

Home Alone: Innovation and sales growth intentions among the sole self-employed

ERC Research Paper 59

June 2017

Home Alone: Innovation and sales growth intentions among the sole self-employed

Areti Gkypali

Enterprise Research Centre and Warwick Business School
aret.gkypali@wbs.ac.uk

Stephen Roper

Enterprise Research Centre and Warwick Business School
stephen.roper@wbs.ac.uk

The Enterprise Research Centre is an independent research centre which focusses on SME growth and productivity. ERC is a partnership between Warwick Business School, Aston Business School, Imperial College Business School, Strathclyde Business School, Birmingham Business School and Queen's University School of Management. The Centre is funded by the Economic and Social Research Council (ESRC); Department for Business, Energy & Industrial Strategy (BEIS); Innovate UK and the British Business Bank. The support of the funders is acknowledged. The views expressed in this report are those of the authors and do not necessarily represent those of the funders.

ABSTRACT

It is widely known that solo self-employed entrepreneurs enjoy non-pecuniary benefits from their employment status and earn less compared to those in employment. They have greater freedom and autonomy in running their businesses and can pursue their intrinsic commercial ambitions relying on their experience, abilities and exploiting the available opportunities from their external environment. In this paper, we argue that solo self-employed entrepreneurs' growth intentions shape their future innovation strategy. We develop a theoretical framework and empirically analyse the relationship and the determinants of innovation and growth intentions using data on a large sample of UK self-employed entrepreneurs. In doing so we extend the theory of planned behaviour to incorporate the role of entrepreneurs' experience in innovation and growth in shaping their corresponding future intentions. Our empirical results suggest that past innovation performance and achieved growth rates shape future growth intentions through an adaptive learning process given the level of entrepreneurial capabilities and external environment opportunities.

Keywords: Solo self-employed; theory of planned behaviour; innovation and growth intentions; past innovation and growth experience; capabilities; external opportunities.

CONTENTS

| | |
|--|-----------|
| ABSTRACT | 3 |
| 1. INTRODUCTION | 5 |
| 2. THEORETICAL FRAMEWORK AND HYPOTHESES | 5 |
| 3. DATA AND VARIABLES..... | 7 |
| 4. RESULTS AND DISCUSSION | 10 |
| 4.1 Innovation intentions | 13 |
| 4.2. Sales growth intentions | 13 |
| 4.3 Robustness test | 15 |
| 5. CONCLUSION..... | 15 |
| REFERENCES..... | 27 |

1. INTRODUCTION

In mid-2014, around 1:6 (14.1 per cent) of the UK labour force identified themselves as self-employed, marginally above the EU average of 13.5 per cent. This group is of increasing importance as the number of self-employed has risen sharply in recent years, accounting for around 40 per cent in the overall rise in UK employment since 2010¹. The profile of self-employment in the UK also differs markedly from that in other major European economies. In 2015, more than 83.3 per cent of the UK self-employed were solo self-employed (i.e., without employees), a higher level than every other European country except Romania (Figure 1). To date, research on this group has focussed mainly on exploring the antecedents of self-employment and understanding the returns to self-employment compared to employment. As a result, there is now ample empirical evidence that the non-pecuniary benefits of self-employment more than compensate for lower initial earnings and lower earnings growth compared to paid employment (Hamilton, 2000; Vivarelli, 2004; McMullen and Shepherd, 2006; Wolfe and Patel, 2016). However, there is little research investigating the growth intentions and strategies of those who are self-employed.

The solo self-employed can pursue their growth objectives with autonomy, relying on their experience and ability and exploiting the available opportunities from their external environment. This may involve adopting innovation-related strategies which would help their sales to grow. Empirically, however, we have little evidence on innovation by the self-employed or indeed micro-businesses as these firms are excluded from most innovation surveys. The UK Innovation Survey, for example, only includes firms with ten or more employees (Robson and Achur 2012; Robson and Ortman 2006). Studies of innovation by the self-employed are therefore unusual, and where these have been undertaken they relate primarily to small, privately-owned companies rather than the solo self-employed. For example, Romero and Martinez-Roman (2012) focus on innovation among the self-employed in Spain and quote the Spanish definition of self-employment as follows ‘individuals who carry out, on a regular basis, personally, directly, by themselves

¹ This has been attributed primarily to a fall in outflow rates due perhaps to changes in pension legislation meaning that people are working for longer and a shortage of other employment opportunities (Office for National Statistics 2014).

and outside the scope of another person's management and organisation, an economic or professional activity for profit, giving or not employment to other employees'. Average employment in their sample was 3.1 but included firms with up to 100 employees. A more recent study focussing on process innovation in a sub-sample of the same dataset has average employment of 4.7, includes firms with up to 50 employees, and actively excludes the solo self-employed: 'self-employed people without employees were excluded because in many cases they are freelance workers or those who work for a single company that prefers to not hire them as paid employees to avoid social security costs and other legal constraints' (Plotnikova, Romero, and Marinez-Roman 2016).

To date the only study specifically focussed on innovation performance by the solo self-employed has been that of de Vries and Koster (de Vries and Koster 2014). They examined the determinants of innovation among 1,400 solo self-employed in the Netherlands in 2010 focussing on the impact of regional, firm and individual influences. Locational factors proved relatively unimportant for product/service innovation but were more significant in terms of process changes. In terms of the business, the type of work being undertaken, and co-operation for innovation were also significant influences. Interestingly, while co-operation for innovation proved positive in general, co-operation with other solo self-employed had a negative impact on innovation propensity. At the individual level, education and ambition were strongly related to innovation propensity with age, gender and intrinsic motivation having little significant influence. Interestingly, de Vries and Koster (2014) define 'ambition' in terms of employment growth, something identified as an objective by 16 per cent of their sample of solo self-employed.

In this paper, using a new UK data set – the Longitudinal Small Business Survey – we aim to extend our understanding of the determinants of innovation and (sales) growth intentions by the solo self-employed. Our focus is on those solo self-employed who intend to remain as lone operators. For these firms growth can only come through increased sales, and the structure of the businesses mean that individual and firms' decisions are essentially one and the same. The theory of planned behaviour (TBP) (Ajzen 1991; Krueger, Reilly, and Carsrud 2000; Wiklund and Shepherd 2003), which suggests that decisions are governed by opportunities, individuals' abilities, and ambition, provides a useful conceptual lens. We make two main contributions. First, we provide an integrated view of the growth intentions

and strategy choices of the solo self-employed. Second, we extend the TPB by incorporating the notion of adaptive expectations (Parker, 2006), and highlighting the role of individuals' prior experience of sales growth and innovation in shaping their respective future intentions. Both prove important determinants in our analysis.

The remainder of the paper is structured as follows. Section 2 outlines our theoretical framework along with our hypotheses. Section 3 gives a detailed account of the data and of the variables employed in the empirical estimation while section 4 presents and discusses the empirical results. Section 5 concludes the paper and provides policy implications based on our empirical findings.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Entrepreneurial intentions provide the link between entrepreneurial attitudes, personality characteristics and subsequent business performance (Krueger and Carsrud 1993; Kim and Hunter 1993; McMullen and Shepherd, 2006). This link lies at the core of the theory of planned behavior (Ajzen 1991; Krueger, Reilly, and Carsrud 2000; Wiklund and Shepherd 2003) which has been widely used in studies of ambitious entrepreneurship. Specifically, for the case of the solo self employed, their autonomy in running their business allows them to pursue business strategies which reflect their experience and intrinsic and commercial ambitions. These, in turn, will shape their willingness to set and follow goal-directed behavior such as undertaking innovation, i.e. the introduction by firms of new products, services or business models (Geroski 2000; Stam and Wennberg 2009; Stenholm 2011).

Typically, however, in studies of larger firms, innovation has been investigated from a *performance* perspective (Parker 2004; Moreno and Cassillas 2008), with less attention paid to the antecedents of firms' innovation decisions. The performance perspective suggests that if a firm successfully implements an innovation, irrespective of its nature, this will lead to sales or employment growth (Mansfield et al. 1977; Aghion et al. 1997; Bloom and Van Reenen 2002). Empirical findings, however, are equivocal (Rosenbusch, Brinckmann, and Bausch 2011). For instance, Coad and Rao (2008) suggested that innovation has a positive effect for only a small portion of high growth firms, while having no effect on firm performance closer to the average. Storey (1994), Roper, (1997) and Deeds,

(2001) provide more positive evidence linking innovation and growth, while other studies find negative growth (Freel and Robson 2004) and survival effects (Buddelmeyer, Jensen, and Webster 2010).

One issue in capturing the relationship between innovation and growth may be the time-lag between innovations being introduced and improvements in performance (Cefis and Orsenigo 2001; Coad and Rao 2008). This suggests the potential value of exploring linkages between other elements of the innovation and growth processes. For example, the links between firms' innovation activities and the process of growth may be stronger at the point where entrepreneurs are planning their strategic moves and developing their future business plans (Shane et al. 2003; Hessels et al. 2008; Hermans et al. 2015). For example, Hessels et al. (2008, p. 324) suggest that '...[h]ardly anybody starts a business in order to achieve innovation, job creation, or economic growth.... Instead, people desire personal profits, or autonomy, amongst others, or are just forced into entrepreneurship because they have no other options'. Put differently, this suggests that the solo self-employed will invest in innovation only where it is necessary to achieve their growth intentions (Wiklund et al. 1997; Gundry and Welsch, 2001; Wiklund and Shepherd, 2003; Rosenbusch et al. 2011)². This suggests our first hypothesis:

H₁: The solo self-employed with stronger growth intentions will have stronger future innovation intentions.

