

Does IT reputation matter? Role of Senior Executives

Jee-Hae Lim
School of Accounting and Finance
University of Waterloo
jh2lim@uwaterloo.ca

Theophanis C. Stratopoulos
School of Accounting and Finance
University of Waterloo
tstratop@uwaterloo.ca

Tony Wirjanto
School of Accounting and Finance
University of Waterloo
twirjanto@uwaterloo.ca

Abstract

The objective of this study is to identify factors that help firms develop an IT capability reputation, and to evaluate whether markets value a firm's ability to develop and sustain IT reputation. Building on the IT strategic leadership and corporate reputation literature, we argue that congruity in the background or hierarchical proximity between CEO and senior IT executive increases the likelihood that the firm will develop an IT reputation, and this congruity or proximity is more important for product differentiating companies. Approaching IT capability reputation from a market standpoint, we theorize that it matters to investors because it reduces information asymmetry. Investors interpret a firm's sustainable IT reputation as a signal of its superior past IT strategy and future IT investment prospects, thus raising the firm's market value. Predicted relationships are validated by results from over 1300 large public firms from the period 1997 to 2009.

1. Introduction

Academic research and anecdotal evidence indicate that corporate reputation, i.e., accumulation of public recognition of the quality of a firm's capabilities and output [38], is a strategic asset and a source of sustainable competitive advantage [15,20,33,40]. A firm's reputation tends to be issue specific, e.g., Apple is known for its product development capability, Toyota for its operations capability, Caesar for its business analytics, and Wal-Mart for its IT capability. However, the focus of corporate reputation literature has been on overall corporate rather than issue-specific reputation [48]. Given the ubiquitous role of IT in business processes and strategies of modern firms, the focus of this study is on an issue-specific corporate reputation, namely a firm's IT capability reputation.

Once a firm has achieved minimal standards in terms of the quality of its capabilities, executives continue working for the esteem of external judges such as trade associations, public interest groups, or the business press [45]. The proliferation of IT-

related awards (e.g., *Information Week 500*, *CIO 100*, *Computerworld 100 best places to work in IT*) seems to indicate that executives want their firm to be recognized for its IT capability. An underlying theme in several well-documented-in-the-media success stories, i.e., firms that have attracted public recognition for their IT-related capability, seems to be the synergistic relation between the firm's CEO and its senior IT executive. For example, R. McDonald, CEO of Procter & Gamble (P&G), has been working closely with the company's CIO, F. Passerini, in order to project an image of P&G as the most technologically enabled business in the world. While there is a growing academic interest in corporate and IT capability related reputation [30,45,48,49], the focus has been on individuals (e.g., CEOs or senior IT executive) rather than teams.

Collectively, prior research and anecdotal evidence point to an opportunity to contribute to both the literature and management practice regarding IT reputation by considering the joint effect of CEOs and IT executives on IT capability related reputation. This leads to our first two-pronged objective: First, examine the association between factors that may lead to a synergistic relation between the CEO and senior IT executive (e.g., similar and IT related background or hierarchical proximity) and IT capability reputation. Second, examine the effect of business strategy on IT capability reputation, as well as the effect of business strategy on the association between synergy related factors and IT capability reputation.

A cynic could argue that observing a synergistic relationship that aims to promote the firm's IT capability reputation is not surprising, because it is motivated by CEOs and senior IT executives' self-interest. If IT reputation is self serving and of no value to external stakeholders, however, then firms with good IT capability reputation should not be valued higher than firms with no IT reputation. This motivates our second objective, which is to evaluate whether market participants require more than just the occasional successful projection of an IT capability image. More specifically, we examine

whether the market values firms that can sustain their IT capability reputation more than firms that can develop but cannot sustain their reputation.

Building our panel data set based on 1,326 large public firms from the period 1997 to 2009, we arrived at four key findings. First, congruity of the IT-related background of CEO and senior IT executive or hierarchical proximity between these two executives contributes to their firm's ability to project successfully an image of superior IT capability to external stakeholders. Second, while a firm's business strategy is associated with IT reputation, results defy the theoretical argumentation. External stakeholders are more likely to assign superior IT capability status to firms with a cost leadership rather than product differentiation strategic focus.

Third, the effect of congruity of the IT-related background of CEO and senior IT executive or hierarchical proximity between these two executives on IT reputation is more important for firms with a product differentiation focus than for cost leaders. Fourth, shareholders value firms that can sustain their IT reputation more than firms that develop but cannot sustain their IT reputation. These results are robust to tests aimed at endogeneity concerns and they are not driven by the magnitude of the firm's reputation.

Our study contributes to the literature on corporate reputation and IT strategic leadership by introducing IT reputation as a channel through which senior executives may affect market valuation. On the management side, our study provides evidence regarding attributes of senior executives that lead to development and sustainability of a firm's IT reputation. The study's key message is this: firms that want to develop and sustain their IT capability reputation should encourage congruity or proximity between their CEOs and IT executives.

2. Theoretical Foundation & Hypotheses

Since the late eighties several magazines and newspapers have started generating IT-related reputation rankings (e.g., *Information Week 500*, *Computerworld Premier 100*, *CIO 100*, *Computerworld 100 best places to work in IT*). Firms leverage such forms of communication, i.e., voluntary participation in magazine-sponsored IT reputation competitions, to project an image of superior IT capability to external stakeholders. This proliferation of IT reputation rankings indicates that IT reputation management has become a strategic priority. Responsibility for managing a firm's reputation tends to be issue specific and is spread among a wide range of executives, e.g., the senior IT executive is responsible for managing the firm's IT

capability reputation; however, the ultimate responsibility rests with the firm's CEO [20].

