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# Entrepreneurial motivation and idea generation by displaced employees

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## **Entrepreneurial motivation and idea generation by displaced employees**

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### **Abstract:**

This paper studies the entrepreneurial motivation and idea generation process of displaced employees. The empirical results are based on both quantitative (survey) and qualitative (interviews) data collected from displaced employees who decided to become entrepreneurs after the closure of R&D facilities of the pharmaceutical company AstraZeneca in Lund (2010) and Södertälje (2012), Sweden. The empirical findings show that the previous experience and expertise gained from AstraZeneca greatly influenced the idea generation process. Although the employees were affected by their job displacement, still 70 percent of the entrepreneurial activities could be regarded as opportunity-based, suggesting that many entrepreneurs are driven by a combination of push and pull motives. With regard to the timing of the idea generation process, about one third of the entrepreneurs came up with their business ideas before learning about the facility closures. Hence, in many cases, being affected by the displacement spurred the launch of ideas that already existed.

**Keywords:** Entrepreneurship, firm closure, firm exit, entrepreneurship after displacement, entrepreneurial idea generation.

**JEL-codes:** J63, L26

## 1. Introduction

As the economy develops, new entrepreneurial ventures are created, while others close. The fierce market competition makes the formation of competitive business models, innovative solutions and new entrepreneurial ventures crucial to ensure that the economy continually flourishes. This continued economic renewal causes job displacement, i.e., involuntary job loss because of economic fluctuations or structural changes. Millions of people face displacement each year. According to OECD (2013), job displacement affects 2–7 percent of employees each year. However, business closures and displacements may also spur new entrepreneurial ventures. According to Nyström (2018), after displacement, between 2–6 percent of Swedish displaced employees decided to become entrepreneurs during the 2001–2009 period. The entrepreneurial ventures created by displaced workers may be necessity-based, i.e., driven by the threat of joblessness or opportunity-based, i.e., motivated by a desire and willingness to explore an innovative idea.

Entrepreneurship researchers have for decades devoted a lot of attention to the entrepreneurial decision making process providing us with knowledge about when, where and by whom entrepreneurial opportunities are discovered, evaluated and exploited (see e.g. Shane and Venkataraman, 2000). Nevertheless, there are still some important knowledge gaps to be filled in this literature. As noted by Shepherd et al. (2015), previous literature has predominantly had a static perspective regarding entrepreneurs' evaluation of opportunities. Future contributions in the research field are likely to acknowledge that entrepreneurial motivation can change over time affecting the decision to become an entrepreneur. Furthermore, Shepherd et al. (2015) note that our understanding of how entrepreneurial decision-making interacts with the organization's setting is limited. According to Maggitti et al. (2013), literature on innovative search processes generally

focuses on organizational search processes, and very few studies examine individuals' search processes. In addition, according to Hoetker and Agarwal (2007), empirical findings on the knowledge transfer associated with business closures are limited. Finally, Caliendo and Kritikos (2009) note that the literature provides much more information about pull factors than push factors regarding entrepreneurial motivation processes. These limitations are unfortunate because the entrepreneurial ventures that are created after displacement can be expected to entail important knowledge transfers. Hence, this paper intends to contribute to our knowledge regarding the knowledge spillover, idea generation and entrepreneurial decision making processes related to becoming an entrepreneur post-displacement.

For this purpose, this paper will study the displaced employees that started their own businesses after the closure of the R&D plants of one of the world's leading pharmaceutical companies, AstraZeneca (AZ), in Lund (2010) and Södertälje (2012), Sweden. With these two closures, approximately 900 employees in Lund and 1,400 employees in Södertälje lost their jobs. According to Life Science Sweden (2013), former employees created 69 new firms in Sweden after AZ's plant closures. These two closures, as well as the subsequent entrepreneurial activities, contribute important knowledge regarding the knowledge transfer processes that occur when highly skilled and educated people lose their jobs. Hence, this paper aims to fill the knowledge gap surrounding displaced employees' motivations and entrepreneurial idea generation processes after business closures. To what extent did these entrepreneurs utilize the knowledge and experience gained at AZ in their entrepreneurial businesses? What were the motivational factors behind their decisions to become entrepreneurs? To what extent were such decisions opportunity-based or necessity-based? How did the processes of identifying and exploring entrepreneurial ideas emerge in relation to these business closures? To answer these research questions, we utilize both qualitative and

quantitative methods. Hence, our empirical data are drawn from a survey of 33 respondents and interviews with 9 former AZ employees who decided to become entrepreneurs after displacement.

The paper is organized as follows. Section two discusses the theoretical arguments and previous empirical research regarding firm closures and job loss, knowledge spillovers, and idea generation. Section three describes the data collection process and the methodological approach. Section four presents and discusses the empirical findings. Section five concludes and provides some suggestions for future research.

## **2. Post-displacement knowledge spillovers and entrepreneurial idea generation**

### **2.1 The post-displacement transition to entrepreneurship**

After receiving information regarding a business closure, the consequent labor mobility of former employees may take several paths. Former employees may become employed in other firms, leave the labor market (for further studies, unemployment, retirement or other reasons) or become entrepreneur (Nyström, 2018). Regarding post-displacement mobility to new employment, OECD (2013) reported that re-employment within one year of displacement varies considerably across countries, ranging from approximately 80 percent in Sweden and Finland to approximately 30 percent in Portugal and France.

