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# **Examining Glass Cliff in the IT Industry**

*Short Paper*

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## **Abstract**

*Gender studies in information systems (IS) have examined the barriers women face - as they make their career choice to join the information technology (IT) industry, as they advance through the ranks, and before they finally decide to quit. This study is an investigation of the firms in the IT sector to explore the presence of a phenomenon, known as the "glass cliff". According to this phenomenon, firms are more likely to appoint women to top positions when they are facing a financial crisis. To facilitate the study, we analyze publicly traded IT firms from 2009 to 2019 and find evidence for the presence of glass cliff. Additionally, we find that the presence of a female board member negatively moderates the relationship between the firm's previous year's crisis status and female appointment in the subsequent year.*

**Keywords:** Glass cliff, crisis, female CEO

## **Introduction**

In 2013 when Marissa Mayer was appointed as the CEO of Yahoo which was losing market share, the discussion hinted at a potential “glass cliff” scenario. The term “glass cliff” was coined by (Ryan & Haslam, 2005) to highlight that women are more likely to be promoted to precarious positions than men. This phenomenon has since then been examined in psychology and management. Researchers since then have found support for both ends where (Reinwald et al., 2022) hypothesized and illustrated that glass cliff was evident in US public firms while (Bechtoldt et al., 2019) in their analysis showed that glass cliff was not evident in large German and UK firms. Our study aims to further this line of research by focusing on the information technology (IT) industry and providing empirical evidence that reflects whether this industry is pervasive or restrictive to glass-cliff and thus contributes to the information systems (IS) literature.

To date, gender studies in IS have dealt with understanding the barriers women face in their careers as IT professionals - entry-level barriers, bias at the workplace, and restrictions in career growth (Igbaria & Baroudi, 1995; McGee, 2018; Trauth & Connolly, 2021). This indicates that the majority of the studies have focused on the first two out of the three stages of a career in IT as proposed by (Ahuja, 2002), which lends an opportunity to delve into factors that may shape organizational decisions and impede women’s career progression.

To address this gap in research, we have analyzed archival financial and executive and board composition data of publicly traded IT companies which can be obtained from the Center for Research in Security Policies (CRSP) and BoardEx from 2009 to 2019. Our work aims to look at female appointments to the top management in firms that are in the purview of IT to understand if these were a consequence of the firm’s poor financial performance. Additionally, we also examine the impact of moderator female board composition.

Recent scholarly works highlight the gender gap in the IT industry and associate that with underlying theories of implicit and explicit gender identity, expectancy-value, and role congruity that led to career choices made by men and women (Harmon & Walden, 2020; Serenko & Turel, 2021). These studies call for increased attention toward encouraging more women to join the industry and designing measures to help them carve a path for their career advancement. Our study holds implications for women leaders in IT also ensuring that they are not set up for failure and are provided opportunities based equally on their leadership skills that go beyond traditional gender roles.

The remainder of the paper is as follows, in the following section we elaborate on the glass cliff literature and discuss in detail the discourse of gender studies in IS. Then, we present our plan for data collection, explain our model, and briefly shed light on the expected results. Next, we conclude our study by discussing the intended contributions which hold implications not just for researchers but also for industry practitioners. Finally, we put forth our ongoing research agenda that will provide more insight into our findings.

## **Literature Review**

### ***Glass Cliff***

Glass cliff was first examined in FTSE 100 companies, the study revealed that when the overall financial market was down, women were appointed to boards of a company that had consistently poor performance as opposed to other companies that had an upward trend in their share price (Ryan & Haslam, 2005). Moreover, in a good market, companies with more tumultuous share prices appointed women as opposed to the firms with more stable share prices. In a later study, it was found that women had a higher chance of being assigned more risky cases than men (Ashby et al., 2006). A pertinent finding from the study is that candidates perceived high-risk cases to lead to better opportunities for women than men, suggesting that women gain more from tackling riskier situations. While this does not necessarily point to a biased intention, it calls for attention to other factors that may indicate the presence or absence of the effect (Cook & Glass, 2014).

The presence of this phenomenon has also been refuted, where a study of top management appointments in German firms interestingly divulges contradictory findings (Bechtoldt et al., 2019). More importantly, the study highlighted that promoting women was a signal to provide a positive outlook to the stakeholders. Although a more recent study presented evidence pointing at the existence of this phenomenon in the US public, emphasized the impact of moderating factors like top management composition and overcame the shortcomings of prior research and provided a theoretical reasoning that may serve as a precursor for the decision to appoint female leaders during crisis (Reinwald et al., 2022).

