The Role of Personal Factors in the Location Decision of Software Services Start-up Firms

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ABSTRACT This paper explores the factors which influence the business location decisions of start-ups, focusing in particular on the role of personal factors. Established explanations of industry location emphasize proximity to firms in the same or related industries and proximity to a wider set of business services, though recent research suggests that personal factors may play an important role in explanations of industry location—particularly in technology-enabled sectors. A survey of 97 new firms, founded between 2008 and 2012, in the Irish software services sector, shows that the business location decision is influenced by the personal motivation of entrepreneurs to attain a desired quality of life, and that this outweighs economic factors such as proximity to firms within the same or related industries, proximity to a broader set of supporting business services, infrastructure or the availability of government support schemes. Personal factors are particularly important to firms located outside the Dublin metropolitan area and to home-based businesses. This has important policy implications for national and regional governments seeking to encourage entrepreneurship in technology-enabled service sectors.

Keywords: industry location; software services; cloud computing; spatial planning; entrepreneurship policy

Introduction

The business location decisions, and resultant spatial patterns, of firms operating in services sectors such as software have increasingly been recognized as complex phenomena. Despite an increased number of empirical studies on the theme, the observed spatial patterns of knowledge-intensive business services (KIBS) firms still remain to be fully explained (Muller & Dolereux, 2009). Wood (2005, p. 437) points to a services-sector heterogeneity, characterizing the spatial pattern of KIBS firms as being “varied, flexible and
regionally distributed, although city-dominated", and notes that while marketing, advertising and financial services firms tend to be most concentrated in dominant city regions, computer services firms are more dispersed across prosperous regions. Camacho-Ballesta et al. (2014, p. 2109) conclude that, with respect to locational trends, “significant differences can be found not only between operational business services and KIBS but also within this last sub-sector of business services”. Muller and Zenker (2001) speak of a paradox within the knowledge-based economy: while enhanced communications technologies might be expected to render spatial proximity redundant, the exchange of tacit knowledge between services firms may still require some degree of proximity, at least in the early stages of their development.

The prominence of personal factors in the business location decision has been most evident among knowledge-intensive, high-technology firms. As Mason et al. (2011) note, remote cloud-based IT infrastructure platforms allow knowledge-intensive software services firms to scale up their product offerings without requiring large-scale capital investment. The benefits of these technologies include cost effectiveness, as users do not need to buy underlying software and hardware layers to develop and deploy applications, rapid scalability and security (Marston et al., 2011). Rigby (2008) captures this phenomenon quite succinctly: for these cloud-enabled service providers, “where there’s a signal, there’s a workplace” (as cited in Mason et al., 2011, p. 628). Technological advances, such as cloud computing, not only reduce capital requirements, infrastructure and associate skill-base requirements in establishing software services, they also enable greater worker and entrepreneur mobility (Lafuente et al., 2010). If it is the case that personal factors regarding quality of life can be as, or even more, decisive than economic factors such as cost minimization and productivity in determining the business locations of knowledge-intensive services firms, this has important implications for policy initiatives aimed at stimulating new firm formation and firm mobility: in order to fully realize their potential, business support schemes and incentives introduced at a national or regional level may need to be complemented by initiatives to improve the quality of life and amenities at a local level.

This study explores the factors that influence the location decisions of new software services firms. Specifically, it explores the impact of personal factors, such as the business founder’s desire to attain a certain quality of life and to reside in an attractive environment, on software services business location decisions and compares their influence to that of a set of location factors long established in location theory literature: namely, agglomeration economies derived from firm co-location. We expect that the proliferation of cloud-based IT platforms, which require little infrastructure or capital investment, presents the KIBS start-ups with a more nuanced location choice calculus, in which the benefits associated with, say, physical proximity to industry participants may be evaluated against the benefits derived from attaining desired quality of life goals. We suggest that if personal factors play a stronger role in business service location decisions than previously thought, this may contribute to the increased heterogeneity and diffusion in firm location patterns observed in the empirical studies referred to above.

This issue is explored in the context of the business location decisions of start-up companies in the Irish software services sector, based on the results of a survey of 97 Irish firms which were established between 2008 and 2012. Existing research on the Irish software sector has explored the role of institutional, government and competitive factors in explaining the origins of the sector, which was initially stimulated by foreign direct invest-
ment inflows in the 1990s, and the subsequent emergence of Irish-owned software firms (O’Riain, 1997, 1998; O’Malley & O’Gorman, 2001; Crone, 2002; Barry, 2008). This is an important context as the Irish software service sector consists of 1056 companies located in Ireland, which are predominantly small and medium-sized enterprises (SMEs) and employ a workforce of over 90,000. Of this population of firms, 806 are Irish-owned companies, employing over 10,000 workers. The sector is regarded as a high-growth sector, with Irish-owned firms averaging 6% growth per annum over the 6 years from 2007 to 2013 (ISA, 2013, 2014).

