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Another road to IT turnover: the entrepreneurial path

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Abstract

This paper addresses an untapped, though important, type of information technology (IT) personnel turnover: IT entrepreneurship. We develop a comprehensive model to understand the factors and processes that influence turnover behaviour for prospective (nascent) IT entrepreneurs. To do this, we review three streams of research: first, the unfolding model of voluntary turnover that specifies six stages in a process model of employee turnover; second, the entrepreneurship literature (focusing on differences between nascent entrepreneurs and non-entrepreneurs), and third, attributes of the IT personnel and IT industry. We use Image Theory as the 'glue' to merge these streams of research together. We do so by proposing two new constructs – r*eadiness to quit (to start a business) (RTQ)* and n*ecessary configuration to quit* (*NCQ*), which we incorporate into a conceptual framework describing how specific dimensions of *RTQ* change over time, either gradually or suddenly, in response to specific events. Based on Image Theory, we describe the process by which nascent entrepreneurs conduct a *compatibility test* to assess the fit between their *current RTQ* and the set of *NCQ*s. If there is a fit, then the nascent entrepreneur is ready to quit his or her current job. We illustrate our model using a sample vignette involving a former IT employee who became an entrepreneur, and we provide suggestions for researchers and practitioners, based on our model and the constructs that we introduce. Although we develop our model in the context of IT turnover and entrepreneurship, *RTQ* and *NCQ*, as well as the conceptual framework, can also be applied to other types of voluntary IT turnover (e.g., accepting a position in another company).
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Introduction

'What if your best database architect decides not only to quit, but also to launch a business in direct competition with your own?'

Retaining information technology (IT) professionals is a critical problem for all organizations – including firms that do not consider themselves to be *technology firms*. For IT firms, however, this issue is even more critical, as the relative importance of human capital *vs* physical capital is higher in IT firms than in non-IT firms (Yang *et al*., 2003). Moreover, according to Agarwal *et al*. (2007, p. 11), 'in the past decade … the business climate has been characterised by considerable IT-based entrepreneurial activity and innovation, driven largely by the capabilities offered by new information technologies'. Thus, beyond the traditional paths to IT employee turnover that have been discussed in the information systems (IS) literature – including

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work exhaustion (Moore, 2000) or job stress among IT consultants who travel frequently (i.e., 'road warriors') (Ahuja *et al*., 2007) – another path through which firms lose IT personnel is employees leaving to set up their own businesses, through entrepreneurship. We suggest naming this path IT entrepreneurial turnover.

To the best of our knowledge, research in the field of entrepreneurship has not been cited within studies of IT turnover. By reviewing and assessing three streams of literature (specifically, the unfolding model of voluntary turnover from organizational behaviour, research on how entrepreneurs differ from non-entrepreneurs, and research on the broader context of IT personnel turnover), we utilize Image Theory (Beach, 1998) to develop a conceptual framework and two new constructs, *readiness to quit* (*RTQ*) and *necessary configuration to quit* (*NCQ*), to better understand IT entrepreneurship. Through our theory building, we focus attention on IT entrepreneurship as a specific type of IT turnover. By focusing on actual turnover behaviour and not just turnover intentions we can enhance the theoretical breadth of IT personnel turnover. We can also incorporate key features of the IT industry context, as well as specific attributes of IT personnel into our theory. This theory addresses three gaps identified in a recent qualitative and quantitative meta-analysis of IT personnel turnover (Joseph *et al*., 2007). Finally, we introduce two constructs *RTQ* and *NCQ*, and we illustrate our conceptual framework with a detailed vignette of a recent IT entrepreneur. We believe that our model and the constructs that we introduce (*RTQ* and *NCQ*) can also be adapted and applied for understanding other forms of voluntary IT turnover, as well (i.e., accepting a position in another company).

The paper is structured as follows. First, we review the three streams of research mentioned above. Second, we introduce Image Theory, which then serves as the 'glue' that links these three streams of research together. Utilizing Image Theory, we introduce our constructs, *RTQ* and *NCQ*, and then illustrate the framework with a sample vignette from a recent IT entrepreneur. We conclude by discussing the implications of our theory both for research and practice.

The unfolding model of voluntary turnover

The first stream of research is the unfolding model of voluntary turnover from organizational behaviour, which was created to address the limited success of conventional variance models in explaining employee turnover (Mobley, 1977; Hom & Griffeth, 1991; Hom *et al*., 1992; Griffeth *et al*., 2000). This model seeks to explain the process by which employees decide to leave their jobs – which is not always anticipated in advance. Hence, variance models that simply predict *intention to quit* do not necessarily explain the reality of job quitting behaviour. In the IT personnel literature, even intention to quit is not well explained by conventional theories such as Theory of Reasoned Action and Theory of Planned Behaviour. Indeed, Joseph *et al*. (2007, p. 562) stated that: 'using turnover intention as a proxy for turnover behavior can result in weak or inaccurate inferences at times, and points to the importance of assessing actual turnover behavior'. Therefore, a model that describes *actual* turnover behaviour is necessary.

Lee & Mitchell (1994) introduced the unfolding model over a decade ago as a process model that describes the *unfolding* of voluntary turnover behaviour. It features the following six stages, each of which may or may not be present in a specific employee's path to leaving: (1) shock, (2) enacting a pre-existing script or plan of action, (3) image violation, (4) level of job satisfaction (low or high), (5) search and/or evaluation of alternatives, and (6) presence of a likely job offer (Lee *et al*., 1996; Lee & Maurer, 1997; Lee *et al*., 1999). In their original model, Lee *et al*. (1996) identified five theoretical paths that should capture most individuals' turnover behaviour. We describe each stage of their process model in greater detail.

The first stage, shock, is described in Lee *et al*. (1999, p. 451) as 'a particular jarring event that initiates the psychological analyses involved in quitting a job'. A shock can be expected (in which case, it is more likely to be positive, according to Morrell *et al*. (2004)); conversely, it may be unexpected. The source of a shock may be internal or external to the individual who experiences it. While Lee and Mitchell's own research assumes the existence of only a *single* shock (which they characterize as 'a single particular event' (Lee *et al*., 1999, p. 461)), others have considered the possibility of multiple shocks (Maertz & Campion, 2004; Kammeyer-Mueller *et al*., 2005). In sum, a shock is an event that may trigger other downstream events in the model, and its inclusion distinguishes the proposed model of turnover from other conventional, variance models that seek to explain turnover intentions.

The second stage, engaged script, is defined as 'a pre-existing plan of action which can be based on past experience, observation of others, reading [about another person's actions] or social expectations' (Lee *et al*., 1999, p. 451). The third stage, image violation, occurs 'when an individual's values, goals and strategies for goal attainment do not fit with those of the … organization or those implied by the shock' (Lee *et al*., 1999, p. 451). The notion of image violation draws upon Image Theory, which we explain in detail, below.

The fourth stage, job dissatisfaction, occurs 'when people come to feel over time that their jobs no longer provide the intellectual, emotional, or financial benefits they desire' (Lee *et al*., 1999, p. 451). The notion of job satisfaction in the unfolding model is similar to its role in traditional variance models; however, the level of job satisfaction matters only for some decision paths in the process model, but not for others. The final two stages of the process model are search and/or evaluation of alternative and the presence of a likely job offer. Lee *et al*. (1996, 1999) state that an individual may consider

alternatives other than conventional employment – such as returning to school, taking time off for travel, or starting a family or business. The latter is especially germane to our research.

As typically applied, the unfolding model has several dozens of permutations of possible paths. Among these paths, Lee & Mitchell (1994) present five so-called *theoretical paths* that are also described in detail by Niederman *et al*. (2007) in the context of IT personnel research. Due to space limitations and the fact that our conceptual framework primarily draws on the existence of stages in a process model, we do not discuss Lee and Mitchell's five theoretical paths in detail.

The existence of the six stages of the unfolding model has been analysed in the context of IT employees. Niederman *et al*. (2007) found that 66% of IT employees who quit their jobs experienced a shock (stage 1). Moreover, a large proportion (82%) of those leaving their jobs reported experiencing one or more *image violations* (stage 3). Most empirical studies that have applied the unfolding model in the organizational behaviour literature have assessed the relevance of core constructs that comprise the model; however, some researchers also called for clearer definitions and measures for each stage, as well as a need for more precise ways to classify individual employees into the five theoretical paths. In recent years, scholars have also called for more radical changes to the logic for determining which specific path fits a given respondent (Holt *et al*., 2007; Morrell *et al*., 2008), while others have urged that the model should be abandoned altogether (Maertz & Campion, 2004, p. 568). We agree with Morrell *et al*. (2008) that the unfolding model has strong explanatory power in describing the actual turnover process. In addition, we consider the notion of a shock to be useful and we support retaining it in the model. Next we review the entrepreneurship literature, which we consider a necessary research stream for understanding IT entrepreneurial turnover.

Entrepreneurship literature

A large and growing body of theory and data exists on entrepreneurs – which has been rarely cited or even acknowledged by IS researchers. Here, we briefly review specific portions of this literature that we consider directly relevant for purposes of theory building for IT personnel. In this literature, a common classification of entrepreneurs is in terms of nascent (i.e., potential), young (i.e., new), and established entrepreneurs (Brixy *et al*., 2008). We focus on the literature that deals with the first type (nascent entrepreneurs), as it is most relevant to our study of IT entrepreneurial turnover. Thus, we omit further mention of the other classes of entrepreneurs. Other classifications of entrepreneurs also exist. For instance, we mention (1) entrepreneurial goals (venture growth-oriented or family income-oriented (Stewart & Roth, 2001)), (2) entrepreneurial status, in terms of necessity-based (e.g., being unemployed) or opportunity-based entrepreneurs (Davidsson, 2006), (3) prior experience in launching a firm (novice *vs* experienced entrepreneurs) (Davidsson, 2006), or (4) other typologies of entrepreneurs (e.g., traditionalist, growth, lifestyle, and status entrepreneurs (Wagner & Andreas, 2008)).

A person is considered a nascent entrepreneur if three conditions are met: 'first, if she/he has done something – taken some action – to create a new business within the past year; second, if she/he expects to share ownership of the new firm; and, third, if the firm has not paid wages or salaries for more than three months' (Reynolds *et al*., 2002, p. 44). For purposes of theory building about IT entrepreneurs, we assume that IT employees who embark on the entrepreneurial path will start their businesses as soon as they leave paid employment (or within a short period of time, either before or after quitting).

A sizeable literature has considered how entrepreneurs differ from non-entrepreneurs. By comparing nascent entrepreneurs to non-entrepreneurs, scholars have found similarities and differences, thereby revealing indicators of subsequent venture creation. Below, we focus on key models and constructs that emerged from this stream of research. We provide a comprehensive summary of prior work in Appendix A.