A CEO's attitude and vision for IT influences the firm's strategic orientation [19], and other executives are likely to be influenced by the CEO's involvement with IT [25]. When CEOs establish IT priorities, firms are more likely to develop strong relationships between business and IT management and achieve IT-enabled sustainable competitive advantage [41].

As importance of IT in firms increases, the optimum outcome is to have a CEO with IT competence who can identify and steer use of IS in the right direction [7]; however, IT-related expertise is far from ubiquitous among CEOs [42]. Many CEOs possess limited IT knowledge or expertise, which means that they are unable to evaluate opportunities associated with IT investments or IT capabilities [34]. As a result the CEO may not feel confident to assume leadership roles on IT initiatives [8], and the CEO - with or without the support of the firm's senior IT executive - may not be able to project an image of superior IT capability to external stakeholders (i.e., help the firm develop an IT capability reputation).

Senior IT executives play a central role in visioning, guiding, and implementing their firm's IT management practices [44], and they are responsible for the firm's ability to exploit an IT-enabled competitive advantage [4,26]. Two of their primary roles, liaison and spokesperson [24], are linked to their firm's ability to develop an IT capability reputation. IT executives help their firm project an image of superior IT capability by building a web of relationships with internal and external stakeholders in order to promote IT's value and contribution [12,21]. This ability to build internal and external relationships is emerging as a significant role expectation of IT executives [44].

However, not all of IT executives are endowed with high hierarchical position within their firm [5,36], as a result, it may be more difficult for senior IT executives that lack internal legitimacy, i.e., low-rank IT executives, to convince external stakeholders about the quality of their firm's IT capability.

CEOs and senior IT executives with common and IT-related formal education, job-related background, or industry experience are likely to have an overlapping knowledge base [14]. This is likely to lead to the development of a shared understanding on how IT-enabled initiatives can improve the firm's competitive position [35] and ability to project an image of superior IT capability to external stakeholders. Similarly, higher structural power of senior IT executives indicates a hierarchical proximity between the CEO and senior IT executives,

and this is likely to affect the development of a shared understanding between the two executives regarding the role of IT in the organization.

The role of IT and its expected impact on firm performance are intertwined with the firm's business strategy, such as cost leadership and product differentiation. Empirical evidence indicates that firms that leverage IT for sales growth are likely to be more profitable than firms that leverage IT for operating cost reduction [32].

Given that external stakeholders tend to associate performance with capability [45], we argue that firms that pursue product differentiation will be more likely to project successfully an image of superior IT capability than cost leaders. Strategies are more successful if there is an alignment between the critical requirements of a firm's strategy and the experience of its executives [22]. Therefore mutual understanding between the firm's CEO and its senior IT executive is more important for the firm's ability to project an image of superior IT capability to external stakeholders in firms that focus on product differentiation, than in cost leaders.

From a market standpoint, a firm's ability to project successfully an image of superior IT capability (i.e., develop an IT capability reputation) is valuable because it reduces the uncertainty that market participants face when they evaluate firms as potential investments [20,23,38]. IT projects are inherently risky [17], expected benefits are ambiguous [28], and perceptions of senior executives regarding IT oscillate between euphoria and dismay [46]. Thus, according to signaling theory, we should expect that market participants would assign a premium to firms that can develop an IT capability reputation.

However, given recent evidence indicating that IT reputation building is driven by the personal gains of CEO and senior IT executives, we speculate that market participants might make the distinction between firms that develop and sustain their IT capability reputation versus firms that cannot sustain their reputation. This is supported by the following evidence.

First, a firm's ability to sustain its IT capability reputation is a process that is not easily replicated by competitors because it is path dependent [29]. Second, firms that want to develop and sustain their reputation need to foster a cycle of reciprocity with their senior IT executives, and there is no short cut to replicating this process [30]. Third, firms that sustain a superior IT capability reputation are more likely to recover faster from losses during a recession [13].

Based on the above we introduce the following hypotheses:

H1: Congruity of IT-related expert power of CEOs and senior IT executives increases the likelihood that their firm will receive external recognition for its IT capability.

H2 Hierarchical proximity between senior IT executives and CEOs possessing IT-related expert power increases the likelihood that the firm will receive external recognition for its IT capability.

H3: Firms that implement product differentiation strategy are more likely to receive external recognition for their IT capability than firms that implement cost leadership strategy.

H4 The impact of congruity or proximity between CEO and senior IT executive on the likelihood that the firm will receive external recognition for its IT capability is higher for product differentiators than cost leaders.

H5: Firms that sustain an IT capability reputation are more likely to achieve higher market valuation than their competitors that develop but cannot sustain their IT capability reputation.