This paper is structured as follows: the second section provides an overview of the theoretical background relating to business location decisions; the third section outlines the data-gathering process and the attributes of the database generated from the respondents’ information; the fourth section provides an analysis of the location choice of the firms, with an emphasis on the issue of personal factors as a determinant of business location and the fifth section concludes with a discussion of the policy implications of the previous section’s findings.

Factors Influencing Industrial Location Decisions

Early theoretical understandings of the factors influencing industrial location decisions, emanating from Alfred Weber’s *Über den Standort der Industrien* (1909 [1929]), were very much formed in a traditional manufacturing context. Weber’s theory of optimal industry location, the first attempt to systematically analyse spatial concentration of industry, emphasizes the individual firm’s desire to minimize transport and labour costs, as well as to benefit from cost advantages arising from the external economies of scale inherent in a co-located, interdependent production system. However, as noted by Predoßl (1928, p. 386), despite Weber’s intention to formulate a general location theory, Weber’s focus on manufacturing industries dictated that “he must introduce all those assumptions that confine his investigations to manufacturing industries, such as given sources of raw materials, given locations of agriculture, and given consuming places”. Predoßl also points out that Weber’s theory is essentially an economic theory, predicated on the firm’s desire to minimize cost and substitute between factors of production.

The agglomeration factor in Weber’s theory—the concept devised by Marshall (1890), whereby a scale economy external to the individual firm benefits co-located firms—has had an enduring legacy and remains a prominent component in modern theories of industrial clusters and innovation systems. Marshallian agglomeration theory characterizes firms as having a tendency to concentrate geographically in order to avail of agglomeration externalities: efficiency gains arising from the pooling of specialized skills and increased specialization of input suppliers (Scott, 1988; Harrison, 1992; Gordon & McCann, 2000; Puga, 2010), as well as knowledge gains in the forms of technological spillovers, which involve informational or knowledge externalities due to the concentration of related firms, facilitating processes of learning and innovation in the locality (Malmberg & Maskell, 1997, 2002). The agglomeration literature also distinguishes between localization externalities accruing to co-located firms in a single industry, or set of closely related industries, and urbanization externalities which allow agents located in densely populated markets to take advantage of positive to inter-industry externalities, such as access to specialized services and public infrastructure (Jacobs, 1969; Fujita et al., 1999; Fujita & Thisse, 2002; Melo et al., 2009). Large urban areas also provide a knowledge infrastructure
that allows firms to “pick and mix” different knowledge inputs, such as marketing and commercial knowledge, information on regulation, standards, testing and finance, as they are required (Jacobs, 1969; Henderson, 2000; Simmie, 2004). That said, it is also recognized that beyond a certain threshold the emergence in urban areas of congestion, regulatory constraints or prohibitive property prices can lead to a “de-clustering” of industrial activity away from metropolitan centres to peripheral urban locations (Ciccone & Hall, 1996; Hansen & Winther, 2010).

Beyond cost minimization, agglomeration economies, the proclivity of knowledge-intensive firms to increasingly engage in collaborative innovation processes with publicly funded actors has seen institutional factors become more prominent in explanations of firm location decisions. The role of publicly funded infrastructure and business support initiatives as determinants of business location in their own right has been well documented. An example of capital incentives and research and development (R&D) subsidies attracting firms to lagging regions can be seen in Frenkel (2001). Bondonio and Greenbaum (2006) find a positive employment impact among SMEs from business incentives offered in the EU Objective 2 areas of Central and Northern Italy between 1995 and 1998. Of course, not all government initiatives are found to be effective: for example, Neumark and Kolko (2010) find that over the period 1992–2004 the enterprise zone programme implemented in California did not increase employment.

In the context of firm location, the systems of innovation literature, in particular, has sought to explain the spatial concentration of hi-tech industries by emphasizing the role of institutions and networks as conduits of knowledge flows among firms, as well as between firms and public sector actors such as research institutions and industrial development agencies (Freeman, 1987; Lundvall, 1992; Nelson, 1993). The role of policy initiatives in facilitating this system of innovation at a regional level has been set out in detail by Asheim and Isaksen (1997), who advocate context-specific, production systems-orientated regional policies directed towards the continuous upgrading of regional economic capabilities. The role of university–industry collaboration in the form of business incubators and public seed capital funds, as well as other forms of “bridging institutions” linking universities to industrial innovation has received a detailed treatment in Mowery and Sampat (2005). Similarly, the importance of science parks in assimilating technical knowledge and resources from adjacent universities, reducing start-up costs for new firms, and providing young firms with industry status and legitimacy has been well documented in a UK setting by Westhead and Batstone (1998).

