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Because She's Worth IT: Stereotype Challenges for Female CIOs in Ensuring IT Security Compliance

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ABSTRACT

Compliance with IT security policies is critical to the organization's success in securing information. IT leadership is vital in influencing employees' IT security compliance. Although female IT leadership is growing, there is little research conducted to date guiding female CIOs, considering the prevalence of unconscious gender biases and stereotyping. The evidence from our experiment using data from Mturk suggests that the gender of the CIO plays an important role in influencing the employees' intentions and reactance to comply with security recommendations. The study helps inform IT literature on the role of the security message sender's characteristics and guides CIOs, particularly women, on how they can tailor their leadership style to achieve greater behavior change. Our work creates awareness of the extent of stereotyping and society's expectations of gender roles still prevalent today while at the same time responding to the calls for increased attention to social inclusion issues in IT.

Keywords

IT leader, CIO Gender, IT expertise, leadership style, reactance theory, IT security compliance

INTRODUCTION AND BACKGROUND

Two things in IT security literature have broad acceptance: first, frequent ransomware attacks and unceasing data breaches have invariably pushed information security threats as a major concern for any organizational leadership (Purdy, 2021). Second, research invariably reveals that it is not the technology but the employees' who are the weakest link in the organization's success in information security compliance (Bulgurcu, Cavusoglu and Benbasat, 2010). It is also established that organizational leadership, particularly IT leadership and the CIO role, is vital in influencing employees' compliance with security policy. However, due to unconscious biases and stereotyping threats (Buckalew, Konstantinopoulos, Russell and El-Sherbini, 2012; Eagly, Wood and Diekmann, 2000) prevalent even today in our society and organizations, CIO gender could influence employee compliance intentions differently as leader gender stereotype could lead to biased judgment and decisions.

A growing body of scholarship documents the prevalence of unconscious gender biases in modern work organizations (Heilman, 2012). Both survey and experimental studies indicate that men are often believed to be more competent and/or agentic than women (Koenig and Eagly, 2014). Stereotyping is a serious challenge faced by women business leaders – more so in the IT area, as Information Technology has traditionally been male-dominated (Nesler, Aguinis, Quigley and Tedeschi, 1993; Reid, Allen, Armstrong and Riemenschneider, 2010). Due to this stereotyping threat, women CIOs are conferred lower social status (McDonald, Toussaint and Schweiger, 2004) and are expected to perform much better and hit higher benchmarks to reach the same levels as men in organizations. They are also expected to be more communal and follow a transformational leadership style, unlike men, who are expected to be more transactional in leadership style (Saint-Michel, 2018; Wang, Chiang, Tsai, Lin and Cheng, 2013).

We argue that in the context of IT security compliance, CIO's non-conforming social roles (e.g., communal) due to stereotyping and gender bias can arouse disapproval and reactance among employees to the security compliance recommendations by leaders. Reactance leads people to resist the social influence of others to regain threatened or lost freedom (Lowry and Moody, 2015). Reactance can also be aroused not only by direct threats but by those that are subtly and outside of conscious awareness (Miron and Brehm, 2006; Steindl, Jonas, Sittenthaler, Traut-Mattausch and Greenberg, 2015).

Thus, using the stereotyping and reactance theoretical lenses, we examine the moderating role of CIO gender on the relationship between perceived IT expertise (as credibility) and leadership style in influencing employees' intention and reactance to comply with cyber-security policy recommendations. The research question was examined using an experimental survey conducted using Mturk. The findings show that gender plays an important role in how IT leadership characteristics – perceived experience and leadership style influences the intentions and reactance to comply with CIO security recommendations.

The paper proceeds as follows: first, we introduce the research model and hypotheses. In the next section, we describe the research methodology. Next, we present the data analysis and results. We then discuss the study's contributions and implications and conclude the paper.

