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AI-Centric Fintech Platform for MSMEs: Optimizing Supply Chain Operation and Credit Access in Bangladeshi Emerging Economy

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Abstract

Purpose: MSMEs play an important role in emerging economies by contributing a significant part of the GDP and offering jobs to the mass population. Despite their economic significance, they struggle with structural challenges, including inefficient logistics, limited storage, and limited access to finance. The purpose of this study is to introduce a feasible approach to address these challenges by adopting a data-driven, AI-based digital platform. **Design/methodology/approach:** We propose to bring the MSMEs, manufacturers/suppliers, and financial institutions into a platform where all the purchase transactions are verified by

the supplier. Based on reliable transaction information, the platform can evaluate credit scores using AI, and financial institutions can finance the retailers. Through this ecosystem, the financing issue can be resolved, and the supplier can provide frequent delivery support to resolve the product collection and limited storage capacity problem for retailers. It also helps the financier in collecting the debt payments. As a result, the ecosystem allows retailers to increase their regular sales. It's a three-way win-win model. **Findings:** The AI model is able to generate credit scores for retailers. With the help of this score, trusted business profiles can be created for retailers. This will eventually assist in clustering all the retailers by various categories. It can finally assist trustworthy MSME businesses to get access to digital finance. The performance of these businesses can be monitored continuously by calculating credit scores per month. Regular financial monitoring can assist in practicing an immediate recovery scheme for any unexpected situation. **Research limitations/implications:** The model was built using limited parameters. However, more raw data parameters, like repayment frequency, on-time payment, etc., should be collected to obtain optimal results. The number of retail stores should also be increased. The process of collaboration with the financier also needs to be finalized. **Practical implications:** The pilot implementation of this project is being conducted in Dhaka, Bangladesh. **Originality/value:** The novelty of this research is to propose a data-driven, AI-based solution for addressing the challenges that MSMEs face in their businesses in a developing country, like Bangladesh.
Keywords: Artificial Intelligence, AI in finance, FinTech, MSMEs, Credit Scoring, Bangladesh, Credit Profiling, Supply Chain Finance

Introduction

In developing countries, particularly within the Southeast Asian region, the micro, small, and medium enterprises (MSMEs) sector is a fundamental economic pillar. The region is home to over 70 million such enterprises, which are responsible for employing over 140 million individuals and represent 99% of all business establishments. The Association of Southeast Asian Nations (ASEAN) Federation of Accountants declared in 2019 that MSMEs are the backbone of the regional economy due to their immense collective contribution (Innovision Consulting Private Limited, 2022, p. 10).

Bangladesh is a developing nation in South Asia where MSMEs form a significant part of the economy. The Ministry of Industry of the Government of Bangladesh defines these enterprises based on two primary criteria: total investment in fixed assets (excluding land and buildings) and number of employees. The official framework covers businesses with investments from 10 lac (BDT) to 30 crore (BDT) and several employees ranging from 1 to 300 in MSMEs (Innovision Consulting Private Limited, 2022, p. 3). MSMEs contribute 25% of Bangladesh's GDP, providing jobs for 87% of the country's civilian population. Due to this reason, it is an extremely important sector to study and research. The country has observed a significant increase in digital financial account access and usage among the poor in recent years. According to Findex 2021, number of adults with financial accounts increased from 50 to 53% as the usage of mobile financial services (MFS) grew swiftly. The number reached 111 million clients by the end of 2021 (Innovision Consulting Private Limited, 2022, p. 3).

Financial Technology (Fintech) can shape our digital future. As the global economy undergoes major changes driven by digitalization, emerging technologies like AI, IoT, and blockchain are revolutionizing financial services (Khando et al., 2023). This rapidly evolving landscape makes

it increasingly challenging for institutions to remain competitive (Murinde et al., 2022). Fintech is fundamentally altering finance by automating services with social computing, IoT, and big data. It empowers consumers toward a self-service culture and disrupts the traditional ecosystem with new business models (Rahman et al., 2021). Internet use accelerated digital payment growth (Khando et al., 2022), which is vital for modern economies. This evolution culminates in Smart FinTech, driven heavily by Data Science and Artificial Intelligence (DSAI) techniques (Cao et al., 2021). In Bangladesh, fintech applications for MSMEs are still quite limited. Compared to larger organizations, small and medium-sized enterprises (MSMEs) confront far more formidable challenges to secure financing. Due to their size, previous experience, and business profile, these enterprises often have limited access to financing through the traditional financing system (Lasak, 2022).

Hossain et al. summarized in their research that some of the challenges faced in Bangladesh by MSMEs are insufficient funding, excessive expenses, high transportation costs, absence of clear government policies, lack of research and development facilities, absence of contemporary technology, unreliable or insufficient raw material supplies, etc. These issues make the environment challenging for MSME business owners to run their businesses in Bangladesh. Among all these problems, our research identifies that insufficient funding and high transport costs are extremely crucial, which finally causes inadequate material storage issues. These three problems are interconnected, and solving them can make the performance of the supply chain ecosystem significantly better. To resolve these challenges, our study proposes a new model that enhances the efficiency of MSMEs by making changes in the supply chain system with the help of financial technology. This model can assist MSMEs in running their business by solving the core problems faced by business owners. It focuses on funding crises, delivery problems, storage issues, and how to resolve these challenges. The research explores how fintech, especially artificial intelligence, can assist retailers in resolving some of these issues.