**Personal Factors in Location Choices**

The changing nature of the production process in the latter half of the twentieth century, involving a movement from traditional Fordist manufacturing to knowledge-intensive hi-tech manufacturing and service provision has led to growing dissatisfaction with classical location theory (Karakaya & Canel, 1998). The development of flexible, modular production technologies has allowed technology-based enterprises, particularly those that are small to medium-sized, to engage in more fluid location decisions (Galbraith & DeNoble, 1988; Galbraith et al., 2008). Since the early 1980s, empirical studies have consistently pointed to the role of intangible qualitative factors (such as business climate, attitudes of the workforce, cultural attributes of the location and government policy orientation), in addition to quantitative cost factors.
Galbraith (1985), for example, finds that the location decisions of high-technology firms are influenced by a different set of factors to those of traditional manufacturing firms, with the availability of skilled personnel and the lifestyle considerations of the owner or CEO being the most salient decision factors. Central to this is the desire of entrepreneurs and skilled employees to live and work in a given area, based on an area’s climate, ambience, leisure and recreational opportunities; housing availability and quality; as well as family and child-rearing considerations (Malecki, 1987; Schmenner, 1987; Malecki & Bradbury, 1992; Sternberg & Arndt, 2001; Florida, 2002; Lafuente et al., 2010; Frenkel, 2012; Sleutjes & Schutjens, 2013). These findings are echoed in the recent Kimmelberg and Nicoll (2011) study of the Massachusetts medical devices industry, which finds that firm location decisions are influenced by both production considerations (availability of appropriately skilled labour) and quality of life issues (crime rates, access to highways and airports, proximity to universities and research institutes, housing costs).

An early recognition of the role of personal factors in business location decisions can be found in Galbraith and De Noble (1988). Galbraith and De Noble, in a study of 226 high-technology firms, find that smaller firms place more importance on “ambience” in their location decision than larger firms, who prioritized business-related factors. Ambience, in the Galbraith and De Noble study, refers to considerations such as climate and the desire of the firm’s CEO or owner to live in a given area, and these two factors were ranked as important or very important by 73% and 74% of the respondents, respectively. The only factor to rank higher than these two ambience factors in the location decision of the respondents was availability of technical employees—a further indication of the importance of both employees’ and entrepreneurs’ lifestyles and aspirations in the business location decision. Gottlieb (1995), in a study of municipalities in New Jersey, finds that the importance of residential amenities extends beyond attracting residents to a given location: firms may evaluate business location choices in terms of how attractive that location is to prospective employees.

These factors have been shown to be particularly influential in the location decisions of IT entrepreneurs and small-scale, footloose, knowledge-based services firms (Love & Crompton, 1999). As Love and Crompton outline, the principal assets of these enterprises are ideas and high-skilled professional personnel rather than inventory or capital equipment. A business location that meets the socio-psychological needs of its employees can enhance a firm’s recruitment and employee retention capabilities, as well as yielding higher workforce productivity (Scanlon, 1984; Taylor, 1987). Love and Crompton (1999) is indicative of the growing body of literature that has recognized “quality of life” as an important element in the business location decision. In their study of the key decision-makers from 174 businesses in Colorado which had relocated, expanded or been launched within a five-year period, quality of life emerged as the most important factor for firms with fewer than eight employees, and employing a high proportion of professionals, moving into Colorado from outside the state. A recent reaffirmation of these findings can be seen in Lafuente et al. (2010), who find, in a study of 150 KIBS firms in Catalonia, that entrepreneurs who locate their businesses in rural areas attach greater importance to personal motives, such as desire to attain a certain quality of life or lifestyle, than to local economic conditions, institutional framework or local infrastructure. Similarly, in their study of the capital investment decisions of SMEs in Dutch municipalities, Sleutjes and Schutjens (2013) find that some “neighbourhood effects” outweigh market factors.
A number of explanations have been put forward as to why qualitative factors, such as ambience, impact the firm’s location decision. For example, Galbraith et al. (2008) attribute this phenomenon to “differentiation” as a competitive strategy, whereby high-tech firms compete not on costs but the development of differentiated products, and as such place a premium on locational factors such as ambience which provide a means of attracting and retaining highly qualified technical staff. A competing explanation which emphasizes individual quality of life preferences rather than firm-specific competitive strategies can be found in the “creative class” thesis of Florida (2002), which has stirred up much debate in recent years. Florida posits that firm location decisions are influenced by the mobility of highly educated, high-income workers and entrepreneurs active in “creative industries”, who choose to reside in what they consider to be vibrant, diverse locations.

In what follows, the role of personal factors in influencing business location decisions is explored via a quantitative analysis of data generated from the survey responses of 97 Irish-owned software services firms established between 2008 and 2012. We expect that the nature of these firms, which require little infrastructure or capital investment, might result in personal factors playing a stronger role in business service location decisions, and that this may explain the increased heterogeneity and diffusion in firm location patterns observed in existing research. The influence of personal factors in the business location decision of these firms is compared to the impact on the business location decision of agglomeration economies derived from firm co-location as per the literature discussed above, namely industry-specific factors; general business factors; infrastructure and government assistance. The importance of personal factors is then analysed for groups of firms based on location (Dublin City, Rest of Ireland) and for firms by type of location (commercial premises, residential property and university start-up incubator/seed accelerator programme/enterprise campus).