Regarding the transition from unemployment to entrepreneurship, previous research has generally shown that unemployed individuals tend to become self-employed at a much higher rate than do employed individuals (Carrasco, 1999). Furthermore, longer periods of unemployment are related to a higher probability of transitioning into entrepreneurship (Andersson and Wadensjö, 2007). Several studies also show that opportunity entrepreneurs perform better than necessity-based entrepreneurial ventures (see e.g. Carrasco, 1999; Andersson and Wadensjö, 2007; De Vries et al., 2013). However, studies on the transitions from unemployment to entrepreneurship tend to include all types of unemployment and do not specifically focus on transitions that are induced by an exogenous shock, such as a business closure. Furthermore, it is commonly assumed that start-ups by unemployed persons are necessity based (Caliendo and Kritikos, 2009). However, a recent study by Røed and Skogstrøm (2014) examined the impact of job loss on entrepreneurship behavior. Their empirical findings were based on Norwegian register data of mass layoffs, with bankruptcies as indicators of exogenous displacement. Røed and Skogstrøm found that, compared with working

in a stable firm, working in a company that will soon close due to bankruptcy increases the entrepreneurial tendency by 180 percent for women and by 155 percent for men. This finding shows that displacement drastically increases the likelihood that former employees will start their own businesses compared with employees who are not displaced. The Swedish data of Von Greiff (2009) also support the higher probability of entrepreneurial activity among displaced employees. Von Greiff (2009) found that displacement results in a 50 percent higher probability of former employees to become self-employed. Caliendo and Kritikos (2009) study the motivation to become entrepreneurs among unemployed individuals. In addition to entrepreneurs identified as driven by push or pull factors they also identify entrepreneurs who are driven by both push *and* pull factors. Using this definition, they find that only 13 percent of the start-ups by unemployed persons are driven by push motives alone. 16 percent of the unemployed are driven by pull motives alone, while the vast majority of 71 percent are driven by both pull *and* push motives. Hence, not all unemployed start-ups are necessity entrepreneurs. Finally, Caliendo and Kritikos (2009) show that start-ups originating from both necessity *and* opportunity have higher survival rates than start-ups out of necessity. Furthermore, Nyström (2018) examined post-displacement entrepreneurship by focusing on the importance of individual and workplace characteristics in the transition to and performance of the ventures. The findings suggest that displaced workers that participate in labor market policies are more likely to become entrepreneurs but that the firms that they start have lower survival rates.

## **2.2 Knowledge spillover and idea generation**

To some extent, knowledge and ideas are public goods, and the creator is not the only one to benefit from such knowledge. Instead, knowledge creation may result in further knowledge creation, which may not be recognizable to the creator but may be recognized and developed by others, thereby

creating knowledge spillovers. Knowledge spillovers may help other agents' innovation efforts in two ways—unintentionally (e.g., when inventions are imitated) or intentionally (e.g., when scientists reveal the results of their research) (Breschi and Lissoni, 2001). Some knowledge is easily documented, reproducible and transferable, while tacit knowledge is difficult to document and frequently context-specific. Hence, tacit knowledge is best transferred through face-to-face interactions and frequently repeated contact (Von Hippel, 1994). Moreover, the cost of transferring tacit knowledge increases with distance and, in turn, tends to be locally concentrated. In this paper, the knowledge transfers from closed establishments are of particular interest. In the event of a business closure, tacit knowledge in particular needs to be carried further by the displaced employees.

New businesses are formed at the intersection of entrepreneurial action and knowledge spillovers (Agarwal, Audretsch and Sarkar, 2007). The literature that connects knowledge spillovers to entrepreneurship underlines that incumbent organizations, the largest players in a given industry, are an essential source of new entrants, specifically when the incubator underutilizes the knowledge that they create (Agarwal et al., 2004; Klepper, 2007; Klepper and Sleeper, 2005). If incumbent firms do not utilize the knowledge that they create, start-ups may use their knowledge, which creates a knowledge flow between firms.

Quite extensive empirical research is now available regarding how knowledge spillovers take place between incumbent firms and entering firms (see, e.g., Agarwal et al., 2007). However, research that examines the knowledge spillovers from exiting firms is more limited. One study by Knott and Posen (2005) suggests that positive externalities, such as knowledge spillovers, are produced by closing firms, which benefits other firms in the industry. Additionally, Hoetker and Agarwal (2007)

show that, even though a firm exit does not halt knowledge diffusion, it reduces it considerably. Moreover, for effective knowledge diffusion to occur, an entrepreneur must utilize the existing firm as a template, observing and perhaps interacting with its routines and rules to completely benefit from knowledge spillovers (Hoetker and Agarwal, 2007). Therefore, previous employment experience in the same industry may have a positive effect on the overall performance of entrepreneurial firms that are formed after displacement.

### **2.3 Entrepreneurial idea generation after displacement**

Idea generation refers to the process of searching for new ideas for new business models (Stampfl, 2015). Entrepreneurship scholars agree that the work experience accumulated during an individual's career is an important source for the generation of new business ideas (Politis, 2005; Shepherd and DeTienne, 2005). Work experience exposes people to unique insights into customer problems and needs, viable markets, product accessibility and competitive resources, which eventually influence their ability to spot an opportunity for a business idea (Gabrielsson and Politis, 2012). The generation of new business ideas is an important part of the entrepreneurial process. Based on his or her ability to identify unmet customer needs, the entrepreneur can generate new solutions, which spur ideas for new start-ups (Gabrielsson and Politis, 2012). Before reaching a developed business idea, i.e., when a market niche, production system and organization are established, the entrepreneurial process most likely starts with more diffuse ideas of how to meet customers' needs (Klofsten, 2005; Davidsson, 2006). This idea or ideas develop and emerge into a basic understanding of what the future business will offer. Therefore, the generation of new business ideas can be understood as a development process, where an idea can be developed and refined during its developmental journey (Ardichvili et al., 2003).

The literature on search processes generally emphasizes organizational search processes, and few studies examine individuals' search processes and their searches for new solutions and ideas (Maggitti et al., 2013). According to Hellmann and Periotti (2011), firms have imperfect capacities to elaborate ideas internally, and they may then allow employees to leave and try out developing incomplete ideas in new firms. The model that they created in their research “describes a natural symbiosis between the ability of firms to sustain idea generation and the comparative advantage of the market in elaborating ideas” (p. 34). This method justifies the process of idea incubation and spawning, which occurs in successful innovative environments, such as Silicon Valley, where a distinct open exchange of ideas takes place across firms and markets.