Literature Review

Micro, Small, and Medium Enterprises (MSMEs) and their role in the economy

The definitions of micro-, small-, and medium-sized enterprises (MSMEs) are not constant around the world. Their categories differ between countries and regions (Dambiski Gomes de Carvalho et al., 2021). They have a possible impact on achieving various sustainable development goals much greater than their size (Endris & Kassegn, 2022). They are one of the strong pillars of the economy and also comprise the majority of enterprises. However, their performance remains modest compared to the large companies (Ciocoiu et al., 2024; Rosyidiana & Narsa, 2024). They are the backbone of many nations worldwide, which contribute significantly to economic growth and employment (Rosyidiana & Narsa, 2024). The dynamic nature of the business landscape, combined with insufficient resources, increases the vulnerability to risks and threatens the long-term sustainability of MSMEs.

MSMEs should serve as an effective platform for entrepreneurs and bring innovation to flourish in their field. In Africa, entrepreneurship is considered a solution to major economic challenges like unemployment, inequality, low productivity, and lack of integration into global value chains (Endris & Kassegn, 2022). Entrepreneurial innovation involves creativity, experimentation, and research required to introduce new products and services (Yacob et al., 2021). UN General Assembly's resolution 71/221 affirms that entrepreneurship contributes

significantly to sustainable development by creating jobs, boosting economic growth, driving innovation, and addressing social and environmental challenges (Endris & Kassegn, 2022).

According to Rosyidiana & Narsa (2024), there is a significant positive correlation between innovation and the financial performance of MSMEs, highlighting the importance of innovative practices. Digitalization employs digital technology to transform a business model, which creates new opportunities for generating revenue and earning value. This process of transitioning to a digital business uses technology and digitized data to change how work is performed, change customer interactions, and generate new digital revenue streams (Meilariza & Delima, 2024). In an era of rapid technological advancement driven by data and artificial intelligence, digitalization is therefore essential for modern MSMEs.

How Data Analytics and Insights Support MSMEs in Growth and Decision-Making

Usage of innovative technologies like big data and predictive analytics is driving a global revolution in operational management (Vachkova et al., 2023). By using historical data and advanced modeling to forecast future trends, predictive analytics allows businesses to make precise, informed decisions (Joel & Oguanobi, 2024). For improving MSMEs, the capabilities of big data analytics and digital platforms are especially valuable, as they directly enhance innovation and overall performance (Bhatti et al., 2022). Implementation of predictive analytics can assist businesses in effectively identifying expansion opportunities. This work can be accomplished by analyzing market trends, segmenting the customer base, and identifying new markets and sectors. Moreover, predictive analysis allows organizations to improve their financial performance. Success can be achieved by optimizing pricing strategies, consumer demand forecasting, and personalizing marketing initiatives according to customer preference and their behavior (Joel & Oguanobi, 2024).

The digital economy and social media analytics, once dominated by the developed world, are now increasingly shifting to developing nations (Akhtar et al., 2023). Current research trends are focusing on various keywords such as “digitalization,” “artificial intelligence,” and “blockchain.” This focus is driven by the strength of data. Big data analytics directly improves the quality of organizational decision-making, offering managers a foundation for developing data-driven insights, particularly within a circular economy structure (Awan et al., n.d.). Data analytics can assist MSMEs to improve operational efficiency by estimating key performance indicators (KPIs) like production rates and supply chain performance. It allows MSMEs to respond swiftly to any changes in the market or consumer behavior, ensuring they remain competitive. Ultimately, statistical analysis allows MSMEs to make smarter decisions, optimize operations, and drive sustainable growth.

Ant Financial has completely transformed China's financial system—including payments, wealth management, and loans—by prioritizing underserved markets, particularly low-income individuals in rural areas. The company achieves this financial inclusion by strategically combining its services with Alibaba's Rural Taobao Strategy. This collaboration allows Ant to issue loans and helps traditional agricultural businesses establish online shops on the Taobao platform. Alibaba provided computers to the rural people and trained them to serve as its representatives in the centers (Ding et al., 2018).

