McAdam and McAdam, 2008). The obvious inference from this perspective is that firms require the greatest levels of assistance at the earliest phases of the growth process, in order to build the adequate 'resource base' and capabilities that ensure survival and success (Gassmann and Becker, 2006). This is reflected in the fact that most firm assistance, particularly incubation, goes towards helping firms in the early parts of their lifecycle (Dee et al., 2011).

Over the past two decades, however, the lifecycle perspective of firm growth has come under sustained criticism for being too simplistic. The view that all firms evolve and grow in an orderly incremental manner is increasingly being challenged (Levie and Lichtenstein, 2010) and a growing body of empirical evidence identifies that firm growth is fundamentally unstable and discontinuous (Garnsey et al., 2006; Storey, 2011; Vinnell and Hamilton, 1999). Rather than a steady linear process, firm growth seems to be highly volatile with periods of slow incremental growth often interjected with 'jumps' of rapid growth and expansion (O'Farrell and Hitchins, 1988). Some claim that key growth 'catalysts' (Vohora et al., 2004), 'tipping points' (Bessant et al., 2005) or 'trigger points' (Brown and Mawson, 2013) provide firms with the opportunity to alter the growth trajectory of firms, acting as a source of dynamism and disequilibrium.

These newer theoretical perspectives contradict the traditional lifecycle models and suggest that rapid growth has the potential to occur in all firms, irrespective of their age, sector and size. Given that firm growth is such a turbulent, time sensitive and random event,

it suggests that identifying when to support potential HGFs is a highly difficult activity for policy makers to undertake (Brown et al., 2014; Coad et al., 2014; Freel, 1998) not least because ‘incubators are being asked to add value to an entity in a state of uncertainty’ (Dee et al., 2011: 22). As a result, the tendency is for policy makers to use firm age as a proxy for both resource scarcity and growth potential, with younger firms receiving a bulk of support (Audretsch and Link, 2012). However, the evidence indicates that more established firms are the ones most capable of transformational growth, not start-up firms which are undergoing (or have recently graduated from) early stage incubation and which have a significantly higher rate of firm ‘deaths’ (Haltiwanger et al., 2013). This pervasive disequilibrium means that using a firm’s age or size as criteria for policy targeting is now increasingly discredited.

Given the emerging theoretical and empirical evidence on the nature of firm growth and development, it appears that the RBV, with its focus on a combination of inimitable, rare and valuable resources (Kraatz and Zajac, 2001), may not be the best theoretical lens through which to assess how best to equip firms for growth (Eisenhardt and Martin, 2000). Given that growth is considered to be dynamic and discontinuous (Coad et al., 2013), the RBV assumptions underpinning the traditional models of business incubation arguably do not translate well to programmes focused on firm growth. As growth is now recognised to be less about the accumulation of resources and more about how firms strategically react to – and capitalise on – growth opportunities or triggers (Brown and Mawson, 2013), accelerator programmes and other interventions focused on promoting business growth require a more suitable theoretical underpinning, such as the concept of *dynamic capabilities*.

At the heart of the concept of dynamic capabilities (Teece, 2007; Teece et al., 1997) is the notion that firms grow and achieve success because they have the ability to ‘sense’, ‘seize’ and capitalise on new growth opportunities, not because of the tangible resources they possess. The characteristics of firms with strong dynamic capabilities include, inter alia, acute levels of entrepreneurial orientation, or ‘the processes, practices, and decision making activities that lead to new entry’ (Lumpkin and Dess, 1996: 136); strong levels of ‘absorptive capacity’ which is the ability to recognise, assimilate and apply external knowledge (Cohen and Levinthal, 1990); close end-user and customer engagement (Van Doorn et al., 2010; Von Hippel, 2009); and the ability to configure – and reconfigure – a firm’s strategic architecture (Eisenhardt and Martin, 2000) as part of a dynamic, iterative, learning process (Deakins and Freel, 1998; Iammarino et al., 2012).

These types of dynamic capabilities differ markedly from the resources and *competencies* of the RBV (Von Tunzelmann and Wang, 2003). Given that HGFs are characterised by high levels of entrepreneurial orientation and strong dynamic capabilities, honing these capabilities is crucial for newer public support models to work effectively. For a good representation of how such dynamic capabilities are operationalised, one only needs to look at the sophisticated and adaptive business models developed within high growth entrepreneurial firms (Teece, 2010). How policy can help facilitate the construction of effective business models within firms seems a challenging agenda. Not only will different policy mechanisms be required to develop these capabilities, notably a shift away from the traditional resource endowments like finance and R&D incentives, but the nature of how policy makers engage with firms to help develop these capabilities will also need to change considerably.

Policy context

Origins and antecedents

The original impetus for incubator mechanisms arose in the immediate aftermath of Second World War, where a strategic priority was to facilitate the growth of science-based industries (Oakey, 2012). Often this was driven by the desire to replicate the economic success of the electronics industries which were emerging in Silicon Valley and Route 128 in the US at the

time (Saxenian, 1994; Smith and Zhang, 2012). These industries were viewed as harbingers of economic rejuvenation and a panacea for economic development during the post-war period (Frenkel, 2012). One consequence of this focus was that economies with fundamentally different industrial structures, resource mixes and entrepreneurial ecosystems sought to prioritise the creation of new technology-based firms (NTBFs) within their industrial policies (Almus and Nerlinger, 1999; Storey and Tether, 1998).

This policy thrust resulted in a range of interventions designed to help grow high-tech industries. Common within this 'policy mix' (Flanagan et al., 2011) were interventions such as the creation of government-funded research laboratories, university science parks (Massey et al., 1992), technology-transfer programmes and technology incubation mechanisms (Smith and Zhang, 2012). While during the 1960s and 1970s 'incubation programs diffused slowly' (Hackett and Dilts, 2004: 57), much of this was undertaken through 'government-sponsored' initiatives as tools to provide economic development (Campbell and Allen, 1987). Since the 1980s, however, there has been a huge expansion in the number and range of incubator programmes (Bruneel et al., 2012), driven in no small part by the desire to make 'science useful' (Hussler et al., 2010) often by promoting NTBFs (Storey and Tether, 1998). A number of these state-backed programmes were heavily connected to the other policy objectives, such as the commercialisation of higher education research and technology transfer (Hannon and Chaplin, 2003; Rothaermel and Thursby, 2005), and thus the policies were closely interdependent and mutually reinforcing.

As outlined in the earlier theoretical discussion, these early public business incubators were heavily shaped by a number of implicit assumptions concerning the types of firms deemed suitable to support and the linear nature of firm growth. In turn, this has resulted in quite a large degree of uniformity in terms of the types of policy approaches adopted. Typically, the vast majority of incubators (and public sector growth accelerators) have been heavily focused on entrepreneurial new start-ups (Grimaldi and Grandi, 2005). In many developed economies, this focus has resulted in intensive public sector-led support mechanisms to incubate formative or embryonic NTBFs (OECD, 2013; Storey and Tether, 1998), with the notable exception of the US, where most incubators/accelerators are predominantly undertaken by the private sector (Clarysee et al., 2015; Miller and Bound, 2011). Many of these programmes in Europe are undertaken directly by regional development agencies or through third-party contractual arrangements with universities and specialist consultants. The firms supported are those deemed to have the largest 'market failures' and heaviest support requirements (Kemp and Weber, 2012), with many programmes specifically aimed at nascent university spin-outs (USOs) (Mian, 1996, 1997, 2011; Patton and Marlow, 2011) despite recognition that very few USOs become growth-oriented firms (Harrison and Leitch, 2010).