Innovation has been associated with dynamic increasing returns which result from *learning-by-doing* and *learning-to-learn effects* (Jovanovich 1982; Collis 1994; Geroski et al. 1997; Cefis and Orsenigo 2001; Roper and Dundas 2008; Clausen et al. 2011; Le Bas and Scellato 2014). In the context of self-employed individuals, such effects rely on the entrepreneur's ability to perceive and respond to environmental changes and opportunities by adapting their innovation behaviour (Van der Ven and Polley 1992; Nicholls-Nixon et al. 2000; Macpherson and Holt 2007). Hence, experience in successfully introducing an innovation is likely to influence future expectations both in terms of innovation performance and its effect on growth (Koellinger 2008; Raymond et al. 2010). The implied persistence in

² However, Rosenbusch et al. (2011) also suggest that adopting an organizational orientation towards innovation can lead to the development of more ambitious goals.

innovation activity may result from three complementary mechanisms: dynamic learning processes, the legacy effects of past successful innovation performance, and the irreversibility of investing in innovation. Dynamic learning processes may arise because of the cumulative accumulation of knowledge capital from past innovation activities (Klette and Johansen 1998). In this context, individuals learn how to effectively generate and combine new and existing knowledge, encouraging the persistence of innovation activity (Cefis 2003; Latham and Le Bas 2006; Peters 2009; Clausen and Pohjola 2013). The second source of persistence in innovation arises when firms reinvest the proceeds of past innovation to maximise future innovation returns (Rosenberg 1982; Flaig and Stadler 1994). Finally, as innovation often involves sunk costs that are non-recoverable there is a strong incentive to maximise the potential payoffs from these investments through continued innovation (Antonelli et al. 2012).

The past innovation experience or success of the self-employed may also influence their sales growth intentions (Gundry and Welsch, 2001). The close link between innovation and growth intentions has been recognised conceptually with Covin and Slevin (1991) describing entrepreneurial firms as business ventures with strategies oriented toward innovation and growth and a capacity to bear the related risks. Related empirical evidence supports the link between innovation experience and future growth intentions. Cucculelli and Ermini (2012) provide evidence that the release of a new product enhances growth opportunities among multi-product firms. In addition, Levie (2016) provides empirical evidence that firms with substantive growth ambition are more likely to report being engaged in innovation activities compared to low growth ambition firms.

In addition to the role of innovation experience in shaping growth and innovation intentions, there is evidence that entrepreneurs have adaptive growth intentions (Coad, 2007). Specifically, it has been argued that entrepreneurs set temporal growth targets but, as their firm evolves, they continuously adapt their future growth aims or intentions (Parker, 2006; Coad, 2007; Greeve, 2008). Based these arguments we formulate the following hypotheses:

H2a: Positive experience in innovation will increase individuals' sales growth intentions

H2b: Prior experience of a growth episode will increase individuals' sales growth intentions

We might also anticipate that the innovation and sales growth intentions of the solo self-employed are also influenced by their own capabilities and market opportunities (Ajzen 1991; Davidsson 1991; Delmar and Wiklund 2003; Wiklund and Shepherd 2003). Individuals' self-efficacy – perceptions of the ability to undertake entrepreneurial activities – have been strongly linked to growth intention in previous studies (Austin and Nauta 2016). Individuals' network linkages may also support higher levels of growth intention through peer learning effects and affirmation (Fernandez-Perez et al. 2015), or by providing access to relevant role models (Bosma et al. 2012; Austin and Nauta 2016). Personal characteristics such as education, gender, prior experience have also been shown to have significant effects on growth intentions (Austin and Nauta 2016). Individuals' capabilities and skills will strongly influence how effectively the solo self-employed are able to turn their intentions into achieved outcomes (Wiklund and Shepherd, 2003). At the same time, individuals' capabilities will shape the routines through which the solo self-employed are able to change and adapt to signals from their external environment. This suggests the following hypotheses:

H3: The solo self-employed with greater skill and resource endowments will have higher sales growth intentions

H4: The solo self-employed who perceive greater market opportunities will have higher sales growth intentions

3. DATA AND VARIABLES

Our data is taken from the first wave of the UK Longitudinal Small Business Survey (UK LSBS). The UK LSBS has been commissioned by the Department for Energy, Business, Innovation and Skills (BEIS) and is the largest small business survey undertaken in the UK. The survey was conducted using Computer Assistance Telephone Interviews (CATI) between July 2015 and January 2016 and provides information about the background of the business, employment and turnover, business capabilities (in terms of their ability to innovate, export, technology use, train staff, etc.), access to finance, business support and firms' future intentions. Two sources were used to derive a sampling frame stratified by firm size (in terms

of number of employees), region and industry sector; for registered businesses, the Inter Departmental Business Register (IDBR) was used as the sample source while, for unregistered businesses with zero employees, Dun & Bradstreet's database was used. The overall response rate for IDBR contacts was 19 per cent and 9 per cent for Dun & Bradstreet contacts resulting in 15,502 responses³. Within this sample there are 4,355 solo self-employed, i.e. respondents which identified themselves as self-employed and had no employees on the payroll at the time of interviewing, excluding owners and partners. As expected, the overwhelming majority of the solo self-employed are in the services sector (74.2 per cent), while half of the solo self-employed are in London and the Southern part of the UK (43.6 per cent).

Our central focus here is the interrelationship between the innovation and growth intentions of the solo self-employed, and the corresponding influence of experience, capabilities and external environment in shaping such future intentions. We measure the sales growth intention of the solo self-employed using a question which asks individuals first whether they 'aim to grow the sales of their business' and then 'by approximately what percentage do you aim to have grown your sales in three years' time?'. We measure individuals' innovation intentions using the responses to a multiple-choice question which asked: 'Does your business plan to do any of the following over the next three years?' Among the alternative, non-mutually exclusive possibilities, firms were asked whether they intended to 'Develop and launch new products/services'. The responses to this question are used to create a binary variable taking value 1 if the firm intended to develop and introduce a product/service innovation within the next three years and zero otherwise.

Reflecting our Hypotheses we include three groups of independent variables in the analysis to capture the past experience of the solo self-employed, their business skills and resources and their external environment (Figure 2).

³ For more information on the design, survey methods and basic results from the first wave of the UK LSBS one can see <https://www.gov.uk/government/collections/small-business-survey-reports>

Individuals' experience may be crucial in shaping their future intentions (Robinson and Sexton, 1994; Hamilton, 2000) and we use three variables to capture the past innovation and growth experience of the solo self-employed. Prior innovation is considered an important precursor of sales growth ambition and future innovation intentions (Stenholm 2011; Hermans et al. 2015), and the UK LSBS includes a binary indicator of whether the solo self-employed introduced any new products or services in the past three years. *Past sales growth* is also considered also an important element of individuals' prior experience (Hamilton, 2000) and is reflected in a variable which captures the percentage of decrease or increase in sales in the previous year. Finally, we include a variable to indicate the length of time the individual has been trading. Previous studies have associated firm age with business and product life cycles (Klepper, 1996; Huergo and Jaumandreu, 2004; Coad et al., 2013) with implications for firms' growth and survival strategies (Gkypali et al., 2015).

The importance of capabilities and resources in driving sales growth intentions is central to the Theory of Planned Behaviour and the Resource Based View of the firm (RBV; Penrose, 1959)⁴. To capture the business capabilities of the solo self-employed we use four binary measures derived from a question which asked respondents to self-evaluate the capability of their business in terms of: (i) developing and implementing a business plan and strategy; (ii) developing and introducing new products or services; (iii) accessing external finance; and, (iv) operational improvement, e.g. adopting industry best practice. Where a capability was said to be 'well-developed' variables take the value of 1 and 0 otherwise.

The final set of drivers of the growth and innovation intentions of the solo self-employed relates to their external environment. Firms' participation in formal and informal business networks provides access to external stimuli and business opportunities which are expected to shape firms' growth ambitions (Krueger et al. 2000; Wiklund et al. 2009; Stenholm 2011). In this context, respondents to the UK LSBS were asked to indicate whether they participate in: (i) a social media business network; (ii) a local Chamber of Commerce; (iii) a formal business

⁴ Firms' managerial capabilities are thought to be the essence of their competitive advantage which is in turn responsible for firms' survival growth and diversification (Helfat and Peteraf, 2003).

network; and, (iv) an informal business network. Based on the responses, four binary variables have been devised taking a value of 1 if the solo self-employed participated in the corresponding network and 0 otherwise. The influence of firms' openness to their external environment in shaping their innovation strategy has been well documented (Stuart, 2000; Laursen and Salter, 2006; Dahlander and Gann, 2010; Love et al., 2014a;b). In addition, internationalisation may provide valuable learning opportunities which contribute to improved innovation performance (Roper and Love, 2002). To capture the influence of self-employed firms' external environment on their innovation intentions we use three variables. The first is a count variable which captures the range (number) of firms' innovation partners; the second variable is a binary variable which captures self-employed firms' presence in international markets while the third variable is a binary variable which captures whether self-employed firms have used information or advice from national and regional government agencies.

