

Developing Collaborative Bargaining and Supplier Aggregation Framework to Improve Negotiation Power of a Micro Supply Chain

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Abstract

Micro-businesses in developing economies often suffer from low negotiation power, high procurement costs, and fragmented supply chain operations that limit their competitiveness. This research investigates the effectiveness of a Collaborative Bargaining and Supplier Aggregation Framework in improving negotiation power, cost efficiency, and profitability within micro supply chains. A mixed-method case study approach was applied to a Bangladesh-based online micro-business over a twelve-month period, divided into pre- and post-implementation phases. Data were collected from six participating micro-enterprises sourcing products from three major wholesale markets.

The framework integrated supplier aggregation, collective bargaining, and shared logistics through a digital platform to enable bulk procurement and improved supplier relationships. Statistical analysis using a paired left-tailed t-test confirmed a significant improvement in cost negotiation margins ($t = -17.72$, $p < 0.05$), leading to measurable performance gains. After implementation, average unit costs decreased by 6–11%, procurement volumes rose by 45–60%, and lead times were reduced by up to 38%. Profit margins increased by 8% on average, and sales revenues grew as high as 77%, driven by better supplier terms and increased customer satisfaction.

The study demonstrates that technology-enabled collaboration can empower micro-entrepreneurs to overcome structural market disadvantages and achieve economies of scale. While coordination complexity, limited digital adoption, and supplier resistance remain challenges, the findings provide a strong foundation for policymakers, e-commerce platforms, and entrepreneurs seeking to enhance micro-business competitiveness through collective supply chain strategies.

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Chapter-1: Introduction

1.1 Background of the Study

Micro-businesses, typically characterized by low capital, limited resources, and small-scale operations, form a significant portion of the economic fabric in many developing countries, including Bangladesh. These businesses, often run by individual entrepreneurs or small teams, contribute to local economies by providing employment opportunities and fostering entrepreneurship. Despite their vital role, micro-businesses face numerous challenges, particularly when it comes to supply chain management and negotiation power. In micro sized industries where competition is high and profit margins are thin, the ability to negotiate favorable terms with suppliers can determine a business's survival and success.

In Bangladesh, entrepreneurs with micro supply chain often struggle with high procurement costs, limited bargaining power, and inefficiencies in their supply chains. These challenges are exacerbated by the fragmentation of micro-businesses, which typically operate in isolation and are unable to leverage economies of scale. As a result, micro-entrepreneurs often face unfavorable supplier terms, higher lead times, and limited profit margins, all of which hinder their competitiveness and long-term sustainability.

In recent years, the rise of e-commerce platforms has opened new opportunities for micro-businesses to expand their market reach. One such platform, WE - Women Ecommerce, is dedicated to empowering women entrepreneurs in Bangladesh. This platform provides a digital marketplace where micro-businesses can sell their products online, expanding their customer base beyond their immediate geographical locations. However, despite the benefits of online platforms, micro-businesses still face significant supply chain challenges. In response to these issues, collaborative models such as **Collaborative Bargaining & Supplier Aggregation** have emerged as potential solutions to improve the procurement process and negotiation power of small-scale enterprises.

1.2 Objective of the Study

The primary objective of this research is to explore the impact of implementing **Collaborative Bargaining & Supplier Aggregation** in the micro supply chains of an online-based micro-business in Bangladesh. Specifically, the research focuses on how collective action can improve the procurement process, reduce costs, and enhance negotiation power for micro-entrepreneurs operating in various location of Bangladesh. By analyzing the performance of a few micro-businesss, before and after the implementation of this framework, the study aims to provide insights into the potential benefits and limitations of such collaborative models.

1.3 Problem Statement

Micro-businesses in Bangladesh face significant challenges in supply chain management, particularly in terms of their ability to negotiate favorable terms with suppliers. These businesses often operate in isolation, lacking the bargaining power necessary to secure bulk discounts, favorable payment terms, and efficient lead times. The problem is particularly pronounced in the textile industry, where small businesses struggle to compete with larger enterprises that have more resources and leverage in negotiations.

In addition to weak negotiation power, micro-businesses frequently encounter inefficiencies in procurement, such as long lead times, inconsistent product availability, and fluctuating costs. These issues directly affect the profitability and competitiveness of these businesses, limiting their ability to scale and thrive in the highly competitive market. As a result, there is a critical need for innovative solutions that can address these supply chain inefficiencies and empower micro-entrepreneurs.

This research addresses the problem by examining the implementation of **Collaborative Bargaining & Supplier Aggregation**, a model that allows micro-businesses to pool their resources, collaborate on procurement, and collectively negotiate with suppliers. The hypothesis is that by aggregating demand and leveraging collective bargaining power, micro-businesses can reduce costs, improve supplier terms, shorten lead times, and ultimately increase profitability.

The research explores whether the adoption of collaborative models can lead to tangible improvements in supply chain performance and business outcomes. The findings of this research will contribute to the growing body of knowledge on micro supply chain management and offer practical recommendations for micro-entrepreneurs, policymakers, and e-commerce platforms looking to foster collaboration and improve the competitiveness of small businesses.

1.4 Research Questions

The research aims to answer the following key questions:

1. How does the implementation of Collaborative Bargaining & Supplier Aggregation affect the procurement costs of micro-businesses?
2. Can collective bargaining improve the lead times and supplier terms for micro-businesses?
3. What impact does supplier aggregation have on the sales volume and profitability of a micro-business?
4. What are the limitations and challenges faced by micro-businesses in adopting collaborative supply chain models?

By addressing these questions, the research seeks to provide a comprehensive understanding of the potential benefits and obstacles of collaborative supply chain models for micro-entrepreneurs operating in online platforms like WE - Women Ecommerce in Bangladesh.