There is now a substantial body of evidence outlining the nature, operating models and effectiveness of these business incubator programmes, which a number of studies have examined in depth (Colombo and Delmastro, 2002; Hackett and Dilts, 2004; Hannon and Chaplin, 2003). These incubator services have traditionally focused on giving new firms a 'home', nurturing them and advising them how to grow. This commonly takes the form of providing subsidised accommodation, access to shared resources (e.g. reception services), capital, business planning, entrepreneurial mentoring and networking opportunities (Bruneel et al., 2012; Kemp and Weber, 2012). In a nutshell, these incubators act as 'entrepreneurial midwives', helping to give birth to early stage new ventures, nurturing them in their earliest days and thereby overcoming the 'liability of newness' (Patton and Marlow, 2011). It is not our intention to assess this extant literature on incubators. However, it is critical to note that over time these models have become more sophisticated in terms of the services they offer, more focused in terms of the client groups they target and more varied in terms of their delivery mechanisms (Dee et al., 2011;

Hackett and Dilts, 2004). A notable facet of these newer iterations is their strong emphasis on networking (Bøllingtoft and Ulhøi, 2005). To date, much of this extant literature has either focused on incubators as a whole, or delineated them by their organisational form (public, private, university) rather than by their ‘client type’, such as HGFs in particular. Developing a strong understanding of the specific growth trajectories of particular firms will enable policy makers to better tailor their offerings towards these client groups.

From incubation to acceleration

It is important to examine HGF acceleration programmes as a distinctive sub-set of public sector business incubators.⁽³⁾ In line with the policy re-orientation towards the goal of promoting more HGFs, in recent years there has been a marked rise in intensive support instruments specifically geared towards the *acceleration* of growth-oriented firms (OECD, 2013). Whilst incubation and acceleration are often considered to be the same phenomenon, they are in fact distinct approaches to business support. The key factors distinguishing these two models are outlined in Table 1.

Table 1. Key differences between incubators and growth accelerators.

Nature/key objectives	Incubators	Growth accelerators
Origin of deal flow	Venture capitalists, banks, university technology transfer offices	Business support agencies, intermediaries such as banks, lawyers
Selection criteria	Self-selection, with minimal qualifying criteria, some sectoral criteria favouring science-based sectors	Historical and project growth-related eligibility criteria, inadvertently favours innovative, high-tech firms
Nature of target firms	Embryonic or early stage start-ups, growth track record often deemed irrelevant	Growth-oriented SMEs, ideally with evidence of performance
Sector	Almost exclusively science-based or high-tech firms	Predominantly high-tech firms, but increasing number of other sectors represented
Revenue streams	Public sector funded in Europe (private sector funded or equity based in the US)	Mostly government-funded programmes across most advanced economies
Market failure addressed	To overcome ‘liability of newness’ and to cross the chasm from IP-based firm to sustainable revenue generation	Informational asymmetries in terms of funding, market access, customer development, etc.
Types of assistance	Provision of accommodation, seed finance, shared services, assistance with R&D funding, in-depth mentoring	No physical accommodation, access to expansion capital, innovation support, leadership development and peer-to-peer support
Delivery of assistance	Typically undertaken in-house by full-time incubator professionals	Typically, outsourced to private sector consultants and ex-entrepreneurs
Time scale	Often three years or more	Between 6 and 12 months. Typically firms recruited in ‘batches’

⁽³⁾The focus in this paper is predominantly on public sector growth accelerator programmes rather than the private sector, equity-based accelerator programmes which are growing rapidly in places like Silicon Valley. Despite the vast growth of these accelerators surprisingly little research has examined these so-called start-up factories (Miller and Bound, 2011).

Whilst accelerators are closely related to traditional business incubation, a key point of difference between incubators and business accelerator programmes is that the latter focuses on working through the ‘growing pains’ faced by growth-oriented firms, rather than helping with the ‘birth’ of a new business. In contrast to the private-sector growth accelerators – such as Y Combinator – predominantly found in the US (Miller and Bound, 2011), programmes in other advanced industrial countries are typically operated by the public sector, often under the auspices of publicly funded economic or business support development agencies (OECD, 2013). Western European economies, in particular, have a strong heritage of using public sector incubator programmes as a vehicle for promoting NTBFs (Bergek and Norrman, 2008; Dee et al., 2011; Soufouli and Vonortas, 2007), so the provision of accelerators by the public sector is a logical continuation of this trend. An increasing number of economies are now operating this type of business support mechanism (OECD, 2013), with the provision of accelerator (and incubation) programmes increasing in the EU by 400% between 2007 and 2013 (Salido et al., 2013). Examples of such publicly funded growth support mechanisms are the Dutch Growth Accelerator and the Danish Growth Houses programme (OECD, 2013).

Despite the proliferation of accelerators, evaluation evidence on this topic remains sparse both in the UK (Mole and Bramley, 2006) and other developed economies (OECD, 2013). While academic evidence is mixed about the impact of incubators and accelerators (Bruneel et al., 2012; Mas-Verdú et al., 2015; Patton and Marlow, 2011), some scholars strongly question their effectiveness (Schwartz, 2009; Storey, 2000; Tamasy, 2007). The true cost effectiveness of these policy instruments is sometimes overlooked due to the fact that many companies supported through these initiatives are often heavily supported through an array of other resource-intensive public sector programmes designed to foster HGFs. For example, firms in Scotland supported by the High-Growth Spin Out programme are also frequently assisted through various other support programmes and mechanisms designed to promote technology entrepreneurship (Brown and Mason, 2014). Underreporting of this issue in evaluations seriously hampers effective assessment in terms of their true performance and real levels of ‘deadweight’.

Empirical analysis: A policy critique

The interviews with both HGFs and policy makers suggest a number of inconsistencies between the assumptions and underlying principles of growth accelerator programmes and realities of their target firms (see Table 2). First, a key belief deeply engrained within policy frameworks is that HGFs will predominantly emerge from the stock of high-tech firms within an economy (Brännback et al., 2010; Mason and Brown, 2013), despite the fact that the evidence shows that these firms do not contribute significantly to the overall population of HGFs (Buss, 2002; Daunfeldt et al., 2014). Second, implicit within these support instruments is the belief that high growth potential NTBFs confront certain ‘market failures’, for example, not being able to fund their R&D requirements.

Indeed, such market failure arguments are firmly engrained within innovation policy and wider entrepreneurship support frameworks (Dodgson et al., 2011; Mazzucato, 2013). Transactional forms of R&D support are often strongly interwoven within accelerator programmes, such as the Danish Growth Houses’ link with Vækstfonden, the state investment fund that provides financing to start-ups and SMEs. Yet, an increasing amount of empirical evidence suggests that successful (and often high-tech) SMEs are using ‘open’ sources of innovation rather than intramural R&D (Brunswick and Van de Vrande, 2014; Van de Vrande et al., 2009). Links to end-users, customers and suppliers have all been found to be critical open sources of innovation within expanding SMEs which reflects the strong dynamic capabilities within these firms (Von Hippel, 2009). Therefore, this kind of transactional policy support often encourages traditional ‘closed’ in-house R&D models that many firms

Table 2. Misalignment between public policy and the nature of HGFs.