4. RESULTS AND DISCUSSION

To empirically investigate (i) the relationship between innovation and growth intentions and (ii) the corresponding effects of innovation and growth experience, resources and skills, and external environment opportunities, a probit and a linear regression were employed. Empirical results of the probit model and corresponding marginal effects are presented in Tables 3 and 4 respectively, while empirical results of the linear regression model are presented in Table 5. In addition to estimating the base model, we explored whether empirical results differentiate between different sample sub-groups. Specifically, we split our sample based on gender, age and sectoral distribution. The corresponding estimation results are also presented in Tables 3-5.

4.1 Innovation intentions

Reflecting our first hypothesis, empirical results for the base model presented in Tables 3 and 4 confirm that the growth intentions of the solo self-employed are linked positively to their innovation intentions. This provides strong support for Hypothesis 1, and suggests that the solo self-employed are more likely to devote resources to innovation when they are pursuing a more expansive growth strategy. This relationship holds regardless of the individual's gender, the firm age and/or

sector (Tables 3 and 4). Moreover, past innovation experience proves to be the most influential factor in driving future innovation intentions. Table 4 presents the marginal effects and suggests that the solo self-employed are 67.4 per cent more likely to plan on introducing an innovation within the coming three-year period if they had introduced an innovation in the previous three-year period. It is worth noting that this finding is robust across the different sub-samples we consider (Tables 3 and 4). One interpretation of this result is that past innovation experience helps the self-employed with the identification of innovation opportunities which shapes their intentions (Ucbasaran et al., 2009; Emami and Dinov, 2017). In addition to past innovation experience, firm age has been also considered as an important experience indicator which has been found to moderate the relationship between innovation and growth (Coad et al. 2016). Based on the probit estimation results, and the corresponding marginal effects, firm age has a negative effect on innovation intentions among the solo self-employed. In other words, those self-employed who have been in business for a shorter period are more inclined towards planning innovation (Tables 3 and 4). This reflects other studies of firm-level innovation which typically find a negative relationship between firm age and innovation outputs (Roper, Du, and Love 2008).

Turning to the role of the external business environment in driving innovation intentions among the solo self-employed, our empirical results confirm that external collaboration and being engaged in exporting both have the anticipated positive influence on innovation intentions (Tables 3 and 4). Both participation in collaborative networks and foreign markets may enhance individuals' knowledge of potential innovation opportunities (Roper and Love, 2002; Laursen and Salter, 2006; Romero and Martinez-Roman, 2012). However, participation in collaborative networks and foreign markets are not an important driver for females who are solo self-employed (Tables 3 and 4). This may reflect the nature of female self-employment as well as their lower level of engagement in export markets (Johnston et al. 2017). Moreover, our empirical results suggest that exporting is not an important determinant of innovation intentions for newer solo self-employed (Tables 3 and 4). We also find no significant effect on innovation intentions from individuals' efforts to secure external finance or business advice. Therefore, Hypothesis 4 is only partially confirmed.

4.2. Sales growth intentions

Table 5 below presents estimation results of the linear regression on the drivers of growth intentions. We find that individuals' experience of sales growth exerts a positive influence on future growth intentions (Hermans et al. 2015), and that past innovation experience also has a significant and positive influence on sales growth intentions irrespective of gender, firm age and sector (Table 5). Both results suggest that the solo self-employed calibrate their performance goals based on their past experiences (Parker 2006; Greeve 2008). This confirms Hypotheses 2a and 2b for the base model and for all other sub-sample estimations.

Other factors also prove important. The length of time they have been operating has a negative and statistically significant influence in shaping the growth intentions of the solo self-employed: younger firms are more optimistic about their growth prospects (Coad et al. 2013). In terms of the influence of (perceived) management capabilities on growth intentions we find mixed results: innovation capability does exert an important influence on growth intentions but management capabilities have no significant effect (Table 5). Therefore, Hypothesis 3 is only partly confirmed. We also find contrasts between the influence of formal and informal networks on growth intentions: while informal networks do influence growth intentions we find no such influence from formal networks. Engagement with social media is also associated with stronger growth intentions by the solo self-employed. Lastly, it is worth mentioning the strong and negative influence of past profitability on growth intentions which remains robust across different sample specifications indicating that self-employed entrepreneurs may find it difficult to translate current profits into future growth (Coad et al. 2013).

4.3 Robustness test

It could be argued that growth and innovation intentions may be interrelated due to unobserved factors which drive both decisions. In addition, the fact that we employ a cross-sectional sample might reinforce suspicions of endogeneity. To test this possibility, we estimated a simultaneous version of both equations using the CMP command in Stata 14 and empirical results are presented in Table 6. To check for heteroscedasticity, we estimated the same model correcting for sector, region, firm age and gender. Based on the estimated correlation coefficient at the

bottom of Table 6, innovation and growth intentions are not influenced by unobserved factors thus, allowing us to estimate each separately. However, it is interesting to note that estimation results remain robust both in the simultaneous estimation of the system of equation and the separate estimation discussed above.

5. CONCLUSION

The focus of this paper has been the interplay between the innovation and growth intentions of the solo self-employed. While there is considerable past research on the antecedents of self-employment, there is a lack of analysis of the strategic behaviour of individual entrepreneurs that intend to remain as solo self-employed. We address this issue using a new survey of UK self-employed. In doing so we extend the theory of planned behaviour to incorporate the role of entrepreneurs' experience in innovation and growth in shaping their corresponding future intentions. We have argued that past innovation performance and achieved growth rates shape entrepreneurial intentions and ambitions through an adaptive learning process given the level of (perceived) entrepreneurial capabilities and external opportunities.

Our empirical analysis suggests four main empirical conclusions. First, as suggested by the theory of planned behaviour, we find positive linkages between the resources and capabilities of the solo self-employed and their growth intentions. Second, we find that the growth and innovation intentions of the solo self-employed are strongly linked to their prior experience: positive experiences in the past are associated with stronger future innovation and growth intentions. This suggests a learning process where entrepreneurs plan for the future, by assigning a much greater weight to their prior experiences in forming their intentions and predictions (Nicholls-Nixon et al. 2000; Minniti and Bygrave 2001). Third, we find a negative relationship between the maturity of their business and the growth and innovation intentions of the solo self-employed. The off-setting impacts of individuals' length of business experience, and its positivity, suggest the complex learning mechanisms which influence the development of the growth intentions of the solo self-employed. In this sense, the growth intentions or ambitions of the solo self-employed are strongly dynamic, reflecting both the underlying aspirations and capabilities of the individual and their accumulated experience. This in turn suggests the importance of allowing for the inter-play between individual

characteristics and experience in shaping their future growth intentions (Wright and Stigliani 2013). Our fourth main empirical result emphasises that social and network connectivity are positively associated with increased growth and innovation intentions. This is consistent with evidence of the role of social and business networks on growth ambition (Johannisson, 1990; Fishcer and Reuber 2011), and evidence on the value of collaboration for innovation for smaller companies (Hewitt-Dundas and Roper, 2017).

Our analysis emphasises the complexity of the individual, contextual and network influences on growth and innovation intentions among the solo self-employed, with previous studies emphasising the diversity of the solo self-employed group (van Stel and de Vries 2015). Indeed, one recent UK report attempts to develop a typology of the self-employed, identifying six sub-categories: 'Visionaries', growth oriented employers; 'Classicals', profit oriented solo self-employed; 'Independents', creative self-employed; 'Locals', locally oriented firms with limited growth ambition; 'Survivors', low earning self-employed; and 'Dabblers', part-time hobbyists (Dellot and Reed 2015)⁵. From a policy perspective, this diversity, and the complexity of the drivers of growth intention, suggests that a combination of policy initiatives may be more effective in boosting growth intentions rather than a single policy measure. For example, our evidence suggests that using social media and engagement with informal business networks are both strongly related to growth intentions. Public support for open learning networks around social media, and targeted at the solo self-employed, would have a combined effect on growth ambitions. Similarly, business networks which stimulate collaborative or open innovation would have similar effects.

The links we establish between the past growth of the solo self-employed and their future intentions also help to interpret other studies which have suggested a link between framework conditions, such as regulation, and aspects of entrepreneurial behaviour (Djankov et al. 2002; Capelleras et al. 2008). Where framework conditions are such that they depress firms' growth performance, our results

⁵ This categorisation is incomplete in that it excludes self-employed workers on contract to a single employer. Recent evidence from the Labour Force Survey suggests this group of contracted self-employed account for 11 per cent of the UK self-employed (Department for Business Innovation and Skills 2016).

suggest that this experience will also dampen future growth intentions. Where framework conditions are more conducive to growth this will likely induce positive innovation and growth intention effects. This suggests a type of temporal spill-over mechanism from current framework conditions which, working through growth intentions, can influence firms' future growth prospects.

Our study provides some new insight into the determinants of growth intentions by the solo self-employed. It remains cross-sectional, however, and is therefore prone to standard challenges around the direction of causality. Access to subsequent waves of the Longitudinal Small Business Survey should allow us to overcome this issue and develop a clearer causal story. In the current analysis, we also implicitly assume that the impact of experiential effects are homogenous across the population of the solo self-employed. There is clearly the potential for moderation, however, linked perhaps to the characteristics or background of the individual. Both suggest the potential for future, more in-depth analysis.