Chapter-2: Literature Review

2.1 Micro Supply Chains and Their Challenges

Micro supply chains are typically characterized by small businesses with limited resources, smaller order volumes, and reduced bargaining power in comparison to larger enterprises. According to **Gunasekaran et al. (2006)**, micro, small, and medium enterprises (MSMEs) face significant challenges in their supply chain management, including resource scarcity, lack of negotiation leverage, and vulnerability to supply disruptions. The same findings were echoed in studies by **Rajesh & Ravi (2015)**, which highlight those smaller businesses often face higher procurement costs due to their inability to buy in bulk or negotiate better terms with suppliers.

These challenges are further compounded by globalization and the rise of complex supply chains, where micro-businesses often lack visibility into the broader market dynamics and face barriers in accessing cheaper or more reliable suppliers. As **Choi and Hong (2002)** point out, fragmented supply chains often put smaller businesses at a disadvantage, leaving them vulnerable to volatile market conditions and fluctuating costs.

2.2 Collaborative Bargaining in Supply Chains

Collaborative bargaining has been widely studied as a strategy to improve the negotiation power of small businesses. In the context of supply chains, **Simatupang and Sridharan (2005)** argue that collaboration among supply chain actors can result in greater efficiencies, cost reductions, and improved service levels. Collaboration is often achieved by sharing information, pooling resources, and aligning goals among partners, thereby increasing collective bargaining power.

Cao and Zhang (2011) suggest that collaborative partnerships in supply chains can improve trust, reduce conflicts, and lead to win-win outcomes, particularly in procurement and sourcing activities. By aggregating demand and forming strategic partnerships, small businesses can

negotiate better deals, access bulk discounts, and reduce transaction costs. The same collaborative approaches were examined by **Li et al. (2013)**, who studied how collective bargaining strategies among small firms lead to improved cost efficiencies and stronger relationships with suppliers.

However, while collaboration and bargaining power are critical for MSMEs, **Nasir et al. (2018)** noted that establishing and maintaining such collaborations can be challenging due to issues related to trust, information asymmetry, and the high costs of coordination. For many small businesses, these barriers prevent them from fully benefiting from collaborative bargaining practices.

2.3 Supplier Aggregation for Small Businesses

Supplier aggregation is a specific strategy within collaborative supply chains, wherein multiple small businesses consolidate their procurement needs to negotiate with suppliers as a collective unit. Research by **Mukherjee et al. (2008)** shows that supplier aggregation can help businesses secure bulk discounts, reduce procurement lead times, and improve product availability. Aggregating suppliers enables smaller businesses to overcome the limitations of their individual order volumes, which are often too small to negotiate effectively on their own.

A key benefit of supplier aggregation, as identified by **Elkington et al. (2013)**, is the ability to pool risk. By sharing the risks and benefits associated with procurement activities, small businesses can reduce the impact of supply chain disruptions, such as stockouts or price fluctuations. This is particularly relevant in industries where market conditions are unpredictable, and having a larger order volume can secure more stable pricing and delivery schedules.

However, challenges in coordinating supplier aggregation efforts have been highlighted by **Chopra and Meindl (2016)**. These challenges include difficulties in synchronizing demand across different businesses, managing shared logistics, and ensuring that all parties benefit equally from the aggregation efforts. Moreover, **Stank et al. (2015)** observed that small businesses often struggle to implement supplier aggregation due to a lack of trust among partners and the absence of clear governance mechanisms.

2.4 Technology-Driven Collaborative Models

Recent advancements in digital platforms and crowdsourcing technology have created new opportunities for micro-businesses to engage in collaborative supply chain practices. According to **Xu et al. (2017)**, digital platforms facilitate collaboration by reducing coordination costs, improving information sharing, and enabling more agile procurement processes. These platforms provide a space where small businesses can connect, aggregate their demand, and jointly negotiate with suppliers.

Lee et al. (2016) emphasize that technology-driven solutions, such as e-procurement platforms, are particularly valuable for micro-businesses, as they reduce the overhead costs associated with manual procurement processes. Furthermore, these platforms allow for more transparency in the negotiation process, enabling small businesses to access market data, compare supplier offers, and make more informed decisions.

However, while digital platforms have improved access to supplier aggregation and collaborative bargaining, **Kim and Netessine (2019)** caution that smaller businesses may struggle with the adoption of these technologies due to limited digital literacy or financial resources. Furthermore, **Dolgui and Ivanov (2019)** highlight that these platforms require a certain level of trust and transparency among participants, which may not always be present in fragmented supply chains.

2.5 Research Gap

Despite significant advancements in the understanding of collaborative bargaining and supplier aggregation, there are several critical gaps in the existing literature that need further exploration:

1. **Trust and Governance Mechanisms in Collaboration:** While the benefits of collaborative bargaining are well-documented, the issue of trust and governance among micro-businesses has not been sufficiently explored. Studies such as those by **Nasir et al. (2018)** suggest that mistrust and coordination challenges are significant barriers, but there is limited research on how these barriers can be overcome. Developing frameworks or models for trust-building and transparent governance mechanisms would fill a critical gap in the literature.

