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The IT Compensation Challenge: Theorizing the Balance Among Multi-Level Internal and External Uncertainties

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Abstract

Attracting, motivating, and retaining Information Technology (IT) professionals has proven to be an ongoing challenge, regardless of the era in question. On average, almost two-thirds of the IT operating budget goes to staffing expenses, with managers and human resources experts struggling to balance IT compensation decisions with the uncertainties their organizations face. While there are many compensation studies that provide descriptive evidence using institutional variables, we lack a comprehensive IT compensation model that explores explanations for IT compensation decision factors from the angle of reducing IT-related uncertainties. This paper integrates concepts from traditional compensation literature, the role of non-monetary rewards, and a multi-level view of factors that influence IT compensation decisions. The use of multi-level factors is supported by traditional agency theory perspectives of compensation, and by contingency theory that looks at external and internal (organizational) contingencies. An interesting result of our analysis is that agency and contingency perspectives of risk provide insights on when fixed or variable pay plans may be more beneficial to the organization. There may be conditions when risk is logically lower, but overall IT compensation amounts will be higher. In particular, our paper proposes that IT compensation can be a viable IT governance mechanism in high-risk conditions when effective monitoring and performance measurement are less attainable, such as in outsourcing situations.

Keywords: *IT Compensation, Agency Theory, Contingency Theory, IT Strategy, Non-monetary Rewards, No-Pay Breaks, Outsourcing, IT Governance, Uncertainty, Risk.*

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1. Introduction[1]

According to surveys by the Society for Information Management (SIM), "attracting, developing, retaining IT professionals" and "IT and business alignment" have been major management concerns ever since their first survey in 1980 (Luftman & Kempaiah, 2007; Luftman & Zadeh, 2011). Staffing (internal and external) remains the overwhelmingly largest component of IT budgets (65% in Europe, 48% in SE Asia, 54% in Latin America, and 68% in the US) (Luftman & Zadeh, 2011). Despite recession in high-tech industries, IT demand has increased in most industries, including the non-high-tech industries (Hirschheim & Newman, 2010; Morgan, 2009, 2010, 2011). As a result, upwards of 20 percent of a CIO's time is spent on human resources (HR) and governance issues (Luftman & Zadeh, 2011). Compensation has long been identified as a facilitator of organizational strategies (Gomez-Mejia & Welbourne, 1988) and a critical lever in attaining, retaining, and motivating skilled IT professionals (Ang, Slaughter, & Ng, 2002). While there are some well-cited empirical studies describing actual compensation approaches, we lack theory that explores managerial rationale behind these findings or that addresses the uncertainty facing organizations seeking to align their own goals and those of their IT employees. We propose a multi-level theoretical model that not only addresses both monetary and non-monetary factors, but also integrates managerial concerns of balancing organizational goals and risk sharing through IT compensation practices.

Two questions drive the conceptual model presented in this paper:

Q1: *What are key explanatory factors of managerial decision-making related to IT compensation?*

Q2: *How do these factors explain managerial decision-making on IT compensation from an uncertainty-reduction perspective?*

"Uncertainty" and "risk" are concepts commonly seen in management performance literature, expecially research drawing on agency theory or contingency theory where there is the risk that agents will not perform, or uncertainty about external environments. Although much of this literature addresses managerial behaviors associated with risk sharing, risk taking, or risk aversion in somewhat generic and non-dynamic terms, there is a common theme of ensuring overall organizational performance (e.g., Bouillon, Ferrier, Stuebs, & West, 2006; Jacobides & Croson, 2001; Liberatore & Luo, 2010; Mahaney & Lederer, 2010; Wiseman & Gomez-Mejia, 1998). We take the perspective that IT management (be they agents or principles) needs to balance specific IT governance risks on behalf of the organization, rather than for personal gain or due to personal risk orientation. Another theme from the literature is that risk is often defined as vulnerability, where the probability of an event is often uncertain. Although risk can contain both negative and positive expectations (e.g., losses and gains), many people intuitively translate the term risk to mean losses. Therefore, while using "uncertainty" and "risk" interchangeably in our discussion, we use the term "uncertainty" in our propositions to make salient the inclusion of both losses and gains. A final risk or uncertainty theme that emerges is the lack of focus on specific, potentially dynamic (changing) IT-related risks associated with attracting, retaining, and motivating IT professionals (as a means of accomplishing the goals of an organization).

To begin, we define "IT professionals" as the non-executive personnel working in a firm's IT department[2]. These may include traditional programming or security personnel, but may also include IT project managers and business analysts. We define "information technology (IT) compensation" as the strategic use of compensation and other coupling IT strategy, or the contractual compensation agreement between organizations and IT service providers or IT professionals, including part-time or contract workers. IT compensation may also contain non-contractual but implied rights to monetary and non-monetary rewards (such as flex-time or training). Importantly, this paper assumes that

[1] Both authors contributed equally to this manuscript.

[2] Many of our propositions may apply to executive personnel; however, executive compensation is frequently treated as having its own set of influencing factors and structures. It is a distinct area of research.

managers can (and often do) use IT compensation as a vehicle to cope with IT-related uncertainty that their firms face in attracting, motivating, and retaining IT workers. Supporting this, we draw on prior studies and related literature (e.g., organization theories and HR management) to provide speculative explanations, insights, and alternative perspectives to other labor economic theories commonly drawn on in compensation literature (Werner & Ward 2004).

In Section 1.1 and 1.2, we summarize the main issues in compensation research. We then argue for the need for a more comprehensive IT compensation theory, and discuss existing studies, gaps, and recent debates in IT compensation as a research area in the information systems (IS) discipline. In Section 2, we review options associated with design of IT compensation plans. In Section 3, we elaborate on our proposed model and draw on empirical studies to support plausible relationships between factors, uncertainty, and various IT compensation options. Our discussion explores how these relationships implicitly or explicitly relate to organizational uncertainty. Contributions of this paper include highlighting areas with inconsistent empirical findings, inclusion of non-monetary rewards in explanatory theory, integration of both internal and external influencing factors, and a focus on managerial rationale of balancing organizational goals and risk sharing through various IT compensation configurations. Our discussion includes implications for future IT compensation studies, theorizing, and practice.

Figure 1 highlights the multi-level factors that we consider.

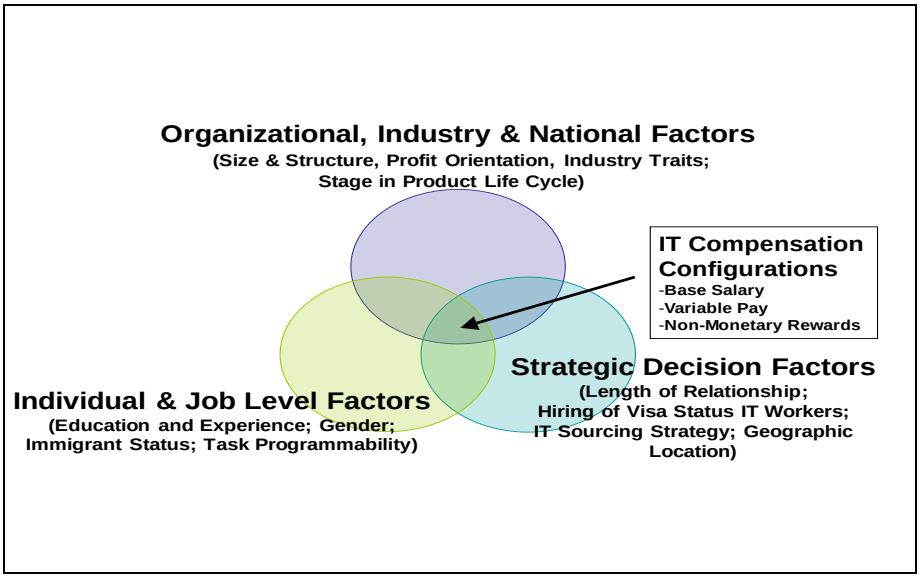

Figure 1. Factors Impacting IT Compensation Configurations

1.1. Historical Context and Schools of Thoughts Related to Compensation

Many compensation principcles can be traced back to the management theorists of the early 1900's. Central principles of monitoring employees and controlling their behaviors through compensation was first proposed by Frederick Taylor, Henry Ford, and theorists in early studies of scientific management (Dulebohn & Werling, 2007). During the 1920s, with industrialization and the growth of organizations, there was an effort to scientifically institutionalize and rationalize managerial control mechanisms, including compensation design. This effort resulted in "bureaucratic personnel practices" that include compensation (or reward) systems, job analysis, job evaluation, promotion systems, and performance appraisals that largely focus on internal control while downplaying the influence (or interrelationship) of external environments (Dulebohn & Werling, 2007). In the 21st century, we see the global trends of downsizing, outsourcing, economic recession, and reduced birth rates. These global trends foster a need to revisit the principles of compensation as a means to cope with the uncertainties organizations face.

1.2. Main Issues In Compensation Literature

Dulebohn and Werling (2007) indicate that compensation has rarely been viewed as a primary object of interest, but rather as a peripheral dependent variable or outcome of other primary issues. This comment reflects the current state of compensation research: a lack of compensation-centered theory. Standing on the shoulder of some well-cited comprehensive reviews, we summarize the main issues in compensation research in Table 1. A surprising number of these review papers narrow their focus to executive compensation. Executive compensation is a specific type of compensation, not a generalized view of compensation, nor an explanation for their differences from general compensation (e.g., Devers, Cannella, Reilly, & Yoder, 2007; Gomez-Mejia & Wiseman, 1997; Sun, Zhao, & Yang, 2010). Few compensation studies or reviews address non-executive positions or other occupations such as the IT occupation. Therefore, very few studies integrate knowledge on IT compensation. In Sections 1.3, 1.4, and 1.5, we explain the need for an IT compensation theory, summarizing challenges and debates in IT compensation literature.

Table 1. Main Issues in Compensation Research

Major issues in compensation research		References
Lack of advancement / diversity in theory.	Substantial amount of compensation research are descriptive; very few focus on theory development; most of the theory-base empirical compensation research use a labor economics perspective; very few integrate diverse research; emphasis is on pay-performance relationships.	Devers et al. (2007). Dulebohn & Werling (2007), Gomez-Mejia & Wiseman (1997).
Macro-level and multi-level factors are relatively downplayed.	Most compensation research emphasizes job-level evaluation, but downplays external environment, and is unable to explain cross-country (or social, cultural) differences.	Dulebohn & Werling (2007), Sun et al. (2010).
Lack of global view.	The majority was published in North American journals, affiliated with North American universities, or use North American samples.	Werner & Ward (2004), Sun et al. (2010).
Lack of topic diversity.	Most compensation research focuses on testing pay-performance (or pay-determinants) relationship. However, few focus on the process of pay decision.	Devers et al. (2007); Dulebohn & Werling (2007).
Lack of method diversity.	Most compensation research is quantitative research based on secondary archival data, but few are qualitative or collect primary data.	Dulebohn & Werling (2007), Gomez-Mejia & Wiseman (1997), Werner & Ward (2004).
Gap between compensation research and practice.	Research focuses on the what, but not the why; large-scale studies aggregate results, losing detail on practice or rationale.	Dulebohn & Werling (2007), Sun et al. (2010).
Lack of gender (and race) explanations.	While most compensation research on gender (and race) measure gender pay differences (or determinants) using labor economics perspective and using government or other secondary data, few explore why (i.e., the reason, explanation) gender pay differences exist.	Blau & Kahn, (2000, 2007), Werner & Ward (2004).