Problem Statement

The economic landscape of Bangladesh, a nation poised to graduate from Least Developed Country (LDC) status in 2026 (United Nations, n.d.), is characterized by a vibrant and dense informal retail sector. A cornerstone of this sector is the micro-retail store, locally termed as "*Mudi Dokan"*, operated by individuals known as micro-merchants. These entities are fundamental to the nation's socio-economic condition, providing both essential livelihoods for proprietors and convenient access to goods for consumers. Their primary inventory consists of Fast-Moving Consumer Goods (FMCGs), catering to the high-frequency, need-based purchasing patterns of the local people. Though the market size is extremely large, the micro-merchants still face various obstacles to run their businesses. Some of the issues include delivery, storage, and funding crises. The details are discussed below:

Fund Crisis

The micro-merchants in this ecosystem predominantly originate from low-income socio-economic backgrounds with limited formal education. Consequently, persistent capital constraints and liquidity challenges are defining features of their operational reality. To mitigate these financial pressures, merchants show a substantial reliance on trade credit from suppliers. This credit-based procurement reportedly constitutes 73.1% of their total sales volume (UNCDF & European Union, 2018). The transactional environment for both sales and repayments is largely cash-based. This combination of factors creates a high-risk environment. In instances of business failure, merchants frequently cease operations and default on their outstanding debts (as noted in field observations of our platform). This high rate of default represents a significant financial liability for suppliers, who face substantial annual losses due to this systemic failure in credit recovery mechanisms. These are some of the existing issues in the MSME field of Bangladesh. These issues make the environment challenging for both MSMEs and FMCG suppliers. To get rid of the funding crisis, retailers may ask for funding from any local financial institution. However, due to their background, financial institutions do not fund them to run their businesses. These problems create a difficult environment for retailers to flourish in their businesses. The issues must be solved if we want to improve the existing supply chain management system.

Storage Issue

The operational patterns of micro-scale retail enterprises are profoundly shaped by inherent structural limitations (*Bangladesh Graduation Status | LDC Portal - International Support Measures for Least Developed Countries, n.d.)*. Our field study indicates that the average retail establishment occupies approximately 150 square feet. In fact, they have the capacity to store products for only one week in general. Due to an insufficient amount of funding, they are unable to rent/buy a bigger store that has enough storage space and excellent accessibility. As a result, the proprietors need to hire additional staff who are only responsible for product collection from the wholesale market. Another problem is, these stores are mostly staffed by one to three individuals, including the proprietor. This limited physical space directly constrains inventory capacity, requiring these businesses to engage in high-frequency stocking, often daily. Therefore, micro-enterprises are highly prone to stock-out problems. The unavailability of a single product typically results in immediate customer diversion to competing stores. This practice can negatively impact sales rate and intensify the competitive pressures within the small-scale retail sector (UNCDF & European Union, 2018).

Delivery Issue

Logistical issues are one of the major challenges various businesses face in Bangladesh. The problem occurs especially in cities due to densely populated metropolitan areas, inadequate infrastructure, and congested traffic patterns (Rahman, 2023). As a result, businesses face significant obstacles to last-mile delivery operations. The issue becomes more severe in densely populated urban areas like Dhaka City. Here, inefficient and delayed transportation caused by blocked traffic routes has become the norm in the daily lives of residents. This issue causes delays and disruptions in the product delivery schedule (*The Importance of Last-Mile Delivery in E-Commerce Logistics*, 2024).

The existing supply chain of Bangladesh is characterized by a critical bottleneck at the wholesale-to-retail interface. The limited funding issue causes an inadequate amount of in-store inventory capacity. Therefore, this causes the store owners to adopt a high-frequency and low-volume procurement strategy. In addition to that, a weak delivery system also forces frequent but small restocking trips, often requiring shop closures and lost sales opportunities (UNCDF & European Union, 2018). This system, however, is fundamentally inefficient for proprietor-run enterprises (typically staffed by one to three individuals) as it necessitates temporary business closures for stock replenishment. The resultant opportunity cost, manifested as lost sales revenue, is a direct outcome of an underdeveloped logistics framework. This systemic deficiency leaves the supply chain fragmented, placing an undue economic burden on the foundational layer of the nation's Fast-Moving Consumer Goods (FMCG) distribution network.

Methodology

Research Architecture

This study introduces a digital platform that can successfully solve existing supply chain-related issues. It introduces a nationwide logistics and commerce platform in Bangladesh. The objective is to address critical challenges in the domains of fund crisis, logistics, and delivery systems. The platform provides integrated solutions to these three interconnected issues and supports the operational efficiency of MSMEs as well as their suppliers. The proposed solution has following key actors:

1) Source: Manufacturer/Wholesaler
2) Local Warehouse: Local Hub/Warehouse offered by the proposed platform, which will be used for temporary storage of our platform
3) Retail Shops: The small roadside MSME shops

The primary objective is to address the challenges of funding, storage, and delivery constraints faced by MSME businesses. To mitigate the issues, these key stakeholders play a central role within the ecosystem.

Fund Crisis Solution

Financial constraints constitute critical challenges for the majority of retailers. Insufficient working capital prevents them from placing large-volume orders in alignment with market demand. As a result, product purchase frequency becomes higher, which makes the system inefficient. To resolve this issue, retailers may ask for a short-term investment from any financial institution. However, due to their weak business profile, they are not eligible to get funds from any financial institution. These institutions don’t feel that retailers are reliable enough to pay back the funds. To mitigate this barrier, our platform offers short-term

financing to retailers, enabling them to independently procure essential products. Here, the proposed supply chain platform makes a partnership agreement with the retailer. To ensure the reliability of retailers, we will collect all the information regarding sales, inventory purchases, inventory assets, etc. The goal is to build their credit profiles based on collected information. This profile consists of retailers' credit information. It is created based on multiple transactional parameters, including order frequency, order volume, payment regularity, and repayment history.

Our platform proposes to include local financial institutions to provide funding support to MSME businesses. After collecting the information of retailers' business profiles, the partner financier evaluates the profile of every retailer and makes investment decisions based on retailer's credibility. Shopkeepers with favorable credit scores, as determined by the above indicators, become eligible to access short-term financing from the platform. Figure 1 illustrates the workflow of this process. It depicts that the retail store has a partnership agreement with the supplier. The supplier collects data from retailers, creates a business profile, and provides it to the local financial institution. These institutions can evaluate the business profile and, based on that, fund those MSME businesses.

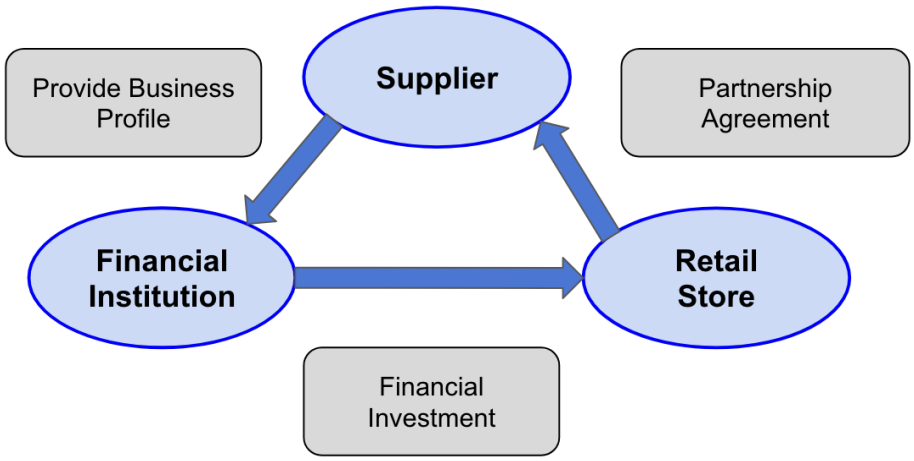


Figure 1: Workflow of the proposed platform

Nevertheless, extending credit without adequate financial evidence entails significant risk. To address this issue, the supplier platform creates a credit profiling system for each retailer. The profile is constructed using a set of transaction-based parameters, including order frequency, order volume, payment frequency, and repayment amounts. This system can divide the retailers into different clusters, based on their overall performance. Retailers who achieve a satisfactory credit score, as determined by these metrics, become eligible to access short-term financing through the platform. Building a credit profile is crucial to determine the reliability of a retailer. Based on the profile, the economic condition of a retailer can be easily verified. Financial institutions can clearly monitor and evaluate the reliability of a retailer. It becomes easier to cluster the retailers into different segments based on their business profile. It can finally assist the authority to decide who will get the fund and the amount to sanction. The process of credit profiling is explained in Figure 2. It shows that retailers' purchase data will be collected in the beginning. Based on the history, performance will be evaluated. Various factors can impact the evaluation, such as order amount per month, order frequency, etc. Credit score will be calculated using performance evaluation. Based on credit score, credit

amount will be assigned to various retailers. As a result, businesses can be clustered in different categories. The final task is to evaluate their business performance.

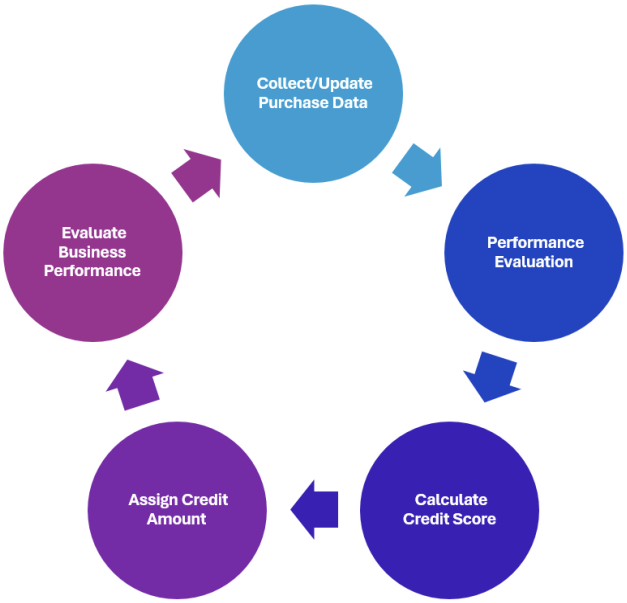


Figure 2: Process flow of evaluating the credit score

Clusterization of retailers will assist financial institutions in providing any decision about investment. Funds will be provided to those shops that consistently maintain a standard credit score. It will be decided based on different parameters. If a shop owner maintains a minimum credit score of 3 on a 1-5 scale for three months consecutively, then he will be eligible to apply for financial investment for the next month. If he fails to maintain this standard, he will not be able to apply for any funding. This system can assist our platform to constantly monitor the performance of each retailer. As a result, if someone's performance continuously decreases for a specific period of time, then an immediate monetary recovery scheme can be possible to avoid any unprecedented incident. Furthermore, proposed platform can support a large number of small businesses to get access of digital financing system based on their performance history.