**Method and Data Sources**

**Data Collection**

Data on the factors that influenced location decisions in software services start-ups were collected via an online survey administered from March to October 2013. As no one source of the population of software service firms exists, the population of firms was derived from business mailing lists acquired from commercial list brokers. The lists included software service firms registered with the Irish Companies Registration Office within the five-year period of 2008–2012. These lists were supplemented with existing lists of contact details for founders and management of software services firms participating in Irish accelerator programmes and incubation centres. An invitation to complete an online survey was sent (by e-mail) to 794 Irish-owned software services firms identified. In all, 102 firms established between 2008 and 2012 completed the questionnaire. When invalid responses were removed, the data set of useable observations numbered 97 firms (12%). The size of our data set (97 firms) is in keeping with a recent survey of the Irish software sector undertaken by Irish Software Association (ISA), AIB and Amárach Research (AIB, 2014), which was based on 106 firms. The AIB (2014) survey estimates that 40%, of Irish-owned software services firms have been in business for less than 5 years. This suggests that approximately 320 Irish-owned firms have been in operation for 5 years or less. Taking this as a benchmark,
our data set of 97 firms is statistically representative at a 90% confidence level with a confidence interval of 7%.

Our data set of early stage software services companies reflects the profile of the population of 728 Irish-owned software services firms constructed by the ISA in that they are small and predominantly based in the North Leinster region (Dublin and the surrounding counties). ISA (2014) notes that 75% of all Irish-owned software firms have less than 50 employees; 70% report annual revenues of less than €1 million and 65% of the firms are located in North Leinster (Dublin and the surrounding counties). The respondent firms in our survey are small, all having less than 50 employees, with 89% of them having less than 10 employees, and an overall average of 4.4 employees. As detailed in the next section, 72% of the firms in our study are located in county Dublin. Collectively these firms report a combined total employment of 429 full-time, or full-time equivalent, employees. In terms of annual turnover, 39% of firms report that they are not currently generating an annual turnover, while a further 46% of firms report a current annual turnover of less than €250,000.

There are a number of distinctive characteristics of our data. First, the focus of the study is on those involved in the location decision. The respondents are predominantly the founder of the firm in question (96%), with the remaining 4% holding a senior position in the business. Ninety-seven per cent of the respondents report that they were involved in the decision-making process regarding the current location of the firm, which addresses the criticism of such surveys by Harding (1989) that the respondents are often not an individual within the company directly involved in the location decision. Second, by focusing on start-ups, we address a further criticism on firm location research raised by Harding (1989): that the location decision of the individuals surveyed may not have taken place in the recent past. All the firms in our data set were established between 2008 and 2012. This five-year window is in keeping with the work of Love and Crompton (1999). Third, the firms included in this study, software services firms, are distinct from previous empirical studies of location decisions within the services sector, which have typically focused on relatively broader sectoral groupings, such as business services. For example, Camacho-Ballesta et al. (2014) study the business services sector, comprising renting of machinery and equipment without an operator, and renting of personal and household goods; computer and related activities; R&D and other business activities; and even Muller and Dolereaux’s (2009) narrower focus on KIBS includes firms with computer and related activities, R&D and other business services.

Variables and Analysis

The focus of the study is on the factors that are important in the location decision in start-ups. Respondents were asked to rank the importance of factors in terms of their current location. The set of factors which the firms were asked to rate correspond with those factors prominent in the theoretical discussion of firm location determinants presented in the second section: (i) government assistance, (ii) personal factors, (iii) industry-specific factors, (iv) general business factors and (v) infrastructure. For each factor a number of sub-factors were presented. Participants were required to rate or score the factors based on importance rather than to rank the factors relative to each other. The responses were captured using a Likert scale, where: 1 is “not at all important”; 2 is “low importance”; 3 is “neither important nor unimportant”; 4 is “moderately important” and 5 is “very important”.
Firm location is considered in terms of geographic location and in terms of types of premises (commercial premises; residential property; university start-up incubator; space provided as a seed accelerator programme or an enterprise campus). In terms of the geographic location of the sample of firms, 72% of the firms are located in county Dublin (the equivalent of a Nomenclature of Units for Territorial Statistics (NUTS) 4 region or local administrative unit, LAU-1, in Eurostat terminology), of which 55% are located in the city of Dublin. For the purposes of this study, a business located within Dublin city is regarded as having a metropolitan location. This allows us to compare the role of personal factors in the business location decision of metropolitan and non-metropolitan firms. Thus, the spatiality of this study is closer in spirit to that of the Lafuente et al. (2010) study of the location decisions of rural Catalan knowledge-based businesses, as opposed to EU-wide studies which extend across large sets of NUTS 2 administrative regions. In terms of types of premises, the firms operate from a variety of types of business premises: 39% are located in a university start-up incubator, space provided as a seed accelerator programme or an enterprise campus; 36% are based in commercial premises and 25% are run from a residential property.