Table 1. Variables definition and descriptive statistics

| | Variables definition | Mean | St. Dev |
|-------------|---|--------|---------|
| Innovexp | Whether the self-employed entrepreneur plans to develop and launch new products/services | 0.464 | - |
| Growthexp | Intention of the percentage of sales growth sales in next 3 years | 18.560 | 883.132 |
| Innperf | Whether the self-employed entrepreneur has introduced a goods or service innovation in the previous 3 yr period | 0.359 | - |
| Growth | Past growth performance in the last 12 months | 4.344 | 31.575 |
| Gender | Whether self-employed entrepreneur is female | 0.262 | - |
| Breadth | Number of cooperation partners | 0.794 | 2.024 |
| Breadth2 | Number of cooperation partners squared | 2.655 | 46.941 |
| Age | Firm age | 16.681 | 73.355 |
| Export | Whether self-employed entrepreneur firm exports | 0.140 | - |
| Extfinance | Whether the self-employed entrepreneur has sought external finance | 0.103 | - |
| Genadvice | Whether information or advice was sought in the last 12 months | 0.229 | - |
| Socmedia | Whether the self-employed entrepreneur participates in a social media network | 0.453 | - |
| Chamber | Whether the self-employed entrepreneur is enrolled in a chamber of commerce | 0.072 | - |
| Formalnet | Whether the self-employed entrepreneur participates in a formal network | 0.215 | - |
| Informalnet | Whether the self-employed entrepreneur participates in an informal network | 0.267 | - |
| Profitab | Whether the self-employed entrepreneur generated profits in the previous financial year | 0.814 | - |
| Operstrat | Whether the self-employed entrepreneur possesses a capability for developing and implementing a business plan | 0.535 | - |
| Innovcap | Whether the self-employed entrepreneur possesses a capability for developing and introducing new products | 0.502 | - |
| Extfincap | Whether the self-employed entrepreneur possesses a capability for accessing external finance | 0.360 | - |
| Opermanag | Whether the self-employed entrepreneur possesses a capability for operational improvement | 0.629 | - |

Table 2. Correlation Matrix among variables

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|
| <u>Innovexp (1)</u> | - | | | | | | | | | | | | | | | | | | | |
| <u>Growthexp (2)</u> | 0.43 | - | | | | | | | | | | | | | | | | | | |
| <u>Imperf (3)</u> | 0.42 | 0.21 | - | | | | | | | | | | | | | | | | | |
| <u>Growth(4)</u> | 0.12 | 0.16 | 0.07 | - | | | | | | | | | | | | | | | | |
| <u>Gender (5)</u> | 0.01 | -0.02 | 0.04 | 0.03 | - | | | | | | | | | | | | | | | |
| <u>Breadth (6)</u> | 0.35 | 0.19 | 0.65 | 0.05 | 0.00 | - | | | | | | | | | | | | | | |
| <u>Breadth2 (7)</u> | 0.27 | 0.15 | 0.45 | 0.03 | -0.01 | 0.92 | - | | | | | | | | | | | | | |
| <u>Age (8)</u> | -0.13 | -0.19 | -0.07 | -0.08 | -0.07 | -0.06 | -0.04 | - | | | | | | | | | | | | |
| <u>Export (9)</u> | 0.19 | 0.16 | 0.17 | 0.11 | -0.04 | 0.12 | 0.10 | -0.04 | - | | | | | | | | | | | |
| <u>Extfinance (10)</u> | 0.12 | 0.17 | 0.05 | 0.03 | 0.01 | 0.08 | 0.07 | -0.01 | 0.05 | - | | | | | | | | | | |
| <u>Genadvice (11)</u> | 0.14 | 0.16 | 0.19 | 0.06 | 0.07 | 0.21 | 0.18 | -0.03 | 0.09 | 0.10 | - | | | | | | | | | |
| <u>Socmedia (12)</u> | 0.24 | 0.22 | 0.20 | 0.10 | 0.03 | 0.19 | 0.14 | -0.16 | 0.18 | 0.03 | 0.14 | - | | | | | | | | |
| <u>Chamber (13)</u> | 0.10 | 0.07 | 0.07 | 0.06 | 0.04 | 0.10 | 0.09 | -0.08 | 0.01 | 0.04 | 0.07 | 0.15 | - | | | | | | | |
| <u>Formalnet (14)</u> | 0.17 | 0.14 | 0.17 | 0.08 | 0.05 | 0.16 | 0.14 | -0.08 | 0.03 | 0.01 | 0.14 | 0.23 | 0.17 | - | | | | | | |
| <u>Informalnet (15)</u> | 0.18 | 0.18 | 0.21 | 0.05 | 0.02 | 0.25 | 0.20 | -0.07 | 0.05 | 0.06 | 0.19 | 0.25 | 0.13 | 0.25 | - | | | | | |
| <u>Profitab (16)</u> | -0.06 | -0.15 | -0.04 | 0.13 | -0.01 | -0.02 | -0.01 | 0.04 | 0.01 | -0.11 | -0.03 | 0.01 | -0.02 | -0.02 | 0.00 | - | | | | |
| <u>Operstrat (17)</u> | 0.05 | 0.09 | 0.08 | 0.07 | 0.01 | 0.05 | 0.04 | -0.03 | 0.01 | 0.02 | 0.08 | 0.10 | 0.07 | 0.08 | 0.09 | 0.05 | - | | | |
| <u>Innovcap (18)</u> | 0.26 | 0.18 | 0.24 | 0.04 | 0.07 | 0.21 | 0.18 | -0.09 | 0.04 | 0.08 | 0.07 | 0.14 | 0.09 | 0.10 | 0.09 | 0.02 | 0.33 | - | | |
| <u>Extfincap (19)</u> | -0.03 | -0.01 | -0.02 | 0.01 | 0.03 | 0.03 | 0.04 | 0.04 | -0.08 | 0.00 | 0.03 | -0.01 | 0.02 | 0.03 | 0.01 | 0.09 | 0.27 | 0.20 | - | |
| <u>Opermanag (20)</u> | 0.07 | 0.05 | 0.08 | 0.06 | 0.04 | 0.08 | 0.05 | -0.05 | 0.02 | 0.00 | 0.07 | 0.15 | 0.05 | 0.11 | 0.11 | 0.05 | 0.31 | 0.24 | 0.24 | - |

Table 3. Probit results for the innovation intentions for the full sample and subsample estimations

| | Full | | Gender | | | Age | | Sector | | | | |
|--------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--|--|
| | | | Female | Male | Young | Established | Prod & Constr. | Transport, R&FS | Business services | Other services | | |
| Growthexp | 0.015*** (0.001) | 0.014*** (0.002) | 0.016*** (0.001) | 0.013*** (0.002) | 0.017*** (0.001) | 0.012*** (0.002) | 0.021*** (0.002) | 0.015*** (0.001) | 0.019*** (0.002) | 0.019*** (0.002) | | |
| Imperf | 0.674*** (0.065) | 0.774*** (0.122) | 0.627*** (0.078) | 0.797*** (0.167) | 0.647*** (0.072) | 0.636*** (0.155) | 0.217 (0.161) | 0.789*** (0.100) | 0.856*** (0.155) | 0.856*** (0.155) | | |
| Age | -0.007*** (0.003) | -0.013** (0.006) | -0.006* (0.003) | -0.047 (0.045) | -0.010*** (0.004) | -0.017*** (0.006) | -0.006 (0.007) | -0.005 (0.004) | -0.005 (0.004) | -0.005 (0.007) | | |
| Breadth | 0.199*** (0.050) | 0.151 (0.100) | 0.231*** (0.059) | 0.256** (0.120) | 0.179*** (0.056) | 0.249** (0.117) | 0.365** (0.156) | 0.148** (0.072) | 0.162 (0.072) | 0.162 (0.125) | | |
| Breadth2 | -0.014 (0.009) | -0.013 (0.019) | -0.016 (0.011) | -0.034* (0.020) | -0.007 (0.011) | -0.021 (0.022) | -0.031 (0.034) | -0.005 (0.013) | -0.019 (0.023) | -0.019 (0.023) | | |
| Export | 0.347*** (0.066) | 0.184 (0.143) | 0.398*** (0.075) | 0.093 (0.162) | 0.411*** (0.073) | 0.879*** (0.179) | 0.293* (0.151) | 0.193*** (0.089) | 0.494*** (0.215) | 0.494*** (0.215) | | |
| Exitfinance | 0.146* (0.077) | -0.064 (0.151) | 0.220** (0.090) | 0.343* (0.176) | 0.093 (0.087) | 0.299** (0.141) | -0.052 (0.167) | 0.192 (0.146) | 0.128 (0.188) | 0.128 (0.188) | | |
| Genadvic | 0.093* (0.056) | 0.149 (0.105) | 0.075 (0.067) | -0.042 (0.132) | 0.126** (0.063) | 0.064 (0.123) | 0.021 (0.159) | 0.055 (0.081) | 0.260* (0.145) | 0.260* (0.145) | | |
| Profitab | 0.096 (0.063) | 0.111 (0.121) | 0.103 (0.074) | 0.244 (0.149) | 0.056 (0.070) | 0.228* (0.135) | 0.404*** (0.150) | -0.054 (0.105) | -0.013 (0.140) | -0.013 (0.140) | | |
| Gender | 0.034 (0.054) | - | - | 0.137 (0.137) | 0.035 (0.060) | 0.093 (0.129) | 0.001 (0.129) | -0.022 (0.088) | 0.187 (0.115) | 0.187 (0.115) | | |
| Constant | -1.316*** (0.126) | -0.935*** (0.248) | -1.450*** (0.149) | -1.192*** (0.339) | -1.265*** (0.145) | -1.161*** (0.250) | -1.169*** (0.270) | -1.146*** (0.204) | -1.109*** (0.268) | -1.109*** (0.268) | | |
| N | 3961 | 1001 | 2960 | 611 | 3350 | 1016 | 657 | 1568 | 720 | 720 | | |
| Chi2 | 1272.572 | 283.080 | 1023.061 | 205.533 | 1035.472 | 262.967 | 190.477 | 530.670 | 265.359 | 265.359 | | |
| P-value | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | |
| R2_p | 0.251 | 0.219 | 0.271 | 0.243 | 0.249 | 0.246 | 0.226 | 0.251 | 0.283 | 0.283 | | |
| BIC | 3998.440 | 1173.450 | 2941.538 | 800.847 | 3322.593 | 956.169 | 794.067 | 1747.153 | 817.746 | 817.746 | | |