Lazear and others posit a *jack-of-all-trades* view of entrepreneurship where breadth of education, balance of skills, and number of roles served in prior job positions are better predictors of entrepreneurial behaviour than specialization or years of experience (Lazear, 2002; Lazear, 2004; Wagner, 2006). Another theory – *successful intelligence* – also argues for balance among different cognitive abilities for successful entrepreneurs (Sternberg, 2004). Indeed, according to Sternberg, entrepreneurs are more likely to succeed if three types of intelligence (analytical, practical, and creative) are combined in a balanced set. Moreover, Sternberg insists that practical intelligence is developed not just through many years of work experience, but rather through a process that he calls learning from experience. He notes that time on the job is less critical since 'some people can be in a job for years and know less than someone … in the job for months' (p. 195). We suggest that the two theories (Lazear's jack-of-all-trades and Sternberg's successful intelligence) are related and complementary. Indeed, people who become successful entrepreneurs learn what is necessary and important from their current job role or educational programme and then progress to the next challenge, accumulating successful intelligence, and experiencing a large variety of roles.

In addition, self-efficacy (SE), innovativeness, and risk-taking are other key attributes of entrepreneurs. Bandura (1982) introduced the notion of SE, which in the entrepreneurial context, refers to self-reported 'confidence in having the relevant skills for running one's own business' (Davidsson, 2006, p. 7). Arenius & Minniti (2005) found a strong role for this construct in distinguishing entrepreneurs from non-entrepreneurs, a result confirmed by others (Boyd & Vozikis, 1994; Zhao *et al*., 2005; Koellinger *et al*., 2007). Chen *et al*. (1998) further specified

entrepreneurial self-efficacy (ESE) as comprised of five sub-factors: innovation, marketing, management, risk-taking, and financial control. Their empirical study found higher levels of SE in terms of innovation and risk-taking among entrepreneurs than in non-entrepreneurs, but no differences in the other three attributes (marketing, management, and financial control).

Another perceptual factor, overconfidence in one's ability to succeed, was also found to be critical to entrepreneurs, and to distinguish nascent entrepreneurs from non-entrepreneurs in many studies (Cooper *et al*., 1988; Busenitz & Barney, 1997; Forbes, 2005; Koellinger *et al*., 2007). Indeed, Koellinger *et al*. (2007) suggest that overconfidence generates a perceptual bias – one that is 'common among individuals in general […] and […] entrepreneurs in particular' (Koellinger *et al*., 2007, p. 520) – which affects the 'perceived chances of outcomes and risks' necessary for starting a business. Koellinger *et al*. attribute such overconfidence to the fact that entrepreneurs have a 'strong tendency to consider their situation as unique' (p. 520) and as a result, they base their decision-making on their insider view. Conversely, Forbes (2005) regards overconfidence and ESE as both important but 'conceptually and empirically distinct'. He failed to find a direct relationship between these constructs, concluding that overconfidence bias 'has more subtle psychological sources' (Forbes, 2005, p. 637), rather than being a direct result of entrepreneurial SE.

Another important construct is perception of business opportunities, often labelled alertness to opportunities (Arenius & Minniti, 2005), which is shaped by overconfidence. For instance, in a study of nascent entrepreneurs, 15% of entrepreneurs perceive good opportunities for venture creation compared to just 4% of non-entrepreneurs (Wagner, 2004b).

Finally, recent results from the Panel Study of Entrepreneurial Dynamics by Schjoedt & Shaver (2007) show that job satisfaction was higher among nascent entrepreneurs before they left their jobs, compared to other employees who remained. Apparently, those who quit to become entrepreneurs are not forced to leave their firms due to low satisfaction with the work. The authors attribute this finding, in part, to the possibility that nascent entrepreneurs 'may simply be more optimistic and positive people' (Schjoedt & Shaver, 2007, p. 747); hence, their high level of job satisfaction reflects their general personality type (i.e., upbeat and optimistic), rather than serving as the motive for staying in or leaving a current job.

Although some claim limited enthusiasm for these entrepreneurial studies that compare nascent entrepreneurs and non-entrepreneurs (Davidsson, 2006, p. 10), this comparative stream of work has yielded many useful constructs – including successful intelligence, balanced skill sets, large breadth of education, large number of roles, entrepreneurial SE, and overconfidence. These constructs help to provide insights into how nascent entrepreneurs differ from other employees, as well as motives that underlie their decision to start a business.

Next, we briefly review a third stream of work: specific features of the IT industry context. As advocated in various studies, the industry context where employees are situated is an important factor that shapes both turnover as well as entrepreneurial behaviour (Wagner, 2004b). Moreover, the IT industry has specific features that are appealing from the entrepreneur's perspective (e.g., a rapid pace of change).

IT personnel and industry context

Here, we briefly review specific features of the IT industry context. We organized our review of these features into attributes of the individual, firm, and environment, as suggested by Joseph *et al*. (2007).

Individual level attributes

A large body of IS research has identified individual level factors that drive turnover (Igbaria & Greenhaus, 1991; Guimaraes & Igbaria, 1992; Igbaria & Greenhaus, 1992; Igbaria & Wormley, 1992; Igbaria *et al*., 1994b; Moore, 2000; Ferratt *et al*., 2005; Agarwal *et al*., 2007). In their review paper, Joseph *et al*. (2007) summarized 43 antecedents to IT turnover intention. Among them, some were positively linked to turnover intention (e.g., role ambiguity, role conflict, threat of professional obsolescence, work exhaustion), while others were negatively linked to turnover intention (e.g., boundary spanning activities, autonomy, pay, promotability, fairness of rewards). Their review concluded that other factors exhibited inconsistent results in explaining turnover intention (e.g., age, education, IT job tenure, organization tenure). Therefore, in order to assess what could influence turnover behaviour, we need to incorporate these factors into a model of IT entrepreneurial turnover.

Firm and environmental level attributes

Aspects of the broader context can be divided in two subsets: the internal organizational context and the external environment (Ang & Slaughter, 2000). The former includes factors specific to a given firm, such as its IT strategy, size, structure, location in the organization lifecycle, and finally, the IT work process. The external environment includes general technology trends, the IT labour market, legal issues, effects of national culture, and the growing influence of globalization in the industry. For example, the degree of robustness of labour markets at a given point in time is a key factor, as highlighted by Panko (2008, p. 194), who notes that the health of the IT industry is an important contextual factor at the environmental level. 'He states that post-bubble job losses and unemployment growth was very short-lived and was not as bad as … people believed'.

To integrate the three streams of literature that we reviewed above (the unfolding model of voluntary turnover, entrepreneurship literature, and contextual features of the IT industry), we turn to Image Theory. We believe it is important to develop a model that considers the integration of the different dimensions discussed in the

three streams of literature (e.g., marketing skills, role conflict). Consistent with prior entrepreneurship research, this implies that, instead of studying the impact of specific traits or abilities on the decision to become an entrepreneur, we should study entire configurations of traits, experiences, and skills (i.e., a 'multidimensional constellation' (Miller, 1986; Vorhies & Morgan, 2003, p. 101)). This insight underlies our construct, *RTQ,* which we introduce below. However, we first introduce Image Theory, which is the 'glue' that allows us to combine the three streams of literature together.

Image Theory

Image Theory, an influential decision-making theory, is one of the underlying foundations of the unfolding model of voluntary turnover (Lee *et al*., 1999). Image Theory views a decision-maker as a 'manager of knowledge and information who attempts to keep a reasonable degree of consistency among his or her images of what is right, what she/he is attempting to achieve, and what he or she is doing to promote those achievements' (Connolly & Beach, 1998, p. 251). In other words, an image is a 'schematic knowledge structure to organize [the decision-maker's] thinking about decisions' (Beach, 1998, p. 12).

Beach introduces two types of decisions with regard to one's image: the *adoption decision* and the *progress decision*. We highlight the former, which focuses on the 'adoption or rejection of candidate [principles] goals or plans as constituents of the trajectory or strategic images' (Beach, 1998, p. 14). In our case, the goal or plan is the decision to quit one's job to start a business. Image Theory posits that people constantly consider and screen different alternatives. They do so by examining the compatibility between the goal and the available choices or alternatives. This *compatibility test* allows the decision-maker to eliminate unacceptable candidates (i.e., options) based on screening 'the relevant constituents of the […] images' (Beach, 1998, p. 14). Hence, when the compatibility test is passed, this means that the decision-maker leaves his/her job because there is a high degree of fit between the image of his/her goal and the available alternative. Image Theory actually posits decision-making as a screening process that seeks to identify incompatibility, which is 'the weighted sum of the number of [image] violations … where the weights reflect the importance of the violation' (Beach, 1998, p. 15). Each identified violation of a specific image is classified as either all-or-nothing, that is there is a violation or there is no violation. The decision-maker calculates whether the 'weighted sum of the violations exceeds some absolute rejection threshold' – in which case the alternative being considered … 'is rejected, otherwise, it is adopted' (Beach, 1998, p. 15). For instance, an image violation would occur if the nascent entrepreneur lacks a specific trait, skill, or experience that she believes is necessary to leave. The greater the weighted sum of image violations, the less likely this potential entrepreneur will be to quit. When no image violations exist (or when the weighted sum of violations is below a certain threshold), the compatibility test is passed, and the decision-maker quits. Below we explain how we draw upon Image Theory in defining our new construct, *RTQ*.

Conceptualizing RTQ and NCQ for nascent entrepreneurs

Defining *RTQ* and *NCQ*

We introduce two new concepts, *RTQ and NCQ,* which seeks to reconcile several gaps that we identified in our review of the literature. First, as discussed above, there is an empirical gap between the constructs of turnover intention and actual turnover behaviour. This gap is related to the low level of explained variance between the two constructs, as well as a temporal gap between intention and actual behaviour (since an intention to quit may go unrealized for many months or years). Second, in order to address actual turnover behaviour, we sought a concept that would precede actual turnover, but which also has the ability to evolve over time, either gradually or suddenly (i.e., following a shock or a set of shocks). Finally, we propose the constructs of *RTQ and NCQ* based on insights drawn from our literature review, the analysis of the case study described below, as well as the first author's entrepreneurial experience. With regard to the last point (the author's entrepreneurial experience), Corbin and Strauss (2008, p. 33) stated that 'As researchers move along in the analysis, it is their knowledge and experience (professional, gender, cultural, etc.) that enables them to respond to what is in the data'.

RTQ is the image representing the configuration (i.e., a 'multidimensional constellation' (Miller, 1986; Vorhies & Morgan, 2003, p. 101)) of all relevant dimensions that potentially influence the decision to quit (e.g., the level of SE in terms of IT skills and the level of job dissatisfaction). Based on the literature review, we suggest an inventory of the potential relevant dimensions for *RTQ* (see Appendix A). We consider two types of images related to *RTQ*: the *current RTQ* and the *NCQ*.

(1) The *current (working) RTQ* is the measure of *RTQ* at a point in time for a given person.
Consider a simplified example that includes just three dimensions (the level of *job dissatisfaction*, level of *SE in marketing*, and the level of *SE in IT skills*). These three attributes appear in Figure 1. In this example, we assume that the weights for all three dimensions are equal. As the 'true' *current RTQ* is impossible to represent, we attempt to approximate this representation by using a radar chart – a technique that has been used in prior IS research (Shaw, 2004; Barnes & Vidgen, 2006; Huang & Han, 2008). In interpreting these radar charts, we note that the points on the perimeter represent either high or low levels of each dimension – as specifically noted on each radar chart. This example (Figure 1a) represents an IT employee who at t_1 initially has a relatively low level of *SE in*

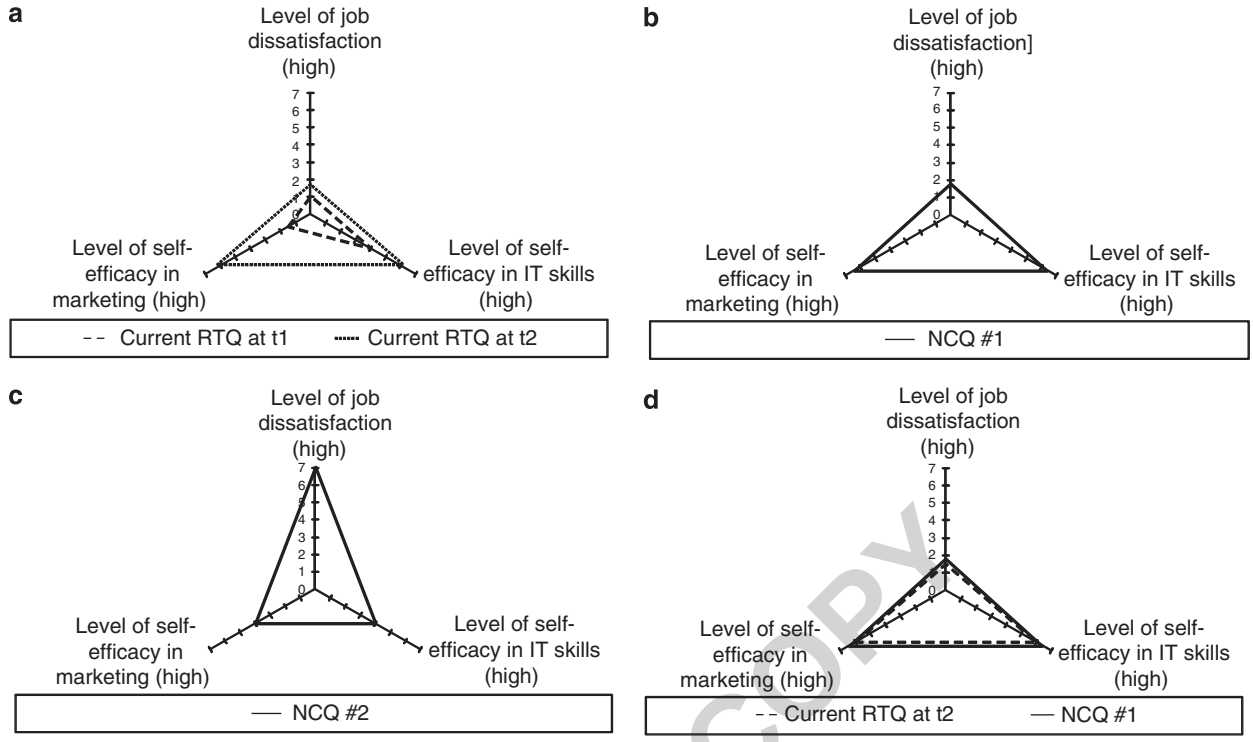

Figure 1 Simplified representations of two *current RTQ* (at t_1 and t_2) and two *NCQ* (#1 and #2).

marketing, a moderate level of *SE in IT skills*, and a low *level of job dissatisfaction* (i.e., high job satisfaction). Next, assume that she attends a course in marketing. During the course, her *SE in marketing* gradually increases to a much higher level at t_2. In addition, just before t_2, the IT software product that she had been working on was finally released and became a success, as acknowledged by her managers, co-workers, and by the external market. Thus, immediately after the product's release, her level of *SE in IT skills* soared to a higher level. Finally, we assume that her level of *job dissatisfaction* remains stable from t_1 to t_2. The *current RTQ* at t_2 is represented by the newer configuration of the three attributes, also shown in Figure 1a.

(2) The *NCQ* represents the configuration of relevant dimensions for which the employee will eventually quit her job. In addition, any individual has not just one *NCQ*, but a set of *NCQs*. Thus, in order to describe the *NCQs*, we must show several possible configurations of these attributes that would trigger the employee to quit. Moreover, as values, goals, and plans vary from one individual to the next, this set of *NCQs* will also differ from one individual to another. In our simplified example, we consider just two *NCQs*. The first *NCQ* consists of a high level of *SE in IT skills*, a high level of *SE in marketing*, and a low level of *job dissatisfaction* (i.e., high job satisfaction) (Figure 1b). This is one configuration wherein the employee feels ready to quit to start her own business, despite a high level of *job satisfaction* (Schjoedt & Shaver 2007). A second configuration for the same employee, *NCQ* #2 consists of moderate levels of *SE in IT* and *SE in marketing*, but a very high level of *job dissatisfaction* (Figure 1c). For this latter configuration, the employee is so dissatisfied with her current job that she is ready to leave, although she does not feel very confident with either her IT skills or marketing skills. The two *NCQs* we described above may be just a few of the possible configurations among a larger set of *NCQs*.

In deciding whether to quit or remain, the employee performs a screening and compatibility test as described by Image Theory (Beach, 1998), in which she compares the *current RTQ* and her set of *NCQs*. If the compatibility test is successful (i.e., there is sufficient fit between *current RTQ* and one of the *NCQs*), then the employee reaches a 'tipping point' and she decides to quit her job (Beach, 1998).

In Figure 1d, we can see that the *current RTQ* at t_2 is quite close to the *NCQ* #1. Using the language of Image Theory, there is no image violation between any dimension of the *current RTQ* and *NCQ* #1. The levels of all three dimensions of the *current RTQ* are very close to those of *NCQ* #1, which means that she is ready to quit at t_2.

Properties of RTQ and NCQ

RTQ and NCQ have several properties:

- The *current RTQ* is dynamic since it captures the employee's perception of various attributes at a point

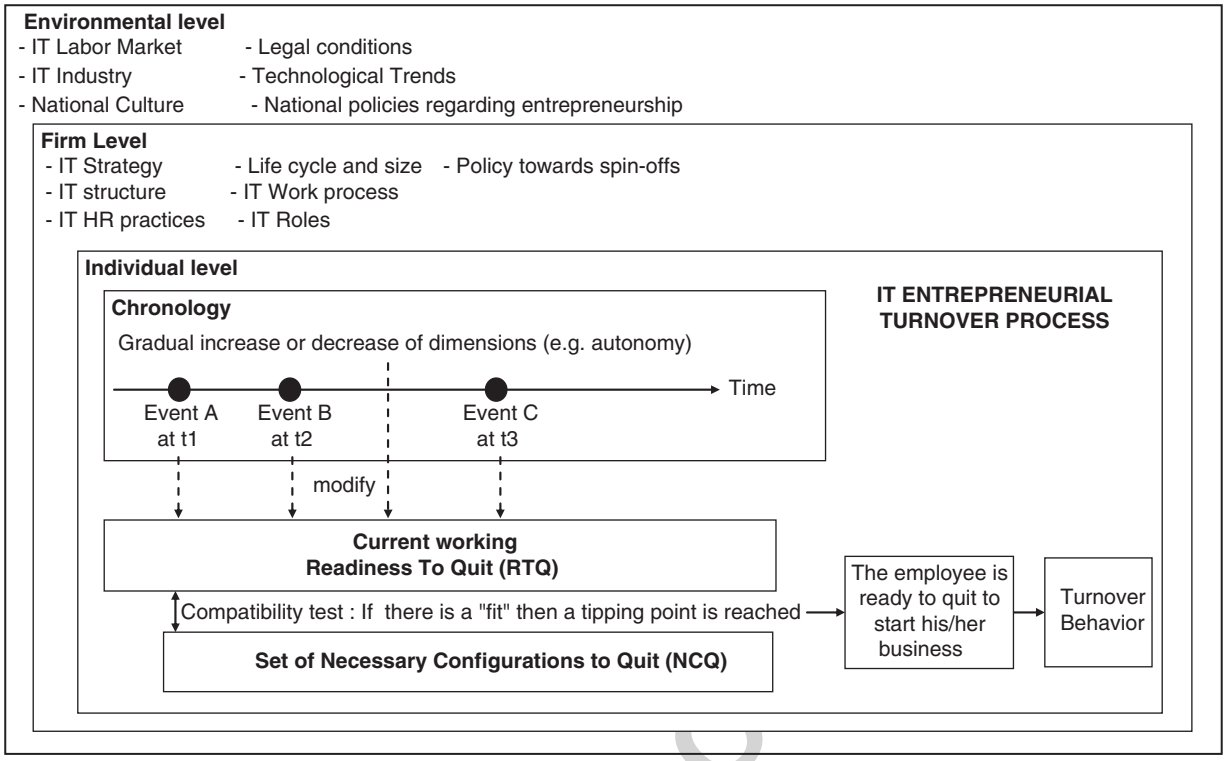

Figure 2 Conceptual framework of the turnover process.

in time. Clearly, the *current RTQ* evolves over time, through a gradual increase or decrease of its dimensions or through a sudden change following a shock. In our simplified example, the *current RTQ* changes from t_1 to t_2 for some dimensions.

- The weighted sum of violations of current *RTQ* (relative to *NCQ*) does not exceed its threshold value when the individual is ready to quit, that is, there is no rejection of the compatibility test. In our example, the *current RTQ* (here at t_2) fits one of the *NCQ* (here, *NCQ* #1).
- The various dimensions are not required to have equal weights during the compatibility test. For instance, an IT employee for whom marketing is critical for her new venture may weight the image violation of *marketing SE* much higher than other attributes when she performs the compatibility test. Under these conditions, she will be willing to leave the existing job only when there will be no image violation on *marketing SE* (i.e., when her level of *marketing SE* will match the *NCQ* level of *marketing SE*), as any image violation of *marketing SE* represents incompatibility. As mentioned before, the weights for the three dimensions in our example are assumed to be equal.
- Along the same lines, some attributes may not be relevant from one individual to the next in assessing the *NCQ*. Such dimensions may be completely ignored by some employees in deciding whether to quit. For example, one individual may heavily weight his level of organizational commitment to his employer, whereas another employee may ignore her level of organizational commitment in contemplating her decision to quit her current job.