Thematic issues	Nature of accelerators	The nature of HGFs
Theoretical foundation	Resource-based view of the firm	HGFs display strong levels of <i>dynamic capabilities</i> , such as the ability to ‘sense and seize’ opportunities, close end-user engagement and strong use of business models
Innovation	Increasing R&D within firms	Strong levels of absorptive capacity, ‘open’ sources of innovation, such as links to customers and end-users
Financing	Strong emphasis on public sources of entrepreneurial finance	Internal resources or traditional sources of debt funding
Internationalisation	Strong focus on exporting and export development	Internationalisation occurs through a wide variety of international market entry modes, such as joint ventures, overseas FDI, overseas acquisitions and partnering
Sectoral focus	High-tech firms and sectors	Majority of HGFs emanate from traditional sectors of the economy, few are high-tech firms
Age of firm	Strongly focuses on assistance for relatively ‘de novo’ start-ups, especially university spin-outs	Majority are existing SMEs (of all ages), often firms who have undergone important growth ‘triggers’ such as MBOs, MBIs or acquisitions
Nature of growth	Support is strongly oriented towards organic growth	Non-organic growth is very important for firms undertaking rapid growth, even within smaller firms
Nature of policy support mechanisms	‘Transactional’ instruments such as grants, subsidies, tax incentives, co-investment funding, etc.	HGFs value ‘relational’ forms of support above direct financial assistance, e.g. strategic guidance and organisational development, etc.
Delivery of policy support mechanisms	The vast majority of business support provided directly by the public sector or through private sector intermediaries	HGFs prefer advice and guidance from peers within industry

(especially SMEs) no longer deem relevant, and which remains rooted in the theoretical assumptions of the RBV.

HGFs in the UK and other advanced industrial economies also increasingly differ from their original conception of the small, young ‘gazelles’ first identified by Birch (1981). HGFs are now recognised to be predominantly medium-sized companies approximately 20–25 years of age (Acs et al., 2008; Mason et al., 2015), operating in range of sectors (Bleda et al., 2013). This was certainly the case across the HGFs interviewed during this research. In fact, R&D intensive technology-based firms comprise only a small proportion the HGF base. In the UK, for example, only 15% of HGFs are technology based (Brown and Mason, 2014). Given a growing recognition that future HGFs are not arising from new ‘de novo’ start-ups, but rather from the existing stock of SMEs (Brown et al., 2014), it is clear that there is a growing mismatch between the current acceleration support available and the needs, both current and future, of future cohorts of potential HGFs.

Arguably, much of the current policy on HGFs is still heavily rooted in the traditions of small business and enterprise policy (Bridge, 2010) with a strong focus on mitigating the market failures in new ventures through financial investment. Whilst R&D grants and tax credits are undoubtedly helpful to many organisations, they are not reflective of the specific needs and wants of potential HGFs. According to some, often rapidly growing firms desire more ‘relational’ forms of support which help increase the managerial capacity of the firm rather than these transactional forms of support (Mason and Brown, 2013). As we learn more and more about the nature of HGFs, support interventions will need to evolve accordingly based on the specific capabilities, needs and preferences of this cohort of firms. We now provide a critique of the specific nature of how many of these programmes operate.

Selection criteria

A number of scholars have noted the attendant difficulties of selecting firms that are likely to become growth oriented (Atherton, 2006; Freel, 1998; Stuart and Abetti, 1987). There is, of course, no sure-fire way of ‘picking winners’ for business support (Bergek and Norrman, 2008), and the identification of HGFs, let alone potential HGFs (Lee, 2014), has been the source of vigorous debate in the high growth entrepreneurship literature for quite some time now not least because ‘they are so rare’ (Nightingale and Coad, 2014: 134). According to some, this leads to a ‘policy quandary’ in selecting firms with strong growth potential because ‘it is extremely difficult for policy makers (or even venture capitalists) to identify such firms’ (McQuaid, 2002: 911).

Given that selecting firms with the potential for high growth is ‘an uncertain process liable to errors’ (Dee et al., 2011: 22), a major concern is the heavy reliance on past financial performance and future growth projections to assess ‘growth potential’. Despite this, many accelerator programmes often use selection criteria based on historical financial metrics, either requiring historic turnover, such as the Dutch Growth Accelerator’s requirement of at least €2million turnover in the past two years, or projected turnover growth like the Danish Growth Houses’ requirement of at least 15% sales growth within the first year of support (OECD, 2013). The evidence indicates that past financial performance and growth does not necessarily translate into future growth in the short term; HGFs are only modestly likely to experience consecutive periods of high growth (Hölzl, 2014). Thus, relying on historic turnover figures and future growth projections may be relatively limiting, as firms without a ‘track record’ of growth may be omitted despite having significant (unrealised) growth potential. Although financial measures are not the only selection metrics in use within the majority of accelerators, they often have a disproportionate weighting attached (OECD, 2013).

Whilst not usually a specific selection criterion, one cannot overlook the issue of firm sector. Although most publicly funded accelerator programmes in the EU do not have a specific sectoral focus per se, key government sectors have an important influence on the types of firms prioritised for support, most notably high tech sectors. For example, in the Netherlands the IT and communications sector is of strategic importance – and this single sector receives over one quarter of placements within the Dutch Growth Accelerator programme (OECD, 2013). If national governments continue to emphasise technology and science sectors, firms operating in these sectors will continue to receive the lion’s share of support, even if unintentionally. Given the small proportion of tech-based firms in the HGF population (Brown and Mason, 2014), it is important to ensure that acceleration support is available to high potential firms across the economy, irrespective of sector.

Programme interventions

Unintended consequences can also arise from the types of assistance offered to potential HGFs. Given the disproportionate number of science and technology companies selected to public

sector support programmes, it perhaps comes as no surprise that the majority of assistance and interventions are available in the form of finance and R&D assistance. Traditionally, incubators have acted as brokers for financing, be it equity financing through VC and angel investors (Lerner, 2010) or government grants and loans (Meyer, 2003). For example, the High Growth Start-Up Unit in Scotland coordinates a range of financial assistance in the form of R&D support and co-investment funding to participating firms. However, this focus on invention and traditional ‘closed’ rather than ‘open’ innovation often comes at the cost of developing business acumen, networks and skills more generally.