1.3. Why We Need Speculative Thoughts and an Explanatory Conceptual Model of IT Compensation

Information technology professionals are usually compensated on a different pay scale (Ang et al., 2002). In some organizations, IT job roles, IT career planning, and IT employee development are segmented into a technical and a managerial stream that further manifests in compensation and career differences for IT workers. These differences can present impediments for career transitions between IT and other areas of the organization and have disrupted organizational reward structures (Reich & Kaarst-Brown, 1999). How to compensate IT workers became an increasingly critical issue in the mid-1980s when organizations began to move from back-room processing to front-room strategic uses of information technologies and realized that both "growing their own" or "buying" skilled IT employees were expensive options with risk trade-offs (Luftman & Zadeh, 2011; Reich & Kaarst-Brown, 1999). However, IT compensation, similar to other compensation research, is dominated by a labor economics perspective focusing on the linkage between compensation and other factors of interest. This valuable but narrow focus excludes consideration of alternative themes such as how managers (and their organizations) make compensation decisions or align compensation decisions with organizational strategies and emerging technology risks (Gerhart & Rynes, 2003; Werner & Ward, 2004). More recently, Fleetwood and Hesketh (2008) have criticized many human resource researchers, arguing that theoretical explanations "will not emerge and develop simply by doing more, and/or better, empirical work" (2008, p. 127-128), while ignoring the importance of **developing explanations** for these links.

To begin to address these issues, we propose explanations for IT compensation based on the concept of uncertainty faced by organizations as they attempt to align the outcomes of their IT workforce with organizational goals while balancing risk. This is a complex undertaking because aspects of uncertainty vary by organization, with recent challenges including: economic uncertainty in the IT product market, volatile priorities due to demands for rapid IT adoption, emerging technological capabilities that have ramped up the speed of IT infrastructure adaptation, managing geographically dispersed IT projects, coordinating multiple IT outsourcing partners, and general concerns about the impact of technology innovation. Uncertainty is often viewed as an abstract construct that may not be observed or measured directly without some understanding of each organizational situation. This may be another reason that traditional empirical research using compensation data has stepped back from looking at the link between IT compensation and organizational uncertainty reduction.

1.4. Why "IT Compensation" Research as a Subset of Compensation Research?

It may come as a surprise that IT compensation is a relatively new research area. Ang et al.'s (2002) work is recognized as the first in-depth analysis of IT compensation, and, in 2007, IT compensation research was identified as a "new" research area in IT workforce studies (Levina & Xin, 2007; Mithas & Krishnan, 2008). While there is much to be learned from general compensation research, the challenges of attracting, motivating, and retaining IT personnel as a unique group of specialized professionals stands out as sufficiently distinct to warrant studies on the topic of IT compensation—at empirical, theoretical, and practical levels.

The IT profession has associated uncertainty and unique characteristics that must be dealt with by IT employees and managers alike. These associated uncertainties and characteristics collectively distinguish IT from many other professions (such as medicine, law, accounting, and finance) and even top management roles. There are four characteristics that are particularly relevant for review when considering IT compensation theory: 1) the continual focus on innovation and change, 2) a distinct IT occupational culture, 3) requirements for specialized training, and 4) an increasing trend to outsource part or all of IT groups or projects.

First, the continual focus on IT innovation and change. The focus on innovation has long been believed to be a core characteristic of the IT profession, and one which presents an acknowledged element of risk and uncertainty (Berronea, Makrib & Gomez-Mejia, 2008; Kleingartner & Anderson, 1987). IT products increasingly tend to have shorter life cycles. Firms in IT and non-IT-industries both face uncertainty from the volatile IT environment, and thus face the challenge of how to compensate (i.e.,

growing or buying) IT personnel they work with. Nonetheless, due to time lags, innovation (or learning new technology) efforts and outcomes are relatively difficult to measure or observe (Chan, Sabherwal, & Thatcher, 2006; Kalakota & Robinson, 2003; Milkovich, 1987). This implies uncertainty in measuring performance at the organizational level, and direct relationships with individual job contributions.

Second, IT has a distinct IT occupational culture. Working in the IT function in any industry exposes individuals to a different occupational culture, one that is often distinct from that of the rest of the organization (Guzman & Stanton, 2009). The IT occupational culture (ITOC) is characterized by the following characteristics: high value of technical knowledge, extreme and unusual demands, feelings of superiority relative to the user community, high pervasiveness of ICT's in non-work contexts, a typical lack of formal work rules in the IT occupational setting, cultural forms manifested in the frequent use of technical jargon, and social stigmatization or stereotyping (Guzman & Stanton, 2009). The IT occupational culture highlights the organizational challenges of balancing the risk faced by organizations of early attrition due to conflicting expectations of new workers against the risk faced by individuals of an unfairly rewarded work environment given IT occupational demands.

Third, the IT profession requires specialized and ongoing training. Differentiated characteristics of the IT profession are reflected in the composition of the IT workforce and the nature of IT work itself (Guzman & Stanton, 2009). The IT workforce is characterized by a larger proportion of technically degreed personnel whose competency is acquired through IT schooling or IT field experience, with ongoing shortages of IT talent. Because competency of IT personnel cannot be easily observed in the short term, organizations competing to attract and retain IT skills face the uncertainty of adverse selection and inferior performance by individuals. Furthermore, due to the pervasive need for IT talent, increased demands for skilled IT personnel contribute to high IT turnover (Hyde, 2003), which leads to increased challenges in IT recruiting and retention (Luftman & Zadeh, 2011)[3]. In addition to individual competency, IT work relying on group collaboration to accomplish projects also contributes to uncertainty in performance at the group level.

Fourth, an increasing trend to outsource part or all of IT groups or projects. Unlike many other professions, IT workers are a globally valuable resource for which there is increasing competition (Luftman & Zadeh, 2011). As noted in empirical research, outsourcing has resulted in increased IT risks and monitoring costs (Aubert, Rivard, & Patry, 1996; Aubert, Patry, & Rivard 2005), which implies increased uncertainty in organizational performance at the strategy level. At the other end of the spectrum is the argument that outsourcing has increased uncertainty about the IT skills needed by local workers and the availability of local (domestic) jobs (Hirschheim & Newman 2010; Tambe & Hitt, 2012).

1.5. Some Challenges Identified in Prior IT Compensastion Research

Having argued for research and theory specific to IT professionals, this section explores some of the ongoing challenges identified from existing research on IT compensation. These challenges include: variability in who is studied (i.e., who *are* the "IT professionals" being compensated); lack of global, cultural status sensitivity in studies; inclusion of gender pay gap issues; alternate sourcing of IT workers (IT sourcing strategies) as part of compensation studies; non-comparable descriptive studies of limited geographical or industrial settings; and the exclusion of non-monetary rewards due to use of historical economic data.

1.5.1. Variability in Who is Studied (aka the Debate on the Definition of IT Professionals)

The term "IT professionals" is somewhat taken for granted and lacks an explicit definition in the IT compensation literature (Ang, et al., 2002; Levina & Xin, 2007; Mithas & Krishnan, 2008). Humphrey (1997) approaches "professionalism" from the lens of managerial awareness of IT rewards, performance, and discipline, rather than institutional legitimacy of the occupation as proposed by Orlikowski and Baroudi (1989). The terms IT workers and IT employees are also often used interchangeably, but generally refer to those who work in, or for, the IT function. Job roles may also

[3] An executive panel at the 2013 ACM Special Interest Group on MIS and Computer and Personnel Research highlighted that attracting, compensating, and retaining IT personnel continues to be a major North American challenge, consistent with Luftman and Zedah's (2011) international survey.

range from highly technical software development and technical support, to IT project management and business analyst roles. These roles are addressed in some of the traditional compensation factors such as education or experience, and are frequently identified in annual descriptive survey reports. An increasingly important differentiating element is that structural variations in larger firms (e.g., hybrid structures), and more organic structures in smaller firms may result in IT professionals being contract employees or distributed in areas that report to someone other than a CIO or senior IT executive (Kaarst-Brown & Guzman, 2005). The inclusion of foreign IT workers operating under special visas is also rarely considered, but presents an important factor that may skew large-scale survey results (Mithas & Lucas, 2010). As just discussed, however, there are often distinct occupational differences that will separate how these people are rewarded in order to attract and retain them.

1.5.2. Global, Cultural, and Economic Status Differences

A second important consideration is whether the Western (North American and European) view of IT professionals captures variations in non-Western societies (Karahanna, Evaristo, & Srite, 2002; Tosi & Greckhamer, 2004; Townsend, Scott & Markham, 1990; Wang, 2007). Based on the authors' understanding of Asia, especially Taiwan, "technical elites" has been a pop term used by the mass media to frame the IT professionals as a class of people having higher social-status, respect, and power in the local society. Taiwan's culture is very similar to those of Singapore, South Korea, and Hong Kong. Apparently, the significance of "IT professionals" in these countries is derived from their role as a productive force contributing to economic activities, which further grants them social power in these countries. As such, IT compensation theory may need to factor in the profession's cultural status, either at the organizational, industry, or regional/country level (Kaarst-Brown, 2005).

1.5.3. Including the Male-Female Gender Pay Gap Issue

In spite of an overall increase in the number of women in jobs in other sciences, a report by the National Center for Women & Information Technology indicates that the number of women in computing jobs has actually decreased since 1991 (Ashcraft & Blithe, 2009). The male-female pay gap, together with unconscious bias, has important influences on this phenomenon (Ashcraft & Blithe, 2009). The report indicates that women earn 11 percent less than their male IT counterparts and account for only 9 percent of management-ranked IT positions. The lower salaries paid to women has been documented and acknowledged in the compensation literature (Blau & Kahn, 2007; Gayle & Golan, 2012; Manning & Swaffield, 2008). In the United States, the female-to-male ratio in pay was around 60 percent from 1950 to 1980 and 76.5 percent from 1978 to 1999 (Blau & Kahn, 2000). More recent studies (e.g., Levina & Xin, 2007; Mithas & Krishnan, 2008; Mithas & Lucas, 2010) have found a gender gap in IT compensation in the United States. An interesting aspect in Levina and Xin (2007) is that they found the gender gap in compensation to be smaller for younger workers, suggesting there may be a trend toward more equitable IT compensation practices. An alternative explanation is that younger women may not have yet experienced the career disruptions that might impact their career (and salary growth) (Manning & Swaffield, 2008). Regardless of the politically correct way of interpreting the male-female pay gap, empirical evidence supports that this variable remains an important factor to consider, and related explanation is still needed in any theory of IT compensation.

1.5.4. Alternate Sourcing of Workers (Insourcing, Outsourcing, and Contract IT Personnel)

Alternate sourcing and compensating of IT personnel is part of an organization's decision about how to manage their technology capabilities based on available resources and competitive goals. This decision affects overall resource allocations for the IT function and, in turn, affects an organization's compensation strategies. Contractual arrangements for outsourced projects vary in their complexity and are generally not addressed as part of IT compensation studies. Yet, sourcing and compensating IT personnel is part of overall talent management and IT governance, not just project management or procurement. In their 2011 study of international IS management issues in different geographic locations, Luftman and Zadeh found that sourcing strategies encompass both domestic and offshore options (Table 2).

Table 2. Summary of Luftman and Zadeh (2011, p. 199) Actual IT Budget Allocations by Geographic Region					
Expenditures	**Global average (%)**	**US (%)**	**Europe (%)**	**SE Asia (including Australia) (%)**	**Latin American**
Hardware, network, software, depreciation	37	32	35	40	42
Internal staff (domestic)	**33**	**43**	**25**	**32**	**30**
Internal staff (offshore)	**7**	**3**	**3**	**5**	**16**
Outsourced staff (domestic)	**10**	**7**	**20**	**7**	**7**
Outsourced staff (offshore)	**4**	**5**	**5**	**4**	**1**
Consulting services	8	10	12	4	4
Note: Bold rows highlight alternate sourcing of workers.					