### **Gender and IS Research**

IS scholars have borrowed theories from psychology and management in the past to examine gender-related problems in the IT industry. (Igbaria & Baroudi, 1995) investigate the difference in job performance and subsequent appraisals between men and women in an eastern US firm. Their study revealed that despite having faired equally in performance, women were not promoted as much as men. This indicated that gender bias existed and more importantly the need for supervisors to recognize women's efforts instead of dismissing them as luck or extensive assistance from others. Women also face a distinct set of barriers as they progress from one stage of their career to the other. For instance, they are subjected to more social expectations and work-family conflict in the early phase of choosing their career, and later it transcends to not having a role model as they progress through their career, and finally losing out on building informal networks and not having access to the right mentorship which is critical for career advancement (Ahuja, 2002). Despite the propositions being set over a decade ago, that study holds importance even today as more women are still quitting the workforce (Armstrong et al., 2018) as their career choice is still guided by implicit and explicit gender identity (Serenko & Turel, 2021), and their beliefs about agentic behavior being more suited for a career in IT (Harmon & Walden, 2020).

Recent qualitative studies shed light on changing factors that contributed to gender equity in the IT industry over decades (Trauth & Connolly, 2021) and how their journey has been different than their men counterparts as they rose from entry-level jobs to executive roles in the field (McGee, 2018). The analysis of the first study brings out the impact of direct and indirect factors such as the influence of parents and school counselors in the formative years and managers in later years that dictate women's initial decision of selecting IT as a career and then advancing in it. The study also mentions external factors namely policy, economic, cultural, and social infrastructure that either are incremental or abrupt also define the status of gender equity. The interviews conducted in the latter study conclude that biases exist right from considering women for leadership positions and persist even after they are in charge because people may not find women to be natural or effective leaders or are simply reluctant to the idea itself.

Building on the studies about glass cliff and a parallel trend of working conditions in the IT industry for women. We hypothesize that,

*H1: Firms in crisis are more likely to appoint female leaders.*

*H2: Firms in crisis with at least one female on their board will negatively moderate the female appointment during this time.*

## **Methodology**

### **Data**

This study focuses on firms included in the IT sector's purview, following prior literature we collected data based on 4-digit NAICS code by following prior literature (Chung et al., 2019). We use the CRSP database to find financial information about firms belonging to these categories (Luo et al., 2013). This yielded a total of 11632 observations consisting of 1803 distinct firms for the period 2009 – 2019. The time frame was chosen to avoid the impact of the global financial crisis on one end and the global pandemic on the other. To analyze the financial status of the firms we follow Reinwald et al. (2022) and calculate Altman-Z scores for the firms. To analyze the CEO appointments and board composition data was obtained from the BoardEx database. After matching the data with BoardEx we ended up with 470 firms for which we had complete data. Our sample has 1040 appointments out of which 4.4% were female appointments.

### **Measures**

*Dependent Variable:* The focal variable of our analysis is female appointment; thus, an appointment is coded as 1 if it is a female appointment and 0 otherwise.

*Independent Variables:* A firm that is facing crisis at a given time is coded as 1 if its Altman-z score falls below 1.8. Prior literature suggests this measure is an ideal indicator of the company's financial health and is widely accepted by researchers and practitioners (Reinwald 2022). It is computed by aggregating 5 financial ratios – 1) a company's operating profitability to total assets 2) Net sales to total assets 3) market

value of equity to total liabilities 4) working capital to total assets and 5) retained earnings to total assets. According to Altman (1968), a score below 3.0 indicates that firms should be cautious, and those below 1.81 have a high chance of bankruptcy in the next two years.

*Moderator & Control Variable:* To facilitate the analysis for hypothesis 2, we have a dummy variable which is coded 1 if there is at least 1 female board member at the time of appointment and 0 otherwise. We include board size as a control and year dummies to account for time-varying fixed effects.

Variable	Observations	Mean	Std. dev	Min	Max
FemaleAppointment	1,040	0.04	0.21	0	1
crisis_prev_1.8	1,040	0.40	0.49	0	1
BoardFemalePresc	1,040	0.40	0.49	0	1
crisis_pev_3.0	1,040	0.49	0.50	0	1
TotalBoardMembers	1,040	6.39	2.90	0	19

Table 1. Summary Statistics

## Results

This study relies on logit regression to find support for hypotheses that best suit regression where the dependent variable is binary. Our model is as follows,

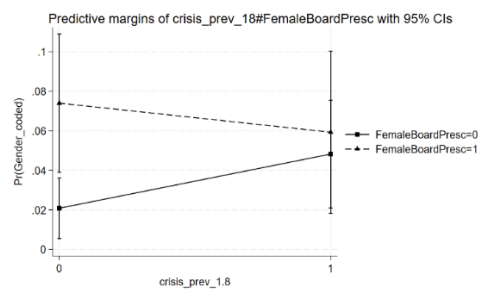
*FemaleAppointment*

$$= \beta_0 + \beta_1 * crisis_{prev} + \beta_2 * crisis_{prev} * BoardFemalePresc + TotalBoardMembers + \varepsilon_t$$

Gender_coded	Coefficient	std. error	z	P>z
crisis_prev	0.87	0.48	1.80	0.07
BoardFemalePresc	1.33	0.46	2.98	0.00
crisis_prev* BoardFemalePresc	-1.11	0.65	-1.70	0.09
TotalBoardMembers	0.02	0.75	0.27	0.79
_cons	-3.76	0.60	-6.3	0
Year Fixed Effects	Yes			

**Table 2. Results**

We find support for both our hypotheses, indicating that a firm under crisis is more likely to appoint a female CEO, however, this action is mitigated in the presence of a female board member. In the interaction plot we can see firms with no female presence in the board are more likely to appoint a female CEO post crisis as opposed to a non-crisis. However, the opposite direction of slope for firms with female presence in the board indicates opposite effect.