It appears that a critical aspect of support which has often been neglected within incubators, and therefore in many accelerators, is the need for a strong external orientation within firms. Whilst the provision of direct financial assistance for R&D can often alleviate immediate funding issues, this can also inadvertently affect the innovative behaviour of the assisted companies. Our interviews with HGFs tended to find that these firms obtained a lot of their innovative ideas and sources of innovation from their customers or end-users (Von Hippel, 2009). As one company explained: ‘we like to work with our customers from research through to development and commercialisation. If they are the ones that are buying our products, they should have a say in what those look like and how they function’. These close two-way relationships are seen as pivotal for helping the firms develop new ideas, customise existing products, provide unique ‘solutions’ (Mawson, 2012) and extend their knowledge of the marketplace. Indeed, other empirical evidence suggests that successful high-tech firms are often those who undertake fee-paying services for other firms while they then develop their own products (Probert et al., 2013) and often experience ‘early sales’ (Gimmon and Levie, 2010). However, providing sizeable levels of R&D grants reduces the incentive for firms to undertake these types of ‘soft’ revenue-generating activities (Probert et al., 2013), making firms more inwardly focused on IP generation (Meyer, 2003). Rather than hone important entrepreneurial traits of sensing and seizing growth opportunities, heavily resourced new firms may become immune from the pressure to create revenue streams. Fittingly, some scholars posit that such resource-intensive interventions ‘might shift behaviour in unhelpful ways’ (Nightingale and Coad, 2014: 134).

This grant-based support also has unintended consequence on a firm’s ability to secure other forms of financing for growth. Accelerators play an important role in facilitating connections between firms and sources of entrepreneurial finance (OECD, 2013). Access to venture capital (VC), in particular, is seen as critical for the successful development of high performing ventures (Lerner, 2010), as some play an important role in mentoring businesses, providing them with contacts and enabling them to connect with customers (Colombo and Grilli, 2009). This is the kind of ‘smart’ money brings with it an array of ancillary benefits which positively benefit a firm. However, a feature of many public sector growth accelerator programmes, such as the High Growth Start-Up Unit in Scotland, is the provision of sources of publicly funded risk equity. In recent years, this has often taken shape in the form of public sector co-investment VC programmes, where the public sector invests directly into firms alongside the private sector (Mason, 2009b). While on paper this looks like a reasonable method of pump-priming VC provision, it often leads to the situation where firms receive funding but do not get access to the benefits associated with ‘smart’ money in terms of mentoring, customer connections and international networks. Again, the provision of this kind of ‘dumb’ money may be counterproductive if firms do not utilise it to good effect and end up becoming more internally focused.

Whilst incubators and accelerator programmes often look for companies with commercialisable disruptive technologies (e.g. Scotland’s High Growth Start-Up Unit), detailed commercialisation assistance is not always within an accelerator’s remit. Indeed, there is a chronic shortage of tailored assistance available to high growth potential companies

in terms of sales and marketing, business model development and (international) networking to develop relationships with potential customers (Mason and Brown, 2013). These elements are often viewed as ‘soft skill sets’ but are of critical importance for the sustained development and growth of businesses, particularly those firms with innovative technology and limited market knowledge (Löfsten and Lindelöf, 2002) who are at risk of becoming ‘science projects’ (Bhide, 2009) rather than viable stand-alone businesses (Meyer, 2003).

While most accelerator programmes touch on certain aspects of marketing (e.g. market positioning), this is often from a high-level strategic perspective rather than a more ‘hands on’ approach focused on operationalisable sales methodologies and customer engagement mechanisms. Research has shown that the most successful companies have a strong customer orientation and can communicate their value propositions more clearly and aggressively than industry representative firms (Chandler et al., 2014), but this understanding needs to be fostered throughout the acceleration process so that customers – and the creation of unique value for customers (Barringer et al., 2005) – remain at the heart of the growth business during its development. Improving the sales capacity of firms is therefore crucial because ‘high growth firms are sales-oriented rather than innovation oriented’ (O’Regan et al., 2006: 39).

Fortunately, some of the newest and most innovative accelerator programmes, like the UK’s Growth Accelerator and the Companies of Scale programme in Scotland, are recognising the tremendous importance of, and need for, management development and sales coaching during the acceleration process (OECD, 2013). The Companies of Scale programme, in particular, is heavily focused on working closely with managers to help sharpen their managerial and entrepreneurial capacity. Enhancing the management and leadership skills is now viewed as an increasing priority to help accelerate firm growth (Deakins and Freel, 1998).

Exit procedures and support structures

Within the incubation literature, studies have sought to evaluate the impact exiting an incubator facility has on firm performance. Some authors note that exit has an immediate and negative effect on the likelihood of immediate firm survival (Schwartz, 2009). Although the evaluation evidence on the acceleration process remains nascent, policy makers have largely failed to take into consideration what happens – or may happen – to those firms that have been intensely supported during the acceleration process. Empirical evidence on this issue is sparse, but case study research on business incubators has found that heavily supporting science-based firms does little to prepare these firms for the onset of facing the marketplace following the completion from an incubation programme (Meyer, 2003; Schwartz, 2009). In fact, it may generate a ‘dependency culture’ within participant firms. Given the tremendous support that firms are eligible to receive, financial and otherwise, they are in many ways insulated from the key challenge that many growing businesses face.

Discussion and policy implications

This paper has identified a number of important issues concerning the theoretical assumptions underpinning publicly funded accelerators and their effectiveness in supporting HGFs: two issues which have largely been overlooked in the literature. There seems to be a critical disconnect between the assumptions underpinning this kind of support and the manner in which rapid growth occurs within firms. Furthermore, the way in which these mechanisms operate may counteract the workings of successful entrepreneurial ventures, which could have negative consequences for the long-term development and sustainability of participant firms. There are important public policy implications arising from this situation which are now highlighted. Owing to the fact that there has been a strong level of ‘policy isomorphism’ across many advanced economies in the field of business incubation and acceleration policy

(Mowery, 2011; OECD, 2013), the findings are salient for policy makers both in the UK and elsewhere.

We have highlighted the fact that the theoretical assumptions underpinning incubation and acceleration interventions are heavily focused on providing more resources for young fledgling firms to help them grow and prosper (Gassmann and Becker, 2006). The RBV is deeply embodied within enterprise and high growth entrepreneurship policy. The contention put forward in this paper is that these theoretical principles are potentially profoundly misleading and that the next generation of accelerator programmes would be better designed around a new theoretical framework, arguably that of dynamic capabilities, to best serve HGFs and those with high growth potential.

The manner in which accelerators assist HGFs also revealed a number of potential deficiencies in their approach. Very few of these programmes are specifically customised to the needs of their local entrepreneurial or situational context. Despite the fact that in most economies high-tech firms comprise a small part of the overall economy, the selection criteria utilised are often heavily skewed towards supporting science-based firms, which may preclude HGFs in other sectors from receiving support. A focus on past rates of growth for inclusion in growth accelerators also seems inflexible, particularly given the fact that past growth is rarely a good predictor for future growth (Hölzl, 2014). This would suggest that sectorally based and mechanistic methods of selection criteria are unlikely to effectively target firms with the strongest growth potential. Effective screening practices election procedures are likely to require recourse to case-by-case qualitative assessments which include a more balanced approach such as assessments of the management team's potential (Aerts et al., 2007).

As other scholars have found, our work discovered that these programmes also have important 'unintended' consequences (Nightingale and Coad, 2014; Tamasy, 2007). It was highlighted how offering firms intensive levels of support alters the innovative and funding behaviour of participating firms. Research has shown that companies which grow quickly in their early days are soon outperformed by those firms which saw more modest performance initially (Gjerløv-Juel and Guenther, 2012), as these modest performers have had time to equip themselves for the complexities and dynamics of growth and put in place appropriate organisational processes and safeguards. Therefore, one has to question whether the intensive support offered in public sector accelerators actually hinders this aspect of firm development within participant firms (Meyer, 2003). This raises the possibility that, rather than preparing firms for the turbulent nature of the modern day business world, some programmes may instead be '*killing them with kindness*'. This seems particularly the case with some programmes like the High-Growth Spin-Out programme in Scotland or Germany's High-Tech Grunderfonds which offer high levels of multi-programme support to a small number of participants (OECD, 2013).