There are different types of IT sourcing strategies considered in IT compensation literature, with IT outsourcing and IT insourcing (or contract work) representing two ends of the spectrum, with variations depending on domestic or foreign locations (Kosnik, Wong-MingJi, & Hoover, 2006; Luftman & Zadeh, 2011; Mahnke, Overby, & Vang, 2005; Tambe & Hitt, 2012). IT insourcing strategies can mean satisfying temporary needs by delegating jobs to in-house personnel or using contracted IT workers assisting with internal IT functions (Brooks, 2006; Hirschheim & Lacity, 2000; Lacity & Hirschheim, 1993). Insourcing may be short-term or ad-hoc in nature when its purpose is to relieve temporary IT needs of the firm (Lacity, Willcocks, & Feeny, 1996). These temporary needs subject the in-sourced IT staff to short-term, irregular compensation plans.

On the other hand, IT outsourcing strategy is "the transfer of an organization's staff, IT infrastructure, processes, applications, and other IT-related activities to an external entity that possesses the capability to provide such service" (Pati & Desai, 2005, p. 282). Uncertainties and monitoring costs are expected to incur to IT outsourcing decisions, which, in turn, influence an organization's compensation strategies. We argue that the increase in the variety of contractual and geographic arrangements for obtaining IT workers requires that we include some outsourcing risks when evaluating overall IT compensation theory and managerial decision-making.

1.5.5. Non-Comparable Descriptive Studies

To date, broad commercial surveys of IT compensation (e.g., Watson Wyatt Inc., Stanton Inc., and IT-Director.Com) tend to focus on the descriptive level, with little research conducted on IT compensation at the explanatory or confirmatory level to explore why these decisions have been made (Burnes, 2006; Hedden, 2005; Hilson, 2001). Among more focused studies, several researchers have investigated compensation for CEO's at high-tech firms (Balkin & Gomez-Mejia, 1987; Balkin, Markman, & Gomez-Mejia, 2000; Hall & Liedtka, 2005). With an emphasis on rewarding top managers, however, these research studies do not address how to compensate other levels of IT professionals for the tasks they perform.

A handful of researchers have also used archival data to investigate determinants of compensation for IT professionals from the perspectives of human capital and labor market theories (Ang et al., 2002; Levina & Xin, 2007; Mithas, 2008; Mithas & Krishnan, 2008; Mithas & Krishnan, 2009). These groundbreaking studies develop a new area of research; however, each of the studies is based in a single country setting that permits more limited theoretical generalizability and comparability (e.g.,

Ang et al.'s in Singapore; Levina and Xin's and Mithas and Krishnan's in the United States). Moreover, similar to many large descriptive reports, the concept of compensation in these focused studies is treated as a unitary concept differing in "quantitative pay level" (total amount paid). Variations in "qualitative pay content" (proportion of base pay versus variable bonus) are under-emphasized. In addition, human capital and labor market perspectives generally do not consider how the design of IT compensation might affect IT governance strategies, risk sharing, or alignment of employee goals with business objectives.

1.5.6. Exclusion of Non-Monetary Rewards

Discussion in Section 1.5.5 leads to a further gap in existing IT compensation studies—the primarily focus is on monetary rewards, with non-monetary rewards excluded from the possible options for total compensation plans (Ang et al., 2002; Wang, 2007). Again, this gap may be related to the reliance on economic data that does not capture this type of information. Given that pay freezes have been in effect in many companies since 2002 (Massaro, 2003), and that 40 percent of companies still reported pay freezes in 2010 (Murphy, 2010), the strategic role of non-monetary (non-cash) rewards should not be ignored in considering IT compensation theory. In casual conversations with many IT executives, the common concern is that they "cannot just keep paying more money to attract or keep good people". The percentage of IT budget allocated to education and training (a non-monetary reward) is also "increasing across all geographies" as organizations prepare and retain their IT talent (Luftman & Zadeh, 2011).

The contributions of these prior studies and gaps in research reinforce the motivation for this paper to develop a more comprehensive theoretical framework of IT compensation that considers some of these dynamic situations and how organizations align their compensation configurations to reduce associated uncertainty.

2.0. Conceptualization of IT Compensation Configurations

At the abstract level, compensation can be interpreted as how a firm actually pays individual workers; it is the multiple meanings of (IT) compensation beyond how firms pay individual employees that enrich the topic of (IT) compensation (Milkovich, Newman, & Gerhart, 2011). Instead of focusing on how individual IT professionals are paid, we view (or conceptualize) IT compensation as a vehicle to reduce uncertainty from the stance of managers in organizations.

We referr to terms such as monetary and non-monetary rewards in Section 1.5.6, but it is worthwhile to briefly review components of IT compensation before summarizing the contributions of agency and contingency theories and to explain how these theories lend insights to unique risks related to IT compensation configurations. There are several ways that people are compensated for their work: fixed or base pay, variable or incentive pay, and competency-based pay. There are also many factors that this configuration is based on. Sections 2.1 to 2.6 provide an overview of these constructs and their relevance to IT compensation configurations.

2.1. Fixed or Base Pay and Variable/Contingent Pay

Organizations have substantial discretion in designing IT compensation plans for their IT personnel. There are two prominent pay systems for organizations to choose from: fixed-pay systems (base pay), and variable-pay systems that are based on the amount of work completed or provide some form of additional incentive (Belcher, 1996). Fixed-pay systems solely comprised of a base salary have been criticized since the 1980s as inflexible, and failing to motivate the behavior deemed necessary to reinforce business strategies and achieve business success (Belcher, 1996). To differentiate from the traditional fixed-pay systems, variable-pay systems, also called "contingent-pay systems", add incentive pay onto base pay to make the compensation plan more competitive (Belcher, 1996; Sanders, 2001; Yermack, 1995). Variable-pay systems were in place in three-quarters (76%) of companies in North America by 2005 (HR Focus, 2005)[4].

[4] Total rewards & incentives, not big raises, will star in 2006 (HR Focus, 2005).

Eisenhardt (1989) suggests that researchers consider contracts as a continuum rather than a dichotomy between base pay and incentive pay. She also suggests that researchers acknowledge that compensation typically has multiple components and therefore needs to incorporate a broader spectrum of compensation options. Several studies thereafter have incorporated mixed-pay approaches (i.e., variable-pay system) that used both base pay and incentive pay (Rajagopalan, 1997; Rajagopalan & Finkelstein, 1992; Roth & O' Donnell, 1996). We use the term "variable pay" to refer to contracts or compensation plans that include both base pay and some level of monetary incentives, which results in potential variability in the quantitative or total amount of compensation a person might receive. Hence, instead of treating IT compensation plans as fixed-pay systems comprised primary of a base salary, we argue that theory needs to view it as a variable-pay system including portions of both base pay (i.e., base salary) and incentive pay, and potentially non-monetary rewards.

2.2. Competency-Based Pay

Another key concept in the compensation literature is "competency-based compensation," also called "skill-based pay". Competencies have long been an integral element of training and performance management; however, according to a 1996 American Compensation Association survey, linking competencies to compensation decisions was a less common but emerging approach (Cira & Benjamin, 1998). Competencies can be defined in different ways (e.g., education, knowledge or learning, creativity, leadership, and behavioral change) in accordance to the attributes deemed of value to the organization (Cira & Benjamin, 1998; Kanin-Lovers & Porter, 1991).

In traditional compensation decisions, organizations pay their employees for the job roles they hold or specific work performed. On the other hand, organizations using competency-based approaches are placing value on the employee's ability to perform activities that are critical to the firm, rather than emphasizing a specific role or set of tasks associated with a particular job (Kanin-Lovers & Porter, 1991). The theoretical assumption behind this approach is that compensation would reflect differences in human capital endowment among workers (Becker, 1975; Mincer, 1970). Competency-based compensation is pertinent to knowledge work that requires professional skills, creativity, and continuous learning, and thus is very relevant to theorizing compensation for IT professionals. Generally speaking, experience and education are the traditional measures used to assess competencies and are linked to most job descriptions, and nearly all job advertisements. This is a somewhat risky way of assessing actual "competency" at the individual level; however, we argue these are not the only factors that make up decisions about IT compensation configurations.

2.3. Non-Monetary Compensation

Non-monetary compensation includes both formal and informal incentives that may be intangible (flextime) or may have indirect monetary value (e.g., free daycare) that, together with monetary rewards (i.e., formal and tangible earnings), are components of total compensation plans. The importance of non-monetary compensation increases during economic recession, in small start-ups, or in organizations with limited financial resources (Morrell, 2011; Prasad, Enns & Ferrrat, 2007). As one example, during the economic tsunami of 2008 and 2009, some firms in Taiwan granted their IT professionals "no-pay breaks" that translated into non-monetary compensation to shelter the IT staff from immediate job loss. Compared to lay-off decisions, from the firms' side, these "no-pay breaks" reduced regular IT personnel and future IT recruiting/training expenditures. Therefore, it reduced uncertainty about economic insecurity and possible IT personnel restructuring, while still preserving flexibility for the firm. However, it is likely that non-monetary compensation is related more to organization size and survivability than to shareholder wealth creation (Murphy, 1997), or to IT professionals' best interests.

In spite of its recognized importance, non-monetary compensation is rarely directly investigated in empirical compensation research (both non-IT and IT specific). One of the reasons for the scarcity is that non-monetary compensation is rarely considered by major economic theories; however, most of the empirical compensation research draws on concepts and propositions derived from economic theories (Mathios, 1989). The other reason for the scarcity is that non-monetary rewards are more difficult to directly evaluate or compare across industries and companies (Elston & Goldberg, 2003;

Mathios, 1989). In a landmark study of earning differences among twins, Mathios (1989) used "occupation" as a proxy for non-monetary rewards, concluding that earnings variation among similarly educated individuals can be partially explained by non-monetary job characteristics that were valued more highly than monetary rewards. His study also stressed the dangers of comparing monetary compensation differences from a perspective of demographics or specific job roles. Morrell (2011) also indirectly examined employee perceptions that may affect relationships between non-monetary incentives and intrinsic motivation by inferring from related HR literature. Unfortunately, this literature's focus is not pay strategy, but related (though still distant) HR practices that are actually psychological or individual perceptual factors (i.e., intrinsic motivation). Similarly, the existing IS (or IT compensation) literature seldom directly focuses on non-monetary compensation as a core phenomenon, but instead refers to non-monetary compensation peripherally in discussions of other HR practices. Neither does the IS literature address non-monetary compensation as a risk-coping mechanism from the managerial side (see the review notes in Table 3).

Table 3 summarizes HR practices targeting IT professionals that may instantiate non-monetary IT compensation at the concrete level. However, in Section 3, we still use the concept of non-monetary compensation at a more abstract level to preserve generality at the theoretical level. Note that almost all of the early IT-HR literature adopt a homogeneous view on IT professionals without differentiating various IT job titles.