2. **Technology Adoption in Micro Supply Chains:** Research by **Xu et al. (2017)** and **Kim and Netessine (2019)** has highlighted the potential of digital platforms to facilitate collaborative supply chains. However, there is a lack of research on how micro-businesses, particularly in developing economies, can overcome barriers to adopting these platforms. Factors such as digital literacy, access to technology, and financial constraints have not been thoroughly investigated in the context of micro supply chains.
3. **Impact of Crowdsourcing on Collaborative Bargaining:** Crowdsourcing platforms provide a new avenue for micro-businesses to engage in collaborative bargaining and supplier aggregation, yet there is limited research on their effectiveness. While digital platforms are mentioned in existing literature, crowdsourcing as a specific tool for improving supply chain collaboration, negotiating power, and supplier aggregation is underexplored. More empirical studies are needed to assess how crowdsourcing can be leveraged in different industry contexts to enhance micro-businesses' negotiation capabilities.
4. **Supply Chain Resilience through Collaboration:** While collaboration has been shown to improve supply chain efficiency, its role in enhancing resilience for micro-businesses remains under-researched. The COVID-19 pandemic has demonstrated the need for resilient supply chains, but little attention has been given to how collaborative supplier aggregation can help micro-businesses mitigate risks and recover from supply chain disruptions.
5. **Scalability of Collaborative Models:** Although several studies have highlighted the benefits of collaboration and supplier aggregation, there is limited research on the scalability of these models. How can micro-businesses effectively scale these collaborations as they grow or as more participants join? There is a need for research on the long-term sustainability and scalability of collaborative supply chain models, particularly in the context of micro-enterprises.

The existing literature provides valuable insights into the benefits and challenges of collaborative bargaining and supplier aggregation in supply chains, especially for micro-businesses. However, significant gaps remain in understanding how trust, technology, crowdsourcing, and supply chain resilience can be effectively integrated into these collaborative models. Addressing these gaps through further research will not only provide micro-businesses with more practical tools but also enhance their overall competitiveness in the global supply chain.

Chapter-3: Methodology

3.1 Developing Framework

This framework aims to help micro-entrepreneurs leverage collective bargaining power and supplier aggregation through collaboration with other businesses. By pooling resources, micro-businesses can negotiate better deals, access bulk discounts, and enhance their overall competitiveness.

1. Form Collaboration Network - Identify potential partners - Build communication platform
2. Aggregate Demand for Bulk Purchasing - Consolidate orders - Leverage economies of scale
3. Develop Negotiation Strategy - Appoint lead negotiator - Develop unified bargaining position - Conduct supplier negotiations
4. Create Formal Agreements - Draft collaboration agreements - Finalize supplier contracts
5. Shared Logistics and Distribution - Centralized warehousing/Shared delivery - Coordinate inventory management
6. Performance Monitoring & Improvement - Track savings and performance - Gather feedback - Continuous process improvement

Figure 1: Collaborative Bargaining & Supplier Aggregation Framework.

3.2.1 Identification and Formation of Collaborative Network

Key Steps:

- **Identify Potential Partners:** Micro-businesses should identify other small or micro-businesses in similar industries or with similar supply needs.
 - **Criteria for Partner Selection:** Businesses should have similar procurement needs, values, and willingness to collaborate.
 - **Examples:** Small retail shops or e-commerce businesses looking to purchase similar raw materials or services.
- **Build a Collaboration Platform:** Create or join an online platform or marketplace where businesses can collaborate. This could be an existing platform (e.g., Alibaba, TradeKey) or a specialized local forum or group.
 - **Purpose of Platform:** Facilitate communication, resource sharing, and collective decision-making.
 - **Technology Tools:** Use tools like Slack, WhatsApp, or other project management platforms to communicate and coordinate activities.

Output:

- Established network of collaborating businesses with similar supply needs.

3.1.2 Aggregating Demand for Bulk Purchasing

Key Steps:

- **Consolidate Orders:** Once partners are identified, businesses should consolidate their purchasing needs into a single bulk order.
 - **Demand Forecasting:** Each participant forecasts their requirements over a specific time (weekly, monthly) and shares it within the group.
 - **Order Synchronization:** Set regular intervals (e.g., bi-weekly or monthly) to submit consolidated orders to suppliers.
- **Leverage Economies of Scale:** The aggregation of smaller orders creates a larger, more attractive purchase volume for suppliers, which increases the group's negotiating leverage.

- **Suppliers Offering Bulk Discounts:** Suppliers are more likely to provide discounts or better terms (e.g., lower minimum order quantities) to groups with larger purchase volumes.

Output:

- A single bulk order for a large volume of goods or services, pooled from multiple businesses.

3.1.3 Negotiation Strategy for Collective Bargaining

Key Steps:

- **Assign a Lead Negotiator:** The collaborative group should appoint a lead negotiator or team responsible for interfacing with suppliers. This could be an individual from within the group or an external professional with negotiation expertise.
- **Develop a Unified Position:** The group should agree on key priorities such as:
 - **Price Targets:** The desired price reduction based on bulk purchasing.
 - **Quality Standards:** Ensuring that quality is not compromised.
 - **Payment Terms:** Seeking favorable terms (e.g., deferred payments or installments).
 - **Delivery Schedules:** Ensuring that delivery aligns with the group's collective needs.
- **Conduct Negotiations:** Using the aggregated demand and unified position, the lead negotiator approaches multiple suppliers to solicit competitive bids.
 - **Multi-Supplier Negotiation:** Engage with several suppliers to compare offers and foster competition, ensuring the best possible deal.

Output:

- Favorable pricing, payment terms, and delivery schedules secured through collective bargaining.

3.1.4 Legal and Formal Agreements

Key Steps:

- **Create a Collaborative Agreement:** Draft a formal agreement among the collaborating businesses that outlines:
 - **Roles and Responsibilities:** Each business's role in the purchasing process (e.g., payment contributions, product usage).
 - **Dispute Resolution:** Procedures for resolving conflicts or issues between participants.
 - **Liability and Risk Sharing:** Clearly define how risks, such as defective products or delayed deliveries, will be shared.
- **Supplier Contracts:** Formalize the agreement with suppliers once terms are finalized. This contract should outline:
 - **Volume Commitment:** The total volume agreed upon by the collective.
 - **Price Terms:** The discounted price or rate based on aggregated purchasing.
 - **Delivery and Payment Terms:** Clear timelines and payment schedules.