Based on these definitions, we present and discuss the conceptual framework of *RTQ* for nascent entrepreneurs.

Conceptual framework

Given that our objective is theory building related to IT employees who may quit their jobs to start a new business, our conceptual framework explains the overall set of attributes and stages in the decision process (see Figure 2). First, following Ang & Slaughter, 2000, we contextualize the situation at two levels: the environmental level (e.g., IT Labor Market, IT industry) and the firm level (e.g., IT strategy, IT structure, IT HR practices). Contextualizing is important as it will, for instance, influence the level of risk perceived (e.g., during a crisis period) as well as the opportunities available. We then consider the individual employee within this constellation of contextual factors. Here, the IT employee faces the decision of whether to quit the present job to start a new business. As described in the chronology part of Figure 2, the employee may encounter either of two scenarios, as described below.

1. A gradual increase or decrease of specific dimensions of *RTQ*. This was illustrated in our simplified example: the employee attended an intensive marketing course,

after which her *SE in marketing* gradually increased between t_1 and t_2.
2. A sudden event (e.g., a *shock*) occurs, which directly and suddenly affects specific dimensions of *RTQ*. In our example, the employee's *SE in IT skills* rose sharply at time t_2, following the completion and successful product launch of her company's new software product.

Next, the employee compares the *current RTQ* with her set of *NCQs*. If the *current RTQ* passes the compatibility test (Beach, 1998) (i.e., there is a fit between the *current RTQ* and one of the *NCQs*), then the employee reaches a tipping point and decides to quit her job. In our example, this occurs at t_2, as shown by the fit between the *current RTQ* at t_2 and *NCQ* #1 along all three dimensions in Figure 1d.

To illustrate our framework, we present the following real example of David (a pseudonym), a current IT entrepreneur, who left his salaried job in 2002 to start his own company in IT software consulting and new product development. This vignette is derived from three interviews conducted in September 2008. Our research methods are summarized in Appendix B.

An illustrative vignette

David's story

David is a French IT consultant and entrepreneur who previously worked as an employee in a technology start-up firm in Paris. He began to work as a software developer at this firm, WebCompany (a pseudonym), in June 2000, just after completing his business degree (with a marketing major). Nine months after he joined the firm, his title changed from New Product Consultant to New Product Engineer. David worked at WebCompany for a total of 22 months, until April 2002. During this time, he developed several e-commerce products for the company, including two highly profitable 'blockbuster' products (both software products that the company licenced to other Internet firms). After 22 months with WebCompany, David decided to quit and launch his own business.

Several critical events occurred during this period. Event 1 occurred just 1 month after he began at WebCompany: his wife passed a highly competitive examination and received an unanticipated job offer in northern France, in the city of Lille. Commuting between Paris and Lille requires an expensive, 1-hour journey by train. After spending 6 months commuting between his home in Paris and his wife's new apartment in Lille, David requested permission from his supervisor in February 2001 to work remotely from Lille. His boss approved his request and, in February 2001, David started to telecommute from Lille (Event 2). A third event was that, during his Christmas holidays in late 2001, David had the opportunity to discuss his options with family members, at which point, it became clear to David that he should start his own business (Event 3). In fact, he delivered his resignation to his boss the first workday after New Year's Day in 2002, and he left the firm 3 months later. This period of 3 months allowed David to complete ongoing projects and to prepare to launch his own company.

During his time at WebCompany, David recognized that several of his attitudes gradually changed. First, he said that his *need for more recognition* gradually grew over time. Second, David expressed a general *boredom with regard to the company's line of business* (Internet audience measurement), as well as *boredom with regard to his co-workers*. In short, David acknowledged a desire to work on new industries with new people. Finally, working remotely allowed David to recognize his strong *need for autonomy*.

We apply our conceptual model to analyse this vignette.

Event 1: David's wife receives an unexpected job offer

One month after David began his job, his wife passed a highly competitive examination and received an unexpected and attractive job offer in Lille. Thus, for nearly 6 months (i.e., from 1 September 2000 to 14 February 2001), David worked in Paris, separated from his wife, and living alone in an apartment *on the 8thfloor [with] no elevator!* Of course, the primary job attribute that evolved over time was *work-family conflict*, due to the forced separation from his wife, which was occasionally resolved by travelling to Lille to visit her – but which also was challenging financially, since train travel in France is very expensive. In addition, David recognized his gradually increasing lack of motivation at work – both because of his *boredom with his co-workers*, and *with WebCompany's line of business*. If we consider David's *current RTQ*, we see that in Figure 3, at t_1, it did not pass the compatibility test (Beach, 1998) with any of the *NCQs*. Given this 'failure' of the compatibility test, there was no reason for David to consider quitting his job at that time. Thus, he remained in his current job; however, another employee with a different set of *NCQs* (for example, an employee for whom *work-family conflict* has a much greater weight) might have passed the compatibility test and decided to quit her job. Indeed, David's *current RTQ* may have been very close to one of his *NCQs*, as he declared that, *[without the option to telecommute], I would have quit [after] a very short delay: maximum of three months!* Therefore, in Figure 3, we can represent David's *NCQ* in the hypothetical situation of telecommuting not being an option.

Event 2: David starts to telecommute

Using Figure 2 as a guide, we next consider the environmental context. During 2000–2001, there was enormous growth in broadband connectivity throughout France (which we label as an IT industry variable). Owing to this change, David began to work from his wife's apartment in Lille, at first, just occasionally, and then, starting in February 2001, 4 days a week.

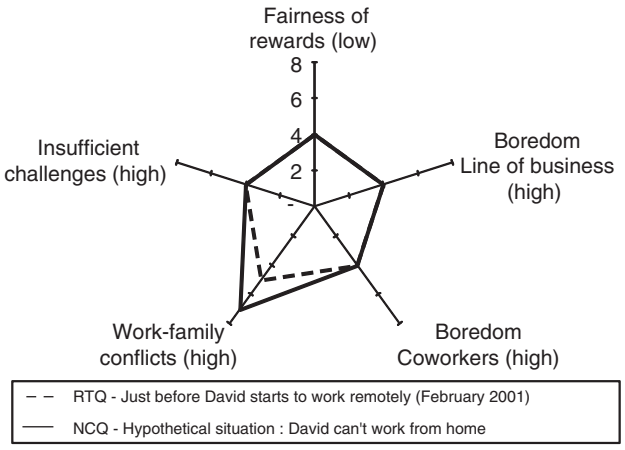

Figure 3 *NCQ* – Hypothetical situation without telecommuting.

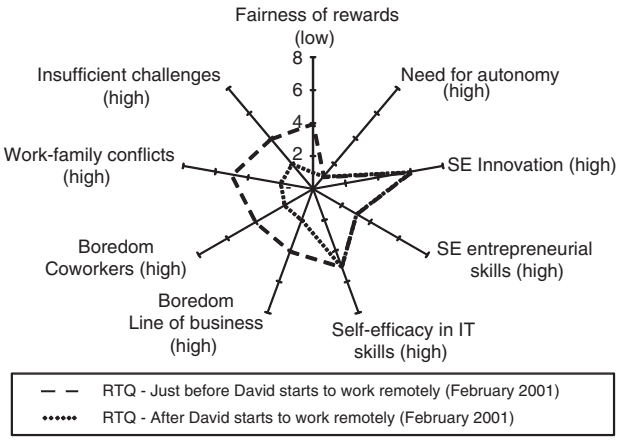

Figure 4 *Current RTQ*, before and after David started to work from home.

After his manager allowed David to telecommute and relocate to Lille, his level of perceived *fairness of rewards* increased. As an immediate result of the option to telecommute, David's level of *work-family conflict* was reduced. At the same time, other attributes shown on David's radar chart (Figure 4) decreased as well: *boredom with the firm's line of business* and *boredom with his co-workers*. In fact, David perceived his work as becoming more challenging after he started to telecommute. Shortly thereafter, David's level of *RTQ* decreased. This had the result of ensuring that David remained with WebCompany (at least for the short term); however, working remotely had a long-term influence on other work attributes that David recognized (*need for autonomy, SE in innovation, SE in entrepreneurial skills, SE in IT skills*), and are added to his *RTQs* in Figure 4.

Event 3: Long-term influence of telecommuting and opportunity for reflection

We portray the long-term influence of telecommuting and the opportunity for time to reflect during the Christmas break in Figure 5 by showing two 'snapshots' in time: (1) just after David began to telecommute in February 2001 and (2) when David resigned at the start of January 2002. At that point in time (i.e., resignation), the *current RTQ* fit one of David's *NCQs*.

David's *boredom with regard to the company's line of business* and *with regard to co-workers* again began to gradually increase, ultimately reaching unacceptable levels. It is important to note that this boredom was not towards the IT skills that David was using in his job; rather, it was boredom with regard to the company projects to which he was applying his skills (i.e., creating metrics for Internet audience measurement). David articulated this point:

> When one is working on Internet audience measure, we do a lot of things, but eventually, it's always [the same boring] … Internet audience measure!

Although the projects were interesting and his relationship with his manager was excellent, David felt the need to meet and work with new people. He also wanted to experience new business *challenges* – perhaps applying his IT skills to a different industry context. Indeed, subsequent projects that he performed as an entrepreneur used very similar skills and technologies, but with the same recurring cycle: usually after about 18–24 months, David would seek novelty – both in terms of the specific application domains, as well as in his set of co-workers. Interestingly, in reflecting back on his work history, David revealed that he typically works at each job for a *one year and a half or two year cycle*. After such an interval of time, David said that he usually felt that he needed a complete change in terms of industry and co-workers. This idea of a recurring cycle will be discussed below.

Simultaneously, there were many factors pushing David towards self-employment (e.g., his high *need for autonomy*, combined with a moderately high level of *SE in entrepreneurship*). Although at the time he decided to quit his job, David believed that starting his own business was risky (e.g., due to a lack of SE in managerial skills), but other factors offset this hesitation (e.g., he was not thinking about hiring any people at the beginning). He decided to quit on 1 January 2002.

During his final months at WebCompany, David's concerns with a lack of *fairness of rewards* became increasingly problematic. Indeed, the Internet measurement products that he had personally developed became highly successful, profitable 'blockbusters', but David continued to receive a fixed salary without any special bonuses, stock options, or other rewards that might acknowledge the enormous financial success of the products that he had created.