This begs the question of what can be done to improve the operational effectiveness of these public sector high growth accelerator programmes. While space precludes a full examination of these issues, general principles in terms of support for HGFs must also apply to these intensive programmes (Brown et al., 2014; Nightingale and Coad, 2014). A key lesson from this body of work is that HGFs are found in all sectors of the economy and using 'sector' as a proxy for future growth is highly flawed. Our analysis also strongly suggests that the provision of transactional 'resources' such as R&D support or funding is unlikely to prove very effective. Indeed, the reverse may be true. Plus, firm age and firm size are unlikely to be suitable criteria through which to select which firms will receive acceleration support.

Another key lesson from our research is that periods of high growth occur randomly (Coad et al., 2013; Storey, 2011), and thus policy needs to take this into account when designing support structures and interventions. Firms often encounter critical stages in their growth

journeys long after they are established (Garnsey et al., 2006) and thus may need assistance with these important growth catalysts at varying times. Business support should therefore be flexible enough to respond to varying temporal episodes, irrespective of a firm's age or 'lifecycle stage' (Brown and Mawson, 2013). Temporal points of inflection which precipitate growth can happen to a firm at any point in its development, so growth support mechanisms have to become much less fixated with young firms and canvass the entire business base for potential 'high flyers' (Storey, 1994).

In terms of specific policy recommendations for growth accelerator programmes, a number of important issues have been raised by this research. The types of support offered to firms participating in growth accelerators should become much less resource based and more 'competency-based'. Therefore, assistance to help with the external orientation of the firm will be important. A strong external orientation within firms helps them to capitalise on external or 'open' sources of knowledge, especially through linkages to customers, end-users, new markets and the adoption of new business models (Tece, 2010; Van de Vrande et al., 2009). A valuable way of facilitating this external orientation is through peer-to-peer experiential learning between entrepreneurs, which research has shown to be a highly valued form of support by firms (Fischer and Reuber, 2003; Van Cauwenberge et al., 2013).

A final point concerns the modus operandi of new public sector growth accelerator programmes. While many of these programmes are funded by the public sector, the majority are increasingly operated via private sector contractors or intermediaries (Bennett, 2008). In some respects this seems sensible, as often support from private providers is perceived to be of more value than direct assistance from government officials (Fischer and Reuber, 2003; Jones et al., 2013). However, 'principal-agent' problems may arise from the mixed objectives confronting the public and private sectors (Dee et al., 2011). In particular, scholars have noted the detrimental distortions which fee targets can have within policy interventions (Bennett, 2012). Owing to these agency problems, some private sector providers who are incentivised to maximise turnover growth in firms may encourage 'growth for growth's sake' irrespective of the organisational capacity within supported firms. This in turn could destabilise some firms if they are not ready to upscale. These issues need to be acknowledged and reconciled when developing appropriate assistance mechanisms.

Conclusion

This paper makes a novel contribution to the literature on the effectiveness of entrepreneurship policy by adopting a theoretically informed analysis of publicly funded high growth programmes. Although little previous research has examined the theoretical underpinnings of business incubation and acceleration policy, a central contention in this paper is that the dominant RBV of firm support has tended to align policy towards a transactional view of firm support which seems at odds with manner in which HGFs grow and operate. In view of the findings of this research, the effectiveness of some of these support interventions therefore seem highly questionable. This suggests that public policy in the realm of support for HGFs is in danger of repeating the longstanding mistakes of UK SME policy more generally (Bennett, 2008; Curran and Storey, 2002).

According to some scholars, entrepreneurship policy in the UK has been criticised for a tendency of recycling initiatives under different banners, thereby perpetuating past mistakes (Huggins and Williams, 2009). This appears to be the case with respect to the evolution of some public sector programmes to support potential HGFs. Many of these models are modifications of previous support instruments (mostly start-up policies), such as commercialisation initiatives specifically designed to support NTBFs. It was highlighted how such resource-intensive support may have quite negative 'unintended consequences' for

some participating firms. Rather than enhancing firm performance these policy frameworks may actually stifle the kinds of dynamic and externally oriented capabilities firms need to prosper. Therefore, despite the change in policy emphasis from incubators to accelerators, the dominant ‘resource-based’ logic underpinning these policy frameworks remains. Here we find evidence to support other scholars who have noted that the ‘implied objectives’ within policy can often be conflicting with the actual needs of SMEs (Storey, 2000).

If public policy is to become more effective in supporting rapid firm growth, a new theoretical lens needs to be adopted within policy frameworks. This should aim to develop the dynamic capabilities within growing firms which emphasises risk orientation, end-user engagement, innovative business models, etc. Greater emphasis on shorter term help to improve the managerial competency of firms, increasing their external orientation and cultivating a culture of peer-based support seem important to help achieve this goal (Brown et al., 2014). This is similar to the practices adopted in private sector growth accelerators. Interestingly, recent initiatives like the UK’s Growth Accelerator and the Companies of Scale programme in Scotland are beginning to incorporate some of these elements. While it is too early to judge the success of these newer forms of ‘relational’ support, these developments seem encouraging nevertheless. Support mechanisms which foster adaptability, enhance the dynamic capabilities and increase the outward orientation of firms appear to offer the best scope for offering effective policy support to these complex, dynamic organisations.

Acknowledgements. In particular, the authors also wish to thank Marco Marchese and Jonathan Potter from the OECD. They also wish to thank Colin Mason for his helpful input into the work for Scottish Enterprise. Finally, the authors wish to thank Robert Bennett and two anonymous referees for their very perceptive and insightful comments on an earlier version of the paper. Remaining errors are, of course, our own.

Declaration of conflicting interests. The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding. The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The authors wish to thank Scottish Enterprise and the OECD for funding the research reported in this paper.