The proposed method is currently under the piloting stage. The platform is being operated in Dhaka, the capital city of Bangladesh. Due to the scarcity of data in the piloting stage, credit score of each month is calculated based on the following parameters:

1) Order Amount
2) Order Frequency

To ensure the constant efficient performance of shopkeepers, it is required to constantly calculate and monitor their credit score. This will eventually help to understand the pattern of their purchase behavior. The final credit score of each month will be calculated in the following manner:

$$CS_X = \frac{CS_1 + CS_2 + \ldots + CS_n}{n}$$

Here, *n = number of months*
CS_X *= Credit score of month X*

The equation exhibits that the final credit score of a single month is the average of the credit scores from the beginning until the current month. That means if a person fails to make any payment, it will directly impact their credit profile. This system will make a shop owner act more cautiously.

Storage Problem Solution

The suggested platform offers delivery service on a daily basis. Upon receiving the orders, the procurement team is responsible for product collection and storing them in the warehouse if necessary. Then the delivery team will deliver the product on the following day. In this way, the owner does not need to worry about the limited space. Storing products for only 2-4 days is sufficient for the owner. Instead, they can focus more on keeping diversified products to attract more customers. This will eventually enable the owners to earn more profit by providing numerous products and services. Figure 3 illustrates the flow of the proposed platform. The diagram demonstrates how the supplier provides logistic support by collecting FMCG products from the source, storing them in local warehouses, and subsequently facilitating last-mile delivery to retail stores.

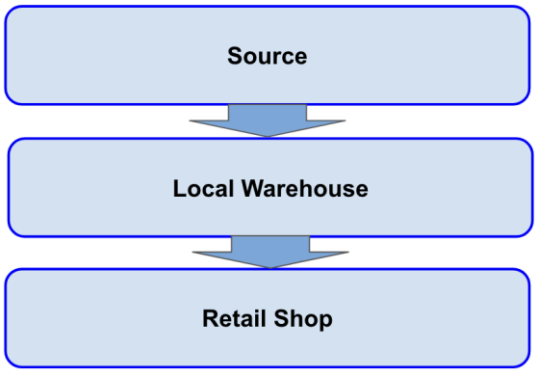


Figure 3: Detailed Workflow of the proposed supply chain framework in Bangladesh

Delivery Problem Solution

The proposed platform functions as a core actor by collecting orders from retail shops. At the field level, the sales team engages directly with shopkeepers, visiting stores to record and manage orders. Each salesperson is equipped with a Point-of-Sales (POS) device provided by the platform. The system integrates the application, which is essential for order collection, inventory tracking, and overall order management.

Upon receiving orders, the team communicates with the source to procure fast-moving consumer goods (FMCG). The source can be either the manufacturer or the wholesaler, depending on the product. The platform facilitates logistics support by coordinating the collection of goods from manufacturers and ensuring their timely delivery to retailers regularly. Furthermore, the platform's centralized inventory system provides the facility to store bulk quantities of products. This finally ensures consistent supply chain stability and reduces the risk of stockouts. The next step is to deliver the product to the retailers. The delivery service will be provided by the proposed supply chain platform through sales representatives, who will also collect payments during the delivery process. The proposed solution mitigates the product collection challenges faced by every retailer.

Dataset Description

Data is collected during the implementation of our pilot project. Based on the field-level report, we are creating our own sales dataset. The pilot project is being conducted in Dhaka, the capital of Bangladesh. We have already collected on-site data from various retail stores. Data is built based on monthly reports of these stores. It contains various information, such as order date, invoice no., store name/party name, transaction type (sale, sale cancelled), total order amount (in Bangladeshi taka), etc. Data is collected for May, June, and July 2025. Table 1 represents the sample of our sales dataset.

Table 1

Sample of sales dataset, 1-b): Insight into the sales dataset

Date	02/05/2025
Invoice No.	52700
Store Name (Party Name)	আনিকা স্টোর
Transaction Type	Sale, Sale Cancelled
Total Order Amount (BDT)	5400

Additionally, Table 2 shows the description of the sales data insight from May to July, 2025. In total, the data of 394 retail stores were recorded during these three months. Altogether 4101 orders were placed by these retailers. Overall, the purchase amount was 29634511 BDT. While performing the field-level work, data privacy was a concern for retailers. To resolve this problem, the platform had an agreement with the retailers. According to the agreement, the platform has permission to share retailers' data with financial institute.