RESEARCH MODEL AND HYPOTHESES

IT expertise and the Moderating role of CIO gender

The CIO position is largely male-dominated (Dawson, Ho and Kauffman, 2015); it creates an unlevel playing field for women CIOs as gender status beliefs are known to shape expectations, not necessarily in their favor, for male-typed tasks (Ridgeway, 2011). Such gender biases make people systematically discount the competence of female business leaders. Thébaud (2015) reports that women managers are often believed to be less achievement-oriented and less competent than their male counterparts, which makes women held to a stricter standard of performance. These stereotyping threats make women with similar abilities work harder than men and face relatively more obstacles (Dryburgh, 1999). Higher expertise of leaders is associated with higher employee approval behavior and lower reactance (Brown and Raven, 1994); discounted expertise thus would increase disapproval and reactance. Due to such gender biases, we argue that the female CIO's expertise will be discounted systematically, resulting in lowering intentions and higher reactance to comply with the CIO's security recommendations. Hence,

H1: CIO gender moderates the positive relationship between perceived CIO IT expertise and the employees' intention to comply with the CIO security recommendation such that the relationship is stronger for the male CIO than the female CIO.

H2: CIO gender moderates the negative relationship between perceived CIO IT expertise and the employees' reactance to comply with the CIO security recommendation such that the relationship is stronger for the male CIO than the female CIO.

H3: CIO gender moderates the positive relationship between perceived CIO IT expertise (quadratic effect) and the employees' intention to comply with the CIO security recommendation such that the relationship is stronger for the male CIO than the female CIO.

H4: CIO gender moderates the negative relationship between perceived CIO IT expertise (quadratic effect) and the employees' reactance to comply with the CIO security recommendation such that the relationship is stronger for the male CIO than the female CIO.

Leadership Style and the Moderating Role of CIO Gender

It is known that female leaders are more transformational than their male counterparts (Eagly, Johannesen-Schmidt and Van Engen, 2003). They are also expected to act according to these roles - men are expected to display agentic characteristics, while women are expected to display communal characteristics and concern for others (Saint-Michel, 2018). The role-congruity perspective suggests that women are expected to demonstrate communal qualities (and thus a transformational leadership style) more than men, who are expected to be transactional leaders (Tyssen, Wald and Heidenreich, 2014). While it is known that both leadership styles are effective (Tyssen et al., 2014), male leaders are expected to be assertive and transactional, whereas women leaders are expected to be more communal and transformative. Miron and Brehm (2006) suggested that unconscious gender biases and stereotyping create reactance effects when people encounter stimuli incongruent with social roles. Having a female CIO in a transactional leadership style or a male CIO in a transformational could trigger reactance and create disapproval in the form of lower intentions among employees based on their expectations regarding traditional gender roles and leadership styles. Hence,

H5: CIO gender moderates the positive relationship between transformational leadership style and the employees' intention to comply with the CIO security recommendation such that the relationship is stronger for the female CIO than the male CIO.

H6: CIO gender moderates the positive relationship between transformational leadership style and the employees' reactance to comply with the CIO security recommendation such that the relationship is stronger for the male CIO than the female CIO.

H7: CIO gender moderates the positive relationship between transactional leadership style and the employees' intention to comply with the CIO security recommendation such that the relationship is stronger for the male CIO than the female CIO.

H8: CIO gender moderates the positive relationship between transactional leadership style and the employees' reactance to comply with the CIO security recommendation such that the relationship is stronger for the female CIO than the male CIO.

The research model is shown in Figure 1 below.