References

- Acs Z J, Parsons W, Tracy S, 2008 *High-Impact Firms: Gazelles Revisited* (Office of Advocacy of the US Small Business Administration (SBA), Washington, DC)
- Aerts K, Matthyssens P, Vandenbempt K, 2007, “Critical role and screening practices of European business incubators” *Technovation* **29** 254–267
- Almus M, Nerlinger E A, 1999, “Growth of new technology-based firms: which factors matter?” *Small Business Economics* **13** 141–154
- Atherton A, 2006, “Should government be stimulating start-ups? An assessment of the scope for public intervention in new venture formation” *Environment and Planning C: Government and Policy* **24** 21–36
- Audretsch D, Link A N, 2012, “Entrepreneurship and innovation: public policy frameworks” *The Journal of Technology Transfer* **37** 1–17
- Barney J, 1991, “Firm resources and sustained competitive advantage” *Journal of Management* **17** 99–120
- Barney J B, 2001, “Is the resource-based theory a useful perspective for strategic management research? Yes” *Academy of Management Review* **2** 41–56
- Barringer B R, Jones F F, Neubaum D O, 2005, “A quantitative content analysis of the characteristics of rapid-growth firms and their founders” *Journal of Business Venturing* **20** 663–687
- Baum J R, Locke E A, Smith K G, 2001, “A multidimensional model of venture growth” *Academy of Management Journal* **44** 292–303

-
- Bennett R, 2008, "SME policy support in Britain since the 1990s: what have we learnt?" *Environment and Planning C: Government and Policy* **26** 375–397
- Bennett R J, 2012, "Government advice services for SMEs: some lessons from British experience", in *Government SMEs and Entrepreneurship Development: Policy, Practice and Challenges* Eds R Blackburn, M Schaper (Gower, Farnham) pp 185–198
- Bergek A, Norrman C, 2008, "Incubator best practice: a framework" *Technovation* **28** 20–28
- Bessant J, Phelps R, Adams R, 2005 *External Knowledge: A Review of the Literature Addressing the Role of External Knowledge and Expertise at Key Stages of Business Growth and Development* (Advanced Institute of Management Research, London)
- Bhide A, 2009, "The venturesome economy: How innovation sustains prosperity in a more connected world" *Journal of Applied Corporate Finance* **21**(1) 8–23
- Birch D, 1981, "Who creates jobs?" *Public Interest* **65** 3–14
- Blackburn R, Smallbone D, 2008, "Researching small firms and entrepreneurship in the UK: developments and distinctiveness" *Entrepreneurship, Theory and Practice* **32** 267–288
- Bleda M, Morrison K, Rigby J, 2013, "The role and importance of gazelles and other growth firms for innovation and competitiveness", in *Innovation Policy Challenges for the 21st Century* Eds D Cox, J Rigby (Routledge, London) pp 36–63
- Böllingtoft A, Ulhøi J P, 2005, "The networked business incubator—leveraging entrepreneurial agency?" *Journal of Business Venturing* **20** 265–290
- Brännback M, Kiviluoto N, Carsrud A, Ostermark R, 2010, "Much ado about nearly nothing? An exploratory study on the myth of high growth technology start-up entrepreneurship" *Frontiers of Entrepreneurship Research* **30** 1–14
- Bridge S, 2010 *Rethinking Enterprise Policy: Can Failure Trigger New Understanding?* (Palgrave Macmillan, Basingstoke, Hampshire)
- Brown R, Mason C, 2014, "Inside the high-tech black box: a critique of technology entrepreneurship policy" *Technovation* **34** 773–784
- Brown R, Mason C, Mawson S, 2014, "Increasing 'The Vital 6 Percent': designing effective public policy to support high growth firms", NESTA working paper 14/01, NESTA, London, http://www.nesta.org.uk/sites/default/files/working_paper_increasing_the_vital_6_percent.pdf
- Brown R, Mawson S, "The geography of job creation in high-growth firms: the implications of growing abroad" *Environment and Planning C: Government and Policy*, Published online first, doi:10.1177/0263774X15614152
- Brown R, Mawson S, 2013, "Trigger points and high-growth firms: a conceptualisation and review of public policy implications" *Journal of Small Business and Enterprise Development* **20** 279–295
- Bruneel J, Clarysse B, Groen A, 2012, "The evolution of business incubators: comparing demand and supply of business incubation services across different incubator generations" *Technovation* **32** 110–121
- Brunswick S, Van de Vrande V, 2014, "Exploring open innovation in small and medium-sized enterprises", in *New Frontiers in Open Innovation* Eds H Chesbrough, W Vanhaverbeke, J West (Oxford University Press, Oxford) pp 135–156
- Bryson J, Ackermann F, Eden C, 2007, "Putting the resource-based view of strategy and distinctive competencies to work in public organizations" *Public Administration Review* **67** 702–717
- Buss T F, 2002, "Emerging high-growth firms and economic development policy" *Economic Development Quarterly* **16** 17–19
- Campbell C, Allen D, 1987, "The small business incubator industry: micro-level economic development" *Economic Development Quarterly* **1** 178–191
- Chandler G, Broberg C, Allison T, 2014, "Customer value propositions in declining industries: differences between industry representative and high-growth firms" *Strategic Entrepreneurship Journal* Published online first DOI: 10.1002/sej.1181
- Churchill N C, Lewis V L, 1983, "The five stages of small business growth" *Harvard Business Review* **61** 30–50
- Clarysee B, Wright M, Van Hove J, 2015, "A look inside accelerators: building businesses", National Endowment of Science, Technology and the Arts, (NESTA) London, http://www.nesta.org.uk/sites/default/files/a_look_inside_accelerators.pdf

-
- Coad A, 2009, *The Growth of Firms* (Edward Elgar Publishing Limited, Cheltenham)
- Coad A, Daunfeldt S-O, Hozl W, Johansson D, Nightingale P, 2014, "High-growth firms: introduction to the special issue" *Industrial and Corporate Change* **23** 91–112
- Coad A, Frankish J, Roberts R G, Storey D J, 2013, "Growth paths and survival chances: an application of Gambler's ruin theory" *Journal of Business Venturing* **28** 615–632
- Cohen W, Levinthal D, 1990, "Absorptive capacity: a new perspective on learning and innovation" *Administrative Science Quarterly* **35** 128–152
- Colombo M G, Delmastro M, 2002, "How effective are technology incubators?: Evidence from Italy" *Research Policy* **31** 1103–1122
- Colombo M G, Grilli L 2009, "A capital partnership: how human and venture capital affect the growth of high-tech start-ups" *Strategic Change* **18** 231–239
- Cowie P, 2012, "SME policy evaluation: current issues and future challenges", in *Government, SMEs and Entrepreneurship Development: Policy, Practice and Challenges* Eds R Blackburn, M Schaper (Farnham, Gower) pp 243–256
- Curran J, Storey D J, 2002, "Small business policy in the United Kingdom: the inheritance of the Small Business Service and implications for its future effectiveness" *Environment and Planning C: Government and Policy* **20** 163–178
- Daunfeldt S-O, Elert N, Johansson D, 2014, "Are high-growth firms overrepresented in high-tech industries?" Working Paper, Örebro University, Örebro Sweden, http://www.oru.se/Extern/Institutioner/HH/Forskning/NEK%20-%20FoAdm/Papers%20seminariesida/140306_Are%20HighGrowth%20Firms%20Overrepresented%20in%20High-tech%20Industries.pdf
- Deakins D, Freel M, 1998, "Entrepreneurial learning and the growth process in SMEs" *The Learning Organization* **5** 144–155
- Dee N, Gill DE, Livesey T F, Minshall T H W, 2011, Incubation for growth: a review of the impact of business incubation on new ventures with high growth potential. Report produced by the University of Cambridge Institute for Manufacturing (IfM) for the National Endowment of Science, Technology and the Arts (NESTA). NESTA, <http://www.nesta.org.uk/library/documents/IncubationforGrowthv11.pdf>
- Dodgson M, Hughes A, Foster J, Metcalfe S, 2011, "Systems thinking, market failure, and the development of innovation policy: the case of Australia" *Research Policy* **40** 1145–1156
- Du J, Temouri Y, 2015, "High-growth firms and productivity: evidence from the United Kingdom" *Small Business Economics* **44**(1) 123–143
- Eisenhardt K, Martin J, 2000, "Dynamic capabilities: what are they?" *Strategic Management Journal* **21** 1105–1121
- Fischer E, Reuber A, 2003, "Support for rapid-growth firms: a comparison of the views of founders, government policymakers, and private sector resource providers" *Journal of Small Business Management* **41** 346–365
- Flanagan K, Uyarra E, Larnaja M, 2011, "Reconceptualising the 'policy mix' for innovation" *Research Policy* **40** 702–713
- Frenkel A, 2012, "Intra-metropolitan competition for attracting high-technology firms" *Regional Studies* **46** 723–740
- Fritsch M, Storey D, 2014, "Entrepreneurship in a regional context: historical roots, recent developments and future challenges" *Regional Studies* **48** 939–954
- Garnsey E, 1998, "A theory of the early growth of the firm" *Industrial and Corporate Change* **7** 523–556
- Garnsey E, Stam E, Heffernan P, 2006, "New firm growth: exploring processes and paths" *Industry and Innovation* **13** 1–20
- Gassmann O, Becker B, 2006, "Towards a resource-based view of corporate incubators" *International Journal of Innovation Management* **10** 19–45
- Gertler M, 2010, "Rules of the game: the place of institutions in regional economic change" *Regional Studies* **44** 1–15
- Gitman E, Levie J, 2010, "Founder's human capital, external investment, and the survival of new high-technology ventures" *Research Policy* **39** 1214–1226
- Gjerløv-Juel P, Guenther C, 2012 "Heroes today – but what about tomorrow? gazelles and their long-term performance", <http://ssrn.com/abstract=2016798>