3. Methodology

The data set for testing the suggested hypotheses was developed by integrating data from three different sources. First, we used all firms listed from 1997 to 2009 in *Information Week 500 (IW500)* as proxy for a firm's ability to project successfully an image of superior IT capability to external stakeholders. Second, we used Securities and Exchange Commission (SEC) filings, *Lexis-Nexis*, and several online sources to manually collect and verify demographic information of CEOs and senior IT executives. Third, we used *COMPUSTAT* for financial data. Our panel dataset covers 1,326 unique firms and their CEOs and IT executives over a 13-year period from 1997 to 2009. For the testing of our hypotheses, we developed the following variables:

IT capability image: IT image is described as an internal picture of superior IT capability projected to an external audience, and firms actively try to project a certain [IT capability] image and help shape the perception that external observers have of the firm [6,48]. We treat the annual *IW500* list as a proxy for firms that have received external recognition for their superior IT capability ($RITC_{it}=1$) for the following reasons: 1) *IW500* is one of oldest IT reputation-related rankings. 2) *IW500* has been widely used in IS research [9,27,29,43]. 3) Firms choose to participate in the *IW500* ranking process. *InformationWeek* invites firms to fill out a

questionnaire, which details their IT strategies, plans, and practices, and an essay, which describes the organization's most innovative IT initiative within the last 12 months. Based on this information, an editorial panel selects and ranks firms that will be included in the annual *IW500* list.

IT capability image (*RITC*) is the dependent variable used for the testing of H1-H4.

Congruity and proximity for CEOs & senior IT executives: To examine the congruity and hierarchical proximity we need to identify IT-related expert power as well as structural power for CEO and senior IT executives. We collected this information by searching proxy statements, such as Form 10-K and DEF-14A from the SEC. In order to verify and enhance the completeness and accuracy of our data, we also conducted a subsequent manual review of each CEO and senior IT executive's biographical information via *Lexis-Nexis* and fifteen online information sources.

In assessing congruity (*CON*), we followed Lim et al. [30] and specified IT-related expert power for CEOs and IT executives based on their IT-related academic education (*Acd=1*), IT-related prior employment (*ITjob=1*), and IT industry-related experience (*ITfirm=1*). These attributes are likely to complement each other over time. Therefore, if the CEO and senior IT executive have one or more of these attributes (*Acd=1* or *ITjob=1* or *ITfirm=1*), we use *CEO_IT_{it}=1* and *SITE_IT_{it}=1* respectively, to indicate that the CEO and senior IT executive have IT-related expert power. Based on the above, we define congruity (*CON*) as an indicator variable equal to one, if both CEO and senior IT executives have IT expert power (*CEO_IT = 1* and *SITE_IT = 1*), and zero otherwise.

In assessing hierarchical proximity (*PRX*), we examine the interaction of CEOs' IT-related expert power with the structural power of senior IT executives. Consistent with Lim et al. [30], we specify the structural power of senior IT executives according to their official title as well as the number of titles they hold, and we use the following binary classification: *SITE_{it}=1* if the IT executive has either just the formal title of CIO or the title of CIO plus additional official title(s), else *SITE_{it}=0*. Based on this, we define hierarchical proximity (*PRX*) as an indicator variable that takes the value of one if the CEO has IT expert power and senior IT executive has structural power (*CEO_IT = 1* and *SITE = 1*), and zero otherwise.

Business strategy: Consistent with Banker et al. [5], we use DuPont analysis in order to break down a firm's ROA and create appropriate proxies for the firm's primary strategic focus in either cost

leadership (*CL*) or product differentiation (*PD*). Given that ROA can be decomposed into asset turnover and profit margin [16], we consider relatively higher levels of asset turnover as a proxy for firms with *CL* strategic focus, and relatively higher levels of operating or gross profit margin as a proxy for firms with *PD* strategic focus.

Congruity of the IT-related background of CEO and senior IT executive (*CON*), hierarchical proximity between these two executives (*PRX*), the business strategy proxies (*PD* or *CL*), as well as the interaction between congruity/proximity and business strategy are the major explanatory variables used for the testing of H1-H4.

Market valuation: Given that typical IT benefits are intangible, Tobin's *q* (*TQ_{it}*) has been used as a performance proxy for examining the effect of IT investment [10,11,37], IT synergies [47], and superior IT capability [31]. *TQ_{it}* captures and reflects co-presence of such intangibles as good management skills [1] and superior IT capability [31]. Given the intangible nature of IT reputation-related benefits, Tobin's *q* is the most suitable measure of market valuation. Market valuation (*TQ*) is the dependent variable used for the testing of H5.

Sustainable IT capability reputation: Reputation is an asset whose value is related to its level of accumulation [18,33]. Given that [IT] reputation is likely to be developed over time and from multiple images [39,48], we use the evolution of a firm's recognition in *IW500* over four-year rolling windows (e.g., 1997-00, 1998-01, ... , 2006-09) to classify firms in terms of their IT capability reputation. We classify a firm as one that has sustained its IT reputation (*SUS_{it}*) if it has been recognized in *IW500* all years within the four-year rolling window. We classify a firm as one that has achieved but not sustained its IT reputation (*UNS_{it}*) if the firm has appeared at least once but less than four times in *IW500* within the four-year rolling window.

The choice of four years is based on prior research, which has shown that firms that have been able to project such an image of superior IT capability to the business press over four consecutive years are more likely to sustain this image in the future due to path dependence [29] and due to a culture of reciprocity between the firm and its IT executive [30].

Recall that in H5, we argue that firms that sustain (*SUS*) their IT reputation are valued more than firms that cannot sustain their IT capability reputation (*UNS*). Hence, contrasting firms that can build and sustain their IT reputation versus firms that build but cannot sustain their IT reputation (*SUS*vs*UNS*) is the major explanatory variable used for the testing of H5.