Table 3. Examples of Nonmonetary Compensation for IT Professionals

Examples of non-monetary IT compensation	References	Review notes
Achievement, socialization (affiliation), power.	Smits, McLean and Tanner (1993)	Touches on non-monetary rewards from the perspective of IS professionals' need (e.g., job characteristic preferences and self-described personal attributes and work traits); however, does not link non-monetary rewards to compensation decisions or firms' strategies from a managerial perspective.
Non-salary compensation.	McLean, Smits and Tanner (1996)	Study questioned and tracked salary importance (i.e., monetary compensation), "there was no information regarding non-salary forms of compensation (i.e., non-monetary compensation)" (p. 297).
Security: job security, pay, and benefits. Achievement: career opportunities, specificity of performance requirements, recognition, work-choice discretion, and social interaction and support. Flexibility: schedule and location discretion.	Prasad, Enns, and Ferratt (2007)	Employment arrangement is studied from the perspective of individual work values of IT professionals (i.e., employee's perceived value of security, achievement and flexibility). However, study does not directly link non-monetary rewards to compensation decisions or organizational strategies from a managerial perspective.
Training and development, work-family balance.	Major et al. (2007)	Addresses best practices of leadership in IT work environment, but does not bring in "non-monetary" rewards.
Work-life balance policies, promoting family-friendly policies, socialization tactics.	Messersmith (2007)	Reviews and details documented consequences/ antecedents of work-life conflicts in IT occupation and suggests possible IT-HR solutions based on existing literature. Does not discuss "non-monetary" rewards.
Recognition, empowerment, fair organizational rewards, competence development, and information-sharing practices.	Paré and Tremblay (2007)	Non-monetary rewards are regarded as high-involvement HR practices, but not as compensation strategies

2.4. Agency Theory, Uncertainty in Monitoring or Outcomes, and IT Compensation

Uncertainty is a concept commonly seen in agency theory and contingency theory. Agency theory is the dominant paradigm in pay-performance research (Barkema & Gomez-Mejia, 1998; Eisenhardt, 1989; Galbraith & Merrill, 1991; Gopal & Sivaramakrishnan, 2008). While contingency theory directs us to focus on strategic alignment between compensation plans and organizational strategies, agency theory focuses on monitoring and control at the individual level. According to agency theory, the "principal" delegates "tasks" to the "agent" in a contractual relationship. There are two prominent, but debatable, options of compensation contracts for the principal to use to aid in monitoring and control: behavior-based compensation (emphasizing base pay) and outcome-based compensation (emphasizing incentive pay) (Eisenhardt, 1989). Agency theory considers the logic of compensation decisions from the aspects of managerial risks (i.e., uncertainty) relating to monitoring costs for the organization. If an organization can monitor an agent's behavior in accomplishing the tasks, the uncertainty of the agent's performance is low; therefore, compensation in the form of base pay is relied on (Eisenhardt, 1989). Conversely, if difficulty in monitoring exists, uncertainty regarding the agent's performance is high; therefore, agency theory argues that principals would compensate partially based on the outcomes of the agent's behavior to reduce the uncertainty for the firm. As such, incentive pay is emphasized as the pay mechanism through which the uncertainty is transferred from the organization on to the agent (Eisenhardt, 1989).

Monitoring costs and uncertainty are constructs at a higher abstraction level that are attributed to job-specific agency factors such as "task programmability" and "proposed length of the agent-principal relationship" (Eisenhardt, 1989). In addition to a lower organizational commitment to the contract worker, other risks may reduce task programmability and increase monitoring costs (Mahaney & Lederer, 2010). Shorter-term contracts are likely to increase the risk of conflicting long-term goals between individuals and the organization due to a lack of organizational citizenship, and quite simply a lack of familiarity with the organization's technologies, practices, and procedures (Eisenhardt, 1989; Reich & Kaarst-Brown, 1999).

2.5. Contingency Theory, Uncertainty, and IT Compensation

Contingency theory has long been linked to research on executive compensation, rather than to non-executive compensation. According to contingency theory, compensation is not a fixed system, but an open system varying in accordance to different environmental and strategic conditions that executives deal with. The perspective of contingency theory shares similar logical grounds to those of variable pay systems, combining both base pay and incentive pay. Given the strategic role of IT in many organizations, the notion of strategic alignment of compensation configurations with organizational strategy provides a valuable complement to agency theory to guide a more holistic understanding of managerial decision-making on IT compensation.

Empirical research on compensation decisions from a strategic aspect is scarce (Gerhart & Rynes, 2003); however, there are several important studies on the contingent relationship or alignment between an organization's strategies and compensation plans (Boyd & Salamin, 2001; Balkin & Gomez-Mejia, 1987; Rajagopalan, 1997; Rajagopalan & Finkelstein, 1992). Balkin and Gomez-Mejia (1987) identified three contingent factors that influence firms' compensation plans: stage in the product life cycle (mature versus growth), organization size (small versus large), and traits of the industry (high tech versus non-high tech). Therefore, we extend the perspective of contingency theory by considering the impact of these three contingencies on IT compensation configurations. We adapt organizational "product life cycle" into "organization life cycle", as Balkin and Gomez-Mejia (1987) do not specify any product types at the product level, but include both services and tangible products in their discussion to cover both product firms and service firms.

2.6. A Summary of Constructs

In sum, the most flexible configuration of IT compensation can be conceptualized as a variable, competency-based pay system including proportions of base pay (the fixed portion remunerated to IT professionals regularly) and incentive pay (the variable portion rewarded to IT professionals based on

individual performance or profit sharing in the organization). Our incorporation of non-monetary rewards for IT workers further extends the spectrum of contractual options, as Eisenhardt (1989) urges. In practice, incentive pay may consist of both monetary rewards that are more quantifiable and non-monetary rewards that may be intangible. Accordingly, IT compensation not only differs in pay level quantitatively, but also varies in pay content qualitatively.

Table 4 summarizes the factors drawn from literature on IT and non-IT compensation. Many of these studies are cited in the introduction; however, a few will be presented in Section 2. The asterisk denotes factors with few empirical IT or general compensation studies. Propositions build on often-conflicting empirical evidence, or are based largely on theoretical speculation where empirical evidence is lacking.

Table 4. A Summary of Explanatory Factors in IT Compensation Configurations

Constructs adopted	Definitions	Summary of uncertainty	References
Education (Individual Level)	Academic (or vocational) training an individual received.	- Performance uncertainty - Adverse selection uncertainty - Emerging technology uncertainty	Anderson, Banker, & Ravindran (2000); Ang et al. (2002); Levina & Xin (2007): Mithas & Krishnan (2008); Sahraoai, 2002; Talmor & Wallace (1998)
Experience (Individual Level)	Total years of work experience an individual has with a job or set of jobs.		
Gender (Individual Level)	Female or male	- Legal uncertainty of non-compliance - Retention uncertainty - Performance uncertainty due to potential career disruption	Ang et al. (2002); **Blau and Kahn (2000, 2007);** Levina and Xin (2007); **Manning and Swaffield (2008)**
Immigrant Status * (Individual Level – *Strategic Decision*)	The legal working status of foreign IT professionals.	- Retention uncertainty after incurred legal costs - Labor uncertainty due to H1B visa caps push up compensation costs	**Hall & Khan (2008);** Mithas and Lucas (2010)
Task Programmability* (Job Level)	Measurability of the task assumed by IT personnel.	- Performance Uncertainty increases monitoring costs	**Eisenhardt (1988,1989);** Mahaney & Lederer (2010); **Sharma (1997); Tosi & Gomez-Mejia (1989)**
Proposed Length of Principal-Agent Relationship* (Job Level – *Strategic Decision*)	The tenure of the working relationship between agent and principle.	- Loyalty of employees and investment by employers in workers is correlated to increased length of intended relationship	Eisenhardt (1989); Gopal and Sivaramakrishnan (2008); Mithas and Krishnan (2008); Osei-Bryson and Ngwenyama (2006);
Organization Size (Organizational Level)	Definition 1: Number of employees Definition 2: Total sales and assets	- Resource uncertainty (vary by size and can impact ability to compete for IT workers)	Ang et al. (2002); Mithas & Krishnan (2008); Levina and Xin (2007); Talmor & Wallace (1998); Balkin and Gomez-Mejia (1987)
Stage in Organization Life Cycle* (Organizational Level)	Mature stage: defined as stage where vast majority are familiar with products/ services, with stable technology and competitive structures Growth stage: defined as stage where sales growth may reach 20 % or more annually, with shifting technology and competitive structures	- Resource uncertainty - Employment stability uncertainty - Innovation uncertainty - Project volatility uncertainty - Market competition	Anderson & Zeithaml (1984); Balkin & Gomez-Mejia (1987); **Hofer (1975); Hambrick (1981, 1983).**

Note: Bold denotes general management literature; * denotes little empirical research in IT comp.

Table 4. A Summary of Explanatory Factors in IT Compensation Configurations (cont.)

Constructs adopted	Definitions	Summary of uncertainty	References
IT Sourcing Strategy* (Organizational Level – *Strategic Decision*)	Organizations' decision on IS development. Outsourcing = non-resident workers of an external entity Insourcing = in-house full-time or part time contract workers; ad-hoc in nature to relieve temporary IT needs	- Resource uncertainty - Monitoring and Coordination uncertainty	Lacity et al. (1996); Lacity & Hirschheim (1993); Mahnke et al. (2005(; Pati & Desai (2005); Brooks (2006); Kosnik et al. (2006); Luftman & Zadeh (2011); Siepmann (2013)
Profit-Orientation (Organizational Level)	An organization is profit-seeking or non-profit seeking	- Resource and opportunity uncertainty	Ang et al. (2002); Levina & Xin (2007); Mithas & Krishnan (2008); **Preston (1989**); **Ruhm & Borkoski (2003)**
Industrial Trait (Industrial Level)	Two categories of industrial traits: high-tech industry and labor-intensive industry (or non-high-tech industry*)*. Company defined as high-tech industry if annual R&D budget is 5% or greater of sales revenues. Measures: SIC codes	- Employment uncertainty - Labor competition uncertainty due to different opportunity levels - IT uncertainty	Balkin & Gomez-Mejia (1987); **Galbraith & Merrill (1991);** Mithas & Krishnan (2008)
Geographic Location Cost of Living/Cultural Clusters (National Level – *Strategic Decision*)	Cost of Living due to Economic and cultural differences for region the organization's IT group is based in (e.g., East or West Coasts of US, or Asia Europe)	- Cost of living variability - Labor availalbility	Ekanayake (2004); Levina & Xin (2007); Mithras & Lucas (2010); Ronen & Shenkar (1985); Tosi & Greckhamer (2004); Townsend et al (1990)

Note: Bold denotes general management literature; * denotes little empirical research in IT comp.

3. Theoretical Propositions and Explanations for Balancing IT Compensation with IT-Related Uncertainty

We propose that the factors summarized in Table 4 contribute to decisions about IT compensation configurations. We now turn to theoretical statements that connect two sets of theoretical concepts: explanatory factors suggested by the literature or its gaps, and the elements of IT compensation configurations. Building on issues of uncertainty, this paper presents three categories of propositions that link explanatory factors with components of IT compensation or particular configurations: (1) alignment of IT compensation with individual and job level uncertainties; (2) alignment between IT compensation and organizational, industrial, and national factors; and (3) alignment of IT compensation with IT strategies. Figure 2 below is repeated to remind the reader of the intersection point that resflects the complexity of IT compensation decision making for management.