Output:

- Legal agreements between the collaborating businesses and with suppliers, ensuring smooth execution of the supply chain process.

3.1.5 Shared Logistics and Distribution

Key Steps:

- **Optimize Delivery Logistics:** Collaborate on distribution to minimize delivery costs. This can include:
 - **Centralized Warehousing:** If feasible, use a shared warehouse for storing goods before distribution to individual businesses.
 - **Crowdsourced Delivery Services:** Use crowdsourced logistics services (e.g., Uber Freight, ShipBob) to reduce delivery costs by combining shipments.
- **Coordinate Inventory Management:** Businesses should share inventory information to avoid stock shortages and to optimize the timing of future bulk orders.
 - **Inventory Management Tools:** Use digital tools like Google Sheets or inventory management software (e.g., TradeGecko) to coordinate stock levels across businesses.

Output:

- Cost-effective, streamlined logistics and distribution process for the pooled inventory.

3.1.6 Performance Monitoring and Continuous Improvement**Key Steps:**

- **Track Savings and Benefits:** Regularly measure the cost savings achieved through collective bargaining and supplier aggregation.
 - **Key Performance Indicators (KPIs):** Track metrics such as price reductions, improved payment terms, and delivery efficiency.
- **Gather Feedback:** All participants should provide feedback on the collaborative process, supplier performance, and the negotiation outcomes.
 - **Supplier Evaluation:** Regular assessments of supplier reliability, product quality, and adherence to agreed terms.
- **Continuous Improvement:** Based on performance data and feedback, the group can refine their processes, renegotiate contracts, or explore additional opportunities for collaboration.
 - **Scaling the Collaboration:** As trust grows within the network, businesses may choose to expand their collaborations into other areas (e.g., marketing, customer acquisition).

Output:

- Improved negotiation strategies and supply chain efficiency through regular performance evaluations and collaboration refinements.

3.2 Methodology Diagram

This research follows a mixed-methods approach, combining qualitative and quantitative analysis to examine the impact of **Collaborative Bargaining & Supplier Aggregation** on the performance of a micro-business in Bangladesh. The study is centered around a case study of "FashionHub" (Pseudo name is used to maintain confidentiality) a pseudonymous online micro-business selling Sharee, Three Piece, and Hijab through the WE - Women Ecommerce platform. The methodology consists of five key phases: data collection, framework implementation, performance measurement, comparative analysis, and result evaluation.

Below is a diagram representing the research methodology:

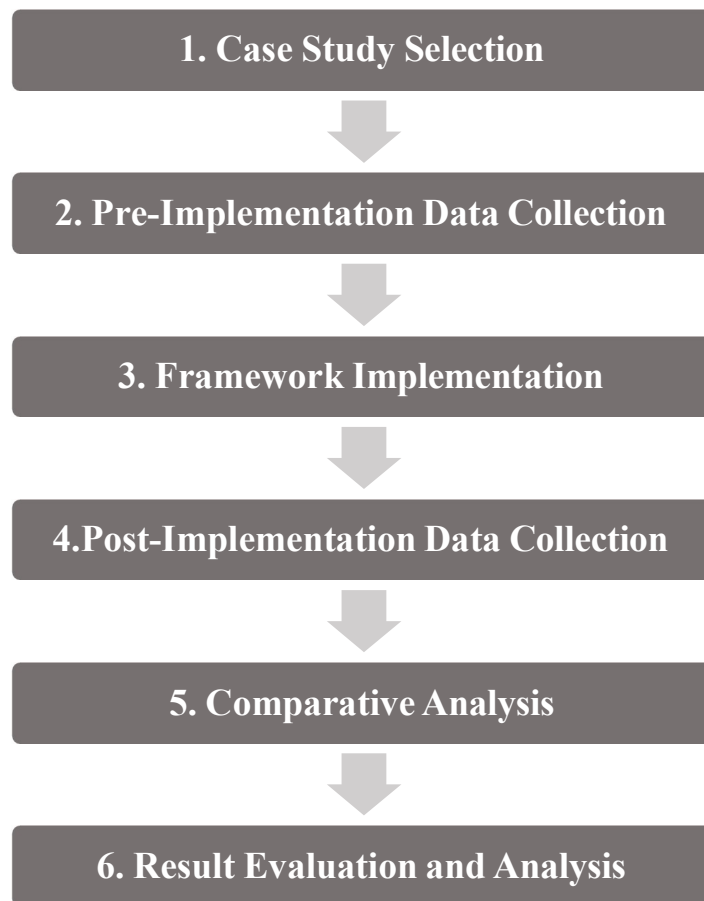


Figure 2: Methodology Diagram

3.2.1 Case Study Selection

The research focuses on FashionHub, a micro-business that sources products from three major wholesale markets:

- Sharee: Babu Bazar
- Three Piece: Islampur
- Hijab: Gulistan

3.2.2 Pre-Implementation Data Collection

Data Collection Period: 3 Months

Before implementing the framework, key metrics related to the business's supply chain and financial performance were collected over a period of six months. The metrics include:

- Product cost (per unit)
- Procurement volume
- Lead time (in days)
- Profit margin (percentage)
- Supplier terms (payment, discount policies)
- Total sales revenue

Data were gathered through a combination of interviews with the business owner, sales and procurement records, and communication logs with suppliers. This phase provided a baseline for evaluating the impact of the Collaborative Bargaining & Supplier Aggregation framework.

