Understanding How Organizational Interventions Mitigate the Barriers Women Face in the IT Workplace: A Theoretical Framework

Full paper

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Abstract

Forbes Insight (2011) reported that 97% of companies surveyed have implemented interventions to improve the retention of women and minorities in the workplace. Despite organizational interventions, women are not staying in the IT workforce. In fact, NCWIT (2015) reported that 57% of women leave the IT workforce within the first five years of their careers. These alarming figures raise questions about the effectiveness of these interventions. Information systems research produced little theoretically sound gender research to facilitate our understanding of organizational interventions and their effectiveness to retain women in IT (Trauth 2013). This paper seeks to address this gap in the literature and provide a theoretical framework to enhance our understanding and our empirical investigations of diversity interventions within organizations.

Keywords

Gender research, organizational interventions, women in IT workforce

Introduction

More than ever, women are critical to the future of the Information Technology (IT) field, as IT's role in the global economy continues to grow. The U.S. Department of Labor expects computer-related jobs to grow by 22% by 2020 (Thibodeau 2012). Studies indicate that meeting this job demand is a difficult task (Overby 2006), and to meet the demand, balanced gender representation in the IT workforce is a necessity (Foust-Cummings et al. 2008; Ashcraft and Blithe 2009). However, the number of women working in IT has dropped 13% over the past decade (Accenture 2010). In 2015, the National Center for Women and Information Technology (NCWIT) reported that the turnover rate of women in the IT workforce, particularly in the first 5 years on the job, was at 57%—twice the turnover rate of men in IT and women in other fields (NCWIT 2015).

Beyond the need for IT professionals, a diverse workforce is also critical to the IT field, for well-managed diversity harnesses the power of innovation (Cox and Blake 1996). To remain relevant, IT organizations must invest in attracting and retaining groups with diverse backgrounds, experiences, and skills (London Business School 2007) that lead to greater innovation, better-served consumers, a more skilled workforce, and heightened economic productivity, as well as advocating social fairness (Ashcraft and Blithe 2009; Trauth 2011). Women participating in IT have a positive impact on organizational output, and technology organizations that fail to harness their talents suffer loss of innovation, productivity, and competitiveness (Consumer Electronics Association 2008). A 2009 report by NCWIT indicated that IT teams composed of a balanced number of men and women were more likely to experiment, be creative, and share knowledge

to accomplish tasks (Ashcraft and Blithe 2009). The same report also indicated teams that included both men and women produced more widely cited IT patents (Ashcraft and Blithe 2009).

Despite the important role women play in IT, they continue to make up a smaller share of the IT workforce (26.1%), as opposed to other related management and professional occupations, where women make up 51% of the overall workforce (Bureau of Labor Statistics 2014). Scholars attribute this to a number of barriers—including stereotypes, questions of legitimacy, isolation, and work life balance (Ashcraft and Blithe 2009; Hewlett et al. 2008; Simard et al. 2008). Some organizations recognize the need to offset these barriers by implementing interventions; in fact, Forbes Insight (2011) reports that 97% of companies surveyed have implemented inclusion strategies. Despite these interventions, women are not staying in IT, which raises questions about the effectiveness of diversity interventions. In fact, a 2012 special issue of *Information Systems Journal* highlighted the need for research that is guided by and further develops theory that can better guide the design of meaningful and effective interventions (von Hellens et al. 2012).

To this end, this paper presents a theoretical framework to better understand and measure the effectiveness of organizational gender diversity interventions. This paper synthesizes the IS and relevant management literature on barriers women experience in the IT workforce that cause them to leave the field. The review also synthesizes IS and relevant management literature focusing on organizational gender diversity interventions. The goal of this paper is to provide a synthesis of the barriers alongside the proposed and existing characteristics of interventions present in the literature in order to guide future studies of barriers women face and the interventions designed to address them. The framework will guide our understanding of the nature and extent to which individual women experience barriers in the presence of gender diversity interventions in IT. The framework provides a holistic view of the catalysts of interventions, the methods and practices designed and deployed, and the nature of metrics and evaluation techniques used to assess the effectiveness of interventions. This holistic view will guide researchers to ask meaningful questions about the nature of barriers and the interventions designed to address them. Further, the framework will guide studies examining the relationships between specific intervention characteristics and specific barriers women experience relevant to their research questions.