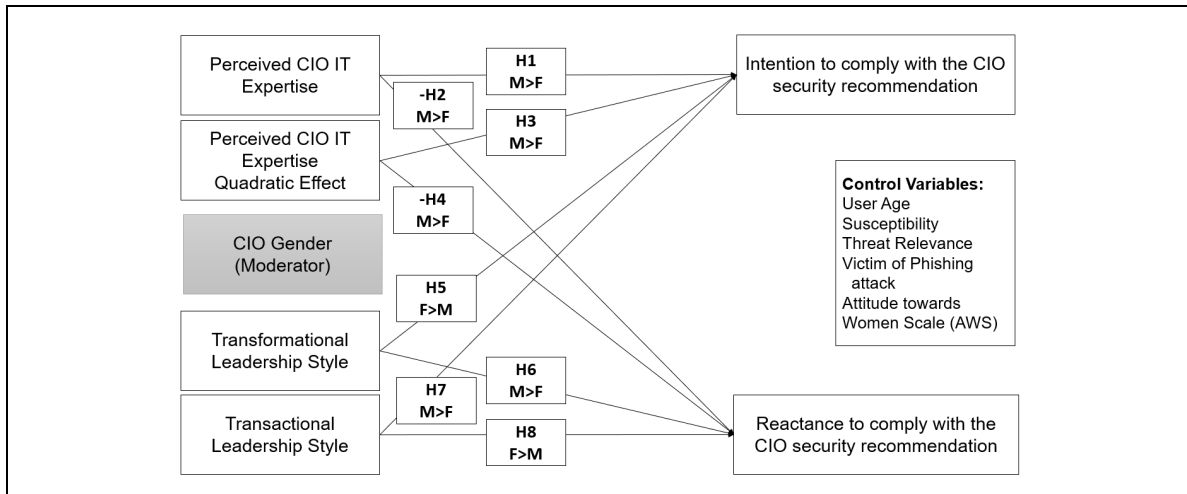


Figure 1. Research Model

RESEARCH METHODOLOGY

Experiment and Data Collection

A controlled experiment using eight different vignettes manipulating CIO gender (male/ female), IT expertise (low/ high), and leadership style (transactional/ transformational) was designed in Qualtrics. Data was gathered from MTurk workers from all over the US. Intention items were adapted from Bansal, Muzatko and Shin (2020); reactance items were adapted from Lowry and Moody (2015); perceived IT expertise items were adapted from Bhattacharjee and Sanford (2006); leadership style items were adapted from Eberlin and Tatum (2008) and Ismail, Mohamad, Mohamed, Rafiuddin and Zhen (2010).

	CIO Male; N (Age, Std dev)	CIO Female; N (Age, Std dev)	Total
User Gender Male	280 (33.49, 9.11)	175 (34.82, 10.41)	455 (34, 9.64)
User Gender Female	108 (36.63, 10.52)	141 (36.94, 10.72)	249 (36.81, 10.61)
Total	388 (34.36, 9.62)	316 (35.77, 10.58)	704 (35, 10.08)

Table 1. Demographics

After removing incomplete and respondents who failed attention checks, we had 744 usable responses. There were 455 males and 249 females in the final sample. The average age of the respondents across the two groups – Male and female CIO is shown in Table 1 below. We also controlled for several variables, as shown in Figure 1. We examined the data for reliability, discriminant, and convergent validity and found no issues. The data were analyzed using Smart PLS.

RESULT

All the hypotheses except for H2 and H4 are supported. H2 and H4 related to the quadratic effect of expertise on reactance. Overall, the findings (H1 and H3) show that expertise is symmetrically discounted for female CIOs such that the expertise as linear (H1) and quadratic effect (H3) leads to higher intentions for male CIOs but not for female CIOs. The moderation role of CIO gender associated with the effect of leadership style on intention to comply with the CIO security recommendation is

supported by structural moderation and parametric t-tests. The results for H5 and H6 suggest that the transformational leadership style increase intention (reactance) to compliance with CIO security recommendations more for female (male) CIOs than male (female) CIOs. The results for H7 and H8 show that the effect of the transactional leadership style increase intention (reactance) to compliance with CIO security recommendations more for male (female) CIOs than female (male) CIOs. The results are presented graphically in Figure 2, and the path coefficients for each CIO group are presented in Table 2.

