

Technology Adoption in the Apparel Industry of Bangladesh: A Qualitative Case Study

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Introduction. Technology advancement is reshaping the global structure of the apparel industry (Wang & Ha-Brookshire, 2018). The apparel industry in industrialized and developed countries has technology-intensive activities along with their knowledge support systems (research and development). However, the apparel industry in most of developing countries are still focusing on simple, repetitive, and labor-intensive operations (Stone & Farnan, 2018). The existing literature suggests that technology adoption and implementation of innovation can bring an economically suitable as well as realistic solution to the developing countries (Alvarez et al., 2013; Salam et al., 2019). Being one of the fastest-growing developing countries, Bangladesh has become the second-largest exporter of apparel products in the global apparel market (WTO, 2019). As the Bangladeshi apparel industry is playing a significant role in the global market, this industry's technology adoption-related behavior is worth investigating. Our literature review shows that there is no example of any qualitative case study in the existing literature that focuses on understanding technology adoption in the Bangladeshi apparel industry. Thus, the purpose of this qualitative case study is to understand the technology adoption-related factors and influences perceived by top industry professionals. The study focuses on the insights of top management personnel because they are more knowledgeable about technology development and advancement, technology trends, government policies, and budgets.

Literature Review. Technology, organization, and environment (TOE) framework (Tornatzky & Fleischer, 1990) provides the theoretical grounding for this study. In the TOE framework, three aspects of business context are identified through which a firm adopts and implements technology-related innovations: technological context, organizational context, and environmental context. Technological context defines both the external and internal technologies pertinent to the firm, and it contains existing internal equipment and practices as well as a bunch of accessible external technologies to the firm. Organizational context defines the descriptive measures about the firm like size, scope, and managerial arrangement. Environmental context focuses on the area within which the firm operates its business, more specifically its competitors, communications with the government, and its industry (Tornatzky & Fleischer, 1990).

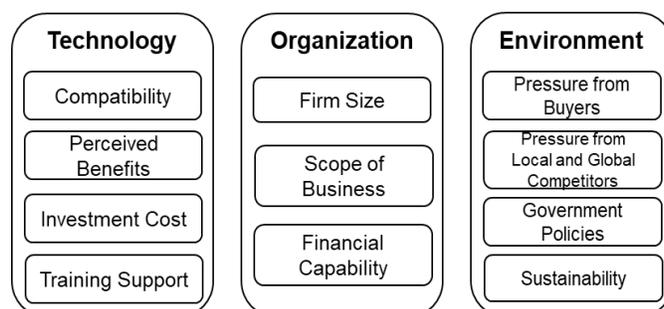
Literature indicates that technology adoption varies across industries as well as countries (Kumar & Siddharthan, 1994). Having more than 80% export income from apparel export, Bangladesh is one of the leading exporters in the global apparel industry (Export Promotion Bureau, 2021). However, Bangladesh's apparel industry is less attracted by researchers. Especially, little research in literature examined the technology adoption issues of the apparel industry of Bangladesh. To the best of our knowledge, Park-Poaps et al. (2020) is the only published article about technology adoption among clothing manufacturers in Bangladesh. However, they used a quantitative study to examine the influences of contextual factors on technology adoption. Due to the unique nature of the apparel industry in Bangladesh, we argue that more in-depth qualitative research is needed to examine Bangladeshi apparel industry practitioners' perspectives regarding technology adoption. Furthermore,

there are no qualitative case studies found in the literature about technology adoption-related behavior of Bangladesh's apparel industry. Our study aims to fill this literature gap.

Method. A qualitative approach was used to collect data for this study. Following the techniques of Eisenhardt (1989) and Seawright and Gerring (2008), the study employed a two-step analytical approach of sampling. At the first step, factories that are export-oriented apparel manufacturers were selected. In the second step, the factories that differ in terms of firm size, owner structure, and scope of business were chosen. Thus, this study includes four cases: two large factories, one medium factory, and one relatively small factory. Out of these four cases, one is woven apparel producer, and the rest are knit apparel manufacturers. This two-step process warrants that a sample is homogeneous and heterogeneous (to a certain degree), aiming to increase external validity (Eisenhardt, 1989; Seawright & Gerring, 2008; Yin, 2018). After getting the IRB approval, a semi-structured in-depth interview was conducted to address the issues related to technology adoption by apparel manufacturers of Bangladesh. The interviewees were the top-level managers of the four apparel manufacturing firms, holding the position of Managing Director/Owner/Executive Director/Director. The interviews were conducted by Zoom software, lasted from 45 to 85 minutes, and were recorded with participants' consent. The questions like “*What kind of benefits do you expect from adopting a new technology?*” and “*What are the factors influencing you to adopt a specific technology? Any example?*” were asked during the interview. All interviews were transcribed. Following the qualitative data analysis approach by Strauss and Corbin (1990), the researchers conducted a within-case analysis to understand technology adoption issues in Bangladesh's apparel firms and a cross-case analysis to identify common patterns among the cases.