Review of Gender Diversity Literature

Studies show that women frequently leave the IT workforce due to negative experiences (Armstrong et al. 2007; Orser et al. 2007), and research identified unique barriers and challenges that IT women face (Ashcraft and Blithe 2009; Hewlett et al. 2008; Quesenberry and Trauth 2012). Because organizations benefit from attracting and retaining women (Ashcraft and Blithe 2009; Trauth 2011), they often attempt to improve women's experience by implementing diversity interventions (Institute of Leadership and Management 2011; Quesenberry and Trauth 2012; von Hellens et al. 2012). Women also develop informal mechanisms to address barriers (Morgan and Trauth 2006; Orser et al. 2007). Because our proposed framework investigates organizational-level interventions and their ability to improve retention rates, our literature review will first examine catalysts for organizational interventions, followed by a review of IT women's experiences and the organizational interventions designed to retain women in IT. We conclude with a comprehensive framework that informs our understanding of the experiences of women in IT and the nature of organizational interventions employed.

Why Organizations Create Interventions

To understand the effectiveness of organizational interventions, we must look at their purpose. Researchers suggest that organizations experience a wide range of strategic and financial benefits from maintaining high levels of workforce diversity. Six organizational benefits, one socially focused and five economically driven, identified in the literature are summarized in Table 1. Representing the only socially oriented catalyst, increasing the number of women in IT promotes social equity between men and women, shrinking the gap between individuals who do and do not participate in technology (Trauth et al. 2006).

Economically speaking, first, addressing the unique needs of underrepresented groups results in increased retention rates and lower attrition costs (Simard et al. 2008). Second, diverse team composition spurs increased performance and out-of-the-box thinking—qualities especially important in technology, where innovation and creativity fuel competitive advantage (Ashcraft and Blithe 2009; Trauth et al. 2006). Third, organizations with higher diversity produce better financial results (McKinsey and Company 2007), and technology teams that incorporate gender diversity were found to be two times more likely to exceed financial performance expectations (Robinson and Dechant 1997). Fourth, a diverse workforce can penetrate broader, more complex markets and increases marketplace understanding (Robinson and Dechant 1997). Finally, organizations that demonstrate their value of diversity establish a high-quality employment brand, helping them attract and retain top talent (Cox and Blake 1996; Simard et al. 2008).

Benefit	Description
Social Responsibility	Increases social inclusion and access by placing and retaining women in influential positions that harness and employ women's talents.
Reduced Business Costs	Reduces costs associated with high turnover rates and improves resource acquisition.
Enhanced Team Performance	Better results, more diverse thinking, heightened creativity, greater innovation, and improved problem solving.
Improved Financial Performance	Organizations with higher diversity produce better financial results compared to those with little or no diversity.
Better Reflection of and Service to Customers	Provides products and services that reflect an understanding of customers' diverse needs and interests.
Diverse and Supportive Culture Attracts the Best Talent	Organizations that create a culture of support and encourage people to have both a professional and a personal life attract the best talent in a shrinking labor pool.

Table 1. Summary of Benefits of Gender Diversity in the Workplace

Recognizing these potential benefits, organizations develop initiatives to improve their diversity culture, which in turn help mitigate barriers that women experience. The next section elaborates on these barriers.

Identifying and Mitigating Barriers

Barriers to attracting and retaining women in IT exist in both the educational pipeline and the workforce (Ashcraft and Blithe 2009; Kalev et al. 2006). While the distressed educational pipeline is a serious concern, this review focuses on barriers facing women in the workforce, including stereotyping, access and legitimacy, less-than-ideal supervisory relationships, and work-life imbalances that lead to feelings of isolation and exclusion. The literature reveals various strategies for mitigating these barriers, including formal methods employed at the organizational level and informal methods employed at the individual level. Table 2 summarizes the specific barriers and mitigation strategies, which are then discussed below. The table elaborates on social and structural barriers presented in Ahuja's (2002) model of barriers. Our review goes beyond Ahuja's (2002) model to include additional barriers identified in the IS and management literature since 2002. The review table also includes organizational interventions identified or suggested in the literature that mitigate the barriers women experience. Our review of barriers specifically focuses on the IT context informed by IS and management literature.

Stereotypes and Organizational Culture

Women in the IT workforce are subject to stereotyping on a much more regular basis than their male counterparts (Accenture 2010; Mannix and Neale 2005). Stereotyping commonly leads to mistaken assumptions about a woman's interests, capabilities, and skills related to IT (Accenture 2010; Foust-Cummings et al. 2008). As a result, career development and advancement opportunities are often limited. For instance, research found women being pushed toward stereotypically "feminine" and less technical

work roles (Scott-Dixon 2004), and passed over for promotions due to assumptions about being "family focused" and "unwilling to travel" (Simard et al. 2008).

Barrier	Ahuja's Model	Description	Organizational Interventions	Specific Practices
Stereotyping	Social Factor	Decisions are made based on assumptions about women's capabilities and preferences.	Build a culture of diversity.	Strong commitment from leadership, accountability, specific goals, and metrics.
Access and Legitimacy	Structural Factor	Gender biases influence promotion criteria & performance evaluations, promoting the myth that women are less capable than men.	Educate to attenuate bias; examine current practice for bias.	Conduct training programs to address and eliminate bias from performance evaluations, promotion criteria, etc.
Supervisory Relationship	Structural Factor	Supervisor has the ability to minimize barriers; however, lack of communication and trust creates problems.	Improve supervisory relationship.	Incorporate desired behaviors into rewards structure; encourage regular and frequent career development discussions.
Isolation and Exclusion	Structural Factor	Lack of mentors, successful role models, and adequate networks.	Professional development opportunities.	Technical training opportunities, professional networking, formal mentoring, and social events.
IT Work Life Conflict	Social Factor	Career mothers are divided between home and work, exacerbated by long hours, travel, and the "fire-fighter" model of IT.	Flexible arrangements.	Organization-wide policies for flexible work hours, telecommuting, part time, etc.

Table 2. Barriers Facing Women in IT and Associated Organizational Interventions

To combat stereotyping, research recommends that organizations build a culture of acceptance (Institute of Leadership and Management 2011). Setting an inclusive cultural tone requires senior leadership to demonstrate support, visible commitment, and accountability (Bolman and Deal 1991; Cox and Blake 1996; Kalev et al. 2006). Upper management can demonstrate dedication by prioritizing diversity in the organization's core values and strategic objectives (McKinsey and Company 2007). While goal-setting is important, establishing metrics to monitor success and identify opportunities is equally critical (Bolman et al. 1991; Institute of Leadership and Management 2011). Generating gender diversity indicators raises awareness and directs the focus for action (McKinsey and Company 2010), while also encouraging all employees to participate in sponsored activities, ensuring that cultural principles extend across the entire organization (Ashcraft and Blithe 2009). Once an inclusive cultural tone is established to address stereotyping tendencies, diversity initiatives have a solid foundation for mitigating further barriers.

Access and Legitimacy through Education and Evaluation
Stereotyping also manifests itself in "access and legitimacy" issues—the view that women are less capable than men (Wilson 2004), leading to differences in performance evaluations compared to male peers (Hewlett et al. 2008; Simard et al. 2008). Research finds men's achievements are credited to personal effort and skill, while women's are attributed to luck and ease of assignments (Simard et al. 2008). Women report that their views and perspectives are not heard or valued (Shafer and Trautlein 2007), which is problematic due to the direct relationship between perceptions of voice and fairness to job satisfaction, level of commitment, and performance appraisals (Konovsky 2000).

To restore access and legitimacy, scholars recommend a two-pronged approach. First, organizations should educate individuals about their behavior and biases (Cox and Blake 1996; Simard and Gilmartin 2010). To be most effective, gender diversity education must extend to all employees, address ways personal stereotypes and biases affect behavior and decision-making, and provide skill-building to reduce future biases (Ashcraft and Blithe 2009; Cox and Blake 1996). Second, organizations should evaluate current practices and eliminate identified biases related to task assignments, promotion criteria, performance evaluations, and gender distribution across levels and functions (Ashcraft and Blithe 2009; Dalton and Mesch 1990; Simard and Gilmartin 2010).

Improve Supervisory Relationships and Sponsorship
Poor supervisor-supervisee relationships present another barrier for women (Foust-Cummings et al. 2008). Inadequate supervisor relations result in a lack of training, regular feedback, and long-term relationships due to higher turnover (Foust-Cummings et al. 2008; Institute of Leadership and Management 2011). Women often feel unable to communicate openly and honestly with direct supervisors, limiting discussions of career goals and personal development opportunities (Ashcraft and Blithe 2009; Foust-Cummings et al. 2008). Furthermore, supervisors often sponsor employees, advocating for advancement and highlighting accomplishments (Foust-Cummings et al. 2008). Lack of sponsorship makes it difficult for women to successfully navigate career advancement in many organizations (Hewlett et al. 2008). For the underrepresented employee, the supervisor plays an invaluable role by offsetting isolation, suggesting mentors, acting as sponsor, and enabling necessary flexibility (Ashcraft and Blithe 2009).

The literature stresses the importance of emphasizing and fostering healthy employee-supervisor relationships (Institute of Leadership and Management 2011; McKinsey and Company 2007; Simard and Gilmartin 2010). Studies find that supervisors who regularly discuss career development, planning, and strategy with supervisees increase advancement rates and overall employee satisfaction (Lee 2001). Other studies find regular coaching sessions empower employees by building self-confidence, developing clear career goals, and encouraging calculated risks (Simard and Gilmartin 2010).

Ameliorate Isolation and Exclusion through Professional Development
Women, being the minority in IT, often feel socially isolated for three reasons, according to researchers: 1) a lack of *mentors* (Ahuja 2002; Burt 1998; Foust-Cummings et al. 2008; Trauth et al. 2006); 2) limited successful *role models* (Ahuja 2002; Burt 1998; Hewlett et al. 2008; Simard et al. 2008); and 3) a limited professional *network* (Granovetter 1995; Morgan and Trauth 2006; Orser et al. 2007). Isolation leads to dissatisfaction and turnover.

To alleviate isolation and exclusion, scholars recommend incorporating professional development opportunities on company time, with workloads adjusted to encourage participation (Hewlett et al. 2008; Simard et al. 2008). Researchers stress the value of establishing mentoring and networking opportunities to increase confidence and ambition in employees, enhance promotion opportunities, and create

sponsorship (Bolman et al. 1991; Orser et al. 2007; Simard and Gilmartin 2010). These efforts have been more successful when integrated into the organization's rewards structure; for example, providing incentives for mentoring were found to increase organizational diversity and interaction between management and underrepresented employees (Mannix and Neale 2005).

Flexible Work Arrangements
Research has widely recognized the "double burden" women face when balancing work and family (Blair-Loy 2007; Greenhaus and Beutell 1985; Shafer and Trautlein 2007). While this barrier is not unique to IT women, specific qualities in the IT field make the work-life balance particularly challenging and tightly correlated to promotion and high turnover rates (Ahuja 2002; Riemenschneider et al. 2006; Simard et al. 2008). IT demands long work hours, unpredictable travel schedules, constant availability, and keeping current with rapidly changing technology (Ahuja 2002; Scott-Dixon 2004; Simard et al. 2008).

Flexible work arrangements alleviate some of the stress that women experience, resulting in higher employee satisfaction and reduced absenteeism (Dalton and Mesch 1990). However, when developing policies, organizations must encourage both women and men to participate (Ashcraft and Blithe 2009) and highlight employees in management roles who participate (McKinsey and Company 2007; Simard et. al. 2008). In addition, researchers stress that employees taking advantage of flexibility should not be penalized when being considered for promotion (McKinsey and Company 2010; Simard et al. 2008). Specific organizational policies include part-time schedules, flexible schedules, parental leave, and telecommuting (Ashcraft and Blithe 2009; Simard et al. 2008).

Informal Methods for Overcoming Barriers
Orser et al. (2007) observed that some women are able to ignore barriers without becoming bitter or resentful. Other research suggests that women employ individual informal strategies to overcome barriers. For example, women reported building professional relationships by leveraging and creating personal and professional social channels independent of organizational interventions (Morgan and Trauth 2006). Women also reported making changes in individual actions, behaviors, work ethic, education, and/or some aspect of personality to better assimilate into the majority (Orser et al. 2007). When organizational interventions and informal methods fail to minimize barriers, studies report a tendency for women to leave the organization or exit the IT field entirely due to a lack of alternatives (Foust-Cummings et al. 2008; Simard and Gilmartin 2010).

Theoretical Framework

The main objective of this paper is to synthesize the literature and develop a framework for characterizing and measuring the effectiveness of organizational interventions in overcoming barriers women face in IT. Gender research in the IS discipline is rich in studies that enhanced our understanding of women's experiences, the barriers they face, and the strategies they use to cope with the IT workforce environment. The research, as illustrated in the review, also provides us with various strategies to enhance the retention and advancement of women in the field. What is missing in our literature is a holistic understanding of organizational interventions and whether and how they mitigate barriers that individual women experience. Apart from a few studies (e.g., Quesenberry and Trauth 2012), gender research in IS suffers from an insufficient understanding of organizational interventions to retain women (Kvasny et al. 2005; Quesenberry and Trauth 2012). In this section, we synthesize the IS literature and propose a theoretical framework to guide our understanding of organizational interventions and how they might mitigate the barriers individual women experience.
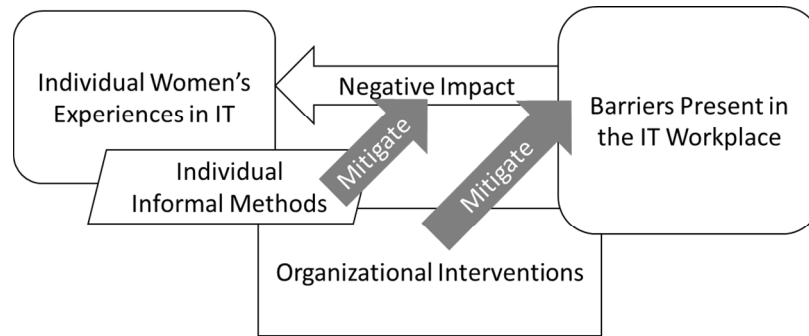
Figure 1. Organizational Interventions Mitigating Individual Barriers Framework

Figure 1 illustrates the interplay among women's experiences, the challenges and barriers they face, and the role of organizational interventions in mitigating the barriers. The literature cautions us not to generalize in assessing organizational initiatives, but instead to consider women's experiences and diversity of needs (Quesenberry and Trauth 2012). Consistent with Trauth's (2002; 2006) Individual Differences Theory of Gender and IT (IDGIT), the framework emphasizes that individual women experience various barriers differently. Their perceptions of these barriers and the individual informal strategies they use to mitigate them are influenced by socio-cultural factors constructed at the individual level (Trauth 2002; Trauth 2006).