Econometric model: To examine the effect of senior executives and business strategy on IT capability image (H1-H4), we propose the estimation of an indicator function similar to the one adopted in Lim et al. [29,30], which uses the random-effect (RE) approach proposed by Wooldridge [50]. More specifically, we estimate (1)

$$RITC_{it} = \beta_0 + \beta_1 * RITC_{it-1} + \beta_2 * (CON_{it-1} \text{ or } PRX_{it-1}) + \beta_3 * PD_{it-1} + \beta_4 * CL_{it-1} + \beta_5 * (CON_{it-1} \text{ or } PRX_{it-1}) * PD_{it-1} + \beta_6 * CON_{it-1} \text{ (or } PRX_{it-1}) * CL_{it-1} + \beta_7 * SIZE_{it-1} + \beta_8 * ROA_{it-1} + \beta_9 * MV_{it-1} + \text{time- and fixed-effect} \quad (1)$$

where, $RITC_{it}=1$ indicates firms that have been able to project an image of superior IT capability to external stakeholders, CON is the measure of congruity between the CEO and senior IT executives regarding their similarity in IT-related expert power, PRX is the measure of proximity in structural power, PD and CL reflect product differentiation and cost leadership, respectively, and $SIZE$ (log of total assets), ROA (return on assets), and MV (market to book value) are the control variables.

Please notice that given the specification of the variables CON and PRX we need to estimate (1) twice. The first time we estimate (1) using CON and the second time using PRX .

More specifically, we estimate

$$RITC_{it} = \beta_0 + \beta_1 * RITC_{it-1} + \beta_2 * CON_{it-1} + \beta_3 * PD_{it-1} + \beta_4 * CL_{it-1} + \beta_5 * CON_{it-1} * PD_{it-1} + \beta_6 * CON_{it-1} * CL_{it-1} + \dots \quad (1a)$$

And

$$RITC_{it} = \beta_0 + \beta_1 * RITC_{it-1} + \beta_2 * PRX_{it-1} + \beta_3 * PD_{it-1} + \beta_4 * CL_{it-1} + \beta_5 * PRX_{it-1} * PD_{it-1} + \beta_6 * PRX_{it-1} * CL_{it-1} + \dots \quad (1b)$$

To examine the impact of sustainable IT capability reputation on firm performance (H5), we use the following two-stage approach. First, we estimate eq. (2).

$$SUSvUNS_{it} = \beta_0 + \beta_1 * SUSvUNS_{it-1} + \beta_2 * (CON_{it-1} \text{ or } PRX_{it-1}) + \beta_3 * PD_{it-1} + \beta_4 * CL_{it-1} + \beta_5 * (CON_{it-1} \text{ or } PRX_{it-1}) * PD_{it-1} + \beta_6 * (CON_{it-1} \text{ or } PRX_{it-1}) * CL_{it-1} + \beta_7 * SIZE_{it-1} + \beta_8 * ROA_{it-1} + \beta_9 * MV_{it-1} + \text{time- and fixed-effect} \quad (2)$$

Please notice that given the specification of the variables CON and PRX we need to estimate (2) twice.

With the exception of $SUSvUNS_{it}$, which contrasts firms that can build and sustain their IT

reputation (SUS_{it}) versus firms that build but cannot sustain their IT reputation (UNS_{it}), all other variables are the same as in eq. (1). We use the predicted values from eq. (2), i.e., $SUSvsUNS_hat_{it}$, to estimate eq. (3):

$$TQ_{it} = \alpha_0 + \gamma_1 TQ_{it-1} + \gamma_2 R\&D_{it-1} + \gamma_3 AD_{it-1} + \gamma_4 CAP_{it-1} + \gamma_5 SUSvUNS_hat_{it-1} + \delta_1 TQ_{it-1} * R\&D_{it-1} + \delta_2 TQ_{it-1} * AD_{it-1} + \delta_3 TQ_{it-1} * CAP_{it-1} + \delta_4 TQ_{it-1} * SUSvUNS_hat_{it-1} + \text{time- and fixed-effect} \quad (3)$$

where TQ_{it} represents Tobin's q, and $R\&D$, AD , and CAP capture research and development, advertising, and capital expenditures, respectively.

4. Results

Descriptive statistics: The percentage of CEOs with IT-related expert power (CEO_IT) is approximately 23% and in an upward trend among firms that have been able to project successfully an image of superior IT capability ($RITC$) versus approximately 17% and with a slightly negative trend among non- $RITC$ firms. In terms of the IT-related expert power of their senior IT executives ($SITE_IT$), we observe a positive trend for both firms. However, the percentage of senior IT executives with $SITE_IT$ is higher among $RITC$ firms (approximately 55%) compared with non- $RITC$ firms (approximately 34%).

A similar pattern emerges when we contrast them in terms of the percentage of their senior IT executives with higher structural power ($SITE$). Overall, there is an increase in the percentage of IT executives with higher structural power; however, the percentage among $RITC$ firms is approximately 70%, versus 34% for non- $RITC$ firms. These results translate into higher levels of congruity (CON) and proximity (PRX) among $RITC$ firms compared to non- $RITC$ firms. The average level of congruity among $RITC$ firms is approximately 15%, versus 8% for non- $RITC$ firms. Hierarchical proximity between the CEO and senior IT executives of $RITC$ firms is approximately 17%, versus approximately 7% for non- $RITC$ firms.

Our descriptive statistics indicate that in recent years the median value of Tobin's q (TQ) for $RITC$ firms is slightly higher than that for non- $RITC$ firms. While the median value of TQ ranges around 1.0 for both firms, the standard deviation is relatively higher among non- $RITC$ firms. In terms of spending on research and development ($R\&D$) and advertising (AD), as well as in terms of capital expenditures (CAP), both $RITC$ and non- $RITC$ firms are at comparable levels.

While these results provide some tentative support for our arguments, no conclusions can be reached based on simple frequency distributions and

descriptive statistics. Econometric analysis based on the estimation of equations (1), (2), and (3) will allow us to evaluate the chain effect of *CON*, *PRX*, and business strategy on IT reputation and business value while controlling for various factors and the potential endogeneity bias.

Results for H1: For the testing of the effect of congruity in IT expert power (*CON*) between the CEO and senior IT executive on the firm's ability to project successfully an image of superior IT capability (*RITC*) we estimated (1a). The estimated value for β_2 is positive (0.141) and statistically significant (p-value < 0.01), supporting H1.

Our finding indicates that if there is congruity of IT expert power between the CEO and senior IT executives, the probability that a firm will be recognized for its IT capability is 14.1% higher compared to firms that do not enjoy this kind of congruity.

Results for H2: For the testing of H2 we used (1b). The estimated effect of hierarchical proximity between the CEO and senior IT executive (*PRX*) on *RITC* is positive (0.122) and statistically significant (p-value < 0.01). This result supports H2 in that hierarchical proximity between the CEO and senior IT executive increases the probability that a firm will receive external recognition for its IT capability by 12.2%.

Results for H3: For the testing of H3, we estimated both (1a) and (1b). The results of the asymptotic *t*-test for the testing of $H_0: \beta_3 = \beta_4$ lead to the rejection of H_0 . The p-value of the *t*-test is 0.039 in the (1a) specification of the model and 0.047 in the (1b) specification of the model. This indicates that the effect of focus on cost leadership (*CL*) on *RITC* is higher than the effect of focus on product differentiation (*PD*) on *RITC*.

Rejection of H3 ($\beta_3 \neq \beta_4$) points to a possible inconsistency between empirical evidence and perception of external stakeholders, i.e., the business press. It seems that the business press does not value a firm's ability to leverage IT for product differentiation as much as it values a firm's ability to leverage IT for containing cost.

We speculate that external stakeholders may better process and place more value on benefits associated with cost savings, which tend to be more tangible and easier to quantify, compared with benefits leading to product differentiation, which tend to be more abstract and less quantifiable.

Results for H4: For the testing of H4, we estimated both (1a) and (1b). Econometric results support H4, which asserts that the interactions of business strategy and congruity or proximity between CEO and senior IT executive on the likelihood that

the firm will receive external recognition for its IT capability is higher for product differentiators than cost leaders. The p-value of the asymptotic *t*-test for the equality of β_5 and β_6 is 0.028 in the (1a) specification and 0.044 in the (1b) specification of the model. The result suggests that congruity and hierarchical proximity between the CEO and senior IT executives seems to matter more for product differentiators than for cost leaders.

Results for H5: For the testing of H5, we first contrast firms that sustain an IT capability reputation (*SUS*) versus firms that develop, but cannot sustain, their IT reputation (*UNS*). Results based on estimation of eq. (2) using *CON* or *PRX* indicate that our propositions hold when we focus on a firm's ability to sustain its IT reputation (*SUS* vs. *UNS*) rather than its IT image (*RITC*). In other words, congruity (*CON*) and proximity (*PRX*) are positively associated with the firm's ability to sustain its IT reputation (*SUS*), cost leadership strategy (*CL*) matters more than product differentiation strategy (*PD*) in *SUS* firms, and the effect of *CON* or *PRX* on a firm's ability to sustain its IT reputation (*SUS*) seems to matter more for *PD* firms than for *CL* firms. In short, the results remain the same.

Based on *CON* speciation of eq. (2), we generate predicted values (*SUSvsUNS_hat*) and use them as independent variables in the estimation of eq. (3). Thus, we channel the effect of *CON* between CEO and IT executive and business strategy focus on market valuation (*TQ*) via *SUSvsUNS_hat*. The coefficient of *SUSvsUNS_hat* is positive ($\gamma_5=0.132$) and statistically significant (p-value < 0.05). This means that firms with sustainable IT capability reputation have Tobin's q that is 0.132 higher than firms that can develop, but cannot sustain, their IT reputation.

We achieve similar results when we used the *PRX* speciation of eq. (2) to generate predicted values (*SUSvsUNS_hat*) and use them as independent variables in the estimation of eq. (3). The coefficient of *SUSvsUNS_hat* is positive ($\gamma_5 = 0.119$) and statistically significant (p-value < 0.05). Overall, results support H5.

Table 1 summarizes the main results of this study.

	Congruity (<i>CON</i>) version	Proximity (<i>PRX</i>) version
H1	Supported	
H2		Supported
H3	Not Supported	Not Supported
H4	Supported	Supported
H5	Supported	Supported

Table 1 – Summary of Results

Testing for endogeneity bias (reverse causality):

A priori, it is possible that firms that are interested in developing and sustaining their IT capability reputation will tend to hire CEOs and IT executives with IT-related expert power in order to achieve congruity in IT-related expert power, or endow their IT executives with high structural power to increase hierarchical proximity between the CEO and senior IT executives.