Results, Discussion, and Implications. The themes identified are organized according to the TOE framework, as illustrated in Figure 1. Regarding technological context, adoption decision is mainly based on perceived benefits, technical compatibility, investment cost, and availability of training and technical support. All executives consider productivity, quality consistency, and flexibility as the most important perceived benefits when adopting a technology. For example, one executive director stated, “In many ways, it (technology) helps us to improve in many ways, but mostly I can say that it improves the efficiency and quality and optimizes the productivity” (Hossain). For organizational context, firm

Figure 1. Technology Adoption in Bangladesh



size, firm's scope of business, and financial capability are major considerations. The relatively smaller factories are the laggard or late majority (Rogers, 1995) in technology adoption and tend to wait and observe other factories around their network to see whether others are satisfied with a specific technology. As one managing director of a small factory stated, “We always take some time and see how other companies are adopting with that, then we invest on those kinds of technology” (Alam). In terms of environmental context,

pressure from buyers, pressure from local and global competitors, government policies, and

sustainability requirements are the main factors impacting technology adoption decisions. All the participants agreed that buyers always have some influences on adopting new technologies and the factories take those influences positively. The most common example from all the participants was that adopting the 3D modeling technology as suggested by buyers helps them efficiently communicate with their buyers for sample approval.

This study helps the stakeholders of Bangladesh's apparel industry understand the apparel firms' technology adoption behavior and adds insights to the global knowledge domain of technology diffusion and transfer. Findings of the study are also helpful to technology providers in promoting and distributing their newer technologies in the apparel industry.

References

- Alvarez, F. E., Buera, F. J., & Lucas, R. E. J. (2013). Idea flows, economic growth, and trade. *National Bureau of Economic Research*.
- Eisenhardt, K. M. (1989). Building theory from case study research. *Academy of Management Review*, 14(4), 532–550.
- Export Promotion Bureau. (2021). *Export Promotion Bureau of Bangladesh*.
<http://www.epb.gov.bd/>
- Kumar, N., & Siddharthan, N. S. (1994). Technology, firm size and export behaviour in developing countries: The case of Indian enterprises. *The Journal of Development Studies*, 31(2), 289–309. <https://doi.org/10.1080/00220389408422362>
- Park-Poaps, H., Bari, M. S., & Sarker, Z. W. (2020). Bangladeshi clothing manufacturers' technology adoption in the global free trade environment. *Journal of Fashion Marketing and Management*. <https://doi.org/10.1108/JFMM-06-2020-0119>
- Rogers, E. M. (1995). *Diffusion of Innovations*. The Free Press.
- Salam, S., Hafeez, M., Mahmood, M. T., Iqbal, K., & Akbar, K. (2019). The dynamic relation between technology adoption, technology innovation, human capital and economy: comparison of lower-middle-income countries. *Interdisciplinary Description of Complex Systems*, 17(1-B), 146–161.
- Seawright, J., & Gerring, J. (2008). Case selection techniques in case study research – A menu of qualitative and quantitative options. *Political Research Quarterly*, 61(2), 294–308.
- Stone, E., & Farnan, S. A. (2018). *The dynamics of fashion* (5th ed.). Bloomsbury.
- Strauss, A. L., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Sage Publications.
- Tornatzky, L., & Fleischer, M. (1990). *The process of technology innovation*. Lexington Books.
- Wang, B., & Ha-Brookshire, J. (2018). Exploration of digital competency requirements within the fashion supply chain with an anticipation of industry 4.0. *International Journal of Fashion Design, Technology and Education*, 11(3), 333–342.
- WTO. (2019). *International trade and tariff data*. World Trade Organisation.
https://www.wto.org/english/res_e/statis_e/statis_e.htm
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage.