Determinants of IT Job Occupations: Integrating Career Anchor Theory and Social Cognitive Career Theory

Research-in-Progress

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Abstract

With the burgeoning demand for information technology jobs, it becomes important to understand the factors that predict the actual occupations of information technology professionals. Extant research has focused heavily on career anchor theory as a theoretical lens to explain this phenomenon. However, the empirical results linking career anchors to IT job occupations are inconclusive and the theory has been criticized for having weak predictive power. Drawing upon social cognitive career theory, this research-in-progress suggests that self-efficacy acts as a second determinant of IT job occupations, which enhances predictive power. A conceptual model is developed, which integrates insights from career anchors theory and social cognitive career theory. The model will be tested via a large-scale survey of alumni from two Canadian universities. This research-in-progress aims at improving the discriminatory power for predicting the under-researched phenomenon of IT job occupations. It can also help in better match IT professionals’ needs, values, and perceived capabilities to their actual job attainments.

Keywords

Career anchor theory, social cognitive career theory, discriminant analysis, IT job occupations, IT careers.

Introduction

Despite recent shocks to the information technology (IT) industry, demand for IT professionals is among the highest in North America (Choudhury et al., 2010; Luftman and Kempaiah, 2007). According to Luftman and colleagues, attracting, developing, and retaining IT professionals continue to be a top concern for IT managers and executives (Luftman and Ben-Zvi, 2011; Luftman et al. 2011), and even became their top concern in 2007 (Luftman and Kempaiah, 2008). This unwavering IT job market is compelling researchers to pay closer attention to the career development of IT professionals, and to especially examine IT career orientations, decisions, and outcomes (e.g., Ituma and Simpson, 2007; Summer et al., 2005; Chang et al., 2011).

IT career research has drawn heavily on career anchor theory (Schein, 1971; Schein, 1975) to examine the relationships between individuals’ orientations and various career development outcomes. Schein (1996) defines orientations as anchors, which are patterns of self-perceived motives, values, and talents that shape individuals’ career decisions. The main premise of the theory is that congruence between an individual’s career anchors and the work environment results in better career development outcomes. Within this broad framework, IT career scholars have generally focused on one or more of the following streams: (1) identifying the dominant career orientations of IT professionals (Ituma and Simpson, 2007; Ginzberg and Baroudi, 1992; Crepeau et al., 1992; Ramakrishna and Potosky, 2003), (2) investigating the impacts of various career orientations on work experiences and job attitudes (e.g., Igbaria et al., 1991;
Summer et al., 2005; Jiang et al., 2001; Jiang and Klein, 2002; McMurtrey et al., 2002), and (3) examining the relationships between career orientations and actual IT-job occupational roles (Igbaria et al., 1991; Crook et al., 1991).

These research streams have significantly contributed to our understanding of IT career development. Nevertheless, given the shortage of IT professionals (Luftman et al., 2011), there is an especially strong need to scrutinize the antecedents of actual IT job occupations. Attaining such knowledge is crucial given that the extant research is emphasizing that the current market shortage is of qualified IT professionals rather than a general shortage (Luftman and Kempaiah, 2007; Choudhury et al., 2010). Hence, it becomes particularly important to understand the attributes that individuals need to possess in order to be attractive, and ultimately be selected, to various IT-job occupations.

This research follows in the steps of the earlier work that examined the determinants of actual IT-job occupational roles (Igbaria et al., 1991; Crook et al., 1991). However, we develop the idea that - despite the usefulness of career anchor theory (CAT) in predicting IT career choices - we need to look beyond career anchors in order to better understand the factors that discriminate among IT job positions occupied by individuals. First, empirical research confirmed that career anchors do not adequately predict IT job occupations (e.g., Quesenberry and Trauth, 2007). A study investigating the career anchors of IT professionals concluded that “the discriminatory power of career anchors/orientations with respect to job types can be described as only marginal” (Crook et al, 1991, pp. 21). Second, there seems to be a mismatch between career anchors and actual job positions, as any given occupation exhibits wide range of anchors (Schein, 1996). Third, there is conflicting evidence among studies that assessed the dominance of career anchors of IT professionals across occupations (see Table 1 for a summary of studies). As shown in Table 1, there are variations with respect to the specific career anchors that were identified as most salient for given IT-job occupations, as well as conflicts with respect to the degree of salience of particular anchors across different studies.