Table 2

Insight into the sales dataset

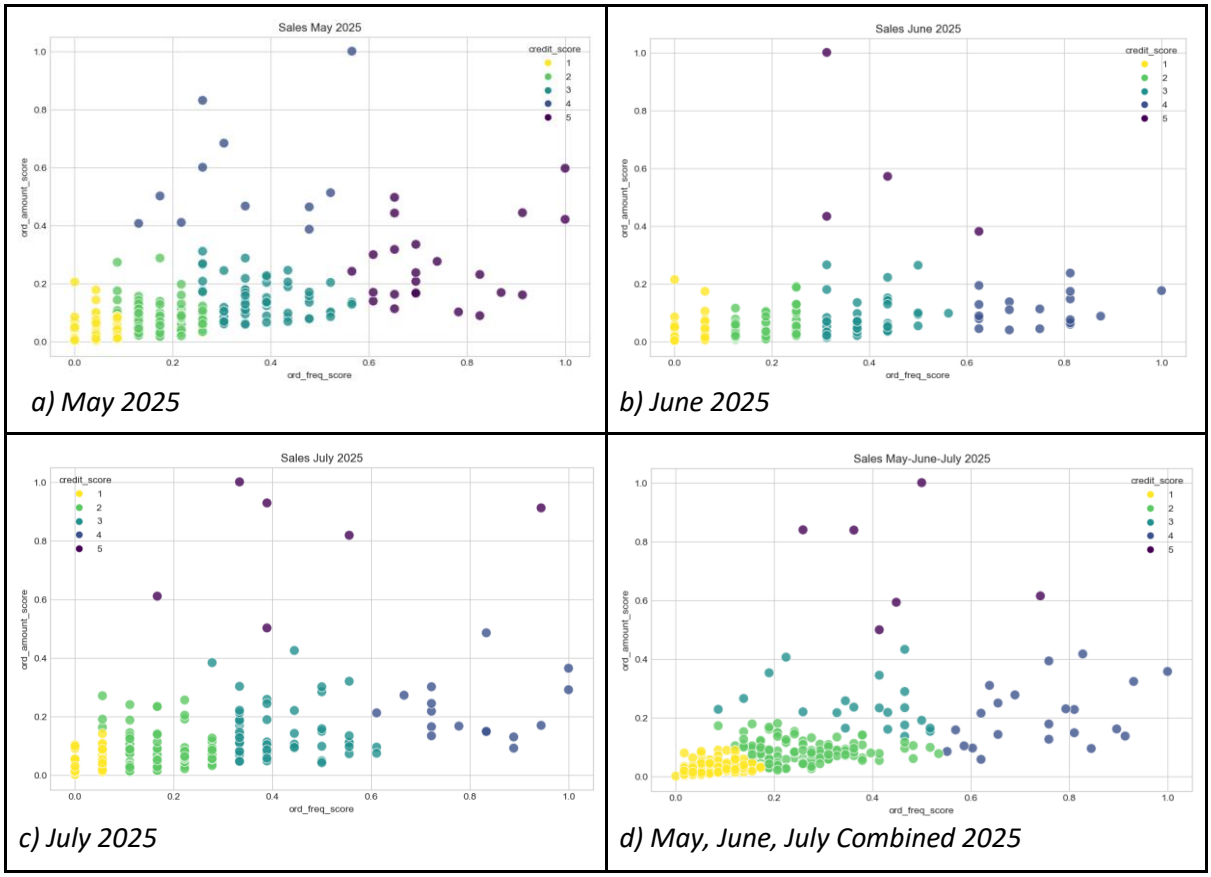
Month Name	Number of shops that placed the order	Number of Orders placed per month	Total amount of orders placed (in BDT)
May, 2025	334	1,800	13,087,915
June, 2025	264	1,071	8,259,870
July, 2025	274	1,230	8,286,726
Total		**4101**	**29,634,511**

Results

In this research, the sales dataset was used to calculate the credit score of retailers. Store name and order amount per month were used to retrieve final score. From these parameters, Order frequency was calculated for each store. Order frequency is the total number of orders given by a single retailer per month. The data analysis part was conducted in a Python 3.8 environment. PyTorch, Dataframe, Scikit-learn, and Matplotlib were used for analysis purposes. One of the most popular machine learning models, the K-means model, was implemented. Collected data in this research were not labeled properly. The K-means clustering model performs excellently with unlabeled data by performing clustering. It divides

the entire customer base into k clusters. In our case, it partitioned the whole dataset into five clusters.