Data were also collected on firm size (employment and turnover) and age (year of start-up) and on the respondent’s role (founder and senior manager), employment status in the firm (full-time and part-time), gender, age, nationality and education. The respondents mostly derive full-time employment from their firm (73%). Eighty-one per cent of the respondents are male and 40% of the respondents are between the age of 25 and 40, with only a small proportion of respondents being under 25 (3%) and a sizeable proportion being over 41 years of age (42%). The respondents are predominantly Irish (90%), with 4% denoting the UK as their place of origin and 6% indicating their origins as outside of Ireland and the UK. Regarding highest education level achieved, 81% of the respondents have completed tertiary education, be it undergraduate level (29%), or postgraduate qualification (52%). The data are analysed using Pearson chi-squared ($\chi^2$) tests in order to provide statistical comparisons between groups of firms.

Results

New Firms’ Location Choices in Irish Software Services Start-ups

The most important factor in the firms’ current location is personal factors relating to the respondent. Table 1 presents the mean scores, standard deviations and frequencies for each of the location factors for (i) all firms, (ii) firms located in the Dublin (metropolitan) area and other areas and (iii) firms based in each of three types of premises: university start-up incubator, space provided as a seed accelerator programme or enterprise campus; business premises and residential premises (Table 1). Personal factors were most highly rated in the location decision of the firms surveyed. Sixty-nine respondents (71%) rated personal factors as either very important or moderately important, yielding an overall average score of 3.99 (Table 1). In comparison, 43 respondents (44%) rated industry-specific factors as either very important or moderately important, while 32 respondents (33%) rated general business factors as either very important or moderately important. This yielded average ratings of 3.08 and 2.64 for industry-specific factors and general business factors, respectively. The role of infrastructure in the location decision received a mean score of 2.89. Government assistance received the lowest mean score (2.46) from
respondents, with 25 respondents (26%) rating government assistance as either very important or moderately important. Thirty-six respondents (37%) rated government assistance as not at all important, compared to only 3 respondents (3%) rating personal factors as not at all important.

The findings presented in Table 1 can be further disaggregated to reveal that the role of personal factors in the business location choice of Irish software services firms is associated with particular location types. While personal factors receive the highest mean rating from respondents (3.99), the 53 respondents located outside of Dublin city bestow a higher mean rating (4.18) to personal factors than those respondents based within Dublin city (3.83). In terms of premises type, those firms which operate from the founder’s residence bestow a higher mean rating to personal factors (4.38) than those firms located in commercial premises or within university incubator, accelerator programme or enterprise campus facilities. These issues are explored further in Table 5 and discussed below.

Table 1. Determinants of current business location

|                              | Government assistance Mean (standard deviation) | Infrastructure Mean (standard deviation) | Industry-specific factors Mean (standard deviation) | General business factors Mean (standard deviation) | Personal factors Mean (standard deviation) |
|------------------------------|-----------------------------------------------|------------------------------------------|---------------------------------|-----------------------------------------------|---------------------------------------------|
| All firms (n = 97)           | 2.46 (1.45)                                   | 2.89 (1.31)                              | 3.08 (1.43)                     | 2.64 (1.44)                                   | 3.99 (1.16)                                 |
| **Frequency:**               |                                               |                                          |                                 |                                               |                                             |
| Not at all important         | 36                                            | 18                                       | 21                              | 31                                            | 3                                           |
| Low importance               | 19                                            | 22                                       | 12                              | 18                                            | 11                                          |
| Neither important nor unimportant | 17                                           | 23                                       | 21                              | 16                                            | 14                                          |
| Moderately important         | 11                                            | 21                                       | 24                              | 19                                            | 25                                          |
| Very important               | 14                                            | 13                                       | 19                              | 13                                            | 44                                          |
| **Firms by location:**       |                                               |                                          |                                 |                                               |                                             |
| Dublin (metro) (n = 53)      | 2.62 (1.48)                                   | 2.98 (1.28)                              | 3.32 (1.46)                     | 2.98 (1.43)                                   | 3.83 (1.17)                                 |
| Rest of Ireland (n = 44)     | 2.27 (1.40)                                   | 2.77 (1.36)                              | 2.80 (1.34)                     | 2.23 (1.36)                                   | 4.18 (1.13)                                 |
| **Type of premises:**        |                                               |                                          |                                 |                                               |                                             |
| University incubator/accelerator programme/enterprise campus (n = 38) | 2.92 (1.60)                                  | 2.95 (1.31)                              | 3.26 (1.37)                     | 3.13 (1.46)                                   | 3.87 (0.96)                                 |
| Commercial (n = 25)          | 2.20 (1.41)                                   | 3.00 (1.31)                              | 3.00 (1.43)                     | 2.49 (1.40)                                   | 3.86 (1.38)                                 |
| Residential (n = 24)         | 2.13 (1.08)                                   | 2.63 (1.35)                              | 2.92 (1.53)                     | 2.08 (1.28)                                   | 4.38 (1.06)                                 |