Gompers et al. (2005) provide ample evidence of the role that large firms play in entrepreneurial spawning, and they find that firms that are more open spawn more ventures. In this context, employee-generated ideas are naturally realized internally. Companies such as Google and 3M pride themselves on frequently creating new ideas in house (*The Economist*, 2009; Bartlett and Mohammed, 1995). Many Silicon Valley firms have a long list of talented employees who leave large firms with novel ideas (Hellmann and Periotti, 2011). Dunkelberg et al. (1987) observed that firms with founders who generated their ideas during previous employment generally experience higher average rates of growth. According to Bhidé (2000), 71 percent of Inc. 500 founders imitated or tailored an idea identified under previous employment.

Hence, many novel and innovative ideas may be circulating within existing companies, which are realized when employees start their own companies (Abou Lebdi, 2017). A key factor for people who choose to actualize their ideas and create spinoffs concerns if the employee perceive that there

are promising new niche markets or technologies that the existing firm is unwilling or slow to explore (Klepper and Sleeper, 2005). Hence, the company culture of these established firms play a key role depending on whether their employees take these ideas to form new competitive firms.

As mentioned above, the literature of search processes generally focuses on organizational search processes, and, unfortunately, very few studies examine individuals' search processes and their searches for new solutions and ideas (Maggitti et al., 2013). Idea generation and search processes to find new business models and to realize them should vary depending on the employees' current situations, where employees affected by displacement constitute an important external stress. In relation to discussions of the motivational factors behind the decision to become an entrepreneur, discussing the opportunity costs of transitioning to necessity-based versus opportunity-based entrepreneurship is important. Necessity-based entrepreneurship refers to entrepreneurial activities that are driven by the threat of joblessness, whereby entrepreneurship is a means of making a living, while opportunity-based entrepreneurship is driven by a willingness to explore an innovative idea (Reynolds et al., 2002). The decision to become an entrepreneur after displacement depends on, among other things, the available offers, such as other job offers, or, in the worst-case scenario, unemployment. If the wage offered by a potential employer is high, the opportunity cost of entrepreneurship increases. If the individual faces unemployment, the benefits available through unemployment insurance determine the opportunity cost and influence his or her likelihood of participating in necessity-based entrepreneurship. If the employee has had unemployment insurance for at least twelve months and fulfils the working requirements set by the Swedish unemployment insurance system, he or she will most likely qualify for an income-related unemployment benefit. This insurance compensates for 80 percent of the previous income up to a maximum of €68 per day for at least 300 days (see Nyström, 2018, for a discussion of the

institutional support available to displaced employees). Hence, it is reasonable to assume that, before the 300 days covered by the income-related unemployment benefits are up, the incentives for the risky choice of entrepreneurship will be relatively low if the displaced employee does not have a business idea in which he or she has great confidence. Hence, the incentives for pursuing necessity-based entrepreneurial activities during this first period can be assumed to be rather low, as one qualifies for income-related benefits. On the other hand, highly educated employees with potentially high incomes (in our case, the employees at AZ) are likely to hit the maximum level of the unemployment insurance benefits; hence, as long as such employees can expect the entrepreneurial income to exceed this maximum level, entrepreneurship may be an attractive choice compared with unemployment benefits.

### **3. Data and methodological approach**

Before we describe the data collection and methodological approach, we will provide a brief description of AZ and the closure of two of its R&D plants, which is the object of our study.

#### **3.1 AstraZeneca and its R&D plant closures**

AZ is a world-leading multinational pharmaceutical company, which is highly knowledge-intensive. The company employs more than 60,000 people in more than 100 countries, with sales of approximately USD 25 billion in 2015. In Sweden, AZ employs 6,600 people who are distributed between the two locations in Södertälje (in the Stockholm region) and Gothenburg. The production facility in Södertälje is the largest of AZ's production plants. The facility in Gothenburg hosts one of AZs three global strategic research centers, and the research there focuses on cardiovascular,

metabolic, respiratory, inflammatory and autoimmune diseases. The AZ headquarters are located in London. Until 2012, its R&D headquarters were located in Södertälje (AstraZeneca, 2016).

On March 2, 2010, AZ announced that its R&D facilities in Lund, located in southern Sweden, would be closed down and that approximately 900 employees would lose their jobs (Henckel, 2013). On February 2, 2012, AZ announced that its R&D plant in Södertälje would be closed down and that approximately 1400 people would lose their jobs (Jensen, 2015). With the closure of these R&D facilities, AZ followed a trend within the pharmaceutical industry. Hence, large R&D companies started to prioritize less in-house research, and instead searching for promising research among smaller life science firms became a trend (Henckel, 2013). The displaced employees at these two R&D locations were highly educated with many years of experience in the pharmaceutical industry. What happened to the employees at these plants? According to Henckel (2013), employees who were so-called generalists (not specialized in life sciences) were offered jobs by other companies. Small to medium-sized life science firms in Sweden, primarily within health technology, hired a handful of engineers. However, after the closure of AZ's facilities in Lund and Södertälje, former employees created 69 new firms in Sweden (Life Science Sweden, 2013). Thirty-two companies were created by former employees from Södertälje, and 37 companies were created by former employees from Lund. These companies are the focus in this paper.

It should be stressed that AZ has had a huge impact on Swedish employment, R&D and exports. Prior to the closure of the R&D plants, the company produced the same amount of research as the Karolinska Institute and more research than the Royal Institute of Technology (Andersson et al., 2008). Furthermore, AZ was responsible for approximately 80 percent of Sweden's total pharmaceutical exports and for approximately five percent of its total exports of manufactured

goods. In terms of employment, AZ accounted for 0.4 percent of the total private employment in Sweden, and approximately 20 percent of the employment of PhDs in R&D (Andersson et al., 2008).