Note: All models include industry and region dummies. Robust standard errors are reported in parentheses

- *, ** and *** asterisks denote statistical significance at 10%, 5% and 1% respectively

Table 4. Marginal Effects for the innovation intentions for the full sample and subsample estimations

| | Full | | Gender | | Age | | Sector | | | |
|-------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | | | Female | Male | Young | Established | Prod & Constr. | Transport, R&S | Business services | Other services |
| <u>Growthexp</u> | 0.004*** (0.000) | 0.004*** (0.000) | 0.004*** (0.000) | 0.004*** (0.000) | 0.004*** (0.000) | 0.004*** (0.000) | 0.003*** (0.000) | 0.006*** (0.006) | 0.004*** (0.000) | 0.005*** (0.001) |
| <u>Imperf</u> | 0.181*** (0.017) | 0.220*** (0.033) | 0.162*** (0.020) | 0.235*** (0.047) | 0.168*** (0.018) | 0.139*** (0.033) | 0.060 (0.045) | 0.225*** (0.027) | 0.225*** (0.027) | 0.224*** (0.038) |
| | -0.002** (0.001) | -0.004* (0.002) | -0.002 (0.001) | -0.014 (0.013) | -0.003** (0.001) | -0.004** (0.001) | -0.002 (0.002) | -0.001 (0.001) | -0.001 (0.001) | -0.001 (0.002) |
| Age | 0.053*** (0.013) | 0.043 (0.028) | 0.060*** (0.015) | 0.076* (0.035) | 0.047** (0.015) | 0.054* (0.025) | 0.101* (0.043) | 0.101* (0.043) | 0.0422* (0.021) | 0.043 (0.033) |
| Breadth | -0.004 (0.002) | -0.004 (0.005) | -0.004 (0.003) | -0.001 (0.006) | -0.002 (0.003) | -0.005 (0.005) | -0.009 (0.010) | -0.009 (0.010) | -0.002 (0.004) | -0.005 (0.006) |
| Breadth2 | 0.093*** (0.018) | 0.052 (0.040) | 0.103*** (0.019) | 0.028 (0.048) | 0.107*** (0.019) | 0.192*** (0.038) | 0.081 (0.042) | 0.081 (0.042) | 0.055* (0.025) | 0.129* (0.056) |
| Export | 0.039 (0.021) | -0.018 (0.043) | 0.057* (0.023) | 0.101* (0.052) | 0.024 (0.023) | 0.065* (0.030) | -0.015 (0.047) | -0.015 (0.047) | 0.055 (0.042) | 0.033 (0.050) |
| <u>Extfinance</u> | 0.025 (0.015) | 0.042 (0.030) | 0.020 (0.017) | -0.012 (0.039) | 0.033* (0.016) | 0.014 (0.027) | 0.006 (0.044) | 0.006 (0.044) | 0.016 (0.023) | 0.068 (0.038) |
| <u>Genadvic</u> | 0.026 (0.017) | 0.031 (0.034) | 0.027 (0.019) | 0.072 (0.044) | 0.015 (0.018) | 0.050 (0.030) | 0.112** (0.041) | 0.112** (0.041) | -0.015 (0.030) | -0.003 (0.037) |
| <u>Profitrab</u> | 0.009 (0.014) | | | 0.040 (0.040) | 0.001 (0.016) | 0.020 (0.028) | 0.000 (0.036) | 0.000 (0.036) | -0.006 (0.025) | 0.049 (0.030) |
| Gender | 3961 | 1001 | 2960 | 611 | 3350 | 1016 | 657 | 1568 | 720 | |

Table 5. Estimation Results for the sales growth intentions for the full sample and subsample estimations

| | Full | Gender | | Age | | Sector | | | | |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------|----------------------|--|
| | | Female | Male | Young | Established | Prod & Constr. | Transport, R&FS | Business Serv. | Other services | |
| | - | | | | | | | | | |
| <u>Intercept</u> | 7.265*** (1.372) | 3.987 (2.733) | 8.083*** (1.587) | 4.834 (4.236) | 7.433*** (1.412) | 4.996** (2.524) | 3.069 (3.423) | 8.612*** (2.272) | 8.821*** (3.154) | |
| <u>Growth</u> | 0.118*** (0.018) | 0.080*** (0.029) | 0.147*** (0.022) | 0.190*** (0.056) | 0.092*** (0.018) | 0.138*** (0.041) | 0.137*** (0.041) | 0.114*** (0.026) | 0.115*** (0.051) | |
| <u>Age</u> | -0.493*** (0.076) | -0.744*** (0.158) | -0.411*** (0.087) | 0.072 (1.939) | -0.052 (0.094) | -0.327*** (0.139) | -0.408*** (0.181) | -0.542*** (0.125) | -0.624*** (0.196) | |
| <u>Operstrat</u> | 1.639 (1.391) | -0.371 (2.777) | 2.185 (1.608) | -1.376 (4.228) | 2.194 (1.442) | 2.802 (2.340) | 9.812*** (3.437) | -1.072 (2.415) | -1.574 (3.297) | |
| <u>Innovcap</u> | 6.895*** (1.387) | 4.432 (2.886) | 7.335*** (1.591) | 16.353*** (4.213) | 5.385*** (1.435) | 2.850 (2.374) | 5.394 (3.425) | 9.817*** (2.339) | 5.706 (3.400) | |
| <u>Extincap</u> | -0.780 (1.393) | 2.974 (2.842) | -1.597 (1.603) | -2.378 (4.395) | -1.087 (1.426) | 1.969 (2.402) | -7.460*** (3.404) | -0.255 (2.377) | 2.327 (3.423) | |
| <u>Opermanag</u> | -1.820 (1.380) | -5.721** (2.899) | -0.571 (1.569) | -0.961 (4.414) | -1.906 (1.416) | -2.192 (2.288) | -2.937 (3.420) | -0.303 (2.408) | -2.136 (3.281) | |
| <u>Socmedia</u> | 6.679*** (1.408) | 8.660*** (2.904) | 6.224*** (1.608) | 1.991 (4.561) | 7.473*** (1.443) | 5.892** (2.520) | 9.161*** (3.387) | 7.277*** (2.415) | 4.603 (3.230) | |
| <u>Informalnet</u> | 5.968*** (1.452) | 5.583* (2.913) | 5.659*** (1.673) | 3.463 (4.415) | 5.973*** (1.505) | 3.557 (2.761) | 3.612 (4.033) | 6.556*** (2.334) | 8.093*** (3.249) | |
| <u>Chamber</u> | 0.086 (2.362) | -5.777 (4.445) | 2.369 (2.782) | 8.631 (6.475) | -1.546 (2.501) | 23.938*** (5.621) | -8.207 (5.928) | -4.769 (3.592) | 6.826 (5.522) | |
| <u>Formalnet</u> | 2.711* (1.583) | 4.464 (3.161) | 2.689 (1.828) | 1.974 (4.888) | 2.883* (1.632) | 7.924** (3.166) | 5.404 (4.192) | -1.136 (2.535) | 4.599 (3.548) | |
| <u>Profitab</u> | -12.692*** (1.665) | -10.876*** (3.416) | -13.622*** (1.907) | -19.482*** (5.286) | -10.584*** (1.714) | -6.018** (2.908) | -14.325*** (3.838) | -16.983*** (3.036) | -8.993*** (3.603) | |
| <u>Constant</u> | 26.534*** (3.333) | 30.786*** (6.920) | 25.279*** (3.826) | 50.414*** (13.563) | 14.403*** (3.538) | 19.808*** (5.627) | 24.943*** (7.557) | 32.829*** (5.877) | 19.320*** (6.664) | |
| N | 2145 | 469 | 1676 | 315 | 1830 | 558 | 346 | 879 | 362 | |
| R ² | 0.172 | 0.200 | 0.184 | 0.233 | 0.135 | 0.172 | 0.228 | 0.184 | 0.206 | |
| BIC | 20648.403 | 4560.643 | 16190.955 | 3244.690 | 17418.771 | 5276.481 | 3387.821 | 8679.121 | 3522.316 | |

Notes: All models include industry and region dummies. Robust standard errors are reported in parentheses.