Notes: Ratings: 1 = not at all important; 2 = low importance; 3 = neither important nor unimportant; 4 = moderately important; 5 = very important. No. of respondents: 97.
Given that respondents rated personal factors as the most important determinant of their current location, we explore this in detail (Table 2). Respondents were asked to rate the following personal factors in terms of their importance in their location decision: place of birth; attractive environment; quality of life; business primary location in residential home; family location and location of your secondary or tertiary education. Of those respondents who rated personal factors as very important or moderately important in their location decision (69), 55 (80%) respondents rated quality of life as a personal factor that was either very important or moderately important in the location decision (mean score of 4.40). Other personal factors to rate highly in terms of importance were attractive environment and family location (rated as either very important or moderately important by 51 (74%) respondents and 48 (70%) respondents with mean scores of 4.08 and 4.13, respectively). Personal factors which appeared to be of lesser importance to respondents in terms of their current business location decisions were those relating to their upbringing (place of birth and proximity to secondary or tertiary education) and whether or not their residential home was the primary location of their business. Firms located in their residential home are prominent in our data set (25% of the respondents operate their business from their private residence). Despite this, it would appear that attaining a desired quality of life, rather than developing a home-based business, is the primary consideration among those respondents who cite personal factors as being either very important or moderately important in their business location decision.

Personal factors might matter more to some respondents, reflecting their employment commitment to the firm (full-time or part-time), or personal characteristics such as gender, age or education. In order to gain further insights into the phenomenon of personal factors being the most important factor in the location of our set of software services firms,

| Place of birth | Attractive environment | Quality of life | Business primary location in residential home | Family location | Location of secondary or tertiary education |
|----------------|------------------------|----------------|-----------------------------------------------|----------------|---------------------------------------------|
| Mean rating    | 2.68                   | 4.08           | 4.40                                         | 3.35           | 4.13                                        | 2.63                                        |
| Standard deviation | 1.36                | 0.84           | 0.79                                         | 1.34           | 1.06                                        | 1.20                                        |

Frequency:

Not at all important: 17 0 0 5 1 16
Low importance: 8 4 2 11 6 7
Neither important nor unimportant: 13 7 6 15 6 21
Moderately important: 14 31 20 8 19 13
Very important: 5 20 35 16 29 2
None of the above: 8 3 2 10 4 6
Invalid/missing: 4 4 4 4 4 4

Notes: Not all columns add to 69 respondents, due to invalid/missing responses to this particular question. Ratings: 1 = not at all important; 2 = low importance; 3 = neither important nor unimportant; 4 = moderately important; 5 = very important.
a set of personal attributes of the respondents and business attributes of their firms are analysed. The attributes in question are analysed for those respondents who rated personal factors as very important (44) and the remaining respondents (53). Pearson $\chi^2$ tests are undertaken to evaluate how likely it is that any observed difference in personal factor rating by attribute type has arisen by chance. When the gender, age, highest education levels attained and current employment status within their firm of both respondents who cite personal factors as very important and the remaining respondents are analysed, it is clear from the insignificant Pearson $\chi^2$ statistics that there are no significant differences between personal factor ratings in terms of these characteristics (Table 3).

While the firms in our sample are all small in terms of revenues and employment, smaller firms might place greater emphasis on personal factors. However, the importance of personal factors does not differ by firm size, whether measured by employment or by revenue (Table 4). The average number employed in firms that cite personal factors as very important is 4.18, compared to 4.62 for all other firms. In terms of turnover of firms that cite personal factors as very important, 77% (34 firms) have turnover of less than €100,000, compared to 68% (36 firms) for all other firms. That is, there are no significant differences, in terms of the importance placed on personal factors, evident across average employment size (insignificant $t$-test) or turnover ranges (insignificant Pearson $\chi^2$).