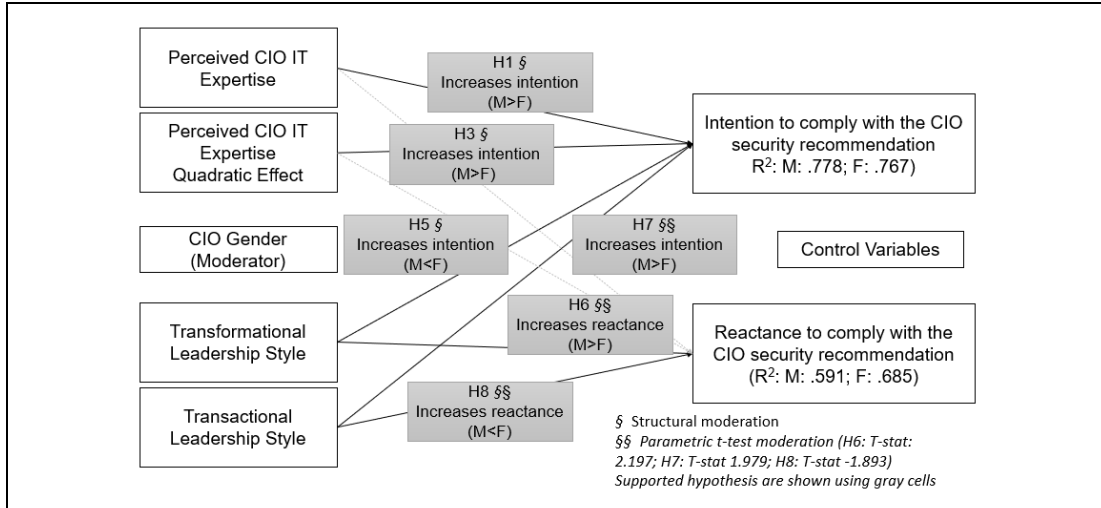


Figure 2. Results Summary

	Male CIO			Female CIO		
	Path Coeff	T-stat	Sig.	Path Coeff.	T-stat	Sig.
H1. Expertise -> Int	0.235	3.732	0.000	0.168	1.898	0.058
H2. Expertise -> React	-0.067	0.528	0.598	-0.030	0.321	0.749
H3. Expertise_Quad_Int -> Int	0.039	2.110	0.035	0.019	0.835	0.404
H4. Expertise_Quad_React -> React	-0.034	1.094	0.274	-0.036	1.535	0.126
H5. TRFL -> Int	0.166	1.895	0.059	0.247	2.799	0.005
H6. TRFL -> React	0.550	4.214	0.000	0.164	1.483	0.139
H7. Transl -> Int	0.242	3.942	0.000	0.055	0.764	0.445
H8. Transl -> React	0.212	1.568	0.117	0.529	6.411	0.000

Table 2. Detailed Results (Path Coefficients)

Note: significant paths (p < .05, two-tail) are highlighted in bold

The control variable analysis suggests that those with high AWS scores have higher intentions for male and female CIOs. Threat relevance increases intention, and susceptibility increases reactance for both CIOs. Respondents' age and victim status had no significant role in the findings.

DISCUSSION AND CONCLUSION

The results confirm the hypotheses and provide several theoretical, practical, and social implications. Regarding theoretical contributions, security literature suggests that studying sender characteristics and how they influence recipients' responses is a fruitful area to study (Siponen and Baskerville, 2018). Although transformational and transactional leadership concepts are found universally among men and women, Bass (1999) argues that much more still needs to be learned about how they are affected by the context in which the leadership occurs. Our work adds to social inclusion in IT - it shows that stereotyping

gender-role expectations can also cause reactance in the case of IT leaders, answering the call that despite the well-explored consequences of reactance, what exactly causes these effects is still not answered well (Steindl et al., 2015).

The study has theoretical, practical, and social implications. It helps inform IT literature on the role of the security message sender's characteristics and the contextual outcomes; on the other hand, it guides CIOs, particularly women, on how they can tailor their security recommendations to achieve greater behavior change. Reactance has been examined in IT security compliance literature; however, examining gender biases on reactance in IT security compliance literature is rare. CIO gender is an important and relatively understudied study area. Even though women's role in business and IT leadership is growing, there is little research to date to guide women business leaders and CIOs (Bansal and Warkentin, 2021; Dwivedi, Joshi and Misangyi, 2018). Recently Bansal (2021) showed that users react differently to female and male CEOs' social accounts (apology and denial) after a data breach. It provides practical guidance, particularly to women CIOs and CISOs (chief information security offices), on how to tailor their leadership style to achieve greater behavior change. Our work also has social implications. It creates awareness of the extent of stereotyping and society's expectations of gender roles still prevalent today while at the same time responding to the calls for increased attention to social inclusion issues in the IT field and gender diversity in IT organizations (Jia, Steelman and Jia, 2022; Truman and Baroudi, 1994).

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