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Community-Based Demand Financing: Integrating Digital Capital, Alternative Data, PO Financing, and Social Capital for Student Businesses

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Abstract

Background: Student Business Groups (Kelompok Usaha Siswa, KUS) in the East Java Double Track Program face limited access to financing because they lack collateral, business-entity bank accounts, and formal credit histories, even though they hold orders, digital activity footprints, and community networks of economic value. This condition calls for a financing model that assesses business eligibility on the basis of verified demand and the community's relational assets.

Objectives: This study aims to build a community-based demand financing model that integrates digital capital, alternative data, demand/purchase order (PO) financing, and social capital on the Ruang Modal platform.

Novelty: These four elements are usually examined in separate streams of literature. This study integrates them into a single financing architecture for young, thin-file business groups that are not yet legal entities and are not served by formal financial institutions, treating orders, execution footprints, and group reputation as a chain of mutually reinforcing evidence.

Research Methodology / Design: The study adopts a qualitative approach within a design science research framework to identify problems, formulate design requirements, develop the model artifact, and evaluate its fit with the financing characteristics of KUS. Informants (platform managers, KUS mentors, and student managers) were selected purposively; data from semi-structured interviews, document analysis, and limited observation were analyzed thematically, focusing on order verification, eligibility profiling based on non-conventional data, working capital disbursement, and community-based risk control.

Findings: Digital capital provides the infrastructure to record and verify the economic activities of KUS, while alternative data enables eligibility assessment as a functional substitute for collateral and formal credit history. Demand/PO financing bridges the cash flow gap between order receipt and customer payment, and social capital forms reputation-based screening, monitoring, and enforcement mechanisms without collateral. Integrating the four components yields a seven-stage financing cycle that is more contextual and inclusive and has the potential to sustain the community's economy.

Implication: Theoretically, the study links the literature on digital capital, alternative credit scoring, supply chain finance, and social capital in the context of student entrepreneurship. Practically, it offers a design basis for order verification, risk assessment, disbursement, monitoring, and repayment features, and suggests that local governments integrate such platforms with existing schemes such as Prokesra and Bank UMKM Jawa Timur, supported by digital and financial literacy training.

Keywords:
Alternative data; community-based demand financing; digital capital; purchase order financing; social capital

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A. Introduction

The East Java SMA Double Track Program has evolved from a vocational education intervention into a student entrepreneurship ecosystem that connects schools, universities, local governments, and the business world. In 2025, the program recorded the formation of 1,600 Student Business Groups (KUS) across 144 senior high schools and received a MURI Record as the senior high school program with the largest number of student business groups; the transaction value of student businesses up to September 2025 was also reported to have reached approximately IDR 4.75 billion (Museum Rekor Dunia Indonesia, 2025; Pemerintah Provinsi Jawa Timur, 2025). Government support does not stop at training. The East Java Provincial Government and Bank UMKM Jawa Timur provide the Prosperity Credit Program (Program Kredit Sejahtera, Prokesra) at an interest rate of 3% per year, while the facility announced for student entrepreneurs provides collateral-free financing of up to IDR 50 million (Bank UMKM Jawa Timur, 2025; Dinas Komunikasi dan Informatika Provinsi Jawa Timur, 2025). These achievements mark the growth of a promising base of young businesses while also demonstrating a policy commitment to link skills education with economic self-reliance.

However, the existence of formal financing facilities does not automatically translate into effective access for KUS. Most KUS are at the start-up stage, are not yet legal business entities, do not hold bank accounts in the name of a business entity, have no fixed assets to pledge as collateral, and have not yet built a formal credit history. These characteristics position them as *thin-file* prospective borrowers: their economic activities are real, but they are not legible to conventional credit assessment tools. The problem is not merely the absence of funds, but the misalignment between the administrative requirements of financial institutions and the forms of eligibility evidence that student businesses can produce. An IFC report emphasizes that traditional assessment systems tend to exclude small businesses and borrowers who lack formal financial histories or collateral, even though they may demonstrate repayment capacity through other data sources (International Finance Corporation, 2026). Thus, the KUS financing gap is institutional and informational in nature: facilities are available, but verification instruments do not yet match the borrower profile.

On the other hand, KUS actually possess economic assets that have not yet been converted into a basis for financing. Verifiable customer orders indicate the existence of demand and potential cash flow; sales records, platform activity, order completion punctuality, and digital interactions form a behavioral business footprint; while relationships with schools, mentors, buyers, and group members provide local information about reputation and execution capacity. Within the *digital capital* framework, digital access, competencies, and practices can be converted into economic and social benefits (Calderón Gómez, 2021). Empirical fintech evidence also shows that alternative data from digital activities can improve risk prediction and broaden access for borrowers without conventional credit scores (Agarwal et al.,

2023; Djeundje et al., 2021). Therefore, the limitations of KUS need to be read together with the informational assets they generate through everyday business activities.

Given these conditions, KUS financing requires an alternative design that does not merely relax credit requirements, but shifts the unit of eligibility analysis from asset ownership to evidence of demand, transaction behavior, and community accountability. Such a model is important because a shortage of working capital can cause orders that are actually viable to go unfulfilled, causing KUS to lose income, reputation, and opportunities to learn entrepreneurship. Community-based financing needs to position the Ruang Modal platform as verification infrastructure, not merely a channel for funding applications. Its urgency lies in establishing a sustainable cycle: transactions generate data, data improves risk assessment, financing enables order fulfillment, and successful repayment strengthens the group's reputation.

