

## The Micro-Factory Model: A Case Study in Entrepreneurship, Slow Fashion, and Sustainability

Barbara Trippeer, HaeJin Gam, and Alisa Otto, University of North Texas

Recent studies in sustainable apparel design and development (e.g., Wells & Orsato, 2005) indicate that fashion firms have increasingly relied on technology and innovation to manage resources as part of a more sustainable supply chain. In response to these challenges, small-scale manufacturers, referred to here as a “micro-factory,” have begun to gain momentum. Wells and Orsato (2005) defined the term *micro-factory* as space where “production and retailing functions combine on one site in small scale facilities” (p.17). The recent pandemic has highlighted many vulnerabilities of the existing fashion system, which often relies on a global supply chain to achieve production goals (Oracle NetSuite, 2021). This paper proposes the framework of the micro-factory as one alternative to meet the needs of apparel design product development because it offers successful approaches to sustainable design and production and tertiary elements involved in sustainability, such as mental health and financial well-being (Earley, 2015; Oracle NetSuite, 2021).

There are many potential sustainable benefits inherent in a micro-factory, such as reducing economic and environmental transportation costs involved in the shipping and sourcing of raw materials and other components. Different approaches in the micro-factory business model may help increase eco-efficiency and support and revitalize the local economy.

Although the micro-factory model makes up only a small percentage of firms in the fashion industry, it has recently begun to emerge as a viable alternative to large-scale design operations. Research presented by Fry et al. (2014) indicates that an increasing number of fashion graduates have started to pursue small business entrepreneurship opportunities post-graduation rather than the more traditional corporate training and practice model. One motivation for this shift toward small business entrepreneurship by emerging design professionals may be a growing dissatisfaction or disillusionment with the global fashion industry system. Many students are turned off by what they perceive as the negative impacts of hyper-globalization. Others express growing concerns that the current fashion system may be both social and environmental unsustainable in its current form. These challenges drive some graduates to seek alternatives to find more creative fulfillment, which allows them to control the end-to-end development process. Fry et al. (2014) ’s interviews with young entrepreneurs revealed that some of their motivations to become small business entrepreneurs included the need to achieve creative satisfaction, realize their drive for innovation, and the urge to practice more socially responsible entrepreneurship (Fry et al., 2014).

Driven by personal beliefs and values, designers working in this new paradigm strive toward reconciling their goals of personal fulfillment with professional achievement in generating new products outside of the mainstream fashion industry dominated by fast fashion. This study seeks to contribute to the knowledge of the entrepreneurial practices of emerging designers, using a micro-factory business model in what is now considered the “slow fashion” approach to apparel design. It also contributes to the emerging studies in fashion and design-

oriented industries, which identify a relationship between value-added craftsmanship and a localized supply chain, indicating a way forward for small-scale manufacturing in contemporary cities (Brydges et al., 2014).

The purpose of this study was to investigate the organization and methods of a company that practices the micro-factory model within American-based manufacturing and production. This company, located in the Southern United States region, produces performance-based ladies' athletic apparel and outdoor clothing using an inclusive size strategy. The documentation through interviews and observation identified opportunities and challenges as a case study. The findings presented here may provide insights into educational opportunities for fashion educators and emerging entrepreneurs interested in exploring the micro-factory apparel business model.

This study employed Brush's entrepreneurship model (1992) to document the case study of a local micro-factory fashion business. Brush's model of entrepreneurship (1992) identifies four strategic factors in a business organization: (a) individual characteristics of business owners, (b) organization of business, (c) business process, and (d) environment to identify the owners of small and medium-sized enterprises. The micro-factory model has often been used to describe how female entrepreneurs operate in the fashion industry (e.g., Horridge & Craig, 2001; Reed et al., 2016).