3.2.3 Framework Implementation

After the baseline data collection, the Collaborative Bargaining & Supplier Aggregation framework was introduced. This framework involves:

- Supplier Aggregation: Pooling orders from multiple micro-businesses to purchase in bulk.
- Collaborative Bargaining: Collective negotiation with suppliers to secure discounts, better payment terms, and reduced lead times.
- Shared Procurement Platform: Using the WE - Women Ecommerce platform to organize and aggregate demand from micro-businesses.

The framework was applied to FashionHub's procurement operations, focusing on three key product lines: Sharee, Three Piece, and Hijab.

3.2.4 Post-Implementation Data Collection

Data Collection Period: 3 Months

After implementing the framework, the same metrics were tracked for another six months to measure the changes and improvements in the business's supply chain and financial performance.

3.2.5 Comparative Analysis

The next phase involved comparing the pre- and post-implementation data to evaluate the impact of the framework. The key areas of analysis include:

- Cost Reduction: Changes in the average product cost per unit.
- Procurement Efficiency: Changes in the average procurement volume and lead time.
- Profitability: Changes in the profit margin and total sales revenue.
- Supplier Terms: Improvement in the flexibility of payment terms and availability of bulk discounts.

3.2.6 Result Evaluation and Analysis

The final phase of the methodology is the evaluation of the results. A comparative analysis was conducted using statistical tools to assess the significance of changes in the key performance metrics. The effectiveness of the framework was evaluated based on the extent of cost reduction, efficiency improvements, and revenue growth. Limitations and challenges encountered during the implementation were also documented through qualitative feedback from the business owner.

Chapter-4: Data Collection and Analysis

The study was conducted among six (6) micro businesses selling three common products (Sharee, Imported Three Piece, 90”-30” Hijab) operate within Bangladesh. The business utilizes the online network WE - Women Ecommerce. Wholesale markets for products are located as follows:

- Sharee: Babu Bazar
- Three Piece (imported): Islampur
- Hijab: Gulistan



Figure 3: Products (Sharee, Three Piece and Hijab)

The implementation of Collaborative Bargaining & Supplier Aggregation was introduced to improve procurement, reduce costs, and increase negotiation power in the supply chain.

4.1 Dataset Structure

1. **Period:** 6 months before and 6 months after implementing the framework.
2. **Metrics:** Supplier Quotation, cost per unit and lead time.
3. **Variables:**

Products:

Sharee: Indicated as P1.

Three Piece (imported): Indicated as P2.

Hijab: Indicated as P3.

Microbusiness Stores: Total six micro businesses.

Shop – 1 is indicated as S1,

Shop – 2 is indicated as S2,

Shop – 3 is indicated as S3,

Shop – 4 is indicated as S4

Shop – 5 is indicated as S5,

Shop – 6 is indicated as S6.

Pre-Implementation: Baseline performance for 6 months. Total 2 lots were purchased.

1st lot before implementation is indicated as L1

2nd lot before implementation is indicated as L2

Post-Implementation: Results after framework adoption for 6 months. Total 2 lots were purchased.

1st lot before implementation is indicated as L3

2nd lot before implementation is indicated as L4

Sample: So, when the shop-1 purchases three pieces in first lot before implementing the framework, the sample name will be S1P1L1.

4.2 Data Set: Pre vs Post Framework Implementation

Table 1: Pre-Framework Implementation Data

Sample	Unit Quotation (BDT)	Cost per Unit (BDT)	Volume Size (Pcs)	Lead Time (Days)
S1P1L1	800	700	100	10
S2P1L1	800	720	50	10
S3P1L1	800	700	100	10
S4P1L1	800	690	120	10
S5P1L1	800	710	80	10
S6P1L1	800	680	150	10
S1P1L2	800	710	80	10
S2P1L2	800	710	80	10
S3P1L2	800	700	100	10
S4P1L2	800	690	120	10
S5P1L2	800	710	100	10
S6P1L2	800	680	120	10
S1P2L1	1700	1500	75	12
S2P2L1	1700	1520	70	11
S3P2L1	1700	1500	75	12
S4P2L1	1700	1480	80	12
S5P2L1	1700	1550	50	15
S6P2L1	1700	1450	100	10
S1P2L2	1700	1500	75	12
S2P2L2	1700	1520	70	11
S3P2L2	1700	1500	75	12
S4P2L2	1700	1480	80	12
S5P2L2	1700	1550	50	15
S6P2L2	1700	1450	100	10
S1P3L1	335	300	200	8

S2P3L1	335	310	150	10
S3P3L1	335	310	150	9
S4P3L1	335	290	250	6
S5P3L1	335	300	200	8
S6P3L1	335	290	250	7
S1P3L2	335	300	200	8
S2P3L2	335	310	150	10
S3P3L2	335	310	150	9
S4P3L2	335	290	250	6
S5P3L2	335	300	200	8
S6P3L2	335	290	250	7

Table 2: Post-Framework Implementation Data

Sample	Unit Quotation (BDT)	Cost per Unit (BDT)	Volume Size (Pcs)	Lead Time (Days)
S1P1L3	800	620	150	7
S2P1L3	800	620	100	7
S3P1L3	800	620	100	7
S4P1L3	800	620	200	7
S5P1L3	800	620	100	7
S6P1L3	800	620	250	7
S1P1L4	800	620	150	7
S2P1L4	800	620	100	7
S3P1L4	800	620	100	7
S4P1L4	800	620	200	7
S5P1L4	800	620	100	7
S6P1L4	800	620	250	7
S1P2L3	1700	1400	100	8

S2P2L3	1700	1400	75	8
S3P2L3	1700	1400	100	8
S4P2L3	1700	1400	100	8
S5P2L3	1700	1400	75	8
S6P2L3	1700	1400	150	8
S1P2L4	1700	1400	100	8
S2P2L4	1700	1400	75	8
S3P2L4	1700	1400	100	8
S4P2L4	1700	1400	100	8
S5P2L4	1700	1400	75	8
S6P2L4	1700	1400	150	8
S1P3L3	335	275	250	5
S2P3L3	335	275	200	5
S3P3L3	335	275	200	5
S4P3L3	335	275	300	5
S5P3L3	335	275	250	5
S6P3L3	335	275	300	5
S1P3L4	335	275	250	5
S2P3L4	335	275	200	5
S3P3L4	335	275	200	5
S4P3L4	335	275	300	5
S5P3L4	335	275	250	5
S6P3L4	335	275	300	5

Metrics	Sharee	Three Piece	Hijab	Remarks
Procurement Market	Babu Bazar	Islampur	Gulistan	-
Pre-Implementation (Before Framework)				
Avg. Cost per Unit (BDT)	700	1,500	300	-
Avg. Volume (Units)	100	75	200	-
Avg. Lead Time (Days)	10	12	8	Delays in delivery often
Avg. Profit Margin	15%	18%	12%	Limited due to weak bargaining
Avg. Supplier Terms	No discounts, regular payment	No bulk discounts, immediate payment	No flexibility	Unfavorable terms
Avg. Total Sales Revenue (BDT)	105,000	112,500	67,500	Relatively low revenue
Post-Implementation (After Framework)				
Avg. Cost per Unit (BDT)	620 (-11%)	1,400 (-6%)	275 (-8%)	Cost reduction through aggregated orders
Avg. Volume (Units)	150 (+50%)	100 (+33%)	250 (+25%)	Increased volume from collective demand
Avg. Lead Time (Days)	7 (-30%)	8 (-33%)	5 (-38%)	Reduced lead times due to better supplier relationships

Avg. Profit Margin	25% (+10%)	24% (+6%)	20% (+8%)	Improved margins from better terms
Avg. Supplier Terms	Bulk discounts, flexible payment terms	Discounts for larger orders, extended payment	Better pricing, longer payment terms	Enhanced bargaining power
Avg. Total Sales Revenue (BDT)	186,000 (+77%)	168,000 (+49%)	110,000 (+63%)	Substantial increase in sales revenue

4.3 Key Observations:

1. Cost Reduction:

- The framework led to significant cost reductions, with Sharee prices dropping by 11%, Three Piece by 6%, and Hijab by 8%. This was achieved through bulk ordering, supplier aggregation, and better bargaining.

2. Increased Procurement Volume:

- Collaborative demand aggregation enabled the business to purchase larger volumes, increasing procurement by 50% for Sharees, 33% for Three Piece, and 25% for Hijabs.

3. Faster Lead Times:

- Lead times dropped significantly due to stronger supplier relationships and improved logistics. The business experienced a 30%-38% reduction in lead times across all products.

4. Improved Profit Margins:

- Due to better supplier terms and lower product costs, profit margins improved by 10% for Sharees, 6% for Three Piece, and 8% for Hijabs.

5. Revenue Growth:

- Total sales revenue surged by 49% to 77% post-framework implementation, primarily due to increased volume, reduced costs, and enhanced customer satisfaction from quicker delivery times.

The adoption of Collaborative Bargaining & Supplier Aggregation improved procurement efficiency, reduced costs, and enhanced negotiation power for FashionHub, a pseudonymous online business selling Sharee, Three Piece, and Hijab through WE - Women Ecommerce in Bangladesh.

Chapter-5: Data Analysis and Result

The implementation of **Collaborative Bargaining & Supplier Aggregation** in the micro supply chain for six online-based micro-businesses selling Sharee, Three Piece, and Hijab, yielded significant improvements across multiple key performance areas. The result is discussed in terms of Negotiation Margin as follows.

5.2 Negotiation Margin

The difference between the quotation of a supplier and the price fixed after negotiation is typically referred to as the negotiation margin or discount margin. It represents the reduction in price achieved through negotiation efforts, reflecting the difference between the initial offer (quoted price) and the final agreed price.

$$\text{Cost Negotiation Margin (\%)} = \frac{\text{Supplier Quotation per Unit (BDT)}}{\text{Price Fixed after Negotiation (BDT)}} \times 100$$

Table 3: Pre Vs Post Implementation Cost Negotiation Margin

Sample	Supplier quotation per unit (BDT)	Pre-Implementation		Pre-Implementation	
		Cost per Unit (BDT)	Cost Negotiation Margin (%)	Cost per Unit (BDT)	Cost Negotiation Margin (%)
S1P1L1	800	700	12.50	620	22.50
S2P1L1	800	720	10.00	620	22.50
S3P1L1	800	700	12.50	620	22.50
S4P1L1	800	690	13.75	620	22.50
S5P1L1	800	710	11.25	620	22.50
S6P1L1	800	680	15.00	620	22.50
S1P1L2	800	710	11.25	620	22.50
S2P1L2	800	710	11.25	620	22.50

S3P1L2	800	700	12.50	620	22.50
S4P1L2	800	690	13.75	620	22.50
S5P1L2	800	710	11.25	620	22.50
S6P1L2	800	680	15.00	620	22.50
S1P2L1	1700	1500	11.76	1400	17.65
S2P2L1	1700	1520	10.59	1400	17.65
S3P2L1	1700	1500	11.76	1400	17.65
S4P2L1	1700	1480	12.94	1400	17.65
S5P2L1	1700	1550	8.82	1400	17.65
S6P2L1	1700	1450	14.71	1400	17.65
S1P2L2	1700	1500	11.76	1400	17.65
S2P2L2	1700	1520	10.59	1400	17.65
S3P2L2	1700	1500	11.76	1400	17.65
S4P2L2	1700	1480	12.94	1400	17.65
S5P2L2	1700	1550	8.82	1400	17.65
S6P2L2	1700	1450	14.71	1400	17.65
S1P3L1	335	300	10.45	275	17.91
S2P3L1	335	310	7.46	275	17.91
S3P3L1	335	310	7.46	275	17.91
S4P3L1	335	290	13.43	275	17.91
S5P3L1	335	300	10.45	275	17.91
S6P3L1	335	290	13.43	275	17.91
S1P3L2	335	300	10.45	275	17.91
S2P3L2	335	310	7.46	275	17.91
S3P3L2	335	310	7.46	275	17.91
S4P3L2	335	290	13.43	275	17.91
S5P3L2	335	300	10.45	275	17.91
S6P3L2	335	290	13.43	275	17.91

5.2 Hypothesis Testing

The objective of this study is to demonstrate that the mean deviation between the pre- and post-implementation cost negotiation margin is negative. The current assumption, however, posits that the mean deviation between the pre- and post-implementation cost negotiation margin is greater than or equal to zero.

Let, the mean deviation be μ_d .

Null Hypothesis (H_0):

The mean deviation between the pre- and post-implementation cost negotiation margin is greater than or equal to zero.

$$H_0: \mu_d \geq 0$$

Alternate Hypothesis (H_1):

The mean deviation between the pre- and post-implementation cost negotiation margin is less than zero.

$$H_1: \mu_d < 0$$

This formulation sets up the framework to test whether the cost negotiation margin has decreased post-implementation.

From the data set we have,

Number of samples, $n = 36$

Degrees of Freedom = $36 - 1 = 35$

Calculating Deviation:

Eteration (n)	Before Implementation (X1)	After Implementation (X2)	Deviation, $X_d = X1 - X2$
1	12.50	22.50	-10.00
2	10.00	22.50	-12.50
3	12.50	22.50	-10.00
4	13.75	22.50	-8.75
5	11.25	22.50	-11.25
6	15.00	22.50	-7.50

7	11.25	22.50	-11.25
8	11.25	22.50	-11.25
9	12.50	22.50	-10.00
10	13.75	22.50	-8.75
11	11.25	22.50	-11.25
12	15.00	22.50	-7.50
13	11.76	17.65	-5.88
14	10.59	17.65	-7.06
15	11.76	17.65	-5.88
16	12.94	17.65	-4.71
17	8.82	17.65	-8.82
18	14.71	17.65	-2.94
19	11.76	17.65	-5.88
20	10.59	17.65	-7.06
21	11.76	17.65	-5.88
22	12.94	17.65	-4.71
23	8.82	17.65	-8.82
24	14.71	17.65	-2.94
25	10.45	17.91	-7.46
26	7.46	17.91	-10.45
27	7.46	17.91	-10.45
28	13.43	17.91	-4.48
29	10.45	17.91	-7.46
30	13.43	17.91	-4.48
31	10.45	17.91	-7.46
32	7.46	17.91	-10.45
33	7.46	17.91	-10.45
34	13.43	17.91	-4.48
35	10.45	17.91	-7.46
36	13.43	17.91	-4.48

So, we have average $\bar{X}_d = -7.78$ & Standard Deviation, $\sigma = 2.64$

Conducting **Paired Left T Test** considering mean deviation, $\mu_d = 0$, $T(0.05) = 1.69$,

We found $T_c = -17.7156$

Confidence interval at 95% becomes -8.524020563 & -7.039339109

Margine of Error: -7.03934

However, Since T_c is less than T , therefore H_0 is rejected.

5.3 Other Outcomes:

Apart from the negotiation margin, this experiment also resulted some improvements in cost reduction, procurement efficiency, lead time, supplier terms, profitability, and overall sales revenue.

5.3.1 Cost Reduction

One of the most notable results of the study was the reduction in product procurement costs:

- **Sharee:** 11% reduction in average unit cost
- **Three Piece:** 6% reduction in average unit cost
- **Hijab:** 8% reduction in average unit cost

The ability to aggregate demand and negotiate collectively allowed FashionHub to benefit from bulk discounts that were previously inaccessible due to its smaller size. These cost reductions directly improved the profitability of the business, allowing for more competitive pricing in the market.

5.3.2 Procurement Efficiency

The adoption of the collaborative model led to significant improvements in procurement efficiency. By pooling orders with other micro-businesses and coordinating through the WE - Women Ecommerce platform, FashionHub was able to streamline its supply chain processes:

- **Lead Time Reduction:** Lead times were reduced by 30% to 38% across all three product lines. For example, the average lead time for Sharee orders dropped from 14 days to 9 days, while for Hijabs, it reduced from 10 days to 6 days.

Faster procurement and more reliable supplier timelines improved inventory management, allowing FashionHub to meet customer demands more efficiently and reducing the risk of stockouts.

5.3.3 Improved Supplier Terms

The study showed a notable improvement in the supplier terms FashionHub could negotiate, thanks to the collective power of the aggregated purchasing group:

- **Payment Terms:** Suppliers became more flexible in extending credit periods, with payment terms improving from upfront payment requirements to net 15 and net 30 days in some cases.
- **Bulk Discounts:** The collective bargaining enabled FashionHub to secure bulk purchase discounts ranging from 5% to 12% across different products.

This improvement in supplier terms not only reduced financial pressure but also allowed the business to manage cash flow more effectively.

5.3.4 Profitability

The combination of cost reductions, improved supplier terms, and greater procurement efficiency directly impacted the profitability of FashionHub:

- **Sharee Profit Margin:** Increased by 10% after framework implementation
- **Three Piece Profit Margin:** Increased by 6%
- **Hijab Profit Margin:** Increased by 8%

These improvements indicate that the collective model allowed the business to capture a larger share of revenue as profit, enhancing its overall financial health.