-
- Greiner L E, 1972, "Evolution and revolution as organizations grow" *Harvard Business Review* **50** 37–46
- Grimaldi R, Grandi A, 2005, "Business incubators and new venture creation: an assessment of incubating models" *Technovation* **25** 111–121
- Hackett S M, Dilts D M, 2004, "A systematic review of business incubation research" *The Journal of Technology Transfer* **29** 55–82
- Haltiwanger J, Jarmin R S, Miranda J, 2013 "Who creates jobs? Small versus large versus young" *The Review of Economics and Statistics* **2** 347–361
- Hannon P, Chaplin P, 2003, "Are incubators good for business? Understanding incubation practice – the challenge for policy" *Environment and Planning C: Government and Policy C* **21** 861–881
- Harrison R T, Leitch C, 2010, "Voodoo institution or entrepreneurial university? Spin-off companies, the entrepreneurial system and regional development in the UK" *Regional Studies* **44** 1241–1262
- Henrekson M, Johansson D, 2010, "Gazelles as job creators: a survey and interpretation of the evidence" *Small Business Economics* **35** 227–244
- Hölzl W, 2014, "Persistence, survival, and growth: a closer look at 20 years of fast-growing firms in Austria" *Industrial and Corporate Change* **23** 199–231
- Huggins R, Williams N, 2009, "Enterprise and public policy: a review of labour government intervention in the United Kingdom" *Environment and Planning C: Government and Policy* **27** 19–41
- Hussler C, Picard F, Tang M F, 2010, "Taking the ivory from the tower to coat the economic world: regional strategies to make science useful" *Technovation* **30** 508–518
- Iammarino S, Piva M, Vivarelli M, von Tunzelmann N, 2012, "Technological capabilities and patterns of innovative cooperation of firms on the UK regions" *Regional Studies* **48** 1283–1301
- Jones P, Beynon M, Pickernell D, Packham G, 2013, "Evaluating the impact of different training methods on SME business performance" *Environment and Planning C: Government and Policy* **31** 56–81
- Kemp P, Weber P, 2012, "Business incubators: their genesis, forms, intent and impact", in *Government, SMEs and Entrepreneurship Development: Policy, Practice and Challenges* Eds R Blackburn, M Schaper (Gower Publishing, Farnham) pp 141–155
- Kraatz M S, Zajac E J, 2001, "How resources affect strategic change and performance in turbulent environments: theory and evidence" *Organization Science* **12** 632–657
- Lee N, 2014, "What holds back high-growth firms? Evidence from UK SMEs" *Small Business Economics* **43** 183–195
- Lerner J, 2010, "The future of public efforts to boost entrepreneurship and venture capital" *Small Business Economics* **35** 255–264
- Levie J, Lichtenstein B B, 2010, "A terminal assessment of stages theory: introducing a dynamic states approach to entrepreneurship" *Entrepreneurship Theory and Practice* **34** 317–350
- Löfsten H, Lindelöf P, 2002, "Science parks and the growth of new technology-based firms—academic-industry links, innovation and markets" *Research Policy* **31** 859–876
- Lumpkin G T, Dess G G, 1996, "Clarifying the entrepreneurial orientation construct and linking it to performance" *The Academy of Management Review* **21**(1) 135–172
- McAdam M, McAdam R, 2008, "High tech start-ups in University Science Park incubators: the relationship between the start-up's lifecycle progression and use of the incubator's resources" *Technovation* **28** 277–290
- McQuaid R, 2002, "Entrepreneurship and ICT industries: support from regional and local policies" *Regional Studies* **36** 909–919
- Mason C, 2009a, "Policy as a focus for small business research" *Environment and Planning C: Government and Policy* **27** 191–194
- Mason C, 2009b, "Public policy support for the informal venture capital market in Europe: a critical review" *International Small Business Journal* **27** 536–556
- Mason C, Brown R, 2013, "Creating good public policy to support high-growth firms" *Small Business Economics* **40** 211–225
- Mason C, Brown R, Hart M, Anyadike-Danes M, 2015, "High growth firms, jobs and peripheral regions: the case of Scotland" *Cambridge Journal of Regions, Economy and Society* doi: 10.1093/cjres/rsu032
- Massey D, Quintas P, Wield D, 1992 *High-Tech Fantasies: Science Parks in Society, Science and Space* **8** 343–358