> I realised that aspect [fairness of rewards] much more when I was telecommuting; telecommuting really gave me the impression to be more autonomous and therefore to give more [effort].

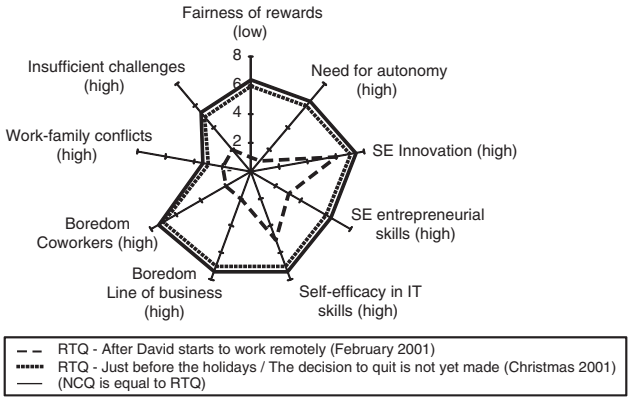

Figure 5 Evolution of the *current RTQ*, from the moment David started to work from home to the moment he resigned. (*Note*: The dimension labelled work-family conflict is retained in the figure in order to be consistent with Figure 4, although this is not a relevant dimension for this specific *NCQ*).

Notably, David's *SE regarding his IT skills* and *SE with his ability to innovate* were also very high at the time – possibly unrealistically high, in view of subsequent events. David stated:

> I now realize that I completely over-estimated my IT skills at that moment [when I made the decision to leave].

This statement reveals the importance of overconfidence as a factor that propels David and other entrepreneurs to leave secure employment, as we discussed in our literature review. David's vignette allows us to observe the role of overconfidence and how it accelerates such employees' decision to quit a stable job.

David made the final decision to quit his job during his Christmas break, at the end of 2001, having time to think, weighing the pros and cons, as well as discussing his options with his wife and his parents. His main concern was related to his wife's support of starting a business (not the decision to quit):

> If my wife would have discouraged, I think I would not have done it …

Overall, his family responded positively:

> [They] understood that if I wanted to go ahead, it was the right moment. We had no children, we didn't have a house, and we were renting an apartment. I had two years of experience which was not necessarily a lot, but I was not taking important risks.

As a result, David passed the *compatibility test* at this time, since he perceived a high degree of *fit* between his *current RTQ* and one of his *NCQs*, as shown in Figure 5.

Other emergent themes

David mentioned that his managers at WebCompany were completely surprised by his decision to leave, as well as the determination with which he made his decision. According to David, they realized that *there is no way we could keep you*. Indeed, his managers had not noticed the changes in his attitudes towards his job, in part, because such changes had occurred gradually over more than a year. The fact that David was working remotely for nearly a year made it even more difficult for David's managers to recognize various changes in his attitude. Moreover, external factors also played a role (the growth and then collapse of the Dot Com bubble, and the rapid growth of the company employing David, leading to changes in David's day-to-day work).

This vignette highlights a specific path to entrepreneurship, which in David's case was from an on-site salaried employee, to remote worker, and finally to an IT entrepreneur (first as an independent IT consultant and then as a 'complete' IT entrepreneur, developing and selling software and services). At each stage, the entrepreneur learns, discovers, or realizes his potential and his needs, and then acts upon them.

In conclusion, we have shown that a particular event (in David's case, the decision to telecommute) indirectly exacerbated his decision to quit through a series of events that included a gradual increase in: (1) his need for *fairness of rewards (e.g., through a better recognition of his own contribution)*, (2) his *need for autonomy* and (3) his *SE regarding entrepreneurial skills (e.g., by successfully working on his own)*. In addition, but not as a direct result of telecommuting, David's *SE regarding his IT skills* (enhanced by the overconfidence effect), as well as his *boredom* towards the application domain within which he was working also played a critical role in his decision to leave his job.

This detailed vignette illustrates our conceptual model, as well as two constructs that we have introduced: the *current RTQ* and the set of *NCQs*. Below, we discuss the contribution of these constructs and our general research model, as well as additional insights that emerged from David's vignette.

Discussion

As shown in the literature review, IT entrepreneurs' motives for leaving secure employment to start a business are multi-dimensional. Moreover, analysing the overall configuration of relevant attributes offers greater insight than studying each individual attribute separately. Comparing the evolution of the overall configuration of relevant dimensions (i.e., comparing *RTQ* to the set of *NCQs*) appears to be a promising direction for understanding IT entrepreneurial turnover.

Our conceptual model highlights the importance of considering gradual increases and decreases in the various dimensions of *RTQ* over time. This focus on gradual changes in employee attitudes is not reflected in the original unfolding model of voluntary turnover – which instead focuses on sudden changes (e.g., a shock or image violation). Our model allows for gradual changes in the relevant employee attitudes. Of course, gradual evolution is not the only possible type of change

in our model. Indeed, a sudden increase or decrease of the relevant dimensions may ensue from specific events – such as one or more *shocks*.

Our model shows that there exists not just one specific configuration of attributes that triggers leaving but instead, a set of *necessary configurations to quit* (*NCQs*) for each individual. Of course, these *NCQs* will vary over time for an employee, but also from one employee to another. However, using our conceptual framework, we believe that the configuration of critical attributes can be explained and captured using both longitudinal as well as retrospective case study approaches (Leonard-Barton, 1990). Indeed, through our case study, we illustrate Schjoedt & Shaver's (2007) result that a high level of job satisfaction is not sufficient to keep employees in their current jobs. This is especially true of employees who later become entrepreneurs – since, they tend to be characterized by overall optimism. This suggests that having a generally high level of job satisfaction is an individual trait (Schjoedt & Shaver, 2007), rather than a situational factor that keeps employees attached to their current job. Consequently, some *NCQs* for a given employee are characterized by high levels of job satisfaction whereas others are not (i.e., in which case, job satisfaction may be low or even irrelevant). For example, just after his wife started her job in Lille, David's *current RTQ* was very high in work-family conflict, but was totally unrelated to his level of job satisfaction (which was also very high but not relevant in this specific decision to quit). After David relocated to Lille and began to telecommute, his configuration was characterized by low work-family conflict, but also recognition of a high need for autonomy, and a high level of boredom with the industry in which he worked, as well as with his co-workers. Additionally, for IT entrepreneurs, if all the entrepreneurial dimensions on the chart are high (e.g., marketing SE, innovation SE, financial SE), then it is very likely that they will quit, despite having high job satisfaction, illustrating another possible *NCQ*.

By applying our conceptual model to the specific vignette with David, we also observed several additional constructs. First, the notion of *boredom* is important; in David's case, however, it was not boredom with the technical skills he was using, but rather boredom with the company's line of business and with his co-workers. Hence, different facets of boredom can exist – specifically, boredom with the work itself, with the specific skill set utilized, with co-workers, with the company's line of business, and perhaps even boredom with the physical office setting. To our knowledge, these different facets of boredom have not previously been mentioned in the IT personnel literature, although the importance of boredom (Pawlowski *et al*., 2007) or lack of challenge (Lee, 2000) are widely acknowledged as key triggers to job turnover in IT personnel research. Recognizing these distinct facets of boredom is especially relevant when studying turnover of potential IT entrepreneurs.

Second, we have shown that cyclical patterns of enthusiasm *vs* boredom with regard to a specific industry or a specific set of co-workers may occur for employees who are likely to become entrepreneurs. As illustrated in David's case, we see that, after a period of several months or years, if new challenges and/or changes of environment do not occur, the nascent entrepreneur will likely become weary (i.e., unchallenged), and leave to pursue new challenges by launching their own venture.

Third, we can see the role of overconfidence in IT entrepreneurial turnover, widely cited in entrepreneurship research, which creates a perceptual bias with regard to the individual's SE (Koellinger *et al*., 2007). In David's case, overconfidence manifested itself in the form of a very high level of SE with his IT skills; however, overconfidence can appear in many forms (e.g., marketing or financial SE).

Fourth, we showed that the option to telecommute can help to alleviate work-family conflict in the short term – hence delaying a decision to leave. At the same time, telecommuting may also trigger gradual changes in several other dimensions that may go unnoticed by one's manager, because the manager and employee do not interact face to face. In David's case, this gradual evolution in attributes included a growing need for autonomy and need for fairness of rewards. Lastly, we can see an interesting transition path from employee to entrepreneur, illustrated in David's case by following a sequence from salaried employee to remote worker, to IT self-employed independent consultant, and finally to full-fledged IT entrepreneur.

We propose some future research to build upon and strengthen our work. It is obvious that a single vignette is not enough to confirm our conceptual model. In this paper, the purpose of David's detailed vignette was to illustrate and provide an instantiation of our model rather than to prove it correct. Additional case studies should be collected to facilitate cross-case analyses in order to compare and contrast results from employees of different ages, gender, geographical location, and IT specialization. Through such cross-case analyses, we hope to better understand IT entrepreneurial turnover – including various possible configurations of *RTQ* and *NCQ*.

Future research should also include both longitudinal case studies as well as retrospective cases. Our choice of a retrospective, illustrative case study is subject to the usual limitations of retrospective research, namely retrospective sense-making (Miller *et al*., 1997). However, retrospective cases have certain strengths that, when used in combination along with longitudinal cases, provide value for empirical research. Our retrospective case study of David is ideal for the purpose of illustrating our theory since several distinct events happened, which ranged over several time periods, and he experienced both gradual – as well as immediate – increases (or decreases) of various attributes that we portrayed in the radar charts (e.g., work-family conflict, need for autonomy, boredom, and need for fairness of rewards). David's case

also demonstrated that overconfidence was present – and was a necessary catalyst to David's decision to venture out on his own, as predicted in the entrepreneurship literature. Despite the strengths of this retrospective case study (and others like it), we are mindful of the advice from Leonard-Barton, who argues that scholars should simultaneously employ both longitudinal and retrospective case studies in qualitative research, in order to achieve the benefits of both approaches while minimizing their respective weaknesses (Leonard-Barton, 1990).

Future research will have to be content with the fact that the number of dimensions necessary to assess *RTQ* may be quite large. To manage this challenge, we suggest that researchers be creative in designing their empirical studies. For instance, we suggest that they combine interviews (to capture relevant, emergent attributes that apply to a given individual) along with personalized questionnaires that can be used to capture quantitative data about the personal relevance and intensity of each dimension over time (Mourmant, 2009). In the future, researchers need not assume equal weights (i.e., importance) for the various dimensions of *RTQ*. While we assumed equal weights for reasons of simplicity, such an assumption is not always warranted. Indeed, the appropriate weights to apply for any given individual are, in part, subjective. Experts in the area of Image Theory have identified specific methods to handle the process of weighting different attitudinal dimensions based on specific data from each subject (Beach & Strom, 1989).