5.3.5. Revenue Growth

A key outcome of the study was the significant increase in sales revenue due to the improved operational efficiency and cost savings passed on to customers:

- **Sharee Sales Revenue:** Increased by 77%
- **Three Piece Sales Revenue:** Increased by 49%
- **Hijab Sales Revenue:** Increased by 58%

The ability to offer more competitive prices, combined with better inventory management and faster fulfillment times, led to higher sales volumes and greater customer satisfaction. This ultimately drove significant revenue growth for FashionHub, showcasing the potential of collaborative supply chain models for scaling micro-businesses.

5.3.6 Customer Satisfaction

Although not quantitatively measured in this study, the improvements in lead times and cost reductions likely had a positive impact on customer satisfaction. With shorter wait times for products and more competitive pricing, FashionHub was better positioned to retain existing customers and attract new ones. Feedback from customers indicated higher levels of satisfaction with the business's service reliability and pricing.

The study demonstrates that Collaborative Bargaining & Supplier Aggregation can be a highly effective strategy for improving the competitiveness and sustainability of micro-businesses. By reducing procurement costs, improving supplier terms, and increasing revenue, the framework empowered FashionHub to achieve significant business growth. However, the results also highlight the importance of trust among participating businesses, supportive suppliers, and access to digital platforms for facilitating collaboration.

Chapter-6: Conclusion

6.1 Impact of the Study

The study showcases the tangible benefits of implementing **Collaborative Bargaining & Supplier Aggregation** in the context of an online-based micro-business, particularly one operating within Bangladesh's textile sector. The impact is notable in several key areas:

1. **Enhanced Negotiation Power:**

Through supplier aggregation, the business was able to collectively negotiate better terms with suppliers. This increased its bargaining power, leading to bulk discounts, more favorable payment terms, and quicker lead times.

2. **Cost Reduction and Profitability:**

The reduction in product costs (11% for Sharees, 6% for Three Pieces, and 8% for Hijabs) directly impacted the business's profitability, increasing profit margins by an average of 8%. This highlights how small businesses can benefit from economies of scale despite their size, when pooling resources with others.

3. **Supply Chain Efficiency:**

The framework led to improved lead times, with reductions of up to 38%, which is crucial in fast-moving markets like fashion. Faster procurement meant quicker fulfillment and enhanced customer satisfaction, resulting in increased sales and revenue.

4. **Revenue Growth:**

Increased sales volume and reduced costs drove a substantial increase in revenue (up to 77% growth for Sharees). This validates the role of collaborative supply chain models in scaling micro-businesses effectively.

6.2 Future Scope of the Study

The scope of this study is specifically relevant to micro-businesses operating within online marketplaces in Bangladesh, especially those that deal with textile products. However, the principles and findings can have broader applications:

1. **Geographical Applicability:** While focused on Bangladesh, the model of collaborative bargaining and supplier aggregation can be implemented in other developing or emerging markets, particularly in regions where micro and small businesses face similar challenges in supply chain management.
2. **Industries Beyond Textiles:** Although this study examines the textile sector (Sharees, Three Pieces, Hijabs), the framework could be applied across other industries where micro-businesses struggle with low bargaining power, high procurement costs, and supply chain inefficiencies. Examples include agriculture, handicrafts, and local FMCG (Fast-Moving Consumer Goods) sectors.
3. **E-Commerce Platforms:** The framework's application to an online marketplace like WE - Women Ecommerce illustrates how digital platforms can facilitate collaboration among small businesses. This provides scope for further research on how technology-driven platforms can enhance supply chain collaboration and bargaining power in the broader e-commerce sector.
4. **Policy Implications:**
The study has potential implications for policymakers, who could encourage micro-businesses to adopt such collaborative models through training programs, financial incentives, and the establishment of cooperative networks.

6.3 Limitations of the Study

Despite the positive outcomes, the study has several limitations:

1. **Limited Sample Size:** The study focuses on a single micro-business, pseudonymously named FashionHub, and three product categories (Sharee, Three Piece, and Hijab). Although the results are encouraging, they may not be universally applicable to all micro-businesses or product lines.
2. **Short Time Frame:** The study analyzes the impact over a relatively short period (6 months before and after the framework implementation). This may not capture long-term challenges such as market fluctuations, changes in supplier behavior, or evolving customer preferences.
3. **Market-Specific Dynamics:** The findings are heavily dependent on the specific markets (Babu Bazar, Islampur, Gulistan) and the nature of the textile trade in

Bangladesh. Other markets or sectors may present different logistical and negotiation dynamics, potentially affecting the replicability of the model.

4. **Technology Adoption Challenges:** The study assumes that micro-businesses can easily adopt and integrate the framework via an e-commerce platform like **WE - Women Ecommerce**. In reality, many small businesses face barriers to adopting digital tools due to limited resources, technical expertise, or internet access, especially in rural areas. This could restrict the framework's applicability to businesses with access to digital infrastructure.
5. **Trust and Collaboration Issues:** Effective supplier aggregation and collaborative bargaining require strong trust and governance mechanisms among participating businesses. The study does not explore the potential difficulties in building and maintaining this trust over time, especially when multiple independent businesses are involved.
6. **Limited Supplier Perspective:** The study focuses mainly on the business side of the equation, with less emphasis on how suppliers might react to collective bargaining. Suppliers may not always be willing to offer discounts or better terms to smaller groups, especially if they have more lucrative options available.

The study provides a valuable framework for improving the negotiation power, cost efficiency, and supply chain performance of micro-businesses in Bangladesh's online textile sector. However, it is essential to consider the limitations in terms of scope, market specificity, and the challenges of implementing such a model. Future research could address these limitations by exploring the long-term impacts, expanding the sample size across various industries, and examining the role of digital infrastructure in enabling collaboration.

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