Order Amount and Order Frequency parameters were fed into the k-means model that eventually produced the final output credit score. The input data were scaled using the minimum-maximum scaling system. Credit score was ranked between 1 and 5, where 1 indicated the lowest and 5, the highest credit score. The results are exhibited for different months in Figure 4. The graph shows the credit score outcome for the "*order_frequency_score*" and "*order_amount_score*" parameters.



a) May 2025 *b) June 2025*

c) July 2025 *d) May, June, July Combined 2025*

Figure 4: Credit Score Calculation of different months (May, June, July 2025)

This project aims to collect and analyze data over a long period of time. Unfortunately, the data was collected only for three months (May, June, and July 2025). However, we wanted to monitor the data for August also. Due to this reason, distribution fitting was performed, which is a statistical approach. Here, truncated normal distribution fitting was implemented. This distribution is appropriate to use when the data consists of nonnegative values and has upper and lower boundaries. Our data have both of these characteristics. Credit scores cannot be negative. People whose order frequency is very low have obtained a credit score of 0. Due to this reason, the truncated distribution model was employed.

This distribution randomly generates new data within a certain range by analyzing the existing data. In this case, by analyzing the existing credit scores (May, June, and July) for each store, a new set of data was generated for August 2025. The graphical representation and comparative analysis can be observed in Figure 5. This figure displays the histogram of credit

score vs. count (shop count) for May, June, July, and August 2025. It displays that the majority of shopkeepers' credit scores are less than or equal to 2. Our model can successfully identify reliable retailers by scoring them higher (three or above). It was also able to cluster the shopkeepers into separate categories based on their credit history.

This research aims to assist only reliable shopkeepers. That's why retailers who have a minimum credit score of 3 will be considered eligible to apply for financial assistance. Shopkeepers who achieve a credit score of 5 are considered to be the most reliable to get financing. On the other hand, a credit score of 1 indicates that the shopkeeper's performance is very poor and is not eligible to get funding. After the calculation, we verified these scores with our sales team, who were responsible for selling products to various shopkeepers.