To anticipate this potential reverse causality, all covariates in eq. (1), (2), and (3) were entered with one period lag. Therefore, they are predetermined at time t . In addition, and to further ameliorate any potential endogeneity bias, we adopted a two-stage procedure in testing H5 in which the predicted value from eq. (2) entered the second-stage regression as an additional covariate.

To evaluate the endogeneity issue in our model, we re-ran the restricted version of eq. (1) by using dynamic panel-data system Generalized Method of Moments (system-GMM) estimator [2,3]. Results confirmed the validity of the System-GMM estimated results. Therefore, we conclude that our main results are not likely to be significantly affected by potential endogeneity biases.

Additional tests - Excluding top 100 ranked firms: One of the main premises of our study is that the market values a firm's ability to sustain its IT capability reputation. In our study, magnitude (*IW500* ranking) of IT capability reputation is not important.¹ To ensure that our results are not driven by top *IW500* ranked firms, we replicated our analysis after excluding the top 100 *IW500* ranked firms from our analysis. Our results remain the same.

5. Discussion and Concluding Remarks

The two-pronged objective of this study was to identify senior executive-related factors that contribute to a firm's IT capability reputation and evaluate whether markets value a firm's ability to sustain its IT reputation. Results based on 1,326 large-scale public firms from a wide spectrum of industries and covering the period from 1997 to 2009 validate the two major predictions of this study.

First, congruity or proximity between the CEO and senior IT executives is positively associated with the firm's IT capability reputation, and this association is stronger for firms that implement a product differentiation strategy. Second, market participants value firms that develop and sustain their IT capability reputation more than they do firms that do not have such an asset.

The study contributes to the IT strategic leadership and corporate reputation literature by introducing IT capability reputation as a channel through which CEOs and senior IT executives affect market valuation. Recognizing that a CEO and senior IT executive are united by a shared responsibility and personal interest in promoting their firm's IT capability reputation, we identified management-related factors, and their interplay with business strategy, that affect the success of these executives in the pursuit of their common goal. Our empirical findings show that congruity in IT-related expert power and hierarchical proximity increases the probability that a firm will project successfully an image of superior IT capability and sustain its reputation.

Our findings complement existing IT strategic leadership literature [5] by establishing that the effect of congruity and proximity on IT reputation is contingent on the firm's business strategy. Our business strategy-related findings point to a potentially paradoxical relation between strategy and IT capability reputation. Contrary to our expectations, external stakeholders seem to associate a focus on cost leadership rather than on product differentiation with superior IT capability.

We relied on signaling theory to articulate the possible mechanism through which the impact of congruity and proximity on IT reputation affects investors' decisions regarding firm valuation. Prior research has argued that reputation is a strategic asset with a high degree of causal ambiguity, and thus is a source of sustainable competitive advantage [15,33,40]. Our findings complement this line of research by showing that the market values firms that can sustain their IT reputation more than firms that develop but cannot sustain their IT reputation.

The findings of this study underline several practical implications for the management of a firm's reputation. Our findings show that sustainable IT reputation is a strategic asset that can contribute to a firm's market valuation. Therefore, firms should focus on long-term rather than short-term strategies related to the firm's IT capability reputation.

A firm can increase its likelihood of developing and sustaining an IT capability reputation by taking actions that can promote congruity and proximity between its CEO and senior IT executives. A firm can achieve this congruity and proximity by increasing the shared IT-related knowledge of its senior executives and by elevating the position of the senior IT executives in the firm's hierarchy. Finally, increasing shared IT knowledge or elevating the internal legitimacy of senior IT executives is more important for firms that implement a product

¹ *IW500* ranking was more important in prior studies [e.g., 9,43].

differentiation strategy than for firms that implement a cost leadership strategy.

The implications for market participants are also important. The message of this study is that not only does the signaling mechanism work, but also it is more refined than one could have guessed. The market shows sophistication in its evaluation of IT reputation by making a distinction in terms of sustainability of IT capability reputation. Last but not least, the results point to a potentially paradoxical behavior of external stakeholders. In spite of theoretical arguments and empirical evidence indicating that IT initiatives associated with product differentiation tend to be more profitable, the editorial panel responsible for the selection of *IW500* firms seems to value more cost-focused initiatives.

Like all studies, there are limitations that must be acknowledged, as they offer opportunities for future research. First, congruity of IT-related expert power as well hierarchical proximity between CEOs and IT executives are multifaceted constructs. In this study we have empirically explored one possible manifestation of the former through the IT-related education and experience of senior executives and the latter through the structural power of senior IT executives. We hope that our strong results will inspire other researchers to continue exploring creative methods of leveraging archival data to introduce other manifestations of these constructs. This would offer an opportunity to reproduce our results, the crux of science, and explore other nuanced implications of these constructs on IT reputation building.

Second, while DuPont analysis offers a way of linking financial ratios to business strategy, these proxies are relatively crude. They capture the effect of a firm's chosen strategy rather than the intent of senior executives to pursue a certain business strategy. Furthermore, they are not explicitly related to the firm's intent to leverage IT for cost leadership or product differentiation. Future researchers may want to develop specific instruments that they can use to survey *IW500* firms in order to develop better proxies for the firm's business strategy focus.