-
- Mas-Verdú F, Ribeiro-Soriano D, Roig-Tierno N, 2015, "Firm survival: the role of incubators and business characteristics" *Journal of Business Research* **68** 793–796
- Mawson S, 2012, *What Makes a High Performing Company?* (Scottish Enterprise, Glasgow)
- Mazzucato M, 2013, *The Entrepreneurial State* (Anthem Press, London)
- Meyer M, 2003, "Academic entrepreneurs or entrepreneurial academics? Research-based ventures and public support mechanisms" *R&D Management* **33** 107–115
- Mian S, 1996, "Assessing value-added contributions of technology business incubators to their tenants" *Research Policy* **25** 325–335
- Mian S, 1997, "Assessing the value-added contributions of university technology business incubators to tenant firms" *Journal of Business Venturing* **12** 251–285
- Mian S, 2011, "University's involvement in business incubation: what theory and practice tell us?" *International Journal of Entrepreneurship and Innovation Management* **13** 113–121
- Miller P, Bound K, 2011, The startup factories – the rise of accelerator programmes to support new technology ventures. NESTA, London, http://www.nesta.org.uk/sites/default/files/the_startup_factories_0.pdf
- Mohr V, Garnsey E, Theyel G, 2014, "The role of alliances in the early development of high growth firms" *Industrial and Corporate Change* **23** 233–259
- Mole K, Bramley G, 2006, "Making policy choices in nonfinancial business support: an international comparison" *Environment and Planning C* **24** 885
- Moreno A, Casillas J, 2008, "Entrepreneurial orientation and growth of SMEs: a causal model" *Entrepreneurship Theory and Practice* **32** 507–528
- Mowery D, 2011, "Learning from one another? International policy 'emulation' and university-industry technology transfer" *Industrial and Corporate Change* **20** 1827–1853
- Nightingale P, Coad A, 2014, "Muppets and gazelles: political and methodological biases in entrepreneurship research" *Industrial and Corporate Change* **23** 113–143
- Oakey R P, 2012, *High Technology Entrepreneurship* (Routledge, Oxford)
- OECD, 2008, *Measuring Entrepreneurship: A Digest of Indicators* (OECD-Eurostat Entrepreneurship Indicators Program, Organisation for Economic Co-operation and Development (OECD), Paris)
- OECD, 2010, *High-Growth Enterprises: What Governments Can Do to Make a Difference* (OECD studies on SMEs and entrepreneurship, Organisation for Economic Cooperation and Development, Paris)
- OECD, 2013, *An International Benchmarking Analysis of Public Programmes for High Growth Firms* (Organisation for Economic Cooperation and Development, Paris)
- O'Farrell P N, Hitchins D M W, 1988, "Alternative theories of small firm growth: a review" *Environment and Planning A* **20** 1365–1383
- O'Regan N, Ghobadian A, Gallea D, 2006, "In search of the drivers of high growth in manufacturing SMEs" *Technovation* **26**(1) 30–41
- Patton D, Marlow S, 2011, "Learning new entrepreneurial firms: learning to overcome liabilities of newness through university technology business incubator support" *Environment and Planning C: Government and Policy* **29** 911–926
- Patton D, Marlow S, Ram M, Sanghera K, 2003, "Interpretative analysis as an evaluative tool: the case of Mustard.UK.COM, a high-growth small business programme" *Environment and Planning C* **21** 813–824
- Penrose E T, 1959, *The Theory of the Growth of the Firm* (Wiley, New York)
- Powers J, McDougall P, 2005, "University start-up formation and technology licensing with firms that go public: a resource-based view of academic entrepreneurship" *Journal of Business Venturing* **20** 291–311
- Probert J, Connell D, Mina A, 2013, "R&D service firms: the hidden engine of the high-tech economy?" *Research Policy* **42** 1274–1285
- Roper S, Hart M, 2013, *Supporting Sustained Growth Among SMEs – Policy Models and Guidelines*, White Paper No 7, Enterprise Research Centre White, University of Warwick
- Rothaermel F T, Thursby M, 2005, "Incubator firm failure or graduation? The role of university linkages" *Research Policy* **34** 1076–1090

-
- Salido E, Sabás M, Freixas P, 2013, The Accelerator and Incubator Ecosystem in Europe. Prepared by Telefónica on behalf of the European Commission, Brussels
- Saxenian A, 1994, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* (Harvard University Press, Cambridge, MA)
- Schwartz M, 2009, "Beyond incubation: an analysis of firm survival and exit dynamics in the post-graduation period" *The Journal of Technology Transfer* **34** 403–421
- Shane S, 2009, "Why encouraging more people to become entrepreneurs is bad public policy" *Small Business Economics* **33** 141–149
- Shrader R, Siegel D S, 2007, "Assessing the relationship between human capital and firm performance: evidence from technology-based new ventures" *Entrepreneurship Theory and Practice* **31** 893–908
- Smallbone D, Baldock R, Burgess S, 2002, "Targeted support for high-growth start-ups: some policy issues" *Environment and Planning C: Government and Policy* **20** 195–209
- Smith D J, Zhang M, 2012 "The evolution of the incubator concept" *International Journal of Entrepreneurship and Innovation* **13** 227–234
- Soufouli E, Vonortas N, 2007, "S&T Parks and business incubators in middle-sized countries: the case of Greece" *Journal of Technology Transfer* **32** 525–544
- Storey D, 1994, *Understanding the Small Business Sector* (Routledge, London)
- Storey D J, 2000, "Six steps to heaven: evaluating the impact of public policies to support small businesses in developed economies", in *The Blackwell Handbook of Entrepreneurship* Eds D Sexton, H Landstrom (Blackwell Business Series, Oxford) pp 176–194
- Storey D J, 2006, "Evaluating SME policies and programmes: technical and political dimensions", in *The Oxford Handbook of Entrepreneurship* Eds A Basu, M Casson, N Wadeson, B Yeung (Oxford University Press, Oxford) pp 248–278
- Storey D J, 2011, "Optimism and chance: the elephants in the entrepreneurship room" *International Small Business Journal* **29** 1–19
- Storey D J, Tether B S, 1998, "New technology-based firms in the European union: an introduction" *Research Policy* **26** 933–946
- Stuart R, Abetti P A, 1987, "Start-up ventures: towards the prediction of initial success" *Journal of Business Venturing* **2** 215–230
- Tamasy C, 2007, "Rethinking technology-oriented business incubators: developing a robust policy instrument for entrepreneurship, innovation and regional development?" *Growth and Change* **38** 460–473
- Teece D, 2007, "Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance" *Strategic Management Journal* **28** 1319–1350
- Teece D, 2010, "Business models, business strategy and innovation" *Long Range Planning* **43** 172–194
- Teece D, Pisano G, Shuen A, 1997, "Dynamic capabilities and strategic management" *Strategic Management Journal* **18** 509–533
- Van Cauwenberge P, Vander Bauwhede H, Schoonjans B, 2013, "An evaluation of public spending: the effectiveness of a government-supported networking program in Flanders" *Environment and Planning C: Government and Policy* **31** 24–38
- Van de Vrande V, de Jong J, Vanhaverbeke W, Rochemont M, 2009, "Open innovation in SMEs: trends, motives and management challenges" *Technovation* **29** 423–437
- van Doorn J, Lemon K N, Mittal V, Nass S, Pick D, Pirner P, Verhoef PC, 2010, "Customer engagement behavior: theoretical foundations and research directions" *Journal of Service Research* **13** 253–266
- Vinnell R, Hamilton R T, 1999, "A historical perspective on small firm development" *Entrepreneurship Theory and Practice* **23** 5–18
- Vohora A, Wright M, Lockett A, 2004, "Critical junctures in the development of university high-tech spinout companies" *Research Policy* **33** 147–175
- von Hippel E, 2009, "Democratizing innovation: the evolving phenomenon of user innovation" *International Journal of Innovation Science* **1** 29–40
- von Tunzelmann N, Wang Q, 2003, "An evolutionary view of dynamic capabilities" *Economie Appliquee* **16** 33–64

-
- Welter F, 2011, "Contextualizing entrepreneurship—conceptual challenges and ways forward" *Entrepreneurship Theory and Practice* **35** 165–184
- Wiklund J, Shepherd D, 2003, "Aspiring for, and achieving growth: the moderating role of resources and opportunities" *Journal of Management Studies* **40** 1919–1941
- Williams N, 2013, "Entrepreneurship and the role of policy" *Environment and Planning C: Government and Policy* **31** 1–4