*, ** and *** asterisks denote statistical significance at 10%, 5% and 1% respectively

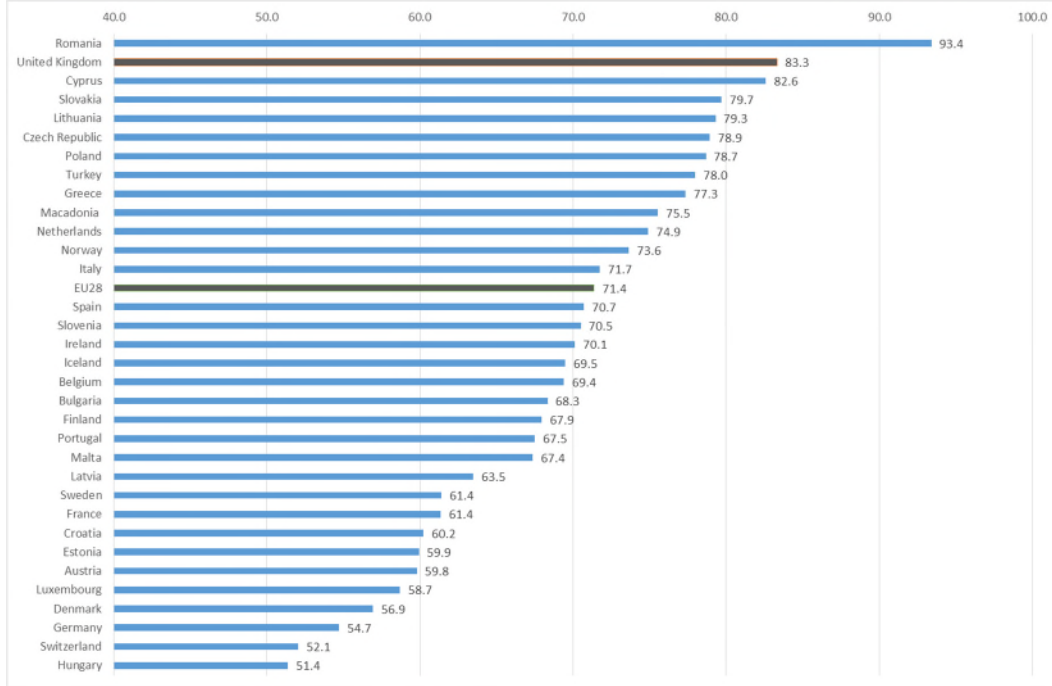
Table 6. Simultaneous estimation of innovation and growth intentions

| | (1) | (2) | (3) | (4) | (5) |
|------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Innovation Intentions | | | | | |
| Growthexp | 0.017*** (0.001) | 0.017*** (0.002) | 0.017*** (0.002) | 0.017*** (0.001) | 0.017*** (0.000) |
| Innpert | 0.661*** (0.067) | 0.661*** (0.104) | 0.661*** (0.100) | 0.661*** (0.073) | 0.661*** (0.063) |
| Age | -0.006** (0.003) | -0.006** (0.003) | -0.006** (0.003) | -0.006*** (0.002) | -0.006*** (0.001) |
| Breadth | 0.198*** (0.051) | 0.198*** (0.040) | 0.198*** (0.052) | 0.198*** (0.033) | 0.198*** (0.044) |
| Breadth2 | -0.014 (0.009) | -0.014** (0.006) | -0.014* (0.008) | -0.014 (0.009) | -0.014*** (0.003) |
| Export | 0.347*** (0.066) | 0.347*** (0.132) | 0.347*** (0.056) | 0.347*** (0.100) | 0.347*** (0.075) |
| Extfinance | 0.146* (0.081) | 0.146** (0.074) | 0.146*** (0.043) | 0.146* (0.076) | 0.146 (0.107) |
| Genadvice | 0.088 (0.057) | 0.088** (0.035) | 0.088 (0.069) | 0.088 (0.076) | 0.088*** (0.023) |
| Profitab | 0.109* (0.064) | 0.109 (0.081) | 0.109 (0.078) | 0.109*** (0.038) | 0.109*** (0.000) |
| Gender | 0.039 (0.055) | 0.039 (0.055) | 0.039 (0.077) | 0.039 (0.027) | 0.039 (0.026) |
| Constant | -1.356*** (0.135) | -1.356*** (0.087) | -1.356*** (0.105) | -1.356*** (0.082) | -1.356*** (0.174) |
| Growth Intentions | | | | | |
| Innpert | 7.161*** (1.426) | 7.161*** (1.018) | 7.161*** (1.406) | 7.161*** (1.014) | 7.161*** (1.357) |
| Growth | 0.118*** (0.027) | 0.118*** (0.007) | 0.118*** (0.024) | 0.118*** (0.020) | 0.118*** (0.035) |
| Age | -12.745*** (1.914) | -12.745*** (2.549) | -12.745*** (2.589) | -12.745*** (1.975) | -12.745*** (1.175) |
| Operatrat | 1.508 (1.431) | 1.508 (2.332) | 1.508 (1.253) | 1.508 (1.141) | 1.508* (0.873) |
| Innovcap | 7.266*** (1.498) | 7.266*** (2.133) | 7.266*** (1.885) | 7.266*** (1.556) | 7.266*** (0.622) |
| Extfinncap | -0.880 (1.408) | -0.880 (1.604) | -0.88 (0.1.786) | -0.880 (1.133) | -0.880 (1.229) |
| Opermanag | -1.810 (1.409) | -1.810** (0.763) | -1.810 (1.874) | -1.810 (1.793) | -1.810 (1.844) |
| Socmedia | 6.824*** (1.435) | 6.824*** (0.564) | 6.824*** (0.688) | 6.824*** (1.385) | 6.824*** (0.767) |
| Informalnet | 5.981*** (1.618) | 5.981*** (0.907) | 5.981*** (1.473) | 5.981*** (0.562) | 5.981*** (0.301) |
| Chamber | 0.138 (2.590) | 0.138 (4.997) | 0.138 (2.197) | 0.138 (4.578) | 0.138 (3.014) |
| Formalnet | 2.821 (1.768) | 2.821 (2.215) | 2.821 (2.073) | 2.821 (0.204) | 2.821*** (0.257) |
| Profitab | -0.489*** (0.082) | -0.489*** (0.056) | -0.489*** (0.076) | -0.489*** (0.185) | -0.489*** (0.121) |
| Constant | 26.448*** (3.354) | 26.448*** (2.949) | 26.448*** (3.204) | 26.448*** (5.995) | 26.448*** (1.910) |
| Lnsig_2 | 3.350*** (0.019) | 3.350*** (0.062) | 3.350*** (0.027) | 3.350*** (0.042) | 3.350*** (0.015) |
| Rho_12 | -0.062 (0.057) | -0.062 (0.060) | -0.062 (0.048) | -0.062* (0.033) | -0.062** (0.024) |
| N | 3969 | 3969 | 3969 | 3969 | 3969 |
| Chi2 | 1325.191 | 0.115 | 151.232 | 6627.925 | 1.35e+12 |
| P-value | 0.000 | 0.990 | 0.000 | 0.000 | 0.000 |
| BIC | 24679.623 | 24265.309 | 24331.600 | 24306.741 | 24257.023 |

Note: All models include industry and region dummies. Robust standard errors are reported in parentheses.

Robust Standard errors are corrected for sector, region, firm age and gender respectively
*, ** and *** asterisks denote statistical significance at 10%, 5% and 1% respectively

Figure 1: Proportion of own-account workers in the self-employed in the EU



Source: Eurostat labour market statistics database, 2015.

Figure 2. Innovation and Sales Growth expectations are shaped by past innovation and growth performance