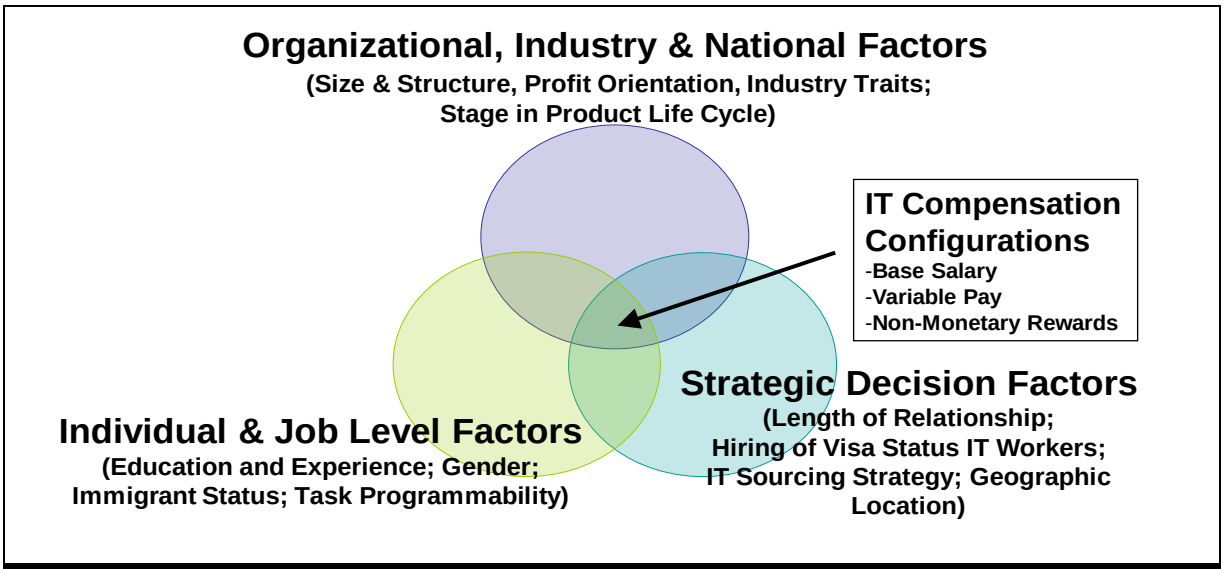

Figure 2. Factors Impacting IT Compensation Configurations (Revisiting Figure 1)

3.1. Aligning IT Compensation with Individual and Job Level Uncertainty

As Figure 1 notes, education and length of experience are important individual factors related to IT compensation configuration decisions, with the controversial factor of gender supported by empirical evidence. At the job level, agency theory supports factors such as task programmability, as it introduces a different aspect of uncertainty.

3.1.1. Individual Level—Education and Experience

Previous IT compensation studies have shown that education and experience are positively correlated with higher pay (Ang et al., 2002; Levina & Xin, 2007). Agency theory helps explain the fact that IT jobs require specialized knowledge and skills important to IT-related innovation, and, as such, is associated with uncertainties of adverse selection because the organization (the principal) may not have enough knowledge to judge the outcome quality of IT candidates (Anderson et al., 2000; Talmor & Wallace, 1998). The literature suggests advantages of compensating IT professionals based on skills or accumulated competencies including the encouragement of continuous learning, improvement of productivity, delegation of decision-making, and enhancement of quality (Sahraoui, 2002). Given the prior research, we do not show education or experience as separate speculative propositions, but instead as accepted relationships with IT compensation decision making under conditions of uncertainty.

3.1.2. Individual Level—Gender-Related Career Disruption

As Section 1.5.3 notes, there is documented evidence of pay disparity based on gender after controlling for job roles and skill sets. A common explanation for the gender pay gap is that women are anticipated to have disrupted work lives, mostly for family reasons, and thus organizations have lower incentives to invest in job-related education, training, or skill for women (Blau & Kahn, 2007; Manning & Swaffield, 2008). It is interesting to note that Ang et al.'s (2002) study, which is based on 1997 Singaporean data, found no significant gender differences in IT compensation. Their findings are inconsistent with Levina and Xin's (2007) study, which is based on 1997, 2001, and 2003 U.S. data, that found evidence of pay differences as women aged. A relevant consideration is that Ang et al.'s (2002) data pool averaged only seven years of IT experience, (younger than Levina and Xin's sample), which again supports the argument that the gender gap in compensation increases as women age (Blau & Kahn, 2007; Levina & Xin, 2007). A country-specific explanation for Ang et al.'s (2002) results is that the Singaporean government encourages women to pursue higher education, and this encouragement decreases evidence of differences in human capital and gender pay gap in early years of work (Levina & Xin, 2007).

This uncertainty associated with women's possible career discontinuity may lead to managerial decisions to pay them less in order to offset the possible loss of the investment in female employees (managerial uncertainty argument) (Blau & Kahn, 2000). A counter speculative argument is the competency argument: that women with longer tenure in the IT profession may have already experienced disruptions to their careers or were excluded from training that would result in reduced experiences or skill levels, leading to pay differences (Levina & Xin, 2007). We frame this from the managerial perspective to address male-female gender issues in IT compensation decision.

P1: *Firms will pay less to female IT professionals than to males to reduce uncertainty of female employees' career discontinuity, controlling for jobs roles and skill sets.*

While we propose this relationship between gender and IT compensation, we also acknowledge that the effect of gender may be salient at the time of IT recruiting decisions (Wang, 2007), however, it may also impact future measures of actual compensation paid to women later in their careers.

3.1.3. Job Level—Uncertainty in Task Programmability

Task programmability is defined as the measurability of an agent's assumed tasks, (Eisenhardt, 1989) and is situated at the job level. According to agency theory, the higher the level of task programmability, the lower the managerial risk of poor performance and the lower the monitoring costs (Eisenhardt, 1988). If we adapt the reasoning of agency theory to IT compensation, many tasks assumed by IT professionals require creative knowledge important to IT-related business innovation. The low programmability of innovative IT tasks leads to information asymmetry between managers and IT professionals, frequently rendering managerial monitoring ineffective and task performance uncertain (Chong & Eggleton, 2007; Eisenhardt, 1989; Roth & O' Donnell, 1996; Sharma 1997). Investing in information systems to monitor IT professionals may be ineffective because this investment is costly and IT professionals may have sufficient knowledge or skills to counteract monitoring. Therefore, under information asymmetry, designing incentives for IT professionals may be an alternative to monitoring (Roth & O' Donnell, 1996; Mishra, Heide & Cort, 1998). Consequently, we propose that incentive pay should account for a higher proportion of total compensation plans for IT professionals whose tasks require more innovative knowledge than in compensation plans for administrative professional staff (e.g., accountants) whose tasks require specific knowledge, less innovation, and are more programmable (lower information asymmetry between supervisors and workers). This proposition is important because it bridges the gap identified in the compensation literature that little research has addressed compensation differences between different groups of IT employees with different knowledge and skills.

P2: *To reduce higher IT performance uncertainty resulting from lower task programmability of IT work, incentive pay will account for a higher proportion of the total compensation plan for IT professionals than that in the total compensation plans for administrative professional staff.*

Little empirical IT compensation research directly measures the impact of task programmability in IT jobs. An explanation for this scarcity is that the economic roots of agency theory "has led researchers to test financial rather than behavioral hypotheses" (Grabke-Rundell & Gomez-Mejia, 2002, p. 3). The other explanation is that task programmability may be an abstract academic term not used in compensation language in practice (Wang, 2007). Although profit is emphasized more than task monitoring in compensation practice, the managerial rationale derived from the concept of task programmability is still acknowledged in practice (Wang, 2007). Wang's study found that what managers actually think of, or agree with may vary from the actual IT compensation practices in organizations. Her interviews suggest that in addition to pay and profit issues, knowing how to motivate IT personnel with tasks, including how to communicate the task programmability to IT personnel, is still of concern to HR and IT managers (Wang, 2007)[5]. Therefore, this proposition on

[5] The following interview quote from Wang (2007) provides support: "The challenge isn't mainly finding the person. The challenge is giving the money they want [challenge in IT compensation planning], and the other challenge about it is making sure they understand what the project is [challenge in communicating task programmability]. This is because we find that IT professionals are more motivated by the new projects they are going to work on than by how much money they make. I mean the money has to be decent, but that is not really what is attractive" (Quote 3-2 Former VP). Reich and Kaarst-Brown (1999,

task programmability grounded in agency theory is still of value in bridging knowledge from practice and knowledge from theory.

3.2. Aligning IT Compensation with Organizational and Industry Factors

There are three organizational factors and one industry factor from the literature that have associated IT-related risks: organizational size and structure, profit orientation, growth or maturity stage of the firm, and whether the firm is in a high-tech industry (Table 4, Figure 1).

3.2.1. Organizational Level—Organization Size and Structure

Organization size and structure are contingency factors affecting organizations' capability to compensate their personnel because size may influence available resources. Empirical research studies operationalized this construct as the number of employees (Balkin & Gomez-Mejia, 1987), and the amounts of sales and assets the organization possesses (Talmor & Wallace, 1998; Ang et al., 2002)[6]. Almost all the IT compensation studies reviewed focus on the relationship between firm size and total pay level, rather than the components in the IT compensation plan. Nonetheless, Levina and Xin's (2007) study, based on U.S. data sets for 1997, 2002, and 2004 (reflecting the trends of 1996, 2001, 2003, respectively), found that total IT pay levels were higher in larger firms than in smaller firms. Mithas and Krishnan's (2008) study based on U.S. data sets of 1999-2002 also confirmed that the total IT pay levels were correlated to firm size. Levina and Xin's (2007) and Mithas and Krishnan's (2008) findings are consistent with the general compensation literature in the U.S. context (Kostiuk, 1990; Mehran, 1995), and with some studies in non-U.S. contexts (e.g., Chuang & Hsu, 2004 in Taiwan) that demonstrate a positive relationship between firm size and total pay level.

It is interesting to note that Ang et al.'s (2002) study based on Singaporean data found that total compensation plans for IT professionals offered by smaller firms did not differ significantly in total pay level from that offered in larger firms. They attributed this finding to the competitive pressures of a severe supply-demand imbalance in the IT labor force back in 1997 (labor economics argument). An alternative explanation may lie in the nature of these smaller firms, especially if they include boutique brokerage firms in the financial sector (Kaarst-Brown & Wang, 2003). The lack of support for the relationship between firm size and total pay level in Ang et al.'s Singaporean data set supports our larger argument for more detailed or even different theoretical explanations to understand the nuance in IT compensation in different cultural contexts.

The dominant findings, however, support that smaller organizations with limited budgets are less able to afford fixed personnel expenditures, and so are inclined to pay lower base salaries in exchange for securing short-term financial stability. This approach permits smaller companies to compete while reducing IT-related cash outlays (Balkin & Gomez-Mejia, 1987). Larger firms tend to bureaucracy and establish performance evaluation systems that emphasize consistency, centralization, and standardization; hence, positions are frequently remunerated based on a fixed personnel expenditure (e.g., base pay) with little managerial control (Balkin & Gomez-Mejia, 1987; Gaver & Gaver, 1993). Accordingly, incentive pay for IT professionals in smaller firms will logically account for a greater proportion of the total reward package, and base pay for IT professionals is likely to be preferable and more efficient in larger firms.

> **P3:** *To offset the uncertainty in financial stability, IT professionals in smaller firms will receive a higher proportion of incentive pay in the compensation plan than IT professionals in larger firms will receive (controlling for job roles and skill sets).*

Organizational structure is also related to organizational size. Smaller firms tend to have flatter structures, and therefore greater variability in job tasks and limited career paths. This may require

2003) found similar explanations when interviewing IT workers who moved into non-IT jobs for new challenges, even with pay freezes and no promotion.

[6] The definition of size or "scale" may vary based on industry standards and country norms for developed or developing nations. As an example, a large company in parts of Africa might have more than 300 employees, whereas a large company in the US might exceed 10,000 employees.

management in smaller firms to differentiate rewards based on other non-monetary factors (Galbraith & Merrill, 1991). Adapting these arguments to IT compensation, IT professionals in smaller firms are likely to have greater disparity in compensation plans reflecting in the non-monetary components. For example, IT professionals in smaller firms would have greater bargaining power over their compensation and have more power to participate in decision-making and salary negotiations, given a less-centralized, less-bureaucratic structure (Balkin & Gomez-Mejia, 1990).