Implications for research

We believe that better understanding IT nascent entrepreneurs' actual turnover behaviour increases our knowledge of IT turnover. At the same time, this reminds us that there are many possible paths to IT turnover, and that each employee is unique to some extent. Not only does each person have different configurations of dimensions that represent his/her *NCQ*, but the specific events that occur in each employee's work life and personal life will differ as well. Thus, we can benefit from conceptual models such as ours that provide the necessary degree of richness to recognize the uniqueness of each employee. At the same time, our model allows us to identify common patterns for classification into a distinct typology.

Because IT entrepreneurs are a specific group of IT employees, ongoing research with additional informants is likely to generate slightly different patterns of results. Future research using both retrospective and longitudinal case studies (Leonard-Barton, 1990) should systematically assess the relevant dimensions and configurations of *RTQ* and *NCQ*, as well as identify similarities and differences in the configurations that form various individuals' *NCQ*. The past few decades of research that have relied on traditional, variance models of employee turnover have amassed literally dozens of factors that predict turnover intention among IT employees (Joseph *et al*., 2007), as well as among a range of other occupational types; however, further research is needed to 'flesh out' various possible configurations for the constructs that we have introduced: both *RTQ* and the set of *NCQs*. Two key research possibilities exist. First, specific patterns of *RTQ* and *NCQ* may suggest additional insights leading to the design of statistical, quantitative models that could employ moderator and mediator variables to explain various factors, their interactions, and outcomes. Second, a different tack could inquire whether there exists a limited set of *NCQs* that explain turnover behaviour among all or most IT entrepreneurs. By collecting more individual life histories, similar to David's vignette, similarities and differences can be identified, an approach similar to one used by Lee & Mitchell (1994) to identify the most common paths to employee turnover (i.e., so-called *theoretical paths* in the unfolding model of voluntary turnover).

In addition, researchers should pay attention to the level and type of receptivity to events among IT employees, as Giacomin *et al*. (2007) suggested. Along these lines, future research could address why individuals react differently to the same event, as well as why a given individual reacts one way to an event at a particular time and, another way at a later time. Collecting moderate-to-large numbers of life histories (i.e., 30–75 cases) may enable detection of these variations.

RTQ contains specific dimensions related to IT (e.g., SE in IT skills) and entrepreneurship (e.g., SE in marketing, part of entrepreneurial SE (Chen *et al*., 1998)). In other industries, additional dimensions may also be relevant if they are germane to specific occupational types, including specific issues related to licencing and certification (e.g., for accountants, architects, nurses), which is generally not an issue for IT professionals. Future research should assess if the properties and conceptual framework of *RTQ* stay the same when applied to other occupational groups (e.g., architects, lawyers, management consultants) who choose to start their own businesses.

As the context of our study is entrepreneurship, we make the implicit assumption that the construct of *RTQ* (and *NCQ*) in fact refers to *RTQ to start a business* – instead of other alternatives (such as leaving to start a family, returning to school, travelling, or immersing oneself in volunteer work). Indeed, we could further sub-divide the construct of *RTQ* into *RTQ* (without necessarily being ready to start a business) and *readiness to start a business* (without necessarily being ready to quit). It is, of course, possible for an employee to start a business 'on the side' while continuing full-time employment, just as it is possible that an employee may leave his/her job but then not start a business until much later in time. While we have assumed that quitting and starting a business happen concurrently, either one may occur in the absence of the other – or with a substantial amount of time separation. We have assumed that these events occur close in time, although clearly they are conceptually distinct. As evidence for this, we note the fact that these behaviours appear separately in the academic literature: in the organizational behaviour literature for turnover (i.e., quitting) *vs* the entrepreneurship literature for

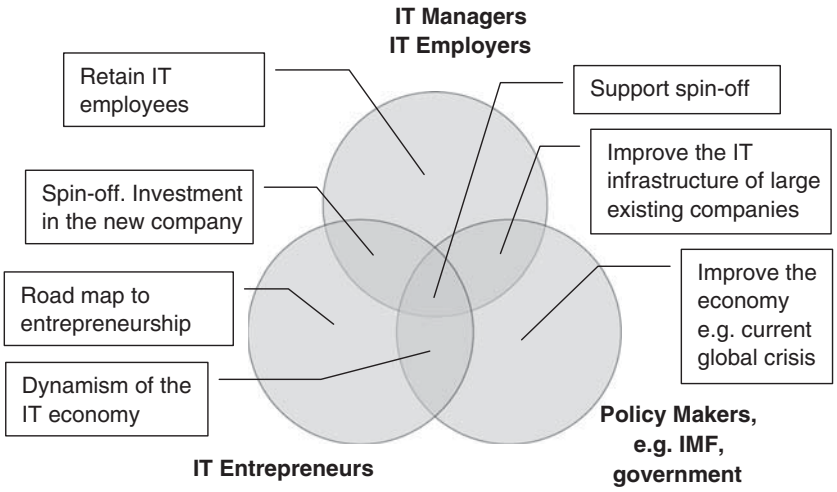

Figure 6 Examples of practical implications.

starting a new business. We provide a comprehensive list of the various dimensions in an inventory located in Appendix A. Future research may focus on teasing apart these two constructs within our model.

Related to this issue, although we have developed our model and the new constructs, *RTQ* and *NCQ,* in the context of IT entrepreneurial turnover, we believe that our ideas can also be helpful for explaining 'normal' voluntary turnover (i.e., quitting to join a new company, rather than to start a new business). Therefore, it is possible to focus the specific dimensions of *RTQ* and *NCQ* based on specific goals of the employee – which may be to start a business, for one individual, but to join a different organization, for another. Thus, our new constructs of *RTQ* and *NCQ* can be readily applied to employees who quit one job in order to start another; or employees who seek to leave the IT industry altogether, while continuing to be a salaried employee (so-called *turn-away* from the IT profession) (Lee *et al*., 1997).

Following Glaser's (2007) call to develop formal grounded theory, future research should focus on abstracting the core concepts of *RTQ* and *NCQ* to the level of a more general decision-making model, that is from a substantive grounded theory to a formal grounded theory. Therefore, we suggest the following preliminary adaptations. First, at the level of the conceptual model, the outcome is not the decision to quit to start a business, but the general outcome of any decision-making process. In addition, the IT context can be modified to fit the specific context of decision-making. Second, the core concepts would then be *current readiness to …* (whatever the decision outcome may be) as well as the *necessary configuration to…* (whatever the decision outcome may be). For example, one decision outcome may be *to become a CIO*, or *to join a start-up firm that pays large stock options*. This type of abstraction will require additional research to assess the generalizability of our new constructs (*RTQ* and *NCQ*) to what Glaser (2007) labels as other *substantive areas*. The value of our theory-building effort is to offer disciplines outside of IS, some novel, relevant concepts and theories, answering repeated calls from leaders in the IS research community (Baskerville & Myers, 2002; Wade *et al*., 2006). Such re-contextualization of the model will assess the extent to which this level of generalizability has been reached (Morse, 1997, p. 163, in Glaser, 2007, p. 106).

Implications for practice

Implications for practice can be discussed at several levels: IT managers, IT entrepreneurs, and policymakers, but also at the level of the intersection of the interests of those groups (see Figure 6). First, by understanding our model – including the notion of *RTQ* and *NCQ* – it may be possible for IT managers to defer or even decrease some IT employees' likelihood of quitting. Having the conceptual tools provided by our model may allow IT managers to consider how their subordinates' needs may change over time, and allow managers to take pre-emptive steps to keep them within the organization. Second (and conversely), there may be economic value in having IT employees become entrepreneurs, as the formation of new ventures is the lifeblood of the IT industry. Consider how less robust our IT economy would be if the entrepreneurs who started firms such as Cisco, Silicon Graphics, Inc, or Sun Microsystems had remained in salaried employment in the particular firms where they began their careers. Thus, in light of this special issue on *Meeting the Renewed Demand for IT Workers*, we believe that understanding IT entrepreneurial turnover is critical, because it is these very entrepreneurs who provide the 'spark' for thousands of future IT jobs. It is these entrepreneurs who hold the power to re-energize the IT industry. By doing so, the IT industry will again become robust and dynamic and, in turn, as educators, we can draw in a new generation of students to major in IT and related subjects.

In terms of other implications for IT managers, such managers should recognize that an employee's *current RTQ* is not stable over time, but rather it will change, either gradually or suddenly, under different scenarios. Recognizing the likelihood of a gradual shift in their employees' needs and other attributes is critical for IT managers, as this will allow them to change their perception of the employee's *NCQ*. Managers who make the mistake of assuming that an employee's *NCQ* is fixed over time may be caught by surprise when their best workers decide to leave (as occurred in David's case). Recognizing that there is not a single configuration of attributes that will cause an employee to quit is important for managers, as it allows managers to recognize that more than one possible 'danger zone' exists where the IT employee may eventually decide to quit. For example, one scenario exists in which very low job satisfaction is required to drive the employee out of the firm, while other configurations for quitting may include high levels of job satisfaction. The level of job satisfaction is irrelevant for certain configurations in which the employee quits because he perceives an opportunity and he is armed with the necessary capabilities to do so. By being attuned to changes in the employees' *RTQ* and the set of *NCQ*, it is possible that managers may be able to alter the level of rewards, challenge, or other job attributes in order to prevent IT employee turnover – or to allow the employee to quit in a 'kinder and gentler' way, with less disruption and hard feelings.

In addition, some emergent concepts from our vignette should be of interest to IT managers. IT managers should potentially consider future IT entrepreneurs as individuals who are sensitive to boredom (possibly with a fluctuating cycle, as shown in David's case), prone to be overconfident with regard to their IT skills (or other skill areas), and seeking high levels of autonomy. Moreover, they should be aware that telecommuting may be the first step to an IT employee's decision to become self-employed or an entrepreneur.

Finally, at a macro level, if we recognize the increasing demand for IT employees to have both soft skills (e.g., communication, marketing, business planning) as well as traditional technical skills, this may mean that larger numbers of IT employees may have the broad and balanced sets of skills (e.g., the *jack-of-all-trade*) required to start a business. Ironically, it may be that by ensuring this greater diversity of technical and non-technical skill sets in IT employees, IT managers may be setting themselves up to see more IT employees quit to become entrepreneurs!