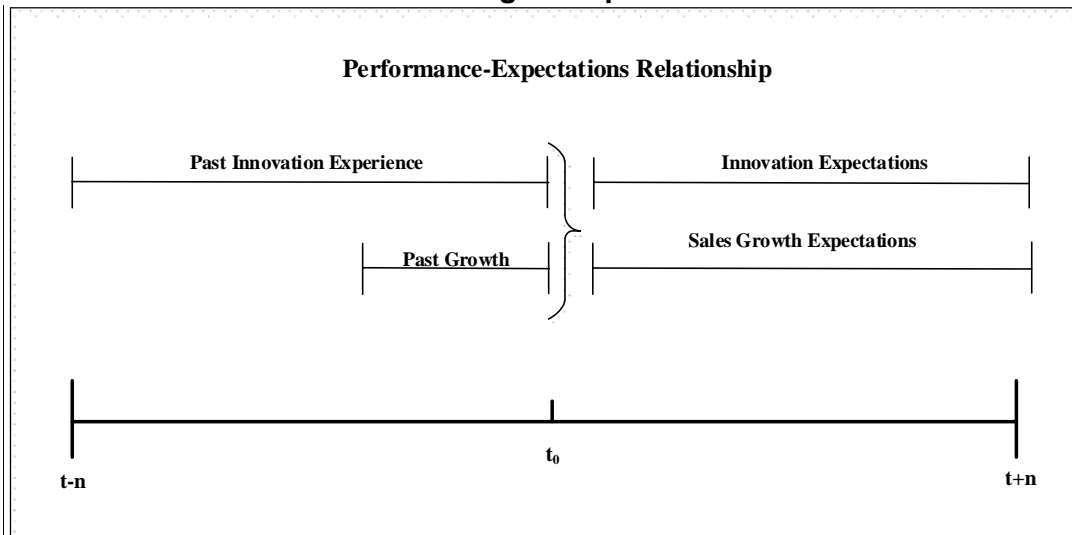
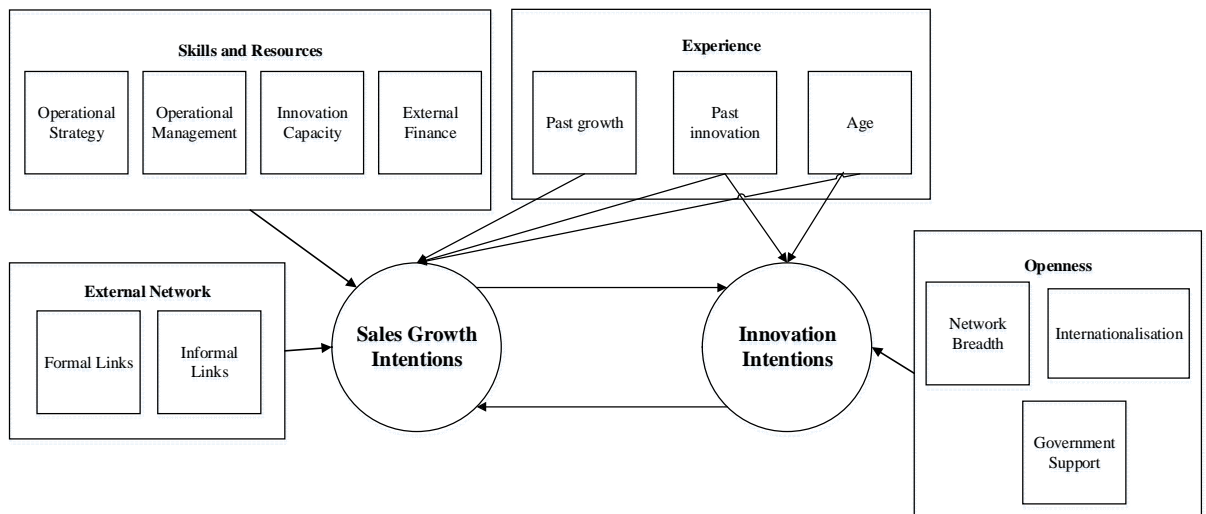


Figure 3. Abilities, Opportunities and Experience shaping the innovation-sales growth



REFERENCES

- Aghion, P., C. Harris, and J. Vickers. 1997. Competition and Growth with Step-by-Step Innovation: An Example. *European Economic Review* **41(3–5)**: 771–782.
- Ajzen, I. 1991. The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes* **50(2)**:179–211.
- Antonelli, C., F. Crespi, and G. Scellato. 2012. Inside Innovation Persistence: New Evidence from Italian Micro-Data. *Structural Change and Economic Dynamics* **23(4)**: 341–353.
- Austin, M.J. and M.M. Nauta. 2016. Entrepreneurial Role-Model Exposure, Self-Efficacy, and Women's Entrepreneurial Intentions. *Journal of Career Development* **43**:260-272.
- Bloom., N. and J., Van Reenen. 2002. Patents, real options and firm performance. *Economic Journal* 112: C97–C116.
- Bosma, N.; J. Hessels; V. Schutjens; M. Van Praag; and I. Verheul. 2012. Entrepreneurship and role models. *Journal of Economic Psychology* **33**:410-424.
- Buddelmeyer, H.; P.H. Jensen; and E. Webster. 2010. Innovation and the determinants of company survival. *Oxford Economic Papers-New Series* **62**:261-285.
- Capelleras, J.-L.; K.F. Mole; F.J. Greene; and D.J. Storey. 2008. Do more heavily regulated economies have poorer performing new ventures? Evidence from Britain and Spain. *Journal of International Business Studies* **39**.
- Cefis, E., and L. Orsenigo. 2001. The Persistence of Innovative Activities. A Cross-Countries and Cross-Sectors Comparative Analysis. *Research Policy* **30(7)**: 1139–1158.
- Cefis, E. 2003. Is There Any Persistence in Innovative Activities? *International Journal of Industrial Organization* **21(4)**: 489–515.
- Clausen, H., and M. Pohjola. 2013. Persistence of Product Innovation: Comparing Breakthrough and Incremental Product Innovation. *Technology Analysis & Strategic Management* **25(4)**: 369–385.
- Clausen., T. M., Pohjola. K., Sapprasert. and B., Verspagen. 201. Innovation strategies as a source of persistent innovation. *Industrial and Corporate Change* **21(3)**: 553-585.
- Coad, A. 2007. A closer look at serial growth rate correlation. *Review of Industrial Organization* **31**:69–82.

- Coad., A. and R., Rao. 2008. Innovation and firm growth in high-tech sectors: A quantile regression approach. *Research Policy* **37**: 633–648
- Coad., A. A., Segarra. and M., Teruel. 2013. Like milk or wine: does firm performance improve with age? *Structural Change Economic. Dynamics* **24**:173–189.
- Coad., A. A., Segarra. and M., Teruel. 2016. Innovation and firm growth: Does firm age play a role? *Research Policy* **45**: 387–400
- Collis, D. J. 1994. How Valuable Are Organizational Capabilities? *Strategic Management Journal* **15(8)**:143–152.
- Covin, J. G., and D.P., Slevin. 1991. A conceptual model of entrepreneurship as firm behaviour. *Entrepreneurship: Theory and Practice* **16(1)**: 7-24.
- Cucculelli., M. and B., Ermini. 2012. New product introduction and product tenure: What effects on firm growth? *Research Policy* **41**:808– 821
- Dahlander, L. and D.M., Gann. 2010. How open is innovation? *Research Policy*, **39**: 699-709.
- Davidsson, P. F., Delmar. and J., Wiklund. 2006. *Entrepreneurship and the growth of firms*. Cheltenham: Edward Elgar
- Deeds, D. L. 2001. The role of R&D intensity, technical development and absorptive capacity in creating entrepreneurial wealth in high technology start-ups. *Journal of Engineering and Technology Management*, **18**:29–47.
- Dellot, B. and H. Reed. 2015. *Boosting the living standards of the self-employed*. London: Royal Society of Arts.
- Delmar, F. and J., Wiklund. 2008. The Effect of Small Business Managers' Growth Motivation on Firm Growth: A Longitudinal Study. *Entrepreneurship Theory and Practice* **32(3)**:437–457.
- Department for Business Innovation and Skills. 2016. *Understanding self-employment*: BIS Enterprise Analysis research report. London.
- Djankov, S.; R. La Porta; F. Lopez-De-Silanes; and A. Shleifer. 2002. The regulation of entry. *Quarterly Journal of Economics* **117**:1-37.
- de Vries, N. and S. Kusters. 2014. *Determinants of innovative solo self-employment: A regional approach*. In GCW 2014. Turin.
- Emami., A. and D., Dinov. 2017. Degree of innovation and the entrepreneurs' intention to create value: a comparative study of experienced and novice entrepreneurs. *Eurasian Business Review*, Forthcoming

- Fernandez-Perez, V.; P.E. Alonso-Galicia; L. Rodriguez-Ariza; and M.D. Fuentes-Fuentes. 2015. Professional and personal social networks: A bridge to entrepreneurship for academics? *European Management Journal* **33**:37-47.
- Flaig, G., and M. Stadler. 1994. Success Breeds Success. The Dynamics of the Innovation Process. *Empirical Economics* **19(1)**: 55–68.
- Freel, M. S., and P. J. Robson. 2004. Small Firm Innovation, Growth and Performance. Evidence from Scotland and Northern England. *International Small Business Journal* **22(6)**:561–575.
- Fishcer, E. and A.R., Reuber. 2011. Social interaction via new social media: (How) can interactions on Twitter affect effectual thinking and behavior? *Journal of Business Venturing* 26: 1–18
- Geroski, P., J., Van Reenen. and C., F., Walters. 1997. How Persistently Do Firms Innovate? *Research Policy* **26(1)**: 33–48.
- Geroski, P.A., 2000. The growth of firms in theory and practice. In: Foss, N., Mahnke, V. (Eds.), *New Directions in Economic Strategy Research*. Oxford University Press, Oxford.
- Gkypali, A., A., Rafalidis, and K., Tsekouras. 2015. Innovation and Export Performance: Do Young and Mature Firms Differ? *Eurasian Business Review* **5**:397–415.
- Greeve., H.R. 2008. A Behavioural theory of firm growth: sequential attention to size and performance goals. *Academy of Management Journal* **3**:476–494.
- Gundry, L. K. and H.P., Welsch. 2001. The ambitious entrepreneur: High growth strategies of women-owned enterprises. *Journal of Business Venturing* **16**:453-470.
- Hamilton, B.H., 2000. Does Entrepreneurship Pay? An Empirical Analysis of the Returns of Self-Employment. *Journal of Political Economy*, **108(3)**:604-631
- Helfat ,C., and M.A. Peteraf. 2003. The dynamic resource based view: capability lifecycles. *Strategic Management Journal* **24 (October Special Issue)**: 997–1010
- Hessels, J., M., Van Gelderen. And R., Thurik. 2008. Entrepreneurial aspirations, motivations, and their drivers. *Small Business Economics* **31**: 323-339.
- Hermans, J.; J. Vanderstraaeten; A. Van Witteloostuijn; M. Dejardin; D. Ramdani; and E. Stam. 2015. Ambitious entrepreneurship: a review of growth aspirations, intentions and expectations. In *Entrepreneurial growth: individual, firm and region* **127-160**.