To address these issues, this paper argues that the inclusion of self-efficacy as a second predictor would better discriminate among IT job occupations. We ask the following question: Can the joint consideration of career anchors and self-efficacy better predict IT job occupations? Self-efficacy refers to self-perceived judgments of an individual’s capabilities to organize and execute courses of action required to attain designated types of performances (Bandura, 1986, p. 391). The concept of self-efficacy has been developed in social cognitive career theory (SCCT) to explain different aspects of career development, such as career interest, choice, and actions (Lent et al., 1994). The main premise justifying its inclusion as a second predictor is that an individual's self-concept of values, needs, and motives (career anchors) is not sufficient to determine his or her actual job outcomes. To increase discriminatory power, it is important to also consider the individual's belief in his or her ability to perform the required work behaviors (self-efficacy). In general, self-efficacy determines whether or not one will pursue a given course of action, how much effort will be expended to pursue it, and to what extent such efforts will be sustained in light of potential obstacles and problems (Hackett and Betz, 1981; Lent et al., 1994; Bandura, 1986). Indeed, prior career research has shown that self-efficacy positively influence persistence in occupational pursuits (Lent et al., 1994) and successful attainment of occupational pursuits (Hackett and Betz, 1981).

The contributions made in this paper are threefold. First, the paper develops a model - based on integrating insights from CAT and SCCT - which intends to improve the discriminatory power for predicting the under-researched phenomenon of IT job occupations. Second, it closes the discrepancy between the conceptual definition of career anchors which partly includes self-perceptions of talents and abilities (Schein, 1978), and the actual operationalization of career anchors in the IS literature where none of the items captures such talents and abilities (e.g., Igbaria et al., 1991; Ginzberg and Baroudi, 1992; Jiang et al., 2001; McMurtrey et al., 2002). This discrepancy is closed by our effort to explicitly conceptualize and operationalize individuals’ perceptions of their self-efficacy as a separate construct that reflects self-perceptions of talents and abilities. Finally, the paper may help academics and practitioners that are interested in helping individuals select the best careers that match with their needs, values, and perceived capabilities.

This paper is organized as follows. The next section describes the literature on career anchor theory and social cognitive career theory and highlights the theories’ key elements that helped us in developing our model. The following section presents the proposed research model and defines its components. The third
section discusses the proposed research and measurement methods that were considered appropriate for this study. Finally, we describe the next steps of the study and offer concluding remarks.

**Literature Review**

**Career Anchor Theory**

The concept of career anchors was originally developed by Edgar Schein to describe a cluster of self-perceived motives, values, and talents that shape an individual’s career decisions (Schein, 1975; Igbaria et al., 1991). Schein (1978) originally introduced five anchors (autonomy/independence; security/stability; technical competence; managerial competence; creativity/entrepreneurship). Those anchors were later extended to also include identity, service and variety (DeLong, 1982).

In the IT career literature, CAT assumes a central role in explaining various career development processes and outcomes. Broadly speaking, three streams of research have been generated. In the first stream, various studies focus on identifying the dominant career anchors in various settings facing IT professionals. For example, a survey of 321 IT professionals found three dominant clusters of career anchors: leadership, technical competence, and stability (Crepeau et al., 1992). Similarly, a study of 464 IT professionals in the US identified technical and managerial competence as the two most prevalent anchors (Igbaria et al., 1991). A study of female IT professionals found that technical and managerial competence are dominant career anchors (Quesenberry and Trauth, 2007). On the other hand, in the cross-cultural study of Ituma and Simpson (2007) found various anchors to be dominant, including some that were included in Schein’s original taxonomy (stability) as well as other new anchors (e.g., being marketable).

The second research stream explores the impacts of career orientations on job attitudes and various aspects of the work experience. Some of the main finding within this stream that lie at the core of CAT are that congruence between career anchors and job occupations enhances job/career satisfaction (Igbaria et al., 1991; Jiang and Klein, 2002; McMurtrey et al., 2002) and organizational commitment (Igbaria et al., 1991; Summer et al., 2005), and reduces turnover intentions (Igbaria et al., 1991; Jiang and Klein, 2002). In one study, the initial discrepancy between career anchors and job roles was reduced by altering some of the job features to make them more congruent with the career anchors (McMurtrey et al., 2002). More specifically, by making the core technology used more sophisticated, managerially-oriented individuals perceived their jobs to be upgraded which was in line with their managerial orientations.

The third stream is the focus of this study – attempts to unravel the empirical relationships between career anchors and IT career choices or job occupations. Amidst a paucity of research in this area, Igbaria et al.’s (1991) seminal study of IT professionals determined that career anchors were statistically correlated with job types. Particularly, technical jobs like systems programmers were more significantly related to individuals who were primarily technically-oriented. Conversely, half of the computer managers and most project leaders were primarily managerially-oriented. Consultants were more evenly split between the two career anchors. Going beyond statistical correlations, another study of 321 IT professionals examined the discriminatory power of career anchors among IT-job types (Crook et al., 1991). The results showed that technical competence, managerial competence, geographical security, service, and variety best discriminate among the job types but the factors’ discriminatory power is marginal.

Overall, we draw two main conclusions from the IT career anchor literature that are relevant for our theorizing. First, there are conflicts in the literature regarding the dominance of various career anchors. For example, variations exist with respect to the anchors that have been identified as most dominant across studies, such as managerial competence, technical competence, autonomy, service, and variety. Also, conflicts have arisen with respect to the degree of dominance of career anchors across studies. Table 1 below shows these conflicting empirical results.

The second conclusion is that the conceptualization and operationalization of career anchors have not been consistent with each other in the literature. Schein originally conceptualized career anchors as a self-concept that consists of (1) self-perceived talents and abilities, (2) basic values, and (3) the evolved sense
of motives and needs as they pertain to the career. This conceptualization has been used in most studies on IT careers (e.g., Ginzberg and Baroudi, 1992; Ituma and Simpson, 2007; Quesenberry and Trauth, 2007; Ramakrishna et al., 2003; Summer et al., 2005). However, the operational measures of career anchors used in the career orientation inventory used mainly tap into perceived values and needs, but not talents and abilities (Igbaria et al., 1991; Ituma and Simpson, 2007; Ginzberg and Baroudi, 1992). Just a few studies exhibited consistency between the conceptual definitions of career anchors and the career orientation inventory which was used to operationalize them (see McMurtrey et al., 2002; Jiang and Klein, 2002).

<table>
<thead>
<tr>
<th>Career anchors</th>
<th>Degree of dominance</th>
<th>Dominant</th>
<th>Moderate</th>
<th>Weak</th>
</tr>
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<tbody>
<tr>
<td>Managerial competence</td>
<td></td>
<td>Igbaria et al. (1991); Crepeau et al. (1992); Quesenberry and Trauth (2007)</td>
<td></td>
<td>Baroudi (1988); Ginzberg and Baroudi (1992)</td>
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<td>Technical competence</td>
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<td>Igbaria et al. (1991); Crepeau et al. (1992); Quesenberry and Trauth (2007)</td>
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<td>Creativity/entrepreneurship</td>
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<td>Summer et al. (2005)</td>
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<td>Ginzberg and Baroudi (1992); Crepeau et al. (1992)</td>
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<td>Autonomy/independence</td>
<td></td>
<td>Summer et al. (2005); Crepeau et al. (1992)</td>
<td>Igbaria et al. (1991)</td>
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<td>Identity</td>
<td></td>
<td>Summer et al. (2005); Crepeau et al. (1992)</td>
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<td>Ginzberg and Baroudi (1992)</td>
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<tr>
<td>Service</td>
<td></td>
<td>Baroudi (1988); Ginzberg and Baroudi (1992); Crepeau et al. (1992)</td>
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<tr>
<td>Variety</td>
<td></td>
<td>Summer et al. (2005); Baroudi (1988); Crepeau et al. (1992)</td>
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<td>Security/stability</td>
<td></td>
<td>Ituma and Simpson (2007); Ginzberg and Baroudi (1992); Crepeau et al. (1992); Quesenberry and Trauth (2007)</td>
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<tr>
<td>Lifestyle</td>
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<td>Igbaria et al. (1991)</td>
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<td>Being marketable</td>
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<td>Ituma and Simpson (2007)</td>
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<td>Challenge</td>
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<td>Ginzberg and Baroudi (1992)</td>
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Table 1. Dominance of Career Anchors in Predicting Occupations
**Social Cognitive Career Theory**

Social cognitive career theory (Lent et al., 1994) is grounded in Bandura's (1986) social cognitive theory, which views individual choice, behavior, and goal attainment as being determined by a triadic reciprocal model of personal attributes (e.g., cognitive and affective states), behavior, and environmental factors. An individual’s self-efficacy - defined as “judgments of their capabilities to organize and execute courses of action required to attain designated types of performances” (Bandura, 1986, p. 391) - is considered the most influential predictor in this model. Another important predictor is outcome expectations (Bandura, 1986). In social cognitive career theory, self-efficacy is also viewed as a key predictor of career performance attainment. This path can be mediated by career interest formation, career choice intentions, and career choice actions (Lent et al., 1994).

The theory has been empirically tested in several contexts primarily to investigate academic performance and career choices. For instance, in a study by Zimmerman et al. (1992), self-efficacy for academic achievement had a positive impact on academic attainment (grades). Academic performance was also indirectly influenced by computer self-efficacy mediated by academic goal-setting (Smith, 2002). In a meta-analysis of the social cognitive predictors of college students’ academic performance and persistence, Brown et al. (2008) found that academic self-efficacy had a positive direct effect on academic performance (GPA and retention). All these studies support Lent et al. (1984) assertions that self-efficacy is the strongest predictor of academic performance.

Pertaining to careers, SCCT was adopted to investigate career choices and actual job occupations such as engineering (Kim and Seo, 2014; Lent et al., 2011), computing (Cohen and Parsotam, 2010; Joshi et al., 2010), and coaching (Cunningham et al. 2007). The theory was also observed in investigating variations across genders (Lent et al., 2008; Inda et al. 2013) and ethnic groups (Kvasny et al. 2011). Overall, the adequacy of SCCT in predicting career choices/actual occupations is inconsistent. Many of the studies provide support for the indirect relationship between Self-efficacy and career choices (e.g., Lent et al. 2005; Kim and Seo 2014). Yet, contrary to Lent et al.’s (1994) original hypothesis, the relationship between outcome expectations and career choice was sometimes found to be direct (Sheu et al. 2010; Lent et al. 2005) or negative (Kim and Seo 2014). Perhaps, one reason behind the conflicting results relates to the type of dependent variable examined where some researchers sought to predict the preferred IT career choices (e.g., Lent et al. 1994) while others (e.g., Jiang et al. 2001) aimed at actual IT-job occupations.

**Self-Efficacy**

Self-efficacy determines the initial development of career interests. Such interests are unlikely to form in areas in which individuals perceive themselves as lacking skills and capabilities (Lent et al., 1994). Self-efficacy also determines career choice intentions. Indeed, individuals are likely to adopt career goals and act towards the career that they see themselves competent to achieve (Lent et al., 1994). These relationships between self-efficacy and career intention/action have received empirical support. For example, one study found that self-efficacy was associated with course enrollment intentions and actual course selections (Lent et al., 1993). Finally, and most relevant for our study, self-efficacy predicts the actual attainment of the pursued career choice. This is because it helps individuals understand, organize, and apply their skills toward attaining their career choice (Lent et al., 1994).

The literature argues that self-efficacy is more in line with Bandura’s original theorization if it is task-specified rather than generalized (Osipow and Temple, 1996). Indeed, recent literature shows that the construct is a more consistent predictor of career choice when conceptualized according to the career domain. For instance, Byars-Winston and Fouad (2008) found that the relationship between math/science-self-efficacy and career choices in mathematics/science is consistent with the Bandura's original theorization. Lent et al. (2008) defined self-efficacy as academic-efficacy and coping-efficacy and achieved adequate data-to-model fit. When self-efficacy was split into IT-technical and IT-non-technical self-efficacy, Joshi et al. (2010) found that the former was positively related to students’ intentions to pursue IT careers whereas the latter was negative correlated.
Research Model: Integrating the Two Perspectives

As our literature review shows, both theories – SCCT and CAT – have been extensively adopted to examine IT careers. However, these two perspectives have not been combined together, which can create more power to predict IT job occupations. The discriminatory power of career anchors in predicting actual IT job occupations has been marginal (Crook et al., 1991). Therefore, we need to look beyond career anchors in order to better understand the factors that discriminate among IT job occupations. Talents and abilities, which are captured in the self-efficacy construct of the social cognitive career model, are not reflected in the operationalization of career anchors. Indeed, there seems to be a discrepancy between the conceptual definition of career anchors which includes self-perceptions of talents and abilities and its operational definition which does not (see Igbaria et al., 1991; Jiang et al., 2001; McMurtrey et al., 2002). For instance, the operationalization of CAT’s technical competence anchor only captures the job attributes that satisfy individuals in a technical job and attract them to pursue it. Contrariwise, the operationalization of SCCT’s technical efficacy measures their technical abilities like programming, networking, and databases. We examined the operationalization of the CAT’s anchors and the different SCCT’s competences in the literature and found that the former capture values and motives while the latter capture talents and abilities. Accordingly, we argue for the integration of these two perspectives (figure 1). This concurs with the original view of Schein that the perceived talents and abilities are important elements of an individual’s career self-concept. Nevertheless, we capture this element in the separate construct of self-efficacy and restrict career anchors to aspects relevant to individuals’ values and motives. This view is consistent with Alavi et al. (2012) who argue that career orientation is a motivational phenomenon and should be grounded in theories of motivation and expectancy. This approach recognizes self-efficacy as a widely-used construct in career theory. Its inclusion in the model enhances construct validity by maintaining consistency between the conceptualization and operationalization of career anchors, which we define in this study similar to McMurtrey et al. (2002) as values, beliefs, and intentions that individuals perceive as important in their careers. Implicitly, the integration of both concepts – career orientation and self-efficacy – has been previously discussed in Lent et al (1994). The authors claimed that both career interests – which is akin to career orientation – and self-efficacy each contributed uniquely to the predictions of career choices.

![Figure 1. Research Model](image-url)
IT Job Occupation

IT job occupation is the only dependent variable in the model. The career anchors literature showed more consistent results when predicting IT-career choices than it did with actual IT job occupations. Accordingly, this research could be more useful in this regard leading us to choose the latter construct. IT job occupation is a categorical construct of three types:

1) Technical such as programmers, architects, and database administrators,
2) Non-technical such as analysts, technical writers, and trainers, and
3) Managerial such as project manager, project leaders, and IT directors.

To measure IT job occupation, we rely on the Dictionary of Occupational Titles (DOT) (http://www.occupationalinfo.org). This database contains thousands of job titles that are organized within mutually exclusive occupational categories that are similar to our classification (technical; non-technical; managerial). Our classification is consistent with prior research (Igbaria et al. 1991; Osipow 1991).

