The Formation Mechanism and Evolutionary Pathways of Data-Driven Core Competence: A Case Study of the New Retail Enterprise SHEIN

Qinghua Hu

School of Business and Management, The Hong Kong University of Science and Technology (HKUST), Hong Kong, China
alice2004813@gmail.com

Abstract. Amidst the wave of the digital economy, the data element is fundamentally reshaping the corporate competitive landscape. Emerging "Ultra-fast Fashion" retailers, epitomized by SHEIN, have risen rapidly through a unique data-driven business model, posing both a challenge and a complement to traditional theories of core competence. This paper aims to dissect the internal composition of "Data-Driven Core Competence" (DDCC) and systematically unveil its formation mechanism and evolutionary path from "data to value." Employing an in-depth single-case study methodology, this research analyzes multi-source secondary data on SHEIN. The findings propose a four-stage dynamic evolution model for DDCC formation: "Data Sensing – Algorithmic Insight – Capability Embedding – Value Co-creation." This model reveals that DDCC is not a static resource but a dynamic capability system, continuously self-reinforced and propelled by a "Data Flywheel." Through digital management that transcends organizational boundaries, SHEIN deeply integrates supply chain members, global consumers, and data elements into a cohesive digital ecosystem, thereby unifying distributed production with centralized management. This has enabled the company to successfully exploit the "attitude-behavior gap" among Gen Z consumers regarding sustainability perceptions and consumption patterns. Theoretically, this study integrates the Resource-Based View (RBV) and the Dynamic Capabilities View (DCV) in the digital consumption context, thereby deepening the understanding of core competence. Practically, it provides an actionable strategic framework and implementation path for enterprises seeking digital transformation, particularly those in cross-border e-commerce and traditional manufacturing.

Keywords: Data-driven, Core Competence, Ultra-fast Fashion, SHEIN, Dynamic Capabilities, Digital Ecosystem

1. Introduction

1.1. Research background

The advent of the digital economy is reshaping the global business landscape with irreversible momentum. Within this paradigm, data has emerged as a key factor of production driving growth [1]. Against this backdrop, the global fashion retail industry is undergoing a profound transformation. Emerging cross-border e-commerce players like SHEIN have pioneered the "Ultra-fast Fashion" model, rapidly ascending to become industry giants on the strength of their astonishing market response speed and cost control capabilities [2]. According to public data, SHEIN captured 50% of the U.S. fast-fashion market in 2022, far exceeding the combined share of ZARA (13%) and H&M (16%) [3]. This phenomenon provokes a critical inquiry: Is SHEIN's success merely a victory of a low-price strategy in an era of traditional retail bottlenecks, or does a novel, inimitable core competence lie behind it? Notably, SHEIN's ascent has been accompanied by significant controversy, particularly concerning environmental sustainability and labor rights [4,5]. Yet, this seems not to have hindered its immense appeal among Gen Z consumers. This paradoxical phenomenon itself constitutes a highly valuable research topic.

1.2. Research questions

Traditional core competence theory emphasizes inimitable, internally accumulated resources and capabilities [6]. However, SHEIN's model demonstrates that its competitiveness is highly dependent on its ability to integrate external data, a decentralized supply chain, and global consumers. Therefore, traditional theoretical frameworks fall short of fully explaining its success. In light of this, this study poses the following core research question:

Main Question: How is a Data-Driven Core Competence (DDCC) formed?

Sub-question 1: What are the key constituent elements of a DDCC?

Sub-question 2: What mechanisms and evolutionary pathways does the formation of a DDCC follow?

Sub-question 3: How does SHEIN cultivate and reinforce its DDCC through digital management that transcends organizational boundaries?

1.3. Significance of the study

The significance of this study is twofold. Theoretically, it responds to the call for a "new interpretation of corporate core capabilities in the digital economy" by attempting to open the "black box" of DDCC formation [1]. It aims to construct a process-based dynamic evolution model, thereby enriching and extending the connotations of the Resource-Based View (RBV) and the Dynamic Capabilities View (DCV) in the digital era. Practically, by providing an in-depth analysis of the SHEIN model, this research offers an actionable analytical framework and transformation pathway for traditional enterprises (especially in apparel manufacturing) facing the challenges of digital transformation [7]. Simultaneously, by revealing the inner logic of its model, this study also provides profound insights for regulators, consumers, and industry practitioners to understand the opportunities and challenges presented by ultra-fast fashion.

2. Literature review and theoretical basis

2.1. The evolution of core competence theory

The study of core competence is rooted in the Resource-Based View (RBV), a theory positing that a firm's sustained competitive advantage derives from its possession of resources that are Valuable, Rare, Inimitable, and Non-substitutable (the VRIO framework) [8]. However, the RBV has been criticized for its static perspective, which struggles to explain how firms adapt and innovate in rapidly changing environments. To address this limitation, Teece proposed the Dynamic Capabilities View (DCV), which emphasizes a firm's ability to integrate, build, and reconfigure internal and external resources to adapt to environmental shifts [9]. The DCV comprises three core dimensions: the ability to Sense market opportunities and threats, the ability to Seize those opportunities, and the ability to Reconfigure organizational resources and structures to maintain competitiveness. This paper will employ the DCV as its primary analytical lens to examine how SHEIN constructs its data-driven core competence.

2.2. Digital transformation and data-driven management

Digital transformation is the process of leveraging digital technologies to reshape business models, organizational processes, and customer experiences [10]. In this process, the role of the data element is paramount. Data is no longer a by-product of business operations but has become a firm's most critical strategic asset [1]. Enterprises can achieve end-to-end management from data acquisition and analysis to value creation by constructing a "data value chain". The "Data Flywheel" concept, proposed by Liu and Wu, vividly illustrates this process: applications generate data, data optimizes models, and models enhance applications, forming a self-reinforcing closed loop [11]. Furthermore, User-Generated Content (UGC), particularly reviews with images, has become a critical source of information influencing consumer decisions and building brand trust [12].

2.3. Relevant research on SHEIN as a case

In recent years, SHEIN, as a phenomenal business case, has garnered widespread attention from scholars both domestically and internationally. Existing research has primarily been conducted from the following perspectives:

Macro-level Strategy and Business Model: Some studies have interpreted SHEIN from a macro-strategic perspective. For instance, Liu employed SWOT analysis and the 4P marketing mix to systematically outline SHEIN's strengths (e.g., rapid new arrivals, low prices, wide product variety), weaknesses (e.g., quality control, logistics), opportunities, and threats, also noting its deficiencies in design sensitivity, social responsibility, and environmental impact [4]. Song utilized the PESTEL model to analyze the macro-political, economic, social, and technological environments affecting SHEIN's development [13]. While these studies provide valuable descriptive frameworks for understanding SHEIN's overall business ecosystem, they do not delve deeply into the internal formation mechanism of its core competence.

Consumer Behavior and Culture: This is the most concentrated area of current research. Scholars have sought to explain the "SHEIN paradox"—why consumers continue to purchase from the brand despite being aware of negative information. The study by Roberti et al found that low prices and style diversity are the primary drivers [2]. Although young consumers are sensitive to sustainability issues, this awareness does not translate into altered purchasing decisions, demonstrating a

significant "attitude-behavior gap [2]." The research by Zimand-Sheiner & Lissitsa further deepens this perspective, finding that negative environmental information does reduce purchase intention through "Perceived Betrayal," but that Gen Z consumers generally lack relevant environmental knowledge [4]. From a consumer culture standpoint, Bak & Sollwedel revealed the "consumer subculture" formed around SHEIN, where consumers exhibit "contradictory appreciation" (e.g., acceptance of both unique styles and knockoffs, perceived high quality alongside low quality) and where impulsive buying is a key feature of their consumption patterns [14]. These studies profoundly reveal the demand-side logic of SHEIN's model, namely its successful capitalization on the psychological and behavioral traits of a specific consumer demographic.

Digital Tools and Supply Chain Management: Other studies focus on the specific tools and organizational methods of SHEIN's operations. The case study by Carr explicitly identifies User-Generated Content (UGC), especially image-based reviews, as a key advantage for SHEIN over competitors like Pretty Little Thing, as it significantly influences the consumer's information search phase and enhances trust [12]. In domestic research, Liu et al proposed its "boundary-spanning digital management" model, detailing how SHEIN uses its proprietary digital system to integrate its vast and dispersed network of suppliers into a highly efficient, collaborative production system [15]. These studies, focusing on the key nodes of "front-end" marketing tools and "back-end" supply chain organization respectively, reveal the concrete implementation methods of SHEIN's data-driven model.

2.4. Literature review summary and positioning of this study

In summary, the existing literature provides insightful analyses of the SHEIN phenomenon from multiple dimensions, including macro-strategy, consumer behavior, marketing tools, and supply chain organization. However, this body of research exhibits a degree of fragmentation. Studies analyzing consumer behavior seldom delve into the organizational logic of its back-end supply chain, while those examining the supply chain model often treat it as a static, pre-existing system, failing to trace how its capabilities are dynamically generated from front-end consumer data.

Few studies have managed to integrate these disparate perspectives—from consumer psychology to supply chain integration, from UGC tools to the business model—into a unified, process-oriented theoretical framework to systematically address the fundamental question of the formation mechanism of "Data-Driven Core Competence." Existing research explains "what" (the business model) and "why" (consumer motivations), but has not fully opened the "black box" of "how" its competence is formed.

Therefore, the positioning of this study is not to simply reiterate existing analyses but to integrate and elevate them. Adopting the DCV as our core framework, we will link the "front-end" of data sensing (consumer data, UGC, etc.) with the "back-end" of capability embedding (agile supply chain) to construct a coherent, multi-stage dynamic evolutionary model. This study endeavors to open the "black box" of DDCC formation, revealing how data flows are transformed into capability flows, ultimately creating a self-reinforcing value-creation loop. This constitutes the core theoretical contribution of this paper.

3. Research design

This study employs an in-depth single-case study methodology. This approach is particularly well-suited for answering process-oriented "how" and "why" questions [16]. As an "extreme" and "prototypical" case of the data-driven, ultra-fast fashion model, SHEIN provides an ideal research

context for theory building. The data for this study is drawn from multi-source secondary materials, including academic literature from databases such as CNKI and Web of Science, in-depth industry reports from sources like 36Kr and Bloomberg, articles from authoritative financial media, and publicly available company information. The data analysis will draw upon the coding principles of grounded theory to conceptualize and categorize the collected case materials. This will be followed by "Pattern Matching" against the theoretical framework constructed in this paper to facilitate a continuous dialogue and iterative refinement between theory and the case data.

4. Case analysis: the formation mechanism and pathways of SHEIN's data-driven core competence

SHEIN's core competence is not a singular technology or resource but rather a dynamic, self-reinforcing system. We propose a four-stage dynamic evolution model—Data Sensing & Acquisition, Algorithmic Insight Generation, Capability Embedding & Process Reconfiguration, and Value Co-creation & Flywheel Effect—to deconstruct its formation process.

4.1. Stage 1: data sensing & acquisition - establishing digital nerve endings

This stage corresponds to the "Sensing" capability within the DCV framework. SHEIN has constructed an omni-directional, boundary-spanning data collection network, with its tentacles reaching into every corner of the global market.

Technological Level: SHEIN utilizes proprietary web crawlers and tools like Google Trends Finder to monitor major e-commerce websites, social media platforms, and fashion blogs worldwide in real-time, capturing micro-trends in colors, patterns, fabrics, and other fashion elements [13].

User Level: This represents SHEIN's most critical data source. First, through its app and website, SHEIN tracks a massive volume of user behavior data in real-time, including browsing, clicks, cart additions, and searches. More importantly, SHEIN masterfully leverages User-Generated Content (UGC). As Carr's study highlights, consumer reviews with images on SHEIN's product pages significantly enhance trust and reduce perceived risk for other potential buyers [12]. This UGC is not merely a marketing tool but also invaluable first-party data, directly reflecting a product's real-world performance and market acceptance.

Social Level: By collaborating with a vast number of micro-influencers (KOCs) and Key Opinion Leaders (KOLs) on platforms like TikTok and Instagram to launch viral marketing campaigns such as #SHEINHaul, SHEIN not only gains immense brand exposure but also transforms social media into a vanguard for sensing fashion trends. This effectively monitors the "consumer subculture" that has formed around its brand [14].

4.2. Stage 2: algorithmic insight generation-building an intelligent decision-making brain

This stage involves transforming the massive, unstructured data collected in the first stage into actionable business directives.

Trend Forecasting and Design Assistance: SHEIN's back-end algorithmic system analyzes, deconstructs, and recombines the collected fashion element data to predict potential bestsellers and automatically generate numerous design prototypes. This frees its design team from tedious foundational work, allowing them to focus on creative optimization and decision-making, enabling an update speed of thousands of new styles per day [17].

Precision Demand Matching: By analyzing user profile data, SHEIN's recommendation algorithm can accurately push new styles to the consumer segments most likely to be interested. Concurrently, the algorithm determines an extremely small initial production order quantity for each new item, typically 100-200 pieces, based on historical sales data and current trend velocity. This lays the foundation for its renowned "small-batch, rapid-response" model.

4.3. Stage 3: capability embedding & process reconfiguration-forging agile organizational muscles

This stage corresponds to the "Reconfiguring" capability of the DCV, where algorithmic insights are solidified into internal and external business processes and core capabilities.

Boundary-Spanning Digital Integration of the Supply Chain: SHEIN's core operational model is what Liu et al. describe as "distributed production, centralized management" [15]. SHEIN itself does not own factories; instead, it provides its proprietary Manufacturing Execution System (MES) to thousands of small and medium-sized garment factories in the Panyu district of Guangzhou. These suppliers receive SHEIN's "small-batch, rapid-response" orders in real-time via the MES, with everything from design specifications and technical requirements to fabric information handled online. Production progress is visible in real-time, and if a product shows signs of becoming a "bestseller" in the market, the system immediately and automatically triggers reorders.

Externalization of Risks and Costs: The corollary to this model is that SHEIN transfers the greatest risks of the traditional apparel industry—inventory risk—as well as significant environmental and social costs, onto its small and medium-sized suppliers in the supply chain [2]. This approach allows SHEIN to maintain an extremely asset-light and operationally agile profile.

4.4. Stage 4: value co-creation & flywheel effect - activating the digital ecosystem

This stage corresponds to the "Seizing" of market opportunities and the realization of value within the DCV.

Market Validation and Value Realization: The "small-batch, rapid-response" model enables SHEIN to test the market at an extremely low cost, achieving a bestseller rate as high as 50% while keeping its unsold inventory rate at around only 10% [17]. The low prices and vast selection of styles precisely cater to Gen Z consumers' demand for fashion, individuality, and value for money [2], driving sales by triggering their impulsive purchasing behavior [14].

Formation of the Data Flywheel: Every purchase, every review, and every UGC photo from a user becomes new data that is fed back into the "Data Sensing" system of Stage 1. This creates a powerful "Data Flywheel": more users bring more data, more data leads to more precise insights, more precise insights result in better products and experiences, which in turn attract more users. This flywheel is the key to the continuous self-reinforcement and iteration of SHEIN's core competence.

Exploiting the "Attitude-Behavior Gap": Research by Zimand-Sheiner and Lissitsa reveals that while Gen Z consumers express concern for sustainability in their values, factors such as price and fashion often dominate their actual consumption behavior, creating an "attitude-behavior gap" [5]. SHEIN's model capitalizes on this gap perfectly. The extreme value and trendy styles it offers make it difficult for consumers to forgo purchasing, even when aware of its negative sustainability information, thus converting potential "Perceived Betrayal" into sustained consumption.

5. Conclusion and discussion

5.1. Research findings

Through an in-depth analysis of the SHEIN case, this study elucidates the formation mechanism of Data-Driven Core Competence (DDCC), yielding three primary findings:

(1) DDCC is a four-stage dynamic evolutionary process. The "Data Sensing – Algorithmic Insight – Capability Embedding – Value Co-creation" model constructed herein systematically reveals the complete pathway through which an enterprise transforms external data into internal core capabilities.

(2) The essence of DDCC is a boundary-spanning digital ecosystem capability. SHEIN's core competence is not confined within the firm's boundaries; rather, it is the ability to construct and operate a digital ecosystem encompassing consumers, suppliers, data, and algorithms. Within this ecosystem, value is co-created by multiple stakeholders.

(3) The "Data Flywheel" is the core engine for the self-reinforcement of DDCC. The vast amount of data generated during the value co-creation process, in turn, propels the optimization and iteration of the entire system, creating a powerful and sustainable positive feedback loop.

5.2. Theoretical contributions

It extends core competence theory. This research posits that in the context of the digital economy and ultra-fast fashion, corporate core competence is evolving from an internal, static resource base to an external, dynamic, ecosystem-based capability for integration and operation. The data element is identified as the nucleus of this new form of competence.

It operationalizes the Dynamic Capabilities View (DCV). The paper provides a detailed illustration of how a firm's "sense-seize-reconfigure" capabilities are actualized in the digital era through the cyclical interplay of "data-algorithm-process," offering fresh empirical evidence for the DCV.

5.3. Managerial implications

For traditional enterprises: Digital transformation must transcend mere technology procurement and pivot towards constructing an ecosystem capable of data exchange and value co-creation with external partners (e.g., suppliers, customers). Process re-engineering and organizational change are critical to this success.

For startups: The "Data Flywheel" DNA should be embedded into the business model from inception. Treating the user feedback and data loop as a core strategic asset, rather than merely a marketing tactic, is essential.

For all managers: It is imperative to enhance "data literacy"—understanding how data drives business decisions—and to be willing to delegate authority to data-driven, intelligent systems. Concurrently, managers must remain highly vigilant of the potential ESG (Environmental, Social, and Governance) risks inherent in such models [18].

5.4. Limitations and future research

This study is subject to several limitations. First, its reliance on publicly available secondary data precluded in-depth internal interviews and field investigations. Second, the generalizability of

findings from a single-case study to other industries requires caution. Finally, while the ESG issues associated with SHEIN were acknowledged, they were not analyzed as a core variable.

Future research could proceed along several avenues: (1) Conducting comparative case studies involving competitors such as Temu and ZARA to test the model's external validity; (2) Employing quantitative methods, like large-scale surveys, to empirically test the causal relationships between the stages proposed in the model; and (3) Undertaking a deeper investigation into the corporate ethics and sustainability challenges inherent in data-driven models, exploring how firms can balance commercial efficiency with social responsibility.

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