- Hewitt-Dundas, N and Roper, S (2017) 'Investigating a neglected part of Schumpeter's creative army: What drives new-to-the-market innovation in micro-enterprises?', forthcoming *Small Business Economics*.
- Huergo, E., and J., Jaumandreu. 2004. How does probability of innovation change with firm age? *Small Business Economics* **22:193–207**.
- Johannisson, B., 1990. Economics of Overview – Guiding the External Growth of Small Firms'. *International Small Business Journal* **9:32–44**
- Johnston, A Prokop, D Crone, M Masango, S and Lassalle, P (2017) 'Assessing the characteristics, determinants and spatial variations of internationalised new ventures in the UK'. Enterprise Research Centre, Research Paper No 56.
- Jovanovic., B. 1982. Selection and the evolution of industry. *Econometrica* **50: 649– 670**.
- Kim, M., and J. Hunter. 1993. Relationships among Attitudes, Intention and Behaviour. *Communications Research* **20(3):331–364**.
- Klepper, S. 1996. Entry, exit, growth and innovation over the product life cycle. *American Economic Review* **86:562–583**.
- Klette, T.J. and F. Johansen. 1998. Accumulation of R&D Capital and Dynamic Firm Performance: a not-so-Fixed Effect Model. *Annales de Economie et de Statistique* **49-50:389-419**.
- Koellinger, P. 2008. Why are some entrepreneurs more innovative than others? *Small Business Economics* **31:21–37**
- Krueger, N. F. and A. L. Carsrud. 1993. Entrepreneurial Intentions: Applying the Theory of Planned Behavior. *Entrepreneurship and Regional Development* **5(4):315–330**.
- Krueger, N. F., M. D. Reilly. and A. L. Carsrud. 2000. Competing Models of Entrepreneurial Intentions. *Journal of Business Venturing* **15(5-6):411–432**.
- Krueger, N. F. 2009. Entrepreneurial Intentions Are Dead: Long Live Entrepreneurial Intentions. In *Understanding the Entrepreneurial Mind: Opening the Black Box*. Eds. A. Carsrud and M. Brännback. Heidelberg: Springer, 51–73.
- Latham, W., and C. Le Bas. 2006. *The Economics of Persistent Innovation: An Evolutionary View*. Berlin: Springer.
- Laursen, L. and A., Salter. 2006. Open for innovation: The role of openness in explaining innovation performance among UK manufacturing firms. *Strategic Management Journal* **27(2): 131-150**.

- Le Bas, C. and G., Scellato. 2014. Firm innovation persistence: a fresh look at the frameworks of analysis. *Economics of Innovation and New Technology* **23:5-6**
- Levie, J., and E., Autio. 2013. Growth and growth intentions. ERC White Paper No.1
- Levie, J. 2016. *Business Growth Ambitions amongst SME leaders – changes over time and links to growth*. Final Report for the Department of Business Energy and Industrial Strategy, UK.
- Love, J. H., S., Roper. and P., Vahter. 2014. Dynamic complementarities in innovation strategies. *Research Policy*, **43(10): 1774–1784**.
- Mansfield, E., J., Rapoport. A., Romeo. E., Villani. S., Wagner. and F., Husic. 1977. *The Production and Application of New Industrial Technology*. Norton, New York.
- Macpherson., A. and R., Holt. 2007. Knowledge, learning and small firm growth: A systematic review of the evidence. *Research Policy* **36: 172–192**
- McKelvie., A. and P., Davidsson. 2009. From resource base to dynamic capability: An investigation of new firms. *British Journal of Management* **20:63–80**.
- McMullen, J. S. and D. Shepherd. 2006. Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review* **31:132–152**.
- Minniti, M., and W., Bygrave. 2001. A dynamic model of entrepreneurial learning. *Entrepreneurship Theory and Practice* **25: 5– 16**.
- Moreno., A. and J., Cassillas. 2008. Entrepreneurial Orientation and Growth of SMEs: A Causal Model. *Entrepreneurship Theory and Practice* **32(3):507-528**
- Nicholls-Nixon., C.L., A.C., Cooper. and C.Y., Woo. 2000. Strategic experimentation: understanding change and performance in new ventures. *Journal of Business Venturing* 15, 493–521.
- Office for National Statistics. 2014. *Self-employed workers in the UK - 2014*, ed. O.f.N. Statistics. London.
- Parker, S. 2004. Growth, innovation and exit. In *The Economics of Self-Employment and Entrepreneurship*. Cambridge University Press, Cambridge UK.
- Parker, S. 2006. Learning about the unknown: How fast do entrepreneurs adjust their beliefs? *Journal of Business Venturing* **21:1 – 26**.
- Penrose, E. T. 1959. *The Theory of Growth of the Firm*. Oxford: Blackwell.
- Peters, B. 2009. Persistence of Innovation: Stylized Facts and Panel Data Evidence. *Journal of Technology Transfer* **34(2): 226–243**.

- Plotnikova, M.; I. Romero; and J.A. Martinez-Roman. 2016. Process innovation in small businesses: the self-employed as entrepreneurs. *Small Business Economics* **47(4): 939–954**
- Raymond, W., P., Mohnen., F., Palm, and S.S. van der Loeff. 2010. Persistence of Innovation in Dutch Manufacturing: Is It Spurious? *Review of Economics and Statistics* **92: 495-504**
- Robinson, P., and E., Sexton. 1994. The effect of education and experience on self-employment success. *Journal of Business Venturing* **9:141-156**.
- Robson, S. and J. Achur. 2012. *First findings from the UK innovation survey, 2011*, ed. I.a.S. Department for Business. London.
- Robson, S. and L. Ortman. 2006. *First findings from the UK Innovation Survey 2005*. Economic Trends 628.
- Romero, I. and J.A. Martinez-Roman. 2012. Self-employment and innovation. Exploring the determinants of innovative behavior in small businesses. *Research Policy* **41:178-189**.
- Roper, S. 1997. Product innovation and small business growth: a comparison of the strategies of German, UK and Irish companies. *Small Business Economics* **9: 523–537**.
- Roper, S. and J., Love. 2002. Innovation and export performance: evidence from the UK and German manufacturing plants. *Research Policy* **31(7): 1087–1102**
- Roper, S. and N., Hewitt-Dundas. 2008. Innovation Persistence: Survey and Case-Study Evidence. *Research Policy* 37(1): 149–162.
- Roper, S.; J. Du; and J.H. Love. 2008. Modelling the Innovation Value Chain. *Research Policy* **37:961-977**.
- Rosenberg, N. 1982. Inside the Black Box: Technology and Economics. Cambridge: Cambridge University Press.
- Rosenbusch, N.; J. Brinckmann; and A. Bausch. 2011. Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs. *Journal of Business Venturing* **26:441-457**.
- Shane, S. E., Locke. and C.J., Collins. 2003. Entrepreneurial motivation. *Human Resource Management Review* **13(2):257–280**.
- Stam, E. and K., Wennberg. 2009. The roles of R&D in new firm growth. *Small Business Economics* **33:77-89**.
- Stenholm, P. 2011. Innovative Behavior as a Moderator of Growth Intentions. *Journal of Small Business Management* **49(2):233–251**

- Storey, D. J., 1994, *Understanding the Small Business Sector*, London, UK: Routledge.
- Stuart, T. 2000. Interorganizational alliances and the performance of firms: a study of growth and innovation rates in a high technology industry. *Strategic Management Journal* **21**: 791–811
- Ucbasaran, D., P., Westhead. and M., Wright. 2009. The extent and nature of opportunity identification by experienced entrepreneurs. *Journal of Business Venturing*, **24(2)**:99–115.
- Van der Ven., A. and D., Polley. 1992. Learning while innovating. *Organization Science* **3(1)**:92-116
- van Stel, A. and N. de Vries. 2015. The economic value of different types of self-employed: a review. *International review of entrepreneurship* **13**:73-80.
- Vivarelli, M., 2004. Are all the potential entrepreneurs so good? *Small Business Economics* **23**: 41–49.
- Wiklund, J. P., Davidsson., F., Delmar. and M., Aronsson. 1997. *Expected Consequences of Growth and Their Effect on Growth Willingness in Different Samples of Small Firms*. Paper presented at the Babson Kauffman Entrepreneurship Research Conference, Wellesley, MA, April 16–19.
- Wiklund, J., and D. Shepherd. 2003. Aspiring for, and Achieving Growth: The Moderating Role of Resources and Opportunities. *Journal of Management Studies* **40(8)**:1919–1941.
- Wiklund, J., H. Patzelt. and D. Shepherd. 2009. Building an Integrative Model of Small Business Growth. *Small Business Economics* **32(4)**:351–374
- Wright, M. and I. Stigliani. 2013. Entrepreneurship and growth. *International small business journal* **31**:3-22.
- Wolfe, M.T. and P.C., Patel. 2016. Grit and self-employment: a multi-country study. *Small Business Economics* **47**:853–874

Centre Manager
Enterprise Research Centre
Warwick Business School
Coventry CV4 7AL
CentreManager@enterpriseresearch.ac.uk

Centre Manager
Enterprise Research Centre
Aston Business School
Birmingham, B1 7ET
CentreManager@enterpriseresearch.ac.uk