### **3.2. Collection of quantitative data**

The methodology used in this paper is a mixed-methods approach consisting of both qualitative and quantitative data. The quantitative data consist of a survey targeted to employees affected by the AZ closures who decided to become entrepreneurs (N=69). Due to the limited number of observations in our target group, the quantitative part needed to be complemented with a qualitative part. The qualitative part consists of interviews with entrepreneurs who were affected by the AZ closures. This combination of the qualitative and quantitative approach contributes to an in-depth understanding of the research topic and provides rich information, which we could not have obtained otherwise.

The survey consisted of both closed and open-ended questions.<sup>1</sup> This survey sought to investigate and identify knowledge spillovers and idea generation when displaced AZ employees started their own companies. A test pilot with four survey participants was conducted before the rest of the surveys were distributed. This test pilot was conducted to ensure that all the questions were well understood and that they led to no misunderstandings. No changes were made to the survey after the test pilot, as the participants confirmed that they understood everything. In Spring 2016, the survey was distributed to the remaining participants two days after the test pilot.

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<sup>1</sup> In this paper, the questions in the survey that focus on entrepreneurial idea generation and motivation are utilized. The full questionnaire and additional empirical material is available in Källner (2016).

The entrepreneurial companies that were targeted in the survey were identified by Life Science Sweden (2013), who published a list online of all the companies that were created by displaced employees from AZ's research facilities in Lund and Södertälje. Sixty-nine companies were identified from this list (see Appendix A). Unfortunately, we do not have explicit information on how Life Science Sweden created this list. However, the sample size was limited to founders of companies that are currently active and that have an online presence via a company webpage (39 companies out of the 69 listed, which generated the names of 60 entrepreneurs). The survey was conducted via Google Forms and was sent to participants' email addresses, which were found on company webpages or elsewhere on the web.

The survey produced 33 responses from the 60 identified participants (a 55 percent response rate). The identified participants included 23 displaced employees from Södertälje, who had founded 11 of the up-and-running companies identified; 37 displaced employees from Lund, who had founded 28 of the up-and-running companies identified; and five participants from both Södertälje and Lund, who participated in the test pilot. Of the participants who responded to the survey, 67 percent were male, and 33 percent were female. Their ages ranged from 31–40 years (9.1 percent), 41–50 years (39.4 percent), and 51 and older (51.5 percent). The sizes of the founded companies ranged from one employee (the founder) to 28 employees. Notably, the number of observations was limited, which calls for a careful interpretation of the results. An additional limitation of this study is that the 60 identified participants were the founders of 39 different companies. as some of the start-ups had several founders who had lost their jobs at AZ.<sup>2</sup>

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<sup>2</sup> Most of the companies have one identified participants (28 firms). 6 firms have two identified participants and 4 firms have three participants and one firm 8 identified participants.

This implies that some companies may be over-represented as regards survey responses.<sup>3</sup> Furthermore, the targeted participants who chose to complete the survey could possibly over-represent the most successful companies. Less successful businesses are more likely to lack e-mail addresses and webpages, thus making them harder to identify and probably more reluctant to complete the survey.

### **3.3 Collection of qualitative data**

Phone interviews were conducted with nine different companies that were established after AZ's two plant closures to conduct an in-depth investigation of the idea generation regarding the founding of a company after AZ's closure announcement.<sup>4</sup> The phone interviews were semi-structured with open-ended questions. In these semi-structured phone interviews, a guide was used that included questions and topics that should be covered, although the interviewer was able to ask additional questions to generate adequate answers. The use of semi-structured interviews allows researchers to dig deeper and thoroughly understand the answers provided (Harrell and Bradley, 2009).

Moreover, the participants in the phone interviews included nine founders from nine different companies, which were founded by displaced AZ employees from Södertälje and Lund (five founders from Södertälje and four founders from Lund). The phone interviews took place two

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<sup>3</sup> Since the responses were submitted anonymously, it is not possible to identify if the responses originated from the same firm.

<sup>4</sup> In this paper, portions of the interviews that focus on entrepreneurial idea generation and motivation are utilized in the empirical analysis. All the interview questions and additional empirical material from the interviews are available in Källner (2016).

weeks after the survey was closed for participants. At the end of the survey, participants were asked to provide an e-mail address and to indicate if they were willing to be contacted for a personal phone interview. The participants in the phone interviews were selected from those who indicated that they would be willing to be contacted. The telephone interviews were recorded to allow for quality transcriptions. The interviewees and the companies that they represent were ensured anonymity due to sensitive information that was revealed.

A limitation of this study relates to the time and distance between AZ's closures and the actual research. The closures took place in 2010 and 2012 while the research took place in 2016. Through this time gap, participants in this study might have forgotten some features of the processes with regard to idea generation and knowledge spillover and they described the processes as they remembered them years later. In other words, the study may suffer to some extent from recall bias.