P4: *To reduce uncertainty of financial instability and task variability, smaller firms with flatter structures will emphasize non-monetary compensation and have greater variability in total compensation among IT professionals.*

3.2.2. Organizational Level—Profit Orientation

It is widely held that workers in non-profit organizations earn less than similar workers in for-profit counterparts. For example, Preston (1989) found that managers and professionals in non-profit organizations earned 18 percent less per hour than their for-profit counterparts, even controlling for industry and human capital characteristics. More recent IT compensation studies (e.g., Levina & Xin, 2007; Mithas & Krishnan, 2008) found that IT professionals in non-profit organizations received lower total pay than IT professionals employed in for-profit counterparts. Several explanations may account for this pay differential in non-profit firms, including institutional rigidity on personnel budgeting, social donation of labor, and trade-off between lucrative incentives and job security (Ang et al., 2002; Ruhm & Borkoski, 2003). These working conditions are like non-monetary perks that IT professionals receive in exchange for a portion of their wage (Ang et al., 2002). However, Ang et al.'s (2002) study did not find differences in total IT compensation between for-profit and non-profit firms. Perhaps, as Levina and Xin (2007) explained, some countries, such as Singapore, have strong government influence to reduce differences between for-profit and non-profit compensation. The ambiguous results in the literature again encourage further comparative, cross-cultural IT compensation research on the differences in profit orientation of organizations, but we do not develop separate propositions on profit orientation here with these influences inferred in organizational size and industry stance.

3.2.3. Organizational Level—Organization Life Cycle

A firm's life cycle stage was found to be a fundamental factor affecting organizational compensation strategies (Balkin & Gomez-Mejia, 1987). In the literature, life cycle is divided into two stages: mature stage and growth stage. The mature stage is defined as the stage wherein the competitive structure is stable, and the vast majority are familiar with the products (or services) and the technology (Balkin & Gomez-Mejia, 1987; Hambrick, 1981, 1983; Hofer, 1975). The growth stage is tightly coupled with innovation and is defined as the stage wherein a firm's sales are growing at 20 percent or more annually, and technology and competitive structure are shifting (Balkin & Gomez-Mejia, 1987; Hofer, 1975; Hambrick, 1981, 1983). Although the influence of organizational life cycle on compensation strategies is significant, this construct has received relatively little attention in the IT or non-IT compensation literature (Werner & Ward, 2004), except by Balkin and Gomez-Mejia (1987, 1990). Therefore, we borrow the arguments from Balkin and Gomez-Mejia and other organizational contingency literature and adapt them into the topic area of IT compensation.

Growth Stage and IT Compensation: Organizations in the growth stage have more investment options such as establishing infrastructure, information systems, and acquiring staff. Expenses for development and the ratio of debt-to-equity affect assets available for IT staffing and monitoring. Organizations in the growth stage not only face uncertainty with the IT staffing process, but also uncertainty regarding the environment. They face high rates of technological change and uncertainty related to success of new product or service innovations (Hofer, 1975). The uncertainty is further intensified when there are many new entrants to the market. Therefore, these firms face greater risk and are more vulnerable than their lower growth counterparts (Smith & Watts, 1982).

Under this uncertain environment, organizations are more likely to work with risk-taking IT personnel who are less concerned with job security and willing to trade off immediate rewards for expected return on their intellectual investment via firm growth. Therefore, firms in the growth stage, especially when there is a high ratio of debt-to-equity, are expected to emphasize market-based incentive pay such as

stock options (Gaver & Gaver, 1993; Smith & Watts, 1982). These function not only to align technical personnel's interests with a firm's developing strategy, but also finance the firm's future growth. The incentives are paid to employees when the strategic objectives have been reached, allowing firms more flexibility in investing in R&D and technical innovation while paying later with a portion of the profits (Balkin & Gomez-Mejia, 1987, 1990). Nonetheless, IT professionals in growth firms will likely demand higher levels of total compensation to balance the potential risk. This enhanced pay level aims to reward risk taking and is referred to as "risk premium" in agency theory literature.

> **P5:** *IT professionals in growth firms will have complex compensation contracts that have a higher proportion of incentive pay linked to the organization or divisional success, and base pay linked to experiences and skills (competencies) to offset uncertainty in the organization's environment.*

Mature Stage and IT Compensation: As firms enter into the mature stage, maintaining current market share and current IT systems are the primary objective. The external competition may still be vicious and volatile in this stage; therefore, incentives are still as attractive for firms in the mature stage as for firms in growth stage (Balkin & Gomez-Mejia, 1987; Wang, 2007). Paradoxically, the need for change and anticipated growth is often reduced in the mature stage (Balkin & Gomez-Mejia, 1987); consequently, standardization of production and low-cost strategies such as achievement of scale economies would be emphasized, while new products as a percentage of sales and R&D expenses decline rapidly from growth to maturity (Anderson & Zeithaml, 1984). As such, base pay and non-monetary rewards (e.g., job security) may be viable compensation vehicles for IT professionals in mature firms with a relatively stable status, and are expected to account for a higher proportion of compensation plans.

> **P6:** *Firms in the mature stage will use incentive pay to cope with still vicious external competition, but emphasize more on base salary or other non-monetary rewards (e.g., job security) for IT professionals to reflect reduced uncertainty in organizational standing.*

3.2.4. Industry Level—Industrial Traits

We define the concept of "industrial traits" as the characteristics of the sectors in which the firm operates. Industrial traits reflect different levels of opportunity, competitiveness, and volatility in the environment surrounding the organization. Uncertainty associated with industrial traits affect organizations' compensation strategies and resulting compensation plans for their personnel (Balkin & Gomez-Mejia, 1987; Kleingartner & Anderson, 1987). Researchers have used different sub-categories to define and measure industrial traits. Galbraith and Merrill (1991), for example, define the "high-tech industry" with seven nominal categories representing seven industry sectors with SIC codes: computers (SIC 357), communication equipment (SIC 366), electronic components (SIC 367), instruments (SIC 38), aerospace (SIC 372), research labs (SIC 737), and space systems (SIC 376). A pitfall of this nominal definition is that it is less general, less comprehensive, and loses applicability in many cases.

Ang et al. (2002) use "information intensity" as a sub-category to describe industrial traits. Drawing on Palmer and Griffith's (1998) work, Ang et al. define information-intensive firms having products or services with high information content and using sophisticated information technology to deliver them. In general, they found information intensity does not affect IT compensation significantly. Levina and Xin (2007), however, found the link between information intensity of industry and IT compensation to be significant based on U.S. compensation data. Levina and Xin propose that search friction and geographical differences in cost of living or other unobservable factors may be critical to understanding the influences of industry trait on compensation. Nonetheless, Mithas and Krishnan (2008) found firms in "IT-intensive industries" pay IT professionals 9 percent more than firms in non-IT-intensive industries, while firms in IT industries pay IT professionals 6 percent more than firms in non-IT industries. A pitfall of using the sub-category of information intensity at the conceptual level is that, in today's information age, almost every organization is found to be information-intensive (Kaarst-Brown & Wang, 2003). This makes this conceptualization less distinctive.

Our paper focuses on two sub-categories of industrial traits used by Balkin and Gomez-Mejia's (1987): "high-tech industry" and "labor-intensive (low-tech) industry". They define high-tech companies as those having annual R&D budgets of five percent or more of sales revenues. It should be noted that this definition might be confounding because R&D expenditures may be unrelated to IT, so we specify non-high-tech or labor-intensive industries would therefore be those with less than 5 percent of revenues spent on IT-related R&D. This measure would be comparable across different countries.

Researchers have shown that incentive pay as a proportion of total compensation is higher in high-tech firms, and the use of incentive pay is more effective in high-tech industries compared to their labor-intensive counterparts (Balkin & Gomez-Mejia, 1990; Galbraith & Merrill, 1991). This is attributed to the fact that high-tech industries are more volatile and subject to rapid change and environmental uncertainties. By emphasizing incentive pay, high-tech firms not only compensate the high risk assumed by IT employees (Balkin & Gomez-Mejia, 1987), but motivate IT personnel to achieve innovation and adaptability that are critical for a firm's success. The environment of labor-intensive industries, on the other hand, is frequently more stable and less dynamic, and one in which the strategic role of information systems and IT personnel is generally viewed as focused on maintaining production quality rather than on facilitating creativity and innovation (Balkin & Gomez-Mejia, 1990; Galbraith & Merrill, 1991). Accordingly, the proportion of incentive pay in the total compensation for IT professionals is expected to be higher in high-tech-oriented firms than for IT professionals in traditionally labor-intensive firms.

> **P7:** *To offset the environmental uncertainty, high-tech-oriented firms will offer a higher proportion of incentive pay in their total compensation for IT professionals than their non-high-tech-oriented counterparts offer.*

3.3. Aligning IT Compensation with IT Strategies

Three of the influencing factors are specifically within an organization's control and represent strategic IT governance decisions: the firm's IT sourcing strategy, the use of foreign workers in domestic locations requiring special visas, and the choice of geographical location in which the IT function is located (with or without the rest of the firm).

3.3.1. Strategic Level—IT Sourcing Strategy as a Strategic Decision

A major focus in IT outsourcing literature is the issue of monitoring from the principal-agent perspective (i.e., agency theory) (Gopal & Sivaramakrishnan, 2008; Osei-Bryson & Ngwenyama, 2006). Linking to IT compensation decisions, the rationale for designing contractual compensation with the IT vendors from the view of clients (or principals or managers) is to reduce uncertainty, rather than paying for individual IT professionals. Central issues in designing contracts with outsourcing vendors are the provision of incentives for performance and allocation of risks (Lacity & Hirschheim, 1993). Risks facing firms that outsource their IT functions include difficulty in estimating costs, obtaining precise information about the IT vendor's capability, and monitoring uncertainty related to the IT vendor's performance (Gopal & Sivaramakrishnan, 2008; Osei-Bryson & Ngwenyama, 2006; Siepmann, 2013). These are referred to as risks of information asymmetry (or programmability), measurement costs, shirking, and opportunistic bargaining that would enhance difficulty in monitoring.

Two typical outsourcing contracts are fixed-price and time and material contracts (Dey, Fan, & Zhang, 2010; Gopal & Sivaramakrishnan, 2008). From the principal's aspect, time and material contracts incur a greater level of monitoring for estimation of costs, while fixed-pay contracts substitute the needs for monitoring with expectations of vendor efficiency (Gopal & Sivaramakrishnan, 2008). Although trust developed through longer-term or repeated sourcing relationships may reduce the risk of adverse selection, difficulty in monitoring is still high compared to the difficulty in monitoring in-house IT professionals. Therefore, we propose that, to trade-off the potential risks associated with vendor performance, firms opting for "IT outsourcing strategies" will focus more on fixed-pay contracts in order to reduce the risk in monitoring and cost estimation, in comparison to those firms opting for "IT insourcing strategies".

P8: *Given the uncertainty in monitoring plus additional performance uncertainty in outsourced relationships, firms opting for IT outsourcing strategies will focus more on fixed pay contracts than firms opting for IT insourcing strategies.*

This line of reasoning is further extended to outsourced IT projects with different levels of risk (Ethiraj, Kale, Krishnan, & Singh, 2005; Gopal & Sivaramakrishnan, 2008). Outsourced IT projects with well-defined services or products may be considered low-risk. For lower-risk IT projects with higher task programmability (such as simple software projects requiring relatively short development time), firms can emphasize the deliverables or outcomes, rather than monitoring a vendor's behavior, and emphasize fixed-pay contracts (Dey et al., 2010). For example, in an interview with a small bank in Wang's (2007) study, a top manager reflected that they rely only on fixed-pay contracts for the IT service provider who is in charge of IT maintenance and support (i.e., low-risk and well-defined tasks).