For IT entrepreneurs, our model provides a roadmap for the journey that leads to their destination: creation of their business venture. Moreover, by identifying trends in various dimensions that comprise their personal set of *NCQs*, and comparing these to their current beliefs about their jobs and themselves, these nascent entrepreneurs may be able to more clearly identify the next steps they should take in order to make their leaving and new venture creation a reality. The conceptual tools we provide in our model can help IT entrepreneurs to realize that a shock may be needed to 'force' them to take the final steps towards leaving – possibly even causing them to (intentionally) provoke such a shock to occur. This may allow some IT entrepreneurs to finally 'cut the cord' that tied them to the security of stable employment. This idea is consistent with the unfolding model of voluntary turnover (which considers shocks as being either *internal* or *external* to the person in question). The possibility of employees deliberately provoking their own shock is also consistent with Image Theory, although this has not been explored to date in the literature. Future work should identify what types of shocks occur and how often their origins are internal (i.e., deliberately caused by the employee) or external (i.e., caused by circumstances beyond his/her control).

Finally, our model gives several additional tools to government policymakers. For instance, a better knowledge of the IT entrepreneurial turnover process will help implementing efficient programmes with regard to taxation, financial support, and laws related to new business creation.

Conclusion

In this theory-building paper, we focused on IT entrepreneurial turnover. We defined *RTQ* as the configuration of all relevant dimensions that influence the decision to quit. We also introduced the notion of a set of *NCQs* defined as configurations of relevant dimensions for which the individual will eventually quit his or her job. Drawing from Image Theory, we operationalized the *compatibility test* by comparing the *current RTQ* and the set of *NCQs*. While the notion of the compatibility test is standard in Image Theory, and indeed has been mentioned in the IS literature (Kishore & McLean, 2007), we have applied it in a novel manner. In doing so, we followed conventional practices for computing the degree of fit (i.e., using the sum of relevant weighted image violations and linking the sum to a rejection threshold) (Beach, 1998, p. 15). We provided a method for illustrating *RTQ* (through the radar chart technique), showing both gradual and sudden changes that may occur over time.

We demonstrated that several events – not necessarily just a single shock – can lead to a decision to quit. Although some events have an immediate influence on the attributes of the *current RTQ*, a gradual evolution of other dimensions may also influence *RTQ* and should be considered when seeking to understand entrepreneurial turnover. Our sample vignette shows how both types of changes (gradual and sudden) can influence the employee's actual decision to quit. Moreover, our model highlights the existence of the set of *NCQs* and shows that merging three streams of literature (the unfolding model of voluntary turnover, attributes that distinguish nascent entrepreneurs from non-entrepreneurs in the entrepreneurship literature, and research on the context of IT turnover) within a single conceptual model can enable

the development of useful, new constructs (e.g., boredom with the line of business) that enhance our understanding of IT turnover. Such conceptual tools allow us to understand both how reductions in IT employment occur (i.e., through quitting) as well as how new companies are formed, which, in turn, provide the potential for thousands of new IT jobs. It is, arguably, through the creation of such new ventures that the IT industry will regain its dynamism, thus providing the opportunity to attract a new generation of students and workers.

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Appendix A

See Table A1 and A2.

Table A1 Inventory of constructs and findings from entrepreneurship

Construct	*Definition*	*Authors*	*Influence to entrepreneurial behaviour*
Human capital			
Education	Attained level of formal training (Wagner, 2004b)	(Wagner, 2004b)	Inverted U-shaped curve; mixed results
Work experience			
Prior start-up experience	Help start other business (Kim *et al*., 2003)	(Delmar & Davidsson, 2000; Davidsson & Honig, 2003; Kim *et al*., 2003)	Positive
Prior work experience in small *and* 'young' firms	A young firm is at most 10 years old. A small firm has less than or equal to 20 employees (Wagner, 2004a)	(Wagner, 2004a, b; Davidsson, 2006)	Positive
Managerial experience	Years of experience as a manager (Davidsson & Honig, 2003)	(Davidsson & Honig, 2003)	No significant effect
'Jack-of-all-trades'			
Breadth of education	Number of professional degrees (Wagner, 2006)	(Lazear, 2002, 2004; Wagner, 2006)	Positive
Balance of skills	*Being sufficiently good at a wide variety of skills to make sure that the business does not fail* (Lazear, 2004)		
Number of roles	Number of prior roles (not employers) (Lazear, 2002); number of fields of experience (different from the number of employers) (Wagner, 2006)		
Successful intelligence	*Ability to succeed in life, according to one's own conception of success, within one's environmental context* (Sternberg, 2004)	(Sternberg, 2004)	Positive if all three types of intelligence are combined in a balanced set
Analytical intelligence	*Ability to analyze and evaluate ideas, solve problems and make decisions*		
Practical intelligence	*Ability that individuals use to find the best fit between themselves and the demands of the environment* (Importance of *learning from experience*)		
Creative intelligence	*Involves going beyond what is given to generate novel and interesting ideas*		
Need for achievement	*Preference for challenge, acceptance of personal responsibility for outcomes, innovativeness* (Shaver & Scott, 1991)	(Shaver & Scott, 1991; Wagner & Andreas, 2008)	Positive and mixed results (managers show the same traits)
Need for autonomy	*Desire to be independent and self-directing* (Vecchio, 2003)	(Vecchio, 2003) (Wagner & Andreas, 2008)	Mixed results

Table A1 Continued

Construct	*Definition*	*Authors*	*Influence to entrepreneurial behaviour*
Perceptual factors			
Self-efficacy (SE)			
SE to run one's business	*Self-reported confidence in having the relevant skills for running one's own business* (Davidsson, 2006, p. 7)	(2005; Boyd & Vozikis, 1994; Zhao *et al.*, 2005; Koellinger *et al.*, 2007)	Positive when compared with non-entrepreneurs
Entrepreneurial SE (ESE)	*An individual confidence in his or her ability to successfully perform entrepreneurial roles and tasks* (Chen *et al.*, 1998).ESE is measured on five dimensions: marketing, innovation, management, risk-taking, and financial control	(Chen *et al.*, 1998)	Positive for innovation and risk-taking. No significant results for the other three when compared to non-founder (i.e. managers)
Locus of control			
Internal locus of control	*Internal versus external control refers to the degree to which persons expect that a reinforcement or an outcome of their behaviour is contingent on their own behaviour or personal characteristics versus the degree to which persons expect that the reinforcement or outcome is a function of chance, luck, or fate, is under the control of powerful others, or is simply unpredictable* (Rotter, 1990)	(Chen *et al.*, 1998)	No significant effect
Chance control		(Chen *et al.*, 1998)	Positive (weak), *nonfounder [managers] believe more strongly than founders that life was controlled by chance*
Fear of failure	*Fear of failure as a reason not to start* (Wagner, 2004a)	(Wagner, 2004a, 2004b, p. 8; Arenius & Minniti, 2005; Koellinger *et al.*, 2007).	Negative
Overconfidence	Overconfidence in one's ability to succeed	(Cooper *et al.*, 1988; Busenitz & Barney, 1997; Forbes, 2005; Koellinger *et al.*, 2007)	Positive (Koellinger *et al.*, 2007, p. 520))
Economic outlook	Economic outlook for family and country	(Davidsson, 2006)	Positive
Opportunity	Recognition, perception, and alertness to business opportunities	(Bhave, 1994; Wagner, 2004b; Arenius & Minniti, 2005)	Positive
Demographics			
Age		(Reynolds, 1997; Delmar & Davidsson, 2000; Bosma & Harding, 2006)	25–34 years old: the most active 55–64 years old: the least active
Gender		(Reynolds *et al.*, 2001)	Men are more likely to start new ventures than women, although there are differences between countries

Table A1 Continued

Construct	*Definition*	*Authors*	*Influence to entrepreneurial behaviour*
Social capital			
Network	Knowing other entrepreneurs	(Wagner, 2004b; Arenius & Minniti, 2005; Koellinger *et al.*, 2007)	Positive, through the reduction of ambiguity
Relatives	Percentage of relatives who are self-employed (Kim *et al.*, 2003)	(Kim *et al.*, 2003)	Positive
Financial capital			
Household income and wealth		(Reynolds, 1997; Kim *et al.*, 2003; Wagner, 2004b; Davidsson, 2006; Arenius & Minniti, 2005, p. 239)	Weak and contradictory results; U-shaped curve (Arenius & Minniti, 2005, p. 239). Future research should distinguish necessity vs. opportunity-based entrepreneurs
Career reasons for entrepreneurship			
Innovation	*An individual's intention to accomplish something new* (Carter *et al.*, 2003)	(Carter *et al.*, 2003)	Positive, however, no significant differences with non-entrepreneurs
Independence	*An individual's desire for freedom, control, and flexibility in the use of one's time* (Carter *et al.*, 2003)	(Carter *et al.*, 2003) (Kolvereid, 1996)	
Financial success	*An individual's intention to earn more money and achieve financial security* (Carter *et al.*, 2003)		
Self-realization	*Reasons involved with pursuing self-directed goals* (Carter *et al.*, 2003)		
A rebel theory		(Davidsson, 2006)	
Roles	*An individual's desire to follow family traditions or emulate the example of others* (Carter *et al.*, 2003)	(Carter *et al.*, 2003; Giacomin *et al.*, 2007)	Those two factors rate lower in importance for entrepreneurs (although, they are key motives to start a business) compared to non-entrepreneurs
Recognition	*An individual's intention to have status, approval, and recognition from one's family, friends, and from those in the community* (Carter *et al.*, 2003)	(Carter *et al.*, 2003; Giacomin *et al.*, 2007)	
Authority	*Characterized by authority, control, steering, responsibility* (Kolvereid, 1996)	(Kolvereid, 1996)	Positive
Participation in the whole process	*Participate in the whole process, follow work tasks from A to Z* (Kolvereid, 1996)	(Kolvereid, 1996)	Positive (weak)
Job satisfaction	*A pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences* (Schjoedt & Shaver, 2007)	(Kolvereid, 1996; Schjoedt & Shaver, 2007)	Higher job satisfaction for entrepreneurs compared to non-entrepreneurs
Reasons for preferring organizational employment			
Security	Security, safety, stability, fixed income	(Kolvereid, 1996)	Negative
Social environment	Larger social environment, social membership, colleagues, mutuality	(Kolvereid, 1996)	Negative
Work Load	Family/leisure, fixed working hours, laziness, simpler, less stressful, low complexity	(Kolvereid, 1996)	Negative
Avoid responsibility	Avoid responsibility, not committing	(Kolvereid, 1996)	Negative
Career path	Career opportunity, promotion	(Kolvereid, 1996)	Negative

Table A2 Inventory of constructs and findings from IT personnel literature (Adapted from (Joseph *et al.*, 2007))