**Figure 1: Interaction Plot**

Further, we investigate how large firms differ from smaller firms. We split our sample based on firm size into large and small firms. Firm size was calculated as a binary variable such that it takes the value of 1 if the value of total assets is equal to or higher than the average total assets in the sample and 0. The result remained consistent for smaller firms (Table 3). Interestingly, in larger firms we observe the opposite pattern, such that, bigger firms are more likely to appoint female CEOs post crisis. We also did a preliminary analysis of post appointment stock returns (Table A2). Our independent variable for the analysis was change in CEO from male to female, dependent variable was stock returns, we controlled for firm level variables and included year fixed effects. All but one model showed a significant result, and the coefficient was positive indicating positive stock return following the change of CEO to female from male.

	Model 1 (small firms)	Model 2 (large firms)
crisis_prev	1.28**	-14.29***
BoardFemalePresc	1.99***	-0.12
crisis_prev* BoardFemalePresc	-1.77**	15.87***
TotalBoardMembers	-0.12	0.45**
_cons	-3.43	-4.52
Year Fixed Effects	Yes	
<b>Table 3. Results</b>		

## Discussion

### Contribution

The primary intention of this study was to examine the presence or absence of glass cliff in the IT industry. By examining the financial performance of firms and subsequent CEO appointments we found evidence for the underlying phenomena. In doing so, our study contributes to the IS research in multiple ways. First, by focusing on the lesser-studied phase of women's careers in this sector we shed light on the plight of women leaders in IT (Ahuja, 2002). While previous scholars have rightly brought to our attention the social and professional reasons that lead to a higher turnover rate of women in comparison to men (Armstrong et al., 2018) and how gender identity plays a key role in this process (Serenko & Turel, 2021) our research divulges yet another predicament faced by the industry. Moreover, despite evidence from prior studies highlighting that higher board diversity yields better firm performance (Dissanayake et al., 2021), not much attention has been paid to women organization leaders which our study manages to achieve. Second, our study uses an empirical approach and encompasses a significantly large sample in comparison to prior studies. IS Gender studies have mainly utilized surveys and qualitative approaches (McGee, 2018; Trauth & Connolly, 2021) spanning over time and covering different job positions, which, highlight the nuances of the difficulties that women face in their careers but lack generalizability. Our analysis overcomes this by analyzing the entire IT industry at once over a substantial period. Finally, the contrasting effects between smaller and larger firms leads to an interesting finding. While it warrants further investigation, we posit that, these decisions may be guided by the perception of female leadership style. On one hand role incongruity suggests that at the time of crisis the traits needed in a leader differ from the norm, and thus women are promoted for the same traits which were previously seen as undesirable for effective leadership. On the other hand, female leadership is seen as transformational (Vinkenburg et al., 2011), which suggests that firms' may attempt to signal a change to their external stakeholders, leading to appointment of female leaders at the time of crisis (Reinwald et al., 2022).

### Limitation

As goes with all research our study also presents its limitations. The significant result serves as an indicator of a problem that has not yet been tackled in IS, however further examination of IT-specific factors can yield more nuanced reasoning for this occurrence. Moreover, our study examines US-based publicly traded firms, even though these firms have served as the primary units of analysis in many IS studies, the results might differ for organizations in another region.

### Ongoing Research

In order to understand the consequences of such actions for a firm and the women leader we need to examine post-crisis trajectories of the firms. We intend to do a difference-in-difference study of market

reaction to understand the impact of appointing female CEO post crisis. Prior literature has contradictory findings in this regard, while on one hand, such a situation has resulted in an increase in dismissal rates owing to heightened negative investor attention (Gupta et al., 2018), on the other hand with rising diversity initiatives firms are more keenly taking women leaders on board (Reinwald et al., 2022). This analysis will shed light on the effect glass cliff has on women leaders. Furthermore, a theoretical framework is needed to deepen our understanding of this phenomena. We plan to extract leadership traits from Q/A segment of earnings call to establish a discernable pattern pre & post crisis.

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## Appendix

	Margin	Delta-method std. err.	z	P>z	[95% conf. interval]	
crisis_prev_18# FemaleBoardPresc						
0 0	0.02	0.01	2.66	0.01	0.01	0.04
0 1	0.07	0.02	4.15	0.00	0.04	0.11
1 0	0.05	0.01	3.47	0.00	0.02	0.08
1 1	0.06	0.02	2.83	0.01	0.02	0.10
<b>Table A1. Margins for interaction plot</b>						

	returns _after_ 1	returns _after_ 2	returns _after_ 3	returns_ after_4	returns _after_ 5
m_f	-0.05	0.09*	0.07	-0.04	0.02
Year Fixed Effects	Yes				
<b>Table A2. Post appointment stock returns</b>					