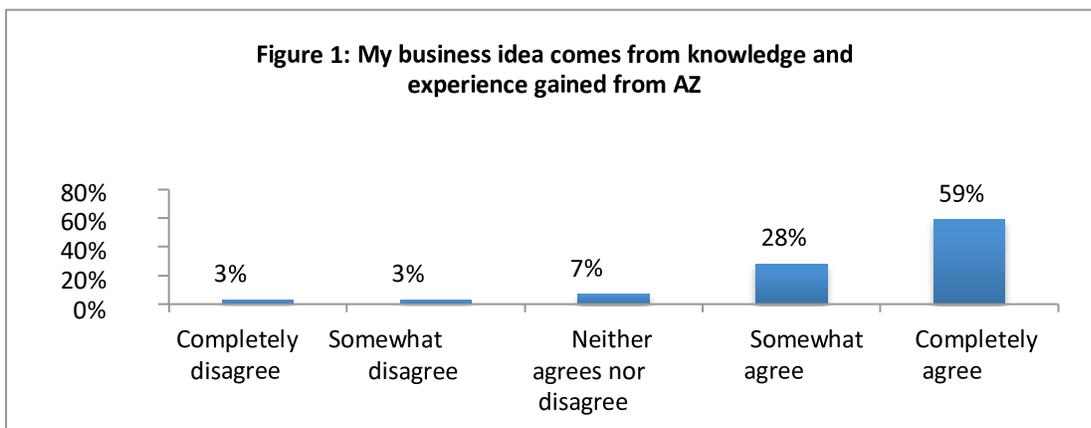
## **4. Empirical Findings**

### **4.1 The profile of the entrepreneurs**

The employees who decided to become entrepreneurs after AZ's closure of two R&D plants were highly educated. Of our 33 respondents, 52 percent held a doctoral degree, and 37 percent held a university degree. The entrepreneurs had worked at AZ for many years, which means that they had built up extensive expertise and a knowledge base within the company. Almost 60 percent of the entrepreneurs worked at AZ for 13 years or more, while 33 percent worked there for 7–12 years. In addition, the entrepreneurs had many years of work experience in the pharmaceutical industry. More than half of the participants had 17 years or more of work experience, and 33 percent had 11–16 years of work experience in the pharmaceutical industry. In total, 88 percent had worked in the field for a minimum of eleven years. Therefore, the displaced employees from AZ brought extensive expertise in and knowledge of their field to their new businesses. With regard to their occupational status at AZ, approximately 60 percent of the entrepreneurs worked as researchers, while 12 percent were executives or managers. Furthermore, almost 80 percent of the respondents had no prior start-up activity experience. What were the options available to the entrepreneurs after the AZ plant closures were announced? 56 percent reported that they applied for other jobs, while the remaining 44 percent did not apply for other jobs. Despite being offered other jobs, 65 percent decided to become entrepreneurs. Furthermore, most displaced employees started their entrepreneurial ventures (70 percent) with previous colleagues from AZ. What type of businesses were founded? According to the survey, 49 percent of the respondents started their businesses in the pharmaceutical industry.

### **4.2. Knowledge spillovers and customers**

Figure 1 presents the results of the survey question regarding the relationship between business ideas and the knowledge gained at AZ. In total, almost 90 percent of the entrepreneurs agreed that their business ideas came from the knowledge and experience that they gained at AZ. Furthermore, the survey reveals that 47 percent of the entrepreneurs reported that their new company's customers related to AZ.



What knowledge and customer relationships did former AZ employees bring to their new companies? The interviews provide some deeper insights into this matter. Regarding customers, in some cases, AZ bought licenses and provided some support and development; i.e., AZ has been an important customer for these new ventures. In other cases, some displaced AZ employees have become part of the customer base of the new company. Regarding spillovers, some themes emerged from the participants' responses regarding the knowledge transferred from AZ: knowledge, experience and expertise in the pharmaceutical field; management and leadership; extensive knowledge about jurisdictional matters; knowledge about potential products and services; academic and organizational competence; research experience; project experience; IT knowledge; drug development experience; scientific methods; programming; experience with running clinical

studies; knowledge about customers' product development processes and their needs; environmental and safety procedures in the lab environment; and lab support. As one entrepreneur put it,

*“Everything we did at AZ, we do today, though we sell our services to other companies.”*

Several statements from the entrepreneurs supported the idea that they exploited the knowledge that they gained at AZ:

*“We created our own job opportunity utilizing the knowledge we gained at AZ, and we created our business idea to do the same thing as we did at AZ. So, AZ truly influenced our business.”*

*“It would have been impossible without my time at AZ, and my time there was crucial.”*

*“I used everything I learned at AZ; it was the core of my business model.”*

The literature that connects knowledge spillovers to entrepreneurship stresses incumbent organizations as an essential source of new entrants, specifically when the incubator underutilizes the knowledge that it creates (Agarwal et al., 2004; Klepper, 2007; Klepper and Sleeper, 2005). Among the opportunity based start-ups generated by unemployed studied by Caliendo and Kritikos (2009), almost 80% had experience from regular employment in the same industry. For entrepreneurs driven by necessity motives about 60 percent had the corresponding experience. Hence, this argument is aligned with this study's results: AZ acted as the incumbent organization; when it closed two plants, the displaced employees then used the knowledge that was generated in

the incumbent firm to found new businesses, as AZ was no longer utilizing these resources. In other words, when the incumbent firm does not commercialize the knowledge in which it has invested, opportunities are then created for entrants. When AZ was no longer utilizing the knowledge that it created, the start-ups founded by displaced AZ employees were then able to use this knowledge, thereby creating a knowledge flow between firms, i.e. knowledge spillover.

Hoetker and Agarwal's study (2007) shows that firm exits do not halt knowledge diffusion; however, they do reduce it considerably. Therefore, Hoetker and Agarwal's study is aligned with this study's results that the AZ firm exit did not halt knowledge diffusion. Hoetker and Agarwal (2007) state that, to ensure effective knowledge diffusion and to completely benefit from knowledge spillovers, an entrepreneur must utilize the existing firm as a template to observe and potentially incorporate its routines and rules. Their argument seems to be aligned with this study's results; most founders of new businesses used AZ as a template and used some of the closing firm's routines, rules and accumulated knowledge.

#### **4.3. Motivation and idea generation**

What impact did the decision to close two AZ plants have on the entrepreneurs' decisions to start new ventures? Figure 2 reveals that the AZ plant closures had an important impact on displaced employees' decisions to become entrepreneurs. In very few cases, these entrepreneurs would have started their companies anyway, but, in most cases, the AZ plant closures were the driving force behind their decisions to become entrepreneurs. 72 percent reported that they started their companies due to the AZ plant closures.