Career Anchors

We adopt McMurtrey et al.’s (2002) definition of career anchors which seems more compatible with the anchors themselves. Yet, we maintain the same descriptions of the anchors as per Schein (1996):

1) Security/stability: Motivated by job security and value long-term attachment to their organization.
2) Entrepreneurial creativity: Motivated by the need to build something that is entirely their own.
3) Technical competence: Excited by the work content itself and prefer technical rather than managerial advancements.
4) Managerial competence: Excited by the opportunity to analyze and solve problems under uncertainty.
5) Autonomy/independence: Motivated to be free of organizational constraints.

Self-Efficacy

Self-Efficacy is defined similar to that of Joshi et al.’s (2010) as “the individual’s belief that he or she can be proficient in skills necessary to becoming an IT professional”. It has two components:

1) IT Non-Technical Self-Efficacy: includes business and human skills such as adaptability, critical thinking, and leadership.
2) IT Technical Self-Efficacy: includes technical skills like process analysis, programming, and implementation.

Research Method

We propose a multiple-linear discriminant analysis as a method to measure the degree to which each of the seven independent variables contribute to a linear function that best discriminates between the three IT-job occupation types. This method can accommodate mixed independent variables (Kohli and Devaraj, 2003) and is suitable to situations where the dependent variable is categorical (Lee 2004). It can explain relationships between multiple independent variables and one categorical dependent variable (Kohli and Devaraj, 2003). With discriminant analysis, a linear combination of independent variables that will discriminate best between predefined groups can be derived (Hair et al., 1992).

Measurement Method

A survey questionnaire has been designed to evaluate the research model’s predictive power. The link to the questionnaire will be sent by e-mail to the alumni of two Canadian universities. Our sample will include all working individuals who have graduated within two years without controlling for the nature of
the company they work for. The questionnaire consists of three sections. The first section probes the type of actual IT-job occupation (technical, non-technical, or managerial) and the number of years in the current position. To allow for inter-group analysis, we will also collect demographic information (gender, attained education, and age) as well as the industry and the sector (private or public) of the employer. The second section includes the 40-item Career Orientations Inventory developed by DeLong (1982) which measures career anchors. This instrument has been validated several times (see Crepeau, et. al., 1992; Wood, et. al., 1985). The third section contains the self-efficacy scale of Joshi et al. (2010) which has 18 IT non-technical self-efficacy items and 13 IT technical self-efficacy items.

A six-point Likert scale is adopted to elicit the alumni's responses. For the Career Orientation Inventory items we ask the respondents to rate how true each of the items is for them. Pertaining to the self-efficacy items, the respondents are asked to rate the level of ability/expertise in the areas described in each item. The questionnaire was pretested with four PhD candidates and minor adjustments were made like item reordering and adding throwaway questions. We also added a control variable to probe whether the respondents' actual IT-job occupation correspond to their choice. This item can help explain whether the variations in the dependent variable are not because of factors other than the proposed ones such as economic, social, or cultural. Finally, we intend to incorporate external factors such as unemployment rate, GDP, and IT-jobs demand as control variables into our model in order to evaluate possible exogenous determinants of IT job occupations.

**Future Research**

The next stage is to pilot-test the survey. Thirty graduates from a Canadian university accepted to complete the preliminary online survey. After we verify the questionnaire’s competency, a full-scale data collection exercise will be conducted. To this end, two Canadian universities have accepted to send e-mails through their alumni offices to students who either completed an IT-related business program or a purely IT program in the past two years.

**Concluding Remarks**

The constant shortage of qualified IT professionals calls for further investigations of the key determinants of IT-job occupations. Individually, career anchor theory and social cognitive career theory either lack predictive power or achieve inconsistent results. Moreover, there seems to be a discrepancy between Schein’s (1978) conceptualization of career anchors which includes the individuals’ values, needs, talents, and abilities and the way the anchors have been operationalized which excludes the latter two. To address these issues, we propose a model that integrates SCCT’s self-efficacy construct with the career anchors to better predict IT-job occupations. We expect the model, if supported, to explain the highlighted inconsistencies and advance the extant knowledge on IT careers. Additionally, academics and practitioners can use the model to assist individuals make better decisions during their IT careers.
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References