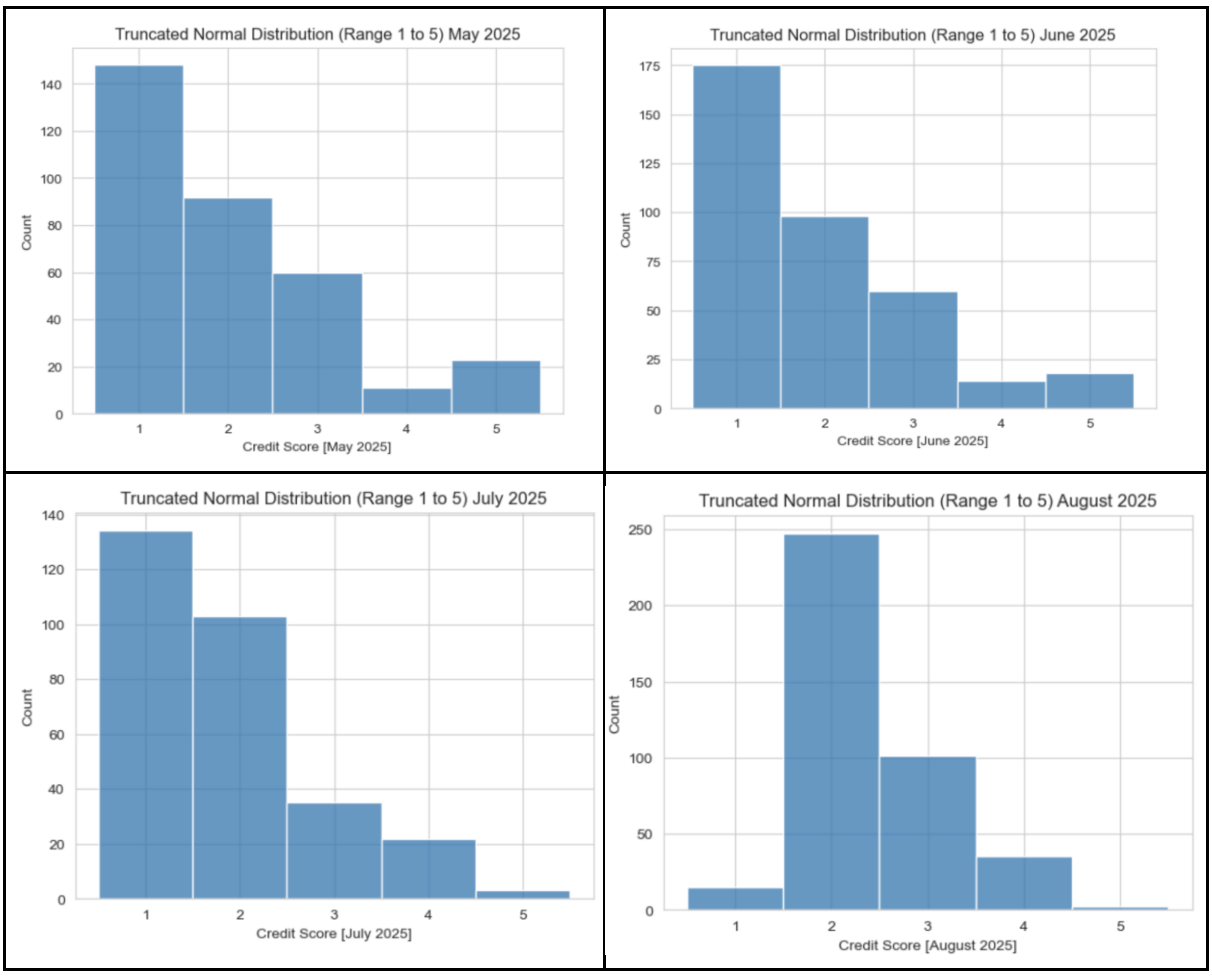


Figure 5: Credit Score vs. Count graph for May, June, July, and August 2025

The following table displays the number of eligible retailers for these three months. The retailer needs to consistently use our service for a minimum of three months to be eligible for get an investment. Table 3 successfully displays how many retailers have a credit score of 3 and above for May, June, July, and August 2025. It also shows the percentage of retailers who will be considered as eligible to apply for financing. The percentage amount varies somewhere between 15% and 30%. This percentage is decreasing monthly. That means filtering out the reliable retailers to receive this service.

The mean and standard deviation were also calculated for all four months and displayed in Table 4. Here, the highest mean and standard deviation are 2.35 (for August) and 1.30 (for May). On the other hand, the lowest mean and standard deviation are 1.45 (for July) and 0.71 (for August).

Table 3
Number of retailers who have a credit score >= 3 for May, June, July, and August 2025

Date (Month, Year)	**Number of potential retailers (credit score >=3)**	**in percentage**
May, 2025	94	28.14
June, 2025	53	20.075
July, 2025	46	16.78
August, 2025	61	15.25

Table 4
Mean and Standard Deviation of May, June, July, and August 2025

Date (Month, Year)	**Mean**	**Standard Deviation**
May, 2025	1.70	1.30
June, 2025	1.50	1.15
July, 2025	1.45	1.09
August, 2025	2.35	0.71

Discussion

This study tries to provide a solution for an existing issue, which is a barrier to the economic flourishing of Bangladesh. It successfully identifies the critical crisis and probable solution by bringing a mass population under financial inclusion. The proposed idea can resolve the funding, storage, and delivery issues of our country. Successful application of this platform could change the existing malfunctioned system in the supply chain market. A similar idea was implemented by Ant Group in China. Ant Group is an affiliated company of the Chinese giant conglomerate Alibaba Group.

Ant Group proposed a financial model called the Ant Financial model, which is essentially a massive, successful strategy for financial inclusion built on proprietary technology and a vast amount of user data. Their goal was to provide financial services to the neglected population in China. The target was low-income individuals and small businesses like MSMEs—who were ignored by traditional financial institutions. They utilized the enormous user transaction history of the Alipay and Alibaba e-commerce platforms as their primary data source. AI and big data were used for analyzing transaction history and behavioral patterns. Finally, Ant was able to create their own alternative credit scores instantly and at low cost by avoiding the requirement for traditional deposits or credit history reports. They transformed their idea into an open, digital platform that provides inclusive, convenient financial services to the people by successfully displacing the established financial network. Ant was finally able to bring a mass group of people into a structured digital financial platform (Zhang & Choi, 2019).

Conclusion and Future Work

Bangladesh is an underdeveloped country, struggling to become a developing nation within the next few years. Without the growth of the MSME sector, it will be difficult to achieve this goal. However, currently, this is one of the most neglected sectors. One of the key factors for this obstacle is that these businesses are run by low-income people. Due to that reason, this sector is often overlooked. This study focuses on existing supply chain-related issues faced by thousands of MSME businesses in Bangladesh. The goal is to propose a feasible solution for resolving the financial, delivery, and storage issues faced by MSME businesses and bring them into the coverage of digital financing. To resolve these issues and evaluate the effectiveness of the solution, the platform is running a pilot project in Dhaka, Bangladesh. The final goal is to implement this model on a large scale throughout the whole nation.

According to the data found from the field study from May to July 2025, a total of 394 retail stores are already using the platform. To address the funding issue, the platform has also offered a solution of collecting investment from financiers, based on the credit profile of each retailer. To calculate the credit score, an AI model, the k-means model, was implemented. The analysis of the field data found that the number of retailers who have a credit score >3 is eligible to receive investment from financiers. As the amount of field data is very limited, we have applied a simulation for August 2025. To generate data, a truncated normal distribution, a machine learning model, was implemented. The credit score, mean, and standard deviation were also calculated and displayed.

The study addressed the common challenges faced by MSME business owners in Bangladesh and proposed a possible solution. Implementation of this idea can eventually improve the supply chain management system in our country. To fix the funding crisis issue, the platform is already in the process of establishing an agreement with the finance companies. The amount of existing data is very small. One of the problems is the insufficient amount of collected data used here. In future research, more data can be collected to achieve precise results. To create more accurate results, raw data on payment frequency, on-time payment, etc., should also be collected from MSME business owners. Another future work is to promote and implement Shariah financing through our platform. As our final goal is to employ sharia financing, we are currently negotiating with various financial institutions for collaboration to successfully implement Islamic finance in the Bangladeshi market.

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