However, there are significant differences when type of business premises and geographical location of firms are taken into account (Table 5). In terms of the type of business premises, 63% of those firms utilizing a residential property as a business premises rated personal factors as very important in their business location decision, while of those firms

### Table 3. Personal characteristics of respondents

|                        | Respondents who rated personal factors as very important (44) | Other respondents (53) |
|------------------------|---------------------------------------------------------------|------------------------|
| Gender                 |                                                               |                        |
| Male                   | 35                                                             | 44                     |
| Female                 | 8                                                              | 9                      |
| Pearson $\chi^2$       | $= 0.04$                                                       |                        |
| Age                    |                                                               |                        |
| 18–24 years            | 1                                                              | 2                      |
| 25–30 years            | 4                                                              | 10                     |
| 31–40 years            | 18                                                             | 21                     |
| Over 40 years          | 21                                                             | 20                     |
| Pearson $\chi^2$       | $= 2.34$                                                       |                        |
| Highest level of       |                                                               |                        |
| education attained     |                                                               |                        |
| Second level           | 5                                                              | 5                      |
| Certificate or Diploma | 4                                                              | 4                      |
| Undergraduate Degree   | 12                                                             | 16                     |
| Postgraduate Degree    | 23                                                             | 28                     |
| Pearson $\chi^2$       | $= 0.23$                                                       |                        |
| Current Employment     |                                                               |                        |
| status within firm     |                                                               |                        |
| Full-time              | 30                                                             | 43                     |
| Part-time              | 14                                                             | 10                     |
| Pearson $\chi^2$       | $= 2.50$                                                       |                        |

Notes: Pearson $\chi^2$ statistics presented above insignificant unless indicated otherwise (significance at 0.10, 0.05 and 0.01 levels denoted by *, ** and ***, respectively). One respondent did not indicate gender.
located in a university incubators, accelerator programmes or enterprise campuses, only 29% of firms rated personal factors as very important in their business location decision. For those located in commercial premises, 50% related personal factors as very important. The Pearson $\chi^2$ statistic indicates that these differences placed on the importance of personal factors by firms located in distinct business premises types are significant at the 5% level.

Furthermore, those firms located outside of the metropolitan area appear to be more likely to rate personal factors as very important. As illustrated in Table 5, of those firms located within Dublin city, 36% of respondents rated personal factors as a very important factor in their business location decision. However, of those firms located outside of Dublin City, the importance attached to personal factors is higher, with 57% of those

| Table 4. Employment and turnover of firms |
|-----------------------------------------|
|                                        |
| Respondents who rated personal factors as very important (44) | Other respondents (53) |             |
|-----------------------------------------|
| Employment                              |                       |             |
| Total employed                          | 184                   | 245         |
| Average employed per firm               | 4.18                  | 4.62        |
| Standard deviation                      | 6.98                  | 5.79        |
| $t$-Stat: 0.34 (5% significance level, two-tailed) | | $p$-value: 0.73 |
| Turnover                                |                       |             |
| No sales                                | 16                    | 22          |
| Less than €100 k                        | 18                    | 14          |
| €100 k–€250 k                           | 5                     | 8           |
| €250 k–€1 mil                           | 3                     | 6           |
| €1 mil–€5 mil                           | 2                     | 3           |
| Pearson $\chi^2 = 2.66$                 |                       |             |

Note: Pearson $\chi^2$ and $t$-test statistics presented above insignificant unless indicated otherwise (significance at 0.10, 0.05 and 0.01 levels denoted by *, ** and ***, respectively).

Table 5. Current business premises and location

| Current business premises                  | Respondents who rated personal factors as very important (44) | Other respondents (53) | Total (97) |
|-------------------------------------------|---------------------------------------------------------------|------------------------|------------|
| University incubator/accelerator programme/enterprise campus | 11 (29%)                                                      | 27 (71%)               | 38 (100%)  |
| Commercial premises                       | 18 (51%)                                                      | 17 (49%)               | 25 (100%)  |
| Residential property                      | 15 (63%)                                                      | 9 (38%)                | 24 (100%)  |
| Pearson $\chi^2 = 7.49^{**}$              |                                                               |                        |            |
| Current business location                  | Respondents who rated personal factors as very important (44) | Other respondents (53) | Total (97) |
| Dublin (metro)                            | 19 (36%)                                                      | 34 (64%)               | 53 (100%)  |
| Rest of Ireland                           | 25 (57%)                                                      | 19 (43%)               | 44 (100%)  |
| Pearson $\chi^2 = 4.27^{**}$              |                                                               |                        |            |

* For Pearson $\chi^2$ statistic, significance at 0.10 level, ** For Pearson $\chi^2$ statistic, significance at 0.05 level, *** For Pearson $\chi^2$ statistic, significance at 0.01 level.
firms located outside of Dublin city rating personal factors as very important in their business location decision. The Pearson $\chi^2$ statistic indicates that these differences in the rating attached to personal factors by firms within and outside the metropolitan area are significant at the 5% level.

**Conclusion**

While established explanations of industry location emphasize proximity to firms in the same or related industries and proximity to a wider set of business services, this study explores the influence of personal factors, such as the business founder’s desire to attain a certain quality of life and to reside in an attractive environment, in the business location decisions of start-up firms in the Irish software services sector. This study focuses on a context where firms might have flexibility in their business location decisions and where traditional explanations of industry location might not apply. By utilizing cloud-based platforms, software service firms may have reduced infrastructure and capital investment needs and may be able to access services and customers through cloud-based platforms.