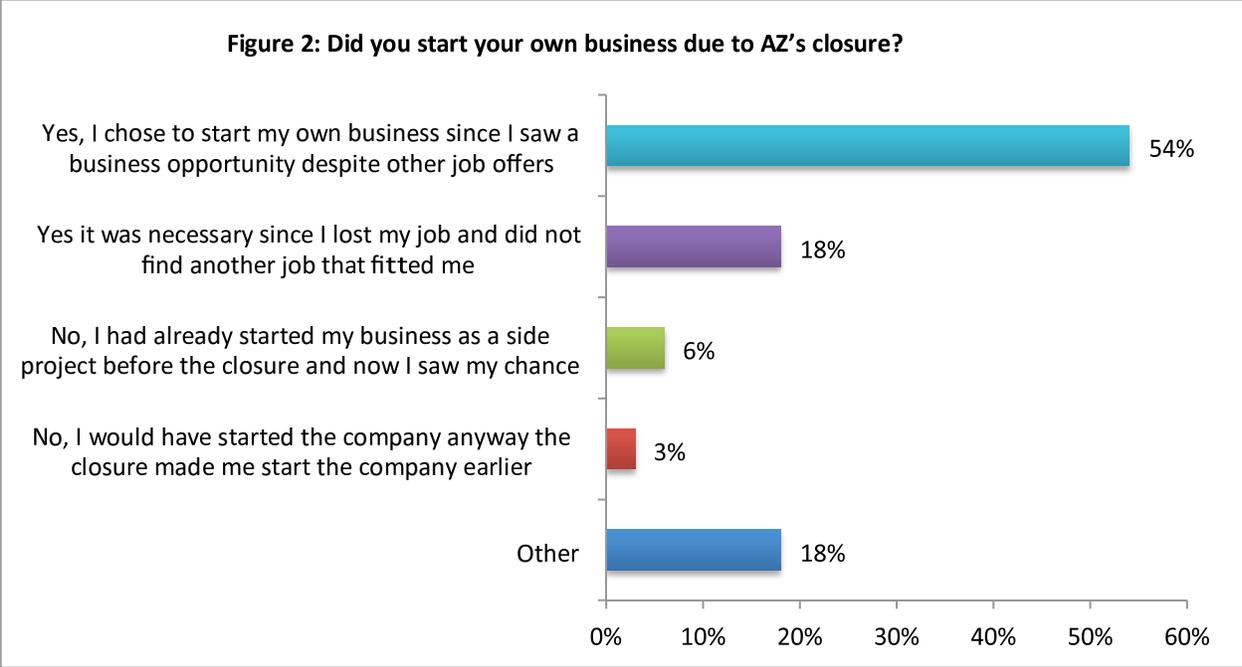
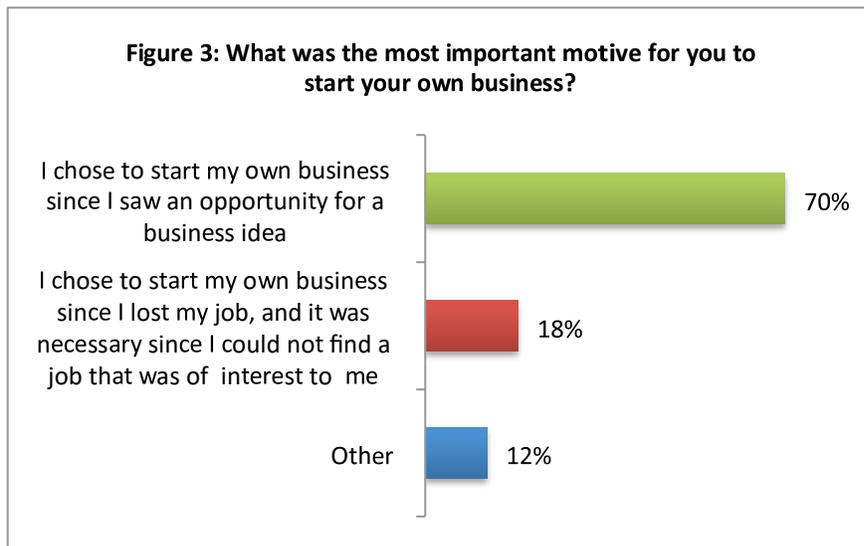


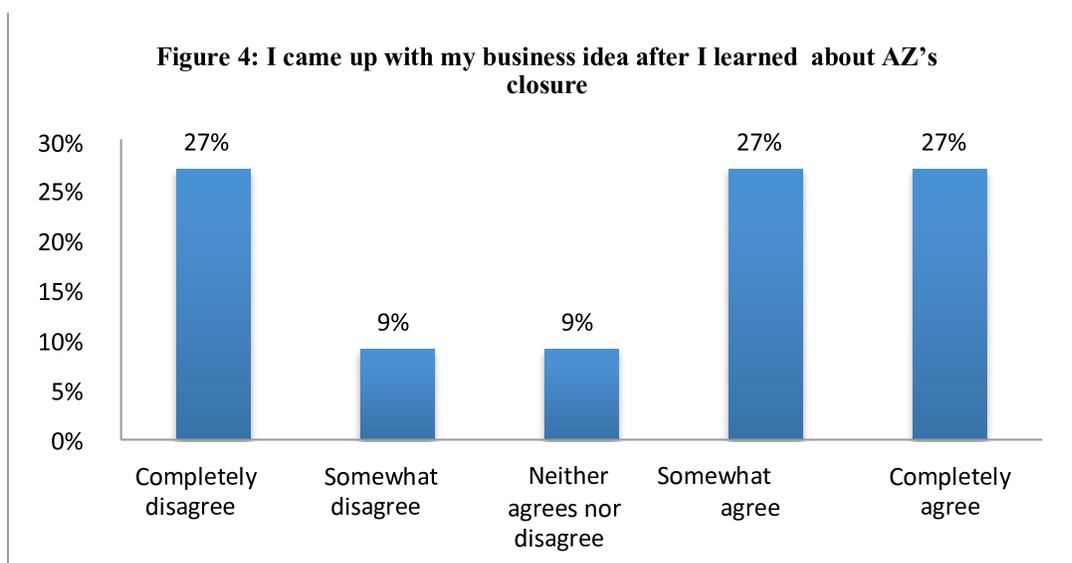
Figure 3 shows that 18 percent of the participants agreed that the most important motivation for starting a business was necessity-based. 70 percent of the participants chose to start their own businesses based on an opportunity to act on a business idea. This survey question is similar to the question posed in the Global Entrepreneurship Monitor (GEM). According to GEM (2015), opportunity-based entrepreneurs account for approximately 85 percent of Swedish entrepreneurs, while necessity-based entrepreneurs account for approximately 5–10 percent. Hence, the entrepreneurial ventures after the AZ plant closures are more often necessity-based compared with overall entrepreneurial ventures in Sweden. However, considering that the entrepreneurs in this case actually lost their jobs due to a business closure, the share of opportunity-based entrepreneurial ventures must be regarded as quite high. Furthermore, the low share of necessity-based entrepreneurs is in line with the findings of Caliendo and Kritikos (2009) who showed that the vast majority of start-ups by unemployed were simultaneously driven by necessity and opportunity motives.

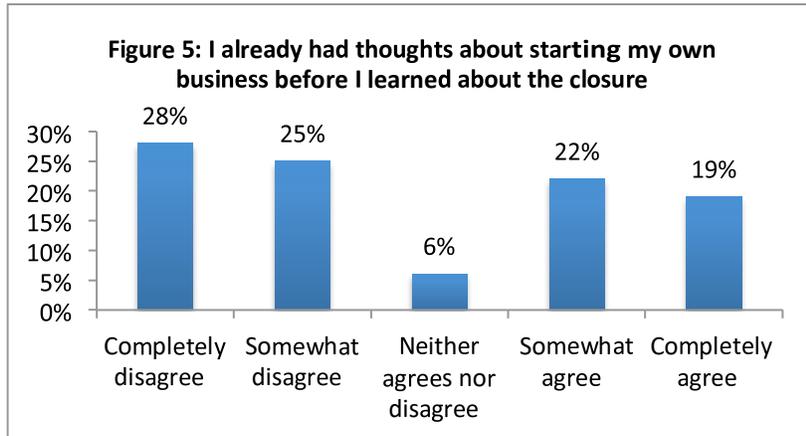


At what stage in the closure process did the employees generate their business ideas? Figure 4 shows that most of the entrepreneurs (54 percent) generated the business idea after learning about the closure. In contrast, just over one third (36%) already had their business idea before they learned about the closure. In these cases, being affected by the displacement spurred the launch of ideas that already existed.

Furthermore, Figure 5 shows that approximately 40 percent of the entrepreneurs had already been thinking about starting a company before the closure announcement, while most entrepreneurs did not have such thoughts. In an open-ended question regarding the point in time at which the entrepreneur began spending time and resources on starting his or her business, in relation to the closure decision, the timing of the idea generation process can be better established. In some cases, the respondents reported that this process began as much as 2 years before the closure (probably those who had already started their ventures as side projects), while others reported that the process

began anywhere from half a year to two months before the closure announcement. In other cases, the entrepreneurs started to spend time on their business ideas 3–6 months after, within a year after, or even 1.5 years after the closure announcement. Hence, when entrepreneurs started spending time on their ideas ranged from 2 years prior to the closure to 1.5 years after the closure. These findings provide insights to the dynamics of the entrepreneurial decision-making process, indicating that some individuals had been nascent entrepreneurs for quite some time and that closure of the plant made them take the decision to become entrepreneurs. The quite extensive preparation time prior to the launch of the start-up is not surprising given the high share of opportunity-based start-ups. Few opportunity based start-ups are initiated without any certain preparation. According to Caliendo and Kritikos (2009) only about 5 percent of the unemployed who were driven by pull motives did not do any certain preparation before starting their venture. For instance, entrepreneurs driven by pull motives had a higher probability to have self-consulted potential customers and used the support by others as a way of preparing themselves before the start-up (Caliendo and Kritikos, 2009).





Many successful entrepreneurs start businesses related to former occupations (Bhidé, 2000). Where did the entrepreneurs’ business ideas come from? Approximately 30 percent of the survey respondents reported that their business ideas were based on ideas that they encountered during previous employment, while 45 percent disagreed. However, as mentioned above regarding knowledge spillovers (section 4.2), the knowledge gained at AZ was seemingly crucial, even if the business idea was not explicitly encountered at AZ. The following statements from interviews substantiate this finding:

*“While working for AZ, I learned the market gap, which then was used to create our business idea.”*

*“The knowledge I gained at AZ was a condition, and it helped me to understand how large firms are operating.”*

The interviewees were asked about their ultimate motive in finally realizing their business ideas in relation to AZ's closure. Overall, the interviewees' ultimate motives differed somewhat, with some stressing the circumstances and their displacement:

*“The circumstances, the fact that my job disappeared, so I had to find something else, and it was hard to find a job since there were no jobs matching my profile. In combination with that, we received great conditions and agreements when displaced.”*

Others stressed their passion for technology and the possibility of exploring an opportunity:

*“Passion for the subject of our business idea and what we were working on at AZ, and I/we did not want to work on anything else.”*

*“I saw this as an opportunity to do what I wanted.”*

#### **4.4 Was entrepreneurship a good choice?**

Finally, the entrepreneurs were asked about whether they thought that becoming an entrepreneur was a good decision. More than 90 percent of the participants agreed that starting a company was a good decision.<sup>5</sup> When asked about if they would have done anything different or if they had regrets with regard to the processes and applications surrounding their businesses, most interviewees expressed that they were happy about their decision to pursue their business ideas.

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<sup>5</sup> We recognize that this high percentage may have been influenced to some extent by a selection bias towards successful respondents. See also Section 3.2.

However, they reported that they could have done a few things differently with regard to the processes (e.g., they should have started their business earlier). However, some respondents did not agree that becoming an entrepreneur was a good decision:

*"I regret that I put so much time into the business, I wish that I had applied and searched for jobs instead."*

## 5. Conclusions and Suggestions for Future Research

This paper aims to contribute to our knowledge about knowledge spillovers, entrepreneurial motivation, and the idea generation processes when displaced employees decide to become entrepreneurs. As such it contributes to the lack of literature on push factors in entrepreneurial motivation processes (Caliendo and Kritikos, 2009).

Our particular focus has been on displaced AZ employees who became entrepreneurs after the AZ R&D plant closures in Lund (2010) and Södertälje (2012). To what extent did these entrepreneurs utilize the knowledge and experience gained at AZ in their entrepreneurial businesses? According to results from the survey and interviews, rather extensive knowledge spillover took place between the closing firm and the new businesses that were founded by displaced employees, even though the underlying business ideas for most entrepreneurial ventures were not always explicitly encountered through previous employment. What knowledge and experiences from AZ did displaced employees bring to their new businesses? Many participants expressed that they learned specific and hands-on knowledge and routines that they could bring to their new businesses. Additionally, approximately 50 percent of the survey participants answered that their company's customers related to AZ. We interpret these answers to reveal that the closing firm's exit did not completely destroy the knowledge accumulated within the company and that part of the existing knowledge was transferred to new opportunity-motivated ventures.

What were the motivational factors behind the decision to become an entrepreneur? To what extent was the decision driven by seizing an opportunity? Were the motives instead necessity-based? Of course, many factors act as incentives for starting a business. The empirical findings suggest that

the vast majority of entrepreneurs (70 percent) started their businesses when they saw an opportunity that they wanted to pursue (opportunity-based), and more than half of the surveyed entrepreneurs actually declined other job opportunities. Approximately 20 percent of the entrepreneurial activities were necessity-based, which is slightly higher than what can be observed for the overall population of Swedish entrepreneurs (as measured by the GEM). However, we interpret the relatively high share of opportunity-motivated entrepreneurs, in spite of an obvious push motive such as job displacement, as supporting the findings by Caliendo and Kritikos (2009), implying that few unemployed who become entrepreneurs are entirely driven by necessity motives. Most of them are driven by a combination of push and pull motives.

The high share of opportunity-based entrepreneurial ventures among the AZ employees is reflected in the characteristics of the start-up process. Half of the participants generated the business idea after learning about the closure, but a quite substantial share of the respondents (about one third) had a business idea before. Hence, in many cases the idea generation process did not necessarily start after the announcement of the displacement. Even if the business ideas may have existed long before the AZ closure, more than 70 percent of the entrepreneurs started their company due to the AZ closure, and very few already had or would have started their companies otherwise. Hence, even if the motivations are primarily opportunity-driven the AZ plant closure was a crucial tipping point in the decision to take hold of these identified entrepreneurial opportunities in the market. It should also be stressed that most of the displaced employees probably would have qualified for receiving unemployment benefits which contributes to the high share of opportunity based start-ups. Overall, most entrepreneurs were seemingly happy about their decisions to become entrepreneurs, even if they perceive that some parts of the processes could have been pursued differently.

As discussed in Section 3, a limitation of this research is the possibility that results may have been influenced somewhat by recall bias and a selection bias towards more successful respondents. Furthermore, this study only investigated displaced employees who were transitioning into entrepreneurship after a pharmaceutical company's closure of two plants. Future research could investigate additional cases and company closures in different industries to compare the results regarding knowledge spillovers and idea generation. In addition, using a long-term perspective to study the performance of post-displacement entrepreneurial ventures could be interesting. How do they perform in terms of sales, exports and job-generating capacity? Furthermore, it should be acknowledged that AZ operates in the high-tech industry sector, and a large share of the displaced employees were highly educated. Education level is positively related to the transition into entrepreneurship in most empirical studies (see e.g., Parker, 2009), perhaps due to the more extensive knowledge spillover and idea generation of these employees compared with employees with lower education levels. Hence, post-displacement knowledge spillover and idea generation in high-tech industry and low-tech industry are likely to vary considerably. Furthermore, the opportunity costs of entrepreneurship can be expected to vary across sectors and across education and income levels. To understand these processes better, further research on the individual processes of displaced employees' transitions into entrepreneurship in both high-tech and low-tech sectors would be valuable.

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## Appendix A. Firms created by former employees of AZ according to Life Science

### Sweden (2013)

Firms created by employees in Södertälje (32)	Firms created by employees in Lund (37)
1. Offspring Biosciences	1. Adroit Science
2. MetaSafe	2. Apposkop
3. Northern Light Pharmaceuticals	3. Bocz Design
4. KeytoLead	4. Competitive Intelligence Solutions
5. Analytical Proof Sweden	5. Delfin kommunikation
6. Brain Shuttle	6. EMMACE Consulting
7. Chemnotia	7. I-Mind Consulting
8. Chemovix	8. LabJoy
9. Evomedicon	9. NeoSpot
10. Novandi Chemistry	10. Nordic Biocube
11. Toxicology Knowledge Team	11. Patient Information Broker
12. Adme Ex	12. Pepticon
13. QPS Sweden	13. Ready Consulting
14. N4 Teknik	14. Red Glead Discovery
15. Prosilico	15. Trial & Care
16. Biogasgenerator	16. Truly Translational
17. Pelago Bioscience	17. Ateljé Råbygård
18. AC Knutsson Consulting	18. B&B villa Orion
19. Retort	19. BRG Consulting
20. Birchmoor Toxicology Service	20. Brödlabbet
21. Carbin Communication	21. Carettacaretta
22. Viva Text & Pharma	22. Dashit

23. Caliti Group	23. Embla träd
24. Statistical Support & Solution	24. GERik Medical Consulting
25. Alveiro	25. Idésprånget
26. Ipcon Consulting	26. Karins vårdträd
27. Hundtrim	27. Kurakademin
28. ErSa Invest	28. Ligatum
29. Regulatory Intellegence Consulting	29. LXI
30. Sveno CMC Consulting	30. Peak Search
31. Tofsvipan Consulting	31. Rubus
32. Sivert Bjurström veterinärkonsult	32. Semator
	33. Tornahem
	34. Joelson Consulting AB
	35. Lars Borgström Inhalation Consulting
	36. Stat Mind
	37. (The 37th company is not listed)