During interviews, the owner indicated her motivation for starting the micro-factory was to build a sustainable apparel business using limited resources that utilized targeted transparency. Kent highlights that "Fashion has a prominent role to play in solving the challenges of both social and environmental inequities. While fashion brands have stepped up their commitments to operating more responsibly, measuring progress in a comparable, standardized way is a monumental task" (Kent, 2021, p.4). In light of this challenge, we have identified five critical sustainable initiatives which have emerged from our case study findings which we will focus on while discussing this study. The five practices to achieve sustainability goals and practicing transparency which we identified during the interviews with our research participants are as follows; (a) utilizing sustainable materials including sustainable packaging, (b) respecting diversity in customers (size and ethnicity), (c) purchasing certified domestically produced materials and equipment, (d) employing social impact factors (e.g., B-Corp certification and women-owned certification), and (e) responding the gender discrimination (Kent, 2021).

The owner specified that the micro-factory model in fashion also allows for customized responses to consumer-led design applications (Fry et al., 2014). Unlike traditional factory settings, this model allows for frequent changes in product lines and styles and a higher degree of certainty concerning quality control. Using a micro-factory environment, a company can achieve value by producing higher-quality products. It allows for more oversight and has fewer touchpoints as part of its assembly and production process. This more intimate setting may also qualify for more expedited garment manufacturing in the micro-factory model. The individuals involved often perform multiple roles to achieve design and production outputs. Montes and Olleros (2019) also added that the micro-factory model could fill the gap between "artisanal and mass production systems, boost the rate of innovation, and enable the local on-demand fabrication of customized products" (p.72).

This study documents opportunities and challenges in practicing the micro-factory model in women's performance apparel clothing. The findings presented in this study may enable undergraduate fashion design students to meet consumer demand for quality and innovation by offering a more personalized hands-on approach to development and production available through the micro-factory.

## References

- Brush, C. G. (1992). Research on women business owners: Past trends, a new perspective, and future directions. *Entrepreneurship: Theory & Practice*, 16(4), 5-30.
- Brydges, T., Lavanga, M., & von Gunten, L. (2014). Entrepreneurship in the fashion industry: a case study of slow fashion businesses. In A. H. Schramme, *Beyond Frames. Dynamics between the creative industries, knowledge institutions, and the urban context* (pp. 73-79). Delft:Eburon: Academic Press/University of Chicago Press.
- Earley, R. G. (2015). Designing for Fast and Slow Circular Fashion Systems: Exploring Strategies for Multiple and Extended Product Cycles. *PLATE conference: Product Lifetimes and the Economy*. London, UK: University of the Arts.
- Fry, A., Faerm, S., & Arakji, R. (2014). Achieving the new graduate dream: building sustainable business success at a small scale. *Cuadernos del Centro de Estudios en Diseño y Comunicación. Ensayos*, (48), 153-175.
- Horridge, P.E. & Craig, J.S. (2001). Female business owners in apparel manufacturing: An integrative perspective. *Clothing and Textiles Research Journal*, 19(3), 89-102.
- Kent, S. (2021, March 22). The sustainability gap: How fashion measures up. *Business of Fashion*.
- Lang, C., & Liu, C. (2019). The entrepreneurial motivations, cognitive factors, and barriers to become a fashion entrepreneur: A direction to curriculum development for fashion entrepreneurship education. *International Journal of Fashion Design, Technology and Education*, 12(2), 235-246.
- Montes, J. O., & Olleros, F. X. (2019). Microfactories and the new economies of scale and scope. *Journal of Manufacturing Technology Management*.
- Oracle NetSuite. (n.d.). *Localizing your Supply Chain: A Cost-Benefit Analysis* [White Paper]. Oracle. <https://www.netsuite.com/portal/assets/pdf/wp-localizing-your-supply-chain-a-cost-benefit-analysis.pdf>
- Reed, E. & Gam H. J. & Banning J., (2016) "Challenges and Benefits of Made in the USA Manufacturing: A Study of Small Business Owners," *International Textile and Apparel Association Annual Conference Proceedings* 73(1).
- Wells, P., & Orsato, R. J. (2005). Redesigning the industrial ecology of the automobile. *Journal of Industrial Ecology*, 9(3), 15-30.