In conclusion, our theory and empirical evidence are consistent with anecdotal evidence from firms that have attracted public recognition for their IT initiatives, such as P&G, Ceasar's, and Starbucks. In these firms, similarly minded CEOs and IT executives have been able not only to develop an IT capability but also to project successfully this image of superior IT capability to external stakeholders. While cynics may see this purely as the self-serving pursuit of CEOs and IT executives, the market makes a clear distinction and allocates a higher premium to

firms that can sustain their IT capability reputation. Therefore, adoption of a long-term approach to IT reputation capability constitutes a win-win situation for both senior executives and shareholders.

Acknowledgments

The authors thank the participants, discussants, and anonymous reviewers at the 47th *Hawaii International Conference on System Science (HICSS 2014)*, 2013 American Accounting Association, the 2013 *Pacific Asia Conference on Information Systems (PACIS)*, the 2013 Canadian Academic Accounting Association (CAAA), and the 2013 AIS Mid-Year meeting for helpful comments and suggestions. We are also grateful to the participants in workshops at University of Waterloo. We acknowledge the financial support provided by the Robert Harding Humanities and Social Sciences Endowment Fund and the University of Waterloo.

6. References

1. Adams, R.B., Hermalin, B.E., and Weisbach, M.S. The Role of Boards of Directors in Corporate Governance: A Conceptual Framework and Survey. *Journal of Economic Literature* 48, 1 (2010), 58–107.
2. Arellano, M. and Bond, S. *Dynamic panel data estimation using DPD98 for GAUSS: A guide for users*. Institute for Fiscal Studies, London, 1998.
3. Arellano, M. and Bover, O. Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics* 68, 1 (1995), 29–51.
4. Armstrong, C.P. and Sambamurthy, V. Information Technology Assimilation in Firms: The Influence of Senior Leadership and IT Infrastructures. *Information Systems Research* 10, 4 (1999), 304–327.
5. Banker, R.D., Hu, N., Pavlou, P.A., and Luftman, J. CIO Reporting Structure, Strategic Positioning, and Firm Performance: To Whom Should the CIO Report? *MIS Quarterly* 35, 2 (2011), 487–504.
6. Barnett, M.L., Jermier, J.M., and Lafferty, B.A. Corporate Reputation: The Definitional Landscape. *Corporate Reputation Review* 9, 1 (2006), 26–38.
7. Bassellier, G., Benbasat, I., and Reich, B.H. The influence of business managers' IT competence on championing IT. *Information Systems Research* 14, 4 (2003), 317–336.
8. Bassellier, G., Reich, B.H., and Benbasat, I. Information technology competence of business managers: A definition and research model. *Journal of Management Information Systems* 17, 4 (2001), 159–182.
9. Bharadwaj, A. A resource-based perspective on information technology capability and firm performance: an empirical investigation. *MIS Quarterly* 24, 1 (2000), 169–196.
10. Bharadwaj, A.S., Bharadwaj, S.G., and Konsynski, B.R. Information Technology Effects on Firm