3.3.2. Individual Level—Immigrant Status as a Strategic Decision

Globalization and shortages of IT workers, even during the economic recession, have created a market for many skilled foreign workers. While language skills and global experience would factor into the education and experience categories, issues of immigration quotas, legal work permits, and firms' sourcing strategies complicate this important strategic decision for firms. Immigrant status and the annual caps on work visa of foreign IT professionals have been widely debated in the United States and are shown to have impact on IT compensation in Mithas and Lucas's study (2010). Nonetheless, academic research on the relationship between immigrant status and IT compensation lags behind practitioner interest and is overwhelmingly practice based, descriptive, and atheoretical. While Mithas and Lucas's research draws on human capital and economic perspectives, we develop an alternative explanation of the relationship between immigrant status and IT compensation from the perspective of coping with the additional costs and uncertainty of different skills sets or training, visa costs, and potential labor restrictions. Understanding "why" contributes to theorizing at an explanatory level; however, most compensation research falls short of developing alternative explanations from different perspectives. We focus on the alignment between IT compensation and other IT strategies, rather than on how firms compensate individual IT professionals.

Logically, IT professionals who need to change their immigrant status to legitimate working status might be compensated at lower levels because the firm has to pay for the legal services and application fees (Burger, 2013; "Going Global", 2010; Hall & Khan, 2008). This would apply in the United States or in any other country in which they lack the legal right to work. A risk to the firm is that, if the IT worker switches to another company, this investment in immigrant applications becomes a waste of the firm's time and resources. In spite of this potential risk, when immigrating foreign IT professionals, firms actually pay higher compensation premiums (i.e., increasing portion of incentive pay or variable pay beyond base pay) to acquire IT human capital, to cover relocation subsidies, and for additional assistances (Mithas & Lucas, 2010; Wang, 2007). In practice, firms would turn to outsourcing to reduce these investment risks of hiring foreign IT professionals, to depress the cost of IT compensation, and to cope with the related uncertainty in visa caps and uncertainty in labor scarcity (Wang, 2007). However, to acquire and grow specialized IT skills that are scarce, expensive, but core to firms' competitiveness, firms would opt to establish offshore branches (usually at locations with lower living standards) to trade off the higher IT pay and to reduce the cost of regular IT personnel expenditures. This may also incur higher fixed expenditures of administration and management at offshore branches.

P9: *To reduce the total cost in immigrating foreign IT professionals, firms would opt for an outsourcing strategy to transfer the investment risk to third-party companies.*

P10: *To reduce costs of acquiring special IT skills that are core to the firm from offshore sources, firms would instead opt to establish offshore branches (insourcing offshore).*

3.3.3. National Level—Geographic Location as a Strategic Decision

Cost of living differences are often controlled or adjusted for in descriptive compensation studies. We argue, however, that geographical differences, including cost of living and cultural factors, represent an

important risk factor in overall IT compensation strategy (e.g.,in managing the resource risks associated with talent management and overall IT governance of a distributed firm). (Note Table 2 showing Latin America's high percentage (16%) of offshore employees versus 5% for the next highest region.)

The influence of geographic factors on IT compensation can be explained from economic or cultural perspectives, which Section 1.5.2 notes. The first economic explanation, which is also the most intuitive, is that firms based in a location with a higher living standard may be forced to compensate IT personnel with higher levels of base salary to offset living expenses. As reported by Business Wire, top executives in northern California were reported to earn the largest base salaries in the US as a proportion of total compensation (Business Wire, 2005), consistent with the top-ranked standard of living at this region. Likewise, compensation differences can also be reflected in the geographic location at the national level, given different types of national economies. For example, Levina and Xin (2007) found a difference in IT compensation across different national contexts between Singapore and the United States. Levina and Xin postulate that geographic difference may account for differences in cost of living or search friction in labor markets, but the cultural value (status) placed on particular occupations should also be considered (Kaarst-Brown, 2005; Karahanna et al., 2002).

This second cultural perspective is based on Ronen and Shenkar's (1985) notion of "cultural clusters", which states that behaviors of countries (or groups) in the same cultural cluster are predicted to be similar. Townsend, Scott, and Markham (1990) conducted cross-national compensation research and found that countries belonging to similar cultural clusters demonstrated similar compensation practices. Townsend et al. found that cultural and socio-economic factors at the national level have utility to explain macro-organizational phenomena. As such, even national differences reflected by general categorization of countries as a "developed" or "developing economy" will affect total IT pay levels and managerial decisions about how to balance risk (Kaarst-Brown & Wang, 2003; Townsend et al., 1990).

Similarly, management scholars have argued that there are cultural differences between management styles of Asian, Latin American, and Western countries, in many cases reflecting both cultural differences and economic realities (Ekanayake, 2004; Luftman & Zadeh, 2011; Tosi & Greckhamer, 2004). Given the complexity of factors that make up national (or regional) differences, development stage (developed or developing) is felt to be a relevant surrogate indicator to consider when looking at IT compensation across nations. At the regional level, however, cost of living adjustments may serve as a surrogate for cluster differences. While this may seem to default to a labor economics view, we argue that the cultural underpinnings are key to explanations (e.g., Luftman & Zadeh, 2011; Kaarst-Brown, 2005; Karahanna et al., 2002; Townsend et al., 1990).

> **P11:** *IT professionals working in different geographic, economic, or cultural clusters will receive different IT compensation plans as firms seek to balance risks from different cultures and economies.*

4. Discussion and Implications

4.1. Risk and Uncertainty and IT Compensation

Table 5 summarizes the propositions, while Table 6 summarizes the uncertainty related to the propositions. Although focusing on particular levels of influencing factors, many of the above propositions touch on influences from other levels.

In practice, HR and IT Executives must make IT compensation decisions that encompass multiple levels—individual characteristics, job features, the nature of the organization and its goals, industry or cultural norms, and economic realities of the country or region in which they operate. As Figures 1 and 2 show, we propose that these factors will intersect with varying levels of influence and importance. For example, the geographic location in which a firm's IT function is located (with or without the rest of firm) may have a dominant influence on the total amount of compensation, regardless of the size or sourcing strategy of a firm, but little to do with composition of compensation plans (use of base or variable pay components). Economics may change the scale, but not the risks!

Similarly, two IT professionals with identical skills may be paid very differently if one is employed in a short-term contract job, and the other is employed in a long-term, full-time job. The nuance of compensation configurations, however, is best observed when considering predominantly "high-risk" or "low-risk" conditions for organizations. Tables 7 and 8 summarize how these factors influence each other, using what we have labeled as "consistently low" or "high uncertainty/risk" conditions. Under a high or low condition, some factors will have a positive correlation and result in higher proportions of base or incentive pay, or on total pay (see legend). The reverse is also true.

Some of the relationships are both intuitive and supported by literature (e.g., higher overall IT salaries are theorized to be offered by larger, for-profit organizations than by large not-for-profit firms). Other relationships are not intuitive and potentially controversial, such as male-female pay disparities.

Table 5. Summary of Propositions

Alignment of individual- and job-level factors and IT compensation configuration		
Male-female gender differences	P1	Firms will pay less to female IT professionals than to males to reduce uncertainty of female employee's career discontinuity, controlling for job roles and skill sets.
Task programmability	P2	To reduce higher IT performance uncertainty resulting from lower task programmability of IT work, incentive pay will account for a higher proportion of total compensation plans for IT professionals than that in total compensation plans for administrative professional staff.
Alignment between organizational and national level factors and IT compensation configuration		
Organizational size and structure	P3	To offset the uncertainty in financial stability, IT professionals in smaller firms will receive a higher proportion of incentive pay in the compensation plan than IT professionals in larger firms will receive, controlling for job roles and skill sets.
	P4	To reduce uncertainty of financial instability and task variability, smaller firms with flatter structures will emphasize non-monetary compensation and have greater variability in total compensation among IT professionals.
Organization life cycle stage industrial traits	P5	IT professionals in growth firms will have complex compensation contracts that have a higher proportion of incentive pay linked to the organization or divisional success, as well as base pay linked to experiences and skills (competencies) to offset uncertainty in the organization's environment.
	P6	Firms in the mature stage will use incentive pay to cope with still vicious external competition, but emphasize more on base salary or other non-monetary rewards (e.g. job security) for IT professionals to reflect reduced uncertainty in organizational standing.
	P7	To offset the environmental uncertainty, high-tech-oriented firms will offer a higher proportion of incentive pay in their total compensation for IT professionals than their non-high-tech-oriented counterparts offer.
Alignment between IT strategies and IT compensation configuration		
IT sourcing strategies	P8	Given the uncertainty in monitoring plus additional performance uncertainty in outsourced relationships, firms opting for IT outsourcing strategies will focus more on fixed-pay contracts than firms opting for IT insourcing strategies.
Strategic choices related to immigrant status	P9	To reduce the total cost in immigrating foreign IT professionals, firms would opt for outsourcing strategies to transfer the investment risk to third-party companies.
	P10	To reduce costs of acquiring special IT skills that are core to the firm from offshore sources, firms would instead opt to establish offshore branches (insourcing offshore).
IT geographic location	P11	IT professionals working in different geographic, economic, or cultural clusters will receive different IT compensation plans as firms seek to balance risks from different cultures and economies, controlling for job roles and skill sets.

Table 6. Uncertainty and Propositions

Level	Decision factor	Summary of uncertainty	Prop. #
Individual level	Lower education	- Performance uncertainty - Adverse selection uncertainty - Emerging technology uncertainty	*Empirical relationships in literature*
	Lower length of experience		
	Gender – female	- Legal uncertainty of non-compliance - Retention uncertainty - Performance uncertainty due to potential career disruption	1
	Legal work status (i.e., needs visa assistance)	- Retention uncertainty after incurred legal costs - Labor uncertainty due to H1B visa caps push up compensation costs	9, 10
Job level	Low task programmability	- Performance uncertainty increases monitoring costs	2
Organizational	Small size & structure	- Resource uncertainty (vary by size and can impact ability to compete for IT workers)	3,4
	Growth/mature stage in organization life cycle	- Resource uncertainty - Employment stability uncertainty - Innovation uncertainty - Project volatility uncertainty - Market competition	5, 6
Industry level	High tech	- Employment uncertainty - Labor competition uncertainty due to different opportunity levels - IT uncertainty	7
IT sourcing strategy	IT outsourcing strategy pursued	- Resource uncertainty - Monitoring and Coordination uncertainty	8
National level	Geographic location has higher cost of living	- Cost of living variability; labor availability	11

4.1.1. Lower Uncertainty Conditions and IT Compensation

We tend to associate higher risk with higher reward. Paradoxically, this may not hold true in IT compensation. Supported by prior evidence, Table 7 shows that total compensation costs are predicted to increase under many conditions when we lower the firm's risk and uncertainty. For example, agency and contingency conditions that are proposed to push total compensation costs higher include having IT workers with higher skills and experience, having predominantly male employees who are not expected to have career discontinuities due to childbirth, and higher salaries paid to foreign workers who have already attained their work visas.

In Table 7, we can also see that settings with many lower-risk conditions support compensation plans composed of larger portions of base pay, but frequently support higher overall pay. This seems counter-intuitive, but reflects much of practice as more stable work environments may have lower turnover, and therefore more experienced and expensive IT workers. The implications for composition of IT compensation plans are potentially significant. Larger proportions of fixed-base pay and non-monetary rewards are theorized in lower-risk situations with long-term principle-agent relationships, mature firms, and where there is high-task programmability in the IT work. Given the rate of technological change, however, these fixed-pay compensation plans may be less effective in aligning the goals of IT workers with their employers.

4.1.2. Higher-Uncertainty Conditions and IT Compensation

In Table 8, the relationships show that the amount of total IT compensation offered to workers is likely to be lower under some conditions when organizational risk is highest. This could include firms using lower skilled or less experienced workers, predominantly female workers. or in smaller firms in competitive markets. Table 8 shows that total compensation is predicted to be higher when task programmability is low (such as in complex tasks or projects), and when we outsource our IT workers. Table 8 also shows that firms may use IT compensation strategies to share the risk with IT workers by increasing the proportion of variable pay under these same higher-risk conditions.