Constructs	*Definition*	*Positive*[a]	*Negative*	*Non-significant*
Desire to move				
Affective commitment	Extent of emotional attachment to an organization (Mathieu & Zajac, 1990)		11	
Career satisfaction	Extent of contentment with one's career progress (Igbaria *et al.*, 1994a)		2	
Continuance commitment	Perceived costs associated with leaving an organization (Paré *et al.*, 2000)		1	1
Job satisfaction	Affective attachment to a job (Tett & Meyer, 1993)		16	
Professional commitment	Strength of identification with and involvement in one's profession (Morrow & Wirth, 1989)			1
Ease of movement				
Perceived job alternatives	Perceived ease of moving between employers (March & Simon, 1958)	5		
Job search				
Job search	Behaviour in seeking alternative employment	1		
Individual Attributes				
Demographics				
Age			4	5
Gender		4		6
Marital status			1	1
Human capital				
Education	Attained level of formal training	4		2
IT tenure	Length of stay in the IT profession		2	1
Organization tenure	Length of stay in the organization	1	5	4
Motivation				
Achievement need strength	Individual's drive for success (Lee, 2001)			1
Career orientations	Career aspirations that define an individual's self concept (Igbaria *et al.*, 1995)	2	2	2
Constriction of control	Narrowing one's span of control (Joseph & Ang, 2001)		1	
Growth need strength	Need for challenge and achievements (Lee, 2000)			1
Negative affect	Tendencies towards negative emotion and cognition (Cropanzano *et al.*, 1993)	1		
Restriction of information processing	Narrowing one's field of attention (Joseph & Ang, 2001)		1	
Social affiliation needs	Individual's desire for belongingness (Lee, 2002)			1
Job-related factors				
Boundary spanning activities	Extent of activities that require interactions across functional units (Baroudi & Igbaria, 1995)	1	4	
Job autonomy	Degree to which job provides discretion in scheduling and executing work (Hackman & Oldham, 1975)		3	
Job involvement	Degree to which employee identifies with current job (Igbaria & Greenhaus, 1992)		1	
Job performance	Performance on various job criteria (Murphy & Shiarella, 1997)		1	1
Motivating potential score	Summary index reflecting job's overall motivating potential (Lee *et al.*, 2000)		1	
Organizational citizenship behaviour	Behaviours above and beyond that prescribed by role (Paré *et al.*, 2000)		1	
Role ambiguity	Extent of uncertainty about expectations of one's role (Cook *et al.*, 1981)	8		1
Role conflict	Extent of incompatibility of role demands (Cook *et al.*, 1981)	8	1	
Task-based rewards	Extent of job elements motivating an individual (Igbaria *et al.*, 1994a)		2	

Table A2 Continued

Constructs	*Definition*	*Positive*[a]	*Negative*	*Non-significant*
Threat of professional obsolescence	Extent of threat experienced due to advancements in IT profession (Joseph & Ang, 2001)	1		
Workload	Perceived quantitative work demands (Moore, 2000)	2		
Work exhaustion	Depletion of emotional and mental energy to meet job demands (Moore, 2000)	2		
Work-family conflict	Inter-role conflict between demands of work and family (Gutek *et al.*, 1991)	1		
Perceived organizational factors				
Career plateau	Low likelihood of additional hierarchical promotion (Ference *et al.*, 1977)		1	
Fairness of rewards	Perception of equity in rewards allocation (Moore, 2000)		6	
Hierarchical position	Level in an organization's hierarchy		3	
Human resource practices	Organization's processes in managing and developing employees (Agarwal & Ferratt, 2002)		1	1
Organization-based rewards	Extent to which organizational factors motivate an individual (Igbaria *et al.*, 1994a)		2	
Pay	Salary obtained in the course of work		6	
Procedural justice	Perceived equity of processes determining performance outcomes (Paré *et al.*, 2001)			1
Promotability	Likelihood of promotion (Baroudi & Igbaria, 1995)		5	
Social support	Availability and quality of helping relationships (Lee, 2002)		1	
Socialization tactics	An organization's socialization practices (King & Xia, 2001)		1	1
Additional constructs from David's case study				
Overconfidence or excessive self-efficacy in IT skills	Boredom with co-workers			
Boredom with the company's line of business	Cyclical patterns of interest (e.g., industry, people, product)			

[a]Number of studies reporting this finding.

Appendix B

Methodology for illustrative case study

In this section, we describe the methodology we used for collecting the data for our illustration (David's vignette) and the construction of the model. We conducted case studies, using a grounded theory approach, in which we collected both retrospective data and longitudinal data. We also collected both qualitative and quantitative data. In addition to following the leading sources on conducting qualitative research, we employ a specific approach (known as life story) to capture the chronology of key events.

Epistemological position Our epistemological position is critical realist. This position 'allows for the pursuit of an interpretivist agenda without denying the existence of the subject under study or its role in regulating research' (Smith, 2006, p. 193). In addition, because we seek to answer 'how and why' questions regarding a 'contemporary phenomenon' (Yin, 1981b, p. 1) and because our approach 'focuses on understanding the dynamics present within single settings' (Eisenhardt, 1989, p. 534), we use a multiple case methodology, in which we treat each informant as a single case study. These techniques are appropriate, given our goals.

Data collection process and analysis Next, we describe the data collection process in detail. Data collection was based on an iterative process as shown in Figure B1.

We used a life story approach (Bertaux & Kohli, 1984; Bertaux, 2005), and data from other, secondary sources. The *life story* approach is a way of collecting data through 'oral, autobiographical narratives' (Bertaux & Kohli, 1984). One of its primary tools is the narrative interview, in which the researcher asks the informant to 'tell all or part of his experience' (Bertaux, 2005, p. 11). Following the life story interview, we transcribe and analyse the data, which may lead to the emergence of new concepts. A secondary goal of the analysis is to capture the diachronic structure of the life story (i.e., a succession of notable events, linked via 'before/after' types of causal structures), which allows for a clear chronology. We then administer a follow-up questionnaire that is customised to the individual informant based on the following guidelines: (1) The choice of items is customized to the respondent's most relevant dimensions from the qualitative analysis; (2) The length of the questionnaire depends on the number of shocks that occurred and the relevant time intervals between events. It is necessary to customize the survey in order to minimize the enormous number of survey items that might otherwise be required (i.e., in order to capture every possible attribute at various points in time). Based on David's chronology, we would need to consider an estimated 2520 items if we were to represent each construct discretely. (We compute this as a total of 70 constructs from the IT personnel literature, the entrepreneurship literature, and emergent constructs, multiplied by nine time periods then by four items per factor.) Obviously, such a large number of items is unwieldy. We greatly reduce the overall number of questions by selecting only the most relevant dimensions. This approach seeks to minimize the number of dimensions that must be portrayed on the subsequent radar charts, so that such charts have as few dimensions as possible – only those that are critical to the individual informant's life story. We are able to focus on the most relevant dimensions because we have already gained a rich understanding of the informant during the first interview. The results from the questionnaire were then used to create various representations of *RTQ* at different points in time. Finally, it is possible to conduct additional interviews to clarify specific points.

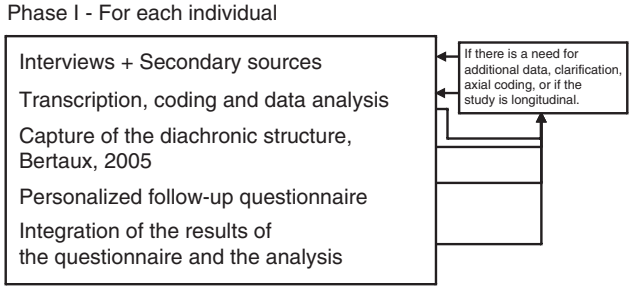

Figure B1 General research design.

The constructs we captured are based, in part, on prior literature, the first author's own entrepreneurial experience (i.e., developing theoretical sensitivity (Corbin & Strauss, 2008)), as well as on the qualitative data that we collected and analysed. Therefore, we iterate between the data and prior literature, so that potential new constructs emerge. The rationale for this approach is that intertwining between constructs in the literature and our emergent analysis of the data provides an in-depth understanding of phenomena. For example, this approach has led to the development of our new constructs, *RTQ* and *NCQ*, as recommended by the Straussian version of grounded theory (Strauss & Corbin, 1997; Corbin & Strauss, 2008). Such an inductive approach has been used in prior research on IT careers (Reich & Kaarst-Brown, 1999). In addition to this specific grounded theory approach, we used additional analysis methods. Due to space constraints, we omit additional details of our analysis methods, but we cite key references for analysing qualitative data (Yin, 1981b; Eisenhardt, 1989; Miles & Huberman, 1994). For instance, we used the technique of tabulating meaningful events (Yin, 1981a). Related to time-ordered displays (Miles & Huberman, 1994, pp. 110–122), we also use techniques from Bertaux, such as analysis of the diachronic structure and sequential causality (Bertaux, 2005, p. 74). In this way, we were

able to reproduce the chronology and retrace the chain of evidence, informed by the gradual evolution of the informant's *RTQ* towards a close match with his or her *NCQ*.

Validation Throughout the entire process, we validated the data previously collected using the technique known as *member-checking*. For instance, the first author initially completed the written questionnaire himself as if he were David, before sending the questionnaire to David. This had the advantage of allowing the first author to 'test' his understanding and awareness of how David would respond, and then being able to compare the two sets of results (David's actual responses and his own simulated responses *as if* he were David) to determine whether he was attuned to David's likely responses. This comparison of the two sets of survey results helped to validate our understanding of the evolution of the various dimensions over time in David's case. Of course, there were a few exceptions, where the first author did not accurately predict David's responses, and these few items were then discussed. In addition, we used the same *member-checking* technique to allow David and other informants to read and validate a summary of their life stories. While the construction of the model was based on David's case study, we analysed 10 additional case studies (both retrospective and longitudinal) to validate the concepts of *RTQ*, *NCQ*, and the conceptual framework.

Limitations of a retrospective data collection Although retrospective data collection, when applied to a salient event, may be subject to the potential bias known as *retrospective sensemaking*, it also allows us to collect data from a larger number of informants, and these informants – all of whom were entrepreneurs at the time we interviewed them – can see 'the whole leaving process in a relatively holistic and measured way' (Morrell *et al*., 2008). Moreover, leaving and starting a business is a salient and emotion-arousing event, which improves the likelihood of respondents remembering these events clearly (Morrell *et al*., 2008), which reduces the problem of bias in retrospective recall. For these reasons, we heed the recommendation from Leonard-Barton (Leonard-Barton, 1990), to combine both longitudinal and retrospective case studies, which she advocates for achieving the benefits of both methods, while minimizing their respective weaknesses. The data we described for David were collected retrospectively, although the first author was also in contact with David during a period of time before he started his business.