- Performance as Measured by Tobin's q. *Management Science* 45, 7 (1999), 1008–1024.
11. Chari, M.D.R., Devaraj, S., and David, P. Research Note—The Impact of Information Technology Investments and Diversification Strategies on Firm Performance. *Management Science* 54, 1 (2008), 224–234.
12. Chatterjee, D., Richardson, V.J., and Zmud, R.W. Examining the Shareholder Wealth Effects of Announcements of Newly Created CIO Positions. *MIS Quarterly* 25, 1 (2001), 43–70.
13. Chen, C., Lim, J.-H., and Stratopoulos, T.C. IT Capability and a Firm's Ability to Recover from Losses: Evidence from the Economic Downturn of the Early 2000s. *Journal of Information Systems* 25, 2 (2011), 117–144.
14. Cohen, W.M. and Levinthal, D.A. Absorptive Capacity: A New Perspective On Learning And Inno. *Administrative Science Quarterly* 35, 1 (1990), 128.
15. Deephouse, D.L. Media Reputation as a Strategic Resource: An Integration of Mass Communication and Resource-Based Theories. *Journal of Management* 26, 6 (2000), 1091–1112.
16. Dehning, B. and Stratopoulos, T.C. DuPont analysis of an IT-enabled competitive advantage. *International Journal of Accounting Information Systems* 3, 3 (2002), 165–176.
17. Dewan, S., Shi, C., and Gurbaxani, V. Investigating the Risk–Return Relationship of Information Technology Investment: Firm-Level Empirical Analysis. *Management Science* 53, 12 (2007), 1829–1842.
18. Dierickx, I. and Cool, K. Asset stock accumulation and sustainability of competitive advantage. *Management Science* 35, 12 (1989), 1504–1511.
19. Earl, M.J. and Feeney, D.F. Is Your CIO Adding Value? *Sloan Management Review* 35, 3 (1994), 11–20.
20. EIU. *Reputation: Risk of risks*. Economist Intelligence Unit, 2005.
21. Feeny, D.F. and Willcocks, L.P. Core IS capabilities for exploiting information technology. *Sloan Management Review* 39, 3 (1998), 9–21.
22. Finkelstein, S., Hambrick, D.C., and Cannella, A.A. *Strategic leadership: theory and research on executives, top management teams, and boards*. Oxford University Press US, 2009.
23. Fombrun, C. and Shanley, M. What's in a name? Reputation building and corporate strategy. *Academy of Management Journal* 33, 2 (1990), 233–258.
24. Grover, V., Jeong, S.-R., Kettinger, W.J., and Lee, C.C. The chief information officer: a study of managerial roles. *Journal of Management Information Systems* 10, 2 (1993), 107–130.
25. Jarvenpaa, S.L. and Ives, B. Executive Involvement and Participation in the Management of Information Technology. *MIS Quarterly* 15, 2 (1991), 205–227.
26. Kearns, G.S. and Lederer, A.L. A Resource-Based View of Strategic IT Alignment: How Knowledge Sharing Creates Competitive Advantage. *Decision Sciences* 34, 1 (2003), 1–29.
27. Kobelsky, K.W., Richardson, V.J., Smith, R.E., and Zmud, R.W. Determinants and Consequences of Firm Information Technology Budgets. *The Accounting Review* 83, 4 (2008), 957–995.
28. Kohli, R. and Grover, V. Business value of IT: An essay on expanding research directions to keep up with the times. *Journal of the Association for Information Systems* 9, 1 (2008), 23–39.
29. Lim, J.-H., Stratopoulos, T.C., and Wirjanto, T. Path Dependence of Dynamic Information Technology Capability: An Empirical Investigation. *Journal of Management Information Systems* 28, 3 (2011), 45–84.
30. Lim, J.-H., Stratopoulos, T.C., and Wirjanto, T.S. Sustainability of a Firm's Reputation for IT Capability: The Role of Senior IT Executives. *Journal of Management Information Systems* 30, 1 (2013), 59–98.
31. Masli, A., Richardson, V.J., Sanchez, J.M., and Smith, R.E. Returns to IT excellence: Evidence from financial performance around information technology excellence awards. *International Journal of Accounting Information Systems* 12, 3 (2011), 189–205.
32. Mithas, S., Tafti, A., Bardhan, I., and Goh, J.M. Information Technology and Firm Profitability: Mechanisms and Empirical Evidence. *MIS Quarterly* 36, 1 (2012), 205–224.
33. Pfarrer, M.D., Pollock, T.G., and Rindova, V.P. A Tale of Two Assets: The Effects of Firm Reputation and Celebrity on Earnings Surprises and Investors' Reactions. *Academy of Management Journal* 53, 5 (2010), 1131–1152.
34. Preston, D.S. and Karahanna, E. How to Develop a Shared Vision: The Key to IS Strategic Alignment. *MIS Quarterly Executive* 8, 1 (2009), 1–8.
35. Preston, D.S. and Karahanna, E. Antecedents of IS Strategic Alignment: A Nomological Network. *Information Systems Research* 20, 2 (2009), 159–179.
36. Raghunathan, B. and Raghunathan, T.S. Relationship of the rank of information systems executive to the organizational role and planning dimensions of information systems. *Journal of Management Information Systems* 6, 1 (1989), 111–125.
37. Ravichandran, T., Liu, Y., Han, S., and Hasan, I. Diversification and Firm Performance: Exploring the Moderating Effects of Information Technology Spending. *Journal of Management Information Systems* 25, 4 (2009), 205–240.
38. Rindova, V.P., Williamson, I.O., Petkova, A.P., and Sever, J.M. Being Good or Being Known: An Empirical Examination of the Dimensions, Antecedents, and Consequences of Organizational Reputation. *The Academy of Management Journal* 48, 6 (2005), 1033–1049.
39. Rindova, V.P. Part VII: Managing Reputation: Pursuing Everyday Excellence: The image cascade and the formation of corporate reputations. *Corporate Reputation Review* 1, 2 (1997), 188–194.
40. Roberts, P.W. and Dowling, G.R. Corporate reputation and sustained superior financial

- performance. *Strategic Management Journal* 23, 12 (2002), 1077–1093.
41. Ross, J.W., Beath, C.M., and Goodhue, D.L. Develop Long-Term Competitiveness Through IT Assets. *Sloan Management Review* 38, (1996), 31–42.
 42. Rout, L. How Corporate Leaders Can Better Manage Information Technology - Editor's Note. *The Wall Street Journal*, 2011.
<http://online.wsj.com/article/SB10001424052748704529204576257093596421046.html>.
 43. Santhanam, R. and Hartono, E. Issues in linking information technology capability to firm performance. *MIS Quarterly* 27, 1 (2003), 125–153.
 44. Smaltz, D., Sambamurthy, V., and Agarwal, R. The antecedents of CIO role effectiveness in Organizations: An empirical study in the healthcare sector. *IEEE Transactions on Engineering Management* 53, 2 (2006), 207–222.
 45. Staw, B.M. and Epstein, L.D. What bandwagons bring: Effects of popular management techniques on corporate performance, reputation, and CEO pay. *Administrative Science Quarterly*, (2000), 523–556.
 46. Stratopoulos, T.C. and Lim, J.-H. IT innovation persistence: an oxymoron? *Communications of the ACM* 53, 5 (2010), 142–146.
 47. Tanriverdi, H. Performance Effects of Information Technology Synergies in Multibusiness Firms. *Management Information Systems Quarterly* 30, 1 (2006), 57–77.
 48. Walker, K. A Systematic Review of the Corporate Reputation Literature: Definition, Measurement, and Theory. *Corporate Reputation Review* 12, 4 (2010), 357–387.
 49. Wang, P. Chasing the Hottest IT: Effects of Information Technology Fashion on Organizations. *MIS Quarterly* 34, 1 (2010), 63–85.
 50. Wooldridge, J.M. Simple solutions to the initial conditions problem in dynamic, nonlinear panel data models with unobserved heterogeneity. *Journal of Applied Econometrics* 20, 1 (2005), 39–54.