Women's Experiences		Intervention Characteristics	
Informal Ways to Overcome	Informally network	Catalysts & Objectives	Social responsibility
	Informally find mentors		Reduced business costs
	Make individual changes		Employee-focused reputation and culture
	Leave IT		Enhanced team performance
	Ignore barriers		Improved financial performance
			Better reflection of and service to customers
Barriers	Stereotypes	Methods & Practices	Build a culture of diversity
	Access and Legitimacy		Educate employees and examine current practices
	Isolation		Professional development opportunities
	Supervisory relationship		Improved supervisor relationships
			Leadership support
	IT work-life balance		Flexible arrangements
		Measurement & Evaluation	Systematic evaluation
			Use of specific metrics to measure impact

Table 3. Organizational Interventions Mitigating Individual Barriers Indicators

As illustrated in Figure 1, we organize the concepts identified in the literature review into three high-level categories: the experiences of women in IT, the barriers they face, and the characteristics of organizational interventions. Women experience the IT work environment individually, influenced by socio-cultural factors (Trauth 2002; Trauth 2006). Their background, personal characteristics, personal influences, cultural attitudes, and environmental context shape their thinking and response to barriers in the workplace identified in the literature review, such as stereotyping and legitimacy. Thus, to mitigate barriers, women may employ individual informal strategies such as ignoring the barriers, identifying networks and informal mentors, and maybe even leaving the workplace. Organizations recognize the

challenges women face and attempt to mitigate these barriers by providing various interventions. In order to best understand the nature and effectiveness of these interventions, the framework illuminates their characteristics—including catalysts and assessment processes—as well as the specific methods and practices employed, such as mentoring programs and flexible work arrangements. Figure 1 illustrates the main elements of our theoretical framework and the proposed interplay between them. Table 3 details the constructs and indicators identified in the literature review relevant to the nature of interventions that will guide our investigation and, thus, our understanding.

The framework may be used to guide a diversity of studies and research questions. Used holistically, the framework can guide our investigation of how effective current interventions are at addressing barriers women experience in IT. In-depth case studies provide a holistic investigation in context that will inform us of the nature of interventions and their ability to address the range of barriers that exist. The framework can guide the design of a survey to investigate how women of various backgrounds and organizations employ informal methods and choose to participate in formal interventions to address the barriers they face. The framework can also be used to assess the perceptions of women and men of the characteristics of interventions, especially catalysts, and the extent to which those perceptions determine the participation and support of such interventions. Below is a sample of research questions this framework can inform:

- What barriers persist in the presence or absence of interventions? And to what extent do they persist?
- How effective are particular methods of intervention at minimizing or eliminating specific barriers?
- What catalysts of interventions are associated with more effective outcomes of interventions?
- What is the nature of the relationships between various intervention characteristics? What are the implications of those relationships?
- What is the impact of the presence of metrics and systematic evaluation of intervention effectiveness?

Findings from such studies will inform the design, deployment, and assessment of gender diversity interventions and ultimately improve organizations' ability to retain and advance women in the IT workforce.

Conclusion

Our objective for this paper was to address two needs identified in the literature. First, our paper addresses the limited research investigating the nature and effectiveness of organizational diversity interventions aimed at retaining women in IT as identified in the literature (e.g., Quesenberry and Trauth 2012; Kvasny et al. 2005). Second, we address the need for theoretically sound gender research by presenting a framework to guide investigations of gender interventions that is informed by two established theoretical lenses (IDGIT and Ahuja's Barriers Model). The framework aims to provide us with a better understanding of gender diversity interventions and their effectiveness at mitigating the barriers women in IT face. To this end, our framework for characterizing and evaluating the effectiveness of interventions maps to the diversity of barriers individual women experience. The framework provides a holistic view of interventions, encompassing intervention characteristics, including catalysts and objectives, methods and practices, and measurement and evaluation strategies; barriers women experience in IT; and informal methods of overcoming barriers. The framework provides a theoretical lens to guide further research to assess the effectiveness of interventions at mitigating barriers women face in IT. Studies pursuing this line of inquiry will enhance our understanding of the nature and extent of barriers women face in IT and inform our design, deployment, and evaluation of effective organizational interventions.

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