Another anomaly is that firms frequently locate their IT function in areas with high IT labor availability; however, this may have the impact of pushing relative IT costs higher due to geographical cultural-cluster effects that increase the status value of the professional (e.g., national, cultural, or cost of living effects). Examples of these aggregated areas include Silicon Valley in the United States, ShenJun in China, and the Hsing-Chu Technology Park in Taiwan. Looking to the future, Luftman and Kempaiah (2007, p.133) site a Technology Business Services report that forecasts Indian wages for IT professionals to exceed those of U.S. workers within 15 years.

Table 7. Assumes Lower Uncertainty Level Positions on Factors: Summary of Proposed Relationships Between Explanatory Factors and Configuration of IT Compensation

Explanatory factors			Impact on content of IT compensation		Impact on amount of IT compensation	
Level	Decision factor	Prop. #	Proportion base pay (fixed pay)	Proportion incentive pay (variable Pay)	Non-monetary rewards	Total Comp. level
Individual level	Higher education		+	*0*	*0*	+
	Greater experience		+	*0*	*0*	+
	Gender – male	1	+	0	0	+
	Immigrant status with work permits	9, 10	0	0	0	-
Job level	High task programmability	2	+	-	0	-
Org. level	Large size & structure	3,4	+	+	-	+
	Mature stage in org. life cycle	6	+	-	+	-
Industry level	Low tech	7	-	-	0	-
National level	Geographic location has lower cost of living	11	-	0	0	-
IT strategy	IT insourcing strategy pursued	8	-	0	+	-

Legend:
+ Positive correlation proposed resulting in a higher proportion or total
- Negative correlation proposed resulting in a lower proportion or total
0 No correlated impact proposed

Table 8. Assumes HIGHER Uncertainty Level Positions on Factors: Summary of Proposed Relationships Between Explanatory Factors and Configuration of IT Compensation

Explanatory factors			Impact on content of IT compensation		Impact on amount of IT compensation	
Level	Decision factor	Prop. #	Proportion base pay (fixed pay)	Proportion incentive pay (variable pay)	Non-monetary rewards	Total comp. l evel
Individual level	Lower education		-	*0*	*0*	-
	Less experience		-	*0*	*0*	-
	Gender – female	1	-	0	0	-
	Immigrant status – needs visa support	9, 10	0	0	+ (coupling IT strategy)	+
Job level	Low task Programmability	2	-	+	0	+
Org. level	Small size & structure	3, 4	-	+	+	-
	Growth stage in org. life Cycle	5	-	+	–	+
Industry level	High tech	7	+	+	0	+
National level	Geographic location has higher cost of living	11	+	0	0	+
IT strategy	IT outsourcing strategy pursued	8	+	0	-	+

Legend:
+ Positive correlation proposed resulting in a higher proportion or total
- Negative correlation proposed resulting in a lower proportion or total
0 No correlated impact proposed

4.2. Implications for Reasearch and Theory

Research on IT compensation is a relatively new area, and, as such, we are still in the early stages of understanding practice. Table 4, Table 7, Table 8, and the two figures summarize a nomologic framework between IT compensation and its impacting factors, with IT compensation configurations treated as a dependent variable. There is clearly much work to be done to better empirically and theoretically understand both the logical and the practical considerations for effective IT compensation under varying uncertainties.

This paper integrates concepts from traditional compensation literature, the role of non-monetary rewards, and a multi-level view of factors that influence IT compensation decisions. The use of multi-level factors is supported by traditional agency theory perspectives of compensation, and by contingency theory that looks at external and organizational contingencies. One interesting result of our analysis is that agency and contingency perspectives of risk provide insights on when fixed- or variable-pay IT compensation plans may be more beneficial to an organization. A second interesting insight is that there may be conditions when risk is logically lower, but overall IT compensation amounts will be higher. In particular, our paper proposes that IT compensation configurations can be a viable IT governance mechanism in high-risk conditions when effective monitoring and performance measurement are less attainable, such as in outsourcing situations. This perspective complements the limitations of most IT compensation research that primarily draws on a labor economic standpoint.

Our proposed theoretical framework relies on generic definitions of several constructs, without further distinguishing different types in the constructs out of a trade-off between abstract and concrete levels in theorizing. For example, the construct of incentive pay does not distinguish between market-based incentives (such as stock options and restricted stock plans) and accounting-based incentive plans (such as bonuses), or between short-term incentives and long-term incentives. Similar constraints exist for the construct of non-monetary rewards. Another example is that the construct of IT professionals does not differentiate various IT job roles. Note that the majority of the early IT-HR literature referred to in Table 1 adopts a homogeneous view on IT professionals without differentiating various IT job titles. Prasad et al. (2007), cite Ferratt and Short (1986) in their debate on different motivational needs of IT workers, stating that, “Indeed, such customization is unnecessary if one accepts a long prevalent notion in the IT literature that IT employees, while different from other occupational groups, are homogeneous in what they seek from an employment arrangement (i.e., their work values)” (p. 350). Despite these debates, this speculative process contributes to theorizing IT compensation by integrating explanatory factors from different literature, highlighting debates in the IT personnel literature, highlighting controversies in conceptual issues, deriving plausible explanations for managerial decisions on aligning IT compensation decisions with IT uncertainty, and exploring factors receiving relatively little attention in the IT literature. Our proposed middle-range theoretical framework and its plausible explanations serve as a hypothetical story about managements’ rationale underpinning IT compensation decisions.

In addition, however, this paper re-considers the definition of these factors and re-interprets their influence on IT compensation from an uncertainty-reduction perspective. This reinterpretation reveals nuanced differences in managerial rationale and practice associated with IT compensation decisions that may not be captured by the functional relationships provided by labor economics or human capital views. Therefore, we believe this more holistic theorizing offers value in helping us understand how managers make IT compensation decisions (Gerhart & Rynes, 2003).

We have argued for the explication of IT compensation configurations that include fixed pay, variable pay, and non-monetary incentives. We encourage future research in this stream to distinguish managerial decisions related to various incentives, address individual versus organizational performance, and incorporate desirability and availability of non-monetary and intangible rewards into options of compensation contracts. The components of non-monetary rewards are more arbitrary and less predictable than monetary rewards across different organizations, potentially aiding understanding of unique decision options pursued under different contingencies and for different reasons. Developing a typology of non-monetary rewards effective in different strategic situations

would begin to fill a gap in empirical research, but would also be of value to management as they reconcile risk/reward relationships associated with IT staffing.

Because competence-based compensation aims to invest in an employee's abilities that are critical to the firm, rather than to purchase an employee's behavior to conduct a specific set of tasks, competence-based approaches to compensation are a valuable complement to the two contractual concepts (behavior-based and outcome-based) in agency theory. Future IT compensation research is also encouraged to more deeply explore contentious explanations for female-male pay disparity, and to consider other factors such as age and aging that have similarly received little attention in IT compensation research.

Furthermore, we encourage future research to incorporate multiple theories to gain a more comprehensive insight. We have tried to move arguments and explanations beyond simple labor economics or human capital perspectives to consider a broader, more holistic view that also incorporates risk and uncertainty. This complexity is more representative of the world we live in. Organizational theories tend to evaluate compensation schemes from the perspective of organizations, whereas institutional theories take into account national policy, and theories on motivation focus on individual preference. We suggest that future studies should examine reward systems from the viewpoint of managerial and non-managerial differences to determine whether IT professionals and executives perceive reward systems differently, and how this may affect risk sharing or outcomes. In additional to a multi-theoretical view, IT compensation research would benefit from mixed-method designs to capture deeper insights into practice and managerial rationale than traditional survey studies.

The seeking of pragmatic but speculative theorizing about IT compensation and other important human resources issues raises questions on how to craft theoretical statements where both practice and theory are integrated. First, there is a bewildering number of names for theoretical statements, including hypothesis, assumptions, propositions, axioms, postulates, premises, corollaries, and theorems (Hage, 1972). The differences among them are nuanced and may be overlooked or misinterpreted by many scholars. Second, many theoretical statements contain only testable/operational statements (e.g., hypothesis) while placing explanatory/untestable statements implicitly in discussions. But the literature does not prohibit blending testable/operational statements (e.g., hypothesis) and explanatory/untestable statement (e.g., assumptions) together in the same theoretical statements (Hage, 1972). All of these questions invite theorizing endeavors related to IT compensation decisions.

4.3. Implications for Corporate Managers and Practitioners

The proposed framework predicts that incentive pay and non-monetary rewards may play a more important role than fixed base salaries in retaining/motivating IT professionals, and also in aligning IT with business goals to reduce uncertainty. The proposed factors and relationships also highlight that IT managers and their organizations have many choices that they can make related to sourcing of IT personnel. Each of these choices has associated risk. It is no longer a simple case of "train our own" or "buy the best talent".

There has been a tremendous focus on increasing female participation in STEM (science, technology, engineering, and mathematics) disciplines. Based on the empirical evidence and the arguments presented here, to cope with human capital uncertainty, firms may benefit from hiring younger female graduates, nurturing them in internship relationships, and building longer-term relationships before, during, and after career disruptions might occur as innovative non-monetary incentives that retain IT worker loyalty and talent.

Many firms have already been pushed into making one of three strategic decisions to back-fill IT personnel shortages: either hire foreign workers, outsource, or insource offshore. IT compensation also has implications for governance in IT personnel sourcing situations. Outsourcing is a trend that has greatly affected the IT profession, serving as an alternative option for obtaining IT personnel. While this practice

has been lauded for cost savings and creating efficiencies, it has been criticized at the same time as more expensive and more difficult to manage than hiring regular IT staff ("HR Outsourcing", 2005). To monitor and maintain the quality of outsourcing IT activities, researchers and practitioners have attempted to develop an evaluation system to manage IT performance (Yoon & Im, 2005). Nonetheless, given the feature of IT tasks' low programmability, a universally applicable evaluation system may be difficult to attain. In this regard, contingent IT compensation could be an alternative governing mechanism to cope with the uncertainty, and to ensure the performance of outsourced IT activities.

As noted throughout the paper, and specifically in the comparisons in Tables 7 and 8, risks do not operate in only one direction. One factor may create pressures for higher total wages, while another may encourage managers to consider a larger proportion of incentive pay or creative use of non-monetary rewards.

From the IT workers' side of the risk equation, senior IT workers with longer work experience, entry-level IT workers with accredited degrees (or certificates), or foreigner workers with work visas may have more bargaining power over their compensation plans because competence factors and work permits reduce managerial uncertainty related to performance, adverse selection, and incurred legal costs associated with the visa process.

Although practices of observable IT compensation planning focus largely on economic considerations, managers acknowledge that their companies do not do enough with IT-pay alignment and non-monetary rewards as strategic aspects. At the same time, they believe these are two important issues in need of more attention in IT compensation planning (Reich & Kaarst-Brown, 1999, 2003; Wang, 2007). Indeed, our understanding of how managers actually make IT compensation decisions is still somewhat clothed in secrecy because most of the compensation studies focus exclusively on observed compensation amounts, usually concrete economic or statistical data (Gerhart & Rynes, 2003). Our proposed framework contributes to exploring this mystery area, and perhaps opening debates in practice.

We encourage further dialogue and exploration by both practitioners and researchers in IT and HR. Although IT compensation research is relatively new, non-IT compensation studies are much older. While there is much we can learn from these non-IT studies, there is a strong need for further theoretical and speculative exploration of how to align IT compensation with business and IT worker goals.

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