This study extends existing research on firm location decisions by showing that in the context of new firms in software services in Ireland, personal factors are the most important factor cited by entrepreneurs in determining their current business location. The importance of personal factors in the business location decision may explain the increased heterogeneity and diffusion in firm location patterns observed in the empirical studies of technology sectors. By studying the key decision-maker in young firms (and therefore a recent decision) in a sub-sector of business services, this study overcomes some of the limitations identified in prior studies of location decisions (Harding, 1989; Camacho-Ballesta et al., 2014).

Three insights can be gleaned from our analysis. First, the findings of this paper highlight that, for many founders of software services firms, personal motivations, such as the individual’s desire to attain a certain quality of life for him/herself and his/her family, tend to outweigh other factors such as industry-specific factors, general business factors, infrastructure and government assistance in the business location decision. Personal factors were rated as either very important or moderately important in determining business location by 71% of respondents, as compared to 44% for industry-specific factors and 33% for general business factors. Government assistance was indicated to be the least important factor in the business location decision.

Second, of the findings shown within the set of personal factors analysed in this study, some are of particular importance. Of those respondents who identified personal factors as either very important or moderately important in their business location decision, the desired quality of life of the respondent was indicated by the respondents to be a particularly influential personal factor. An attractive environment and family location were also found to be influential personal factors. In contrast, factors relating to the upbringing of entrepreneurs (place of birth and proximity to secondary or tertiary education) or business-related factors (whether or not their residential home was the primary location of their business) were less influential. Third, the importance of personal factors depends on geographical location and type of premises. Firms located outside of a metropolitan centre and firms operating from a residential property exhibited a higher likelihood to rate personal factors as a very important factor in their business location choice.
The prominence of personal factors in the business location decision has important implications for industrial and entrepreneurship policy. From a policy perspective, entrepreneurs who seek to establish their own business may require a distinct set of government support structures than those currently on offer. As the National Endowment for Science, Technology and the Arts (NESTA) note in the UK context, such business founders are not currently well served by the existing publicly supported infrastructure for innovation such as science parks and innovation incubators (Mahroum, 2010). NESTA advocate greater provision of “innovation kiosks”, which would provide timely and on-demand access to various sets of resources including access to a much needed social environment and peers. This would appear to be indicative of the need for government support programmes to keep pace with the greater flexibility and “footloose-ness” of software services firms in a cloud-enabled world.

At a sub-national level, an emphasis on personal motivations in the business location decisions of new firms has implications for regional development policy: if industrial synergy and technology transfer via spatial proximity are of lesser importance than, say, the individual software services entrepreneur’s desire to attain a certain quality of life for him/herself and his/her family, then this sector has greater potential to develop a decentralized location pattern. This may be good news for regional policy-makers who can complement business support schemes and incentives introduced at a national level with initiatives to enhance quality of life, environmental factors and amenities at a local level.

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Notes

1. Similarly, the Keeble and Nachum (2001) study of 300 business services SMEs across South East England identifies the co-existence of a Central London neo-Marshallian cluster which benefits from proximity to clients and collective learning, and a decentralized pattern of business services firms across South East England which operates independently of the London cluster.

2. The National Institute of Standards and Technology (NIST) defines cloud computing as “a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Mell & Grance, 2011, p. 2). Cloud computing is regularly cited within the European Union (EU) as a strategic economic enabler contributing to GDP, employment and innovation (Etro, 2009; Pierre Audoin Consultants, 2010; Deloitte, 2011; IDC, 2012; Leimbach et al., 2014).

3. Bieri provides a review of empirical studies assessing the relationship between Florida’s creative class theory and economic growth (2010).

4. In the terminology of the OECD–EU definition of cities in Europe, the urban centre population size of Dublin is ranked as extra-large (XL: 500,000–1,000,000). One Irish city (Cork) is ranked as medium (M: 100,000–250,000) and three (Galway, Limerick and Waterford) as small (S: 50,000–100,000).
See Dijkstra and Poelman (2012) for further details: http://ec.europa.eu/regional_policy/sources/docgener/focus/2012_01_city.pdf

5. See, for example, Rubalcaba and Gago (2003) and Camacho-Ballesta et al. (2014). The NUTS is a geocode standard developed and regulated by the EU for referencing the subdivisions of EU member states. NUTS 2 is the second sub-level of the statistical hierarchy. The number of NUTS 2 regions within a given EU member states varies considerably in terms of population density and surface area: with Germany (39), UK (37), France (27) and Italy (21) comprising the largest number of NUTS 2 regions, while Portugal (7), Denmark (5), Finland (5) and Ireland (2), for example, comprise considerably fewer. See http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/introduction for further details.

6. Accelerator programmes are typically mentoring programmes of a 3–6-month duration provided for a cohort of companies in exchange for an equity share. Incubator programmes generally last for a longer duration and provide mentorship and support for individual companies (Bound & Miller, 2011).

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