The microfinance literature has long shown that *social capital* can substitute for part of the function of collateral through peer selection, information exchange, monitoring, norms of reciprocity, and reputational sanctions. These mechanisms are found in rotating savings and credit associations (ROSCA), cooperatives, self-help groups, and group lending schemes. Geographic proximity, trust, friendship, group homogeneity, and networks of acquaintances are associated with group repayment performance (Al-Azzam et al., 2020). Nevertheless, group lending is not an unconditional solution: the experiment by Cornée and Masclet (2022) shows that forming groups without sanction mechanisms and long-term relationships can give rise to *free riding*. This finding underscores that social capital must be translated into explicit rules for selection, monitoring, and consequences. In the digital economy, trust and local networks can also be combined with digital infrastructure to mobilize community resources more transparently (Riabokin & Kotukh, 2025).

A second stream of literature has developed around *supply chain finance*, particularly *purchase order* (PO) financing, as well as credit assessment based on *alternative data*. PO financing uses confirmed orders as the basis for providing capital before production or delivery of goods, thereby bridging the *cash flow gap* between the emergence of demand and the receipt of payment (Lima & Huchzermeier, 2019; Reindorp et al., 2018). The relevance of transaction-flow-based design is also shown by Casaburi and Macchiavello (2019): the timing of payments can function as a commitment device, although weak contract enforcement limits market effectiveness. In Indonesian fintech practice, a valid PO is assessed together with the buyer's reputation and the business's ability to fulfill the order before financing is disbursed (Modalku, 2025). At the same time, the integration of platform data and analytics can reduce information asymmetry and help funders distinguish the quality and risk of MSMEs (Song et al., 2021). Recent developments even combine alternative data with artificial intelligence to assess borrowers without formal histories, although their application still requires consent for data use, model explainability, bias audits, and consumer protection (International Finance Corporation, 2026).

Although relevant, these four elements are generally analyzed in separate streams of literature. Studies of digital capital focus on access and the ability to turn digital resources into advantages; studies of alternative data center on risk prediction; the PO financing literature discusses working capital financing in supply chain relationships; while studies of social capital examine trust and group-based

enforcement. Little research has yet brought all four together as a financing architecture for student business communities that are not yet legal entities and have no credit history. Moreover, PO financing studies typically assume formal suppliers and buyers, whereas KUS operate within a school ecosystem with small transaction sizes, intensive mentoring, and reputations attached to the group. This gap opens room for developing *community-based demand financing* that fits the character of Ruang Modal and Double Track KUS.

This study aims to (1) identify the components of digital capital that can form the verification infrastructure for KUS economic activities; (2) analyze demand/PO financing mechanisms to finance working capital needs based on verified orders; (3) explore the role of social capital in collateral-free selection, monitoring, and repayment enforcement; and (4) develop a conceptual model that integrates these three domains with alternative data. Based on these objectives, the main research question is: "How can a community-based demand financing model that integrates digital capital, alternative data, demand/PO financing, and social capital be designed to ensure the economic sustainability of the Student Business Group community in the Double Track Program?"

The novelty of this study lies in the integration of four pillars into a single conceptual model and in the empirical context of its application. The proposed model positions digital capital as recording and verification infrastructure, alternative data as the basis for estimating eligibility, demand/PO financing as a disbursement mechanism based on transaction needs, and social capital as an instrument of community governance and enforcement. Unlike financing models that rely on collateral or formal business entities, this design treats orders, execution footprints, and group reputation as a chain of mutually reinforcing evidence. The focus on Double Track Program KUS also extends the study of inclusive finance to communities of student entrepreneurs, a context that remains limited in the literature on fintech, supply chain finance, and the economics of education.

B. Literature Review

This section reviews the five bodies of work on which the proposed model rests: community-based financing and social capital, digital capital and inclusive fintech platforms, alternative data and credit scoring, demand/PO financing, and the resulting initial conceptual framework.

B.1. Community-Based Financing and Social Capital

Community-based financing is an arrangement for raising, disbursing, and overseeing funds that is rooted in membership and local knowledge. Unlike individual credit, which relies on formal documents, credit scores, and physical collateral, this model uses social proximity to recognize the needs, capacity, and behavior of prospective recipients. Its forms include rotating savings and credit associations (ROSCA), cooperatives, self-help groups, revolving funds, and joint-liability (*tanggung renteng*) lending. In a ROSCA, periodic contributions are pooled and allocated in rotation; in cooperatives or revolving funds, common funds are lent out based on group decisions. Manea (2024) shows that the logic of ROSCA can be combined with digital infrastructure to finance assets sustainably. However, community proximity is no

guarantee of inclusiveness: groups can exclude members perceived as weak, and shared shocks can weaken their ability to share risk.

The main resource of this model is *social capital*, namely the networks, trust, norms of reciprocity, and reputation that facilitate coordination. Social capital functions as a *collateral substitute* because members hold information unavailable to financial institutions, can screen their peers, and bear social costs if they break their commitments. Enforcement does not rely solely on legal contracts, but on peer monitoring, reprimands from mentors, restricted access to the next round of funds, and the risk of losing reputation. The timing of payments can also build discipline and commitment, but its effectiveness still depends on the credibility of enforcement (Casaburi & Macchiavello, 2019). Meanwhile, G. Ofosu et al. (2025) emphasize that partnerships with small-scale actors require formal arrangements that turn potential conflict into synergy and negotiation. In other words, trust needs to be institutionalized in membership rules, access rights, verification processes, and proportionate consequences.

Critically, social capital is better viewed as a complement to, rather than a complete substitute for, formal governance. Strong ties reduce information asymmetry, but they can also give rise to collusion, favoritism, excessive social pressure, or tolerance of default. Therefore, community financing design must separate the functions of recommendation, approval, disbursement, and monitoring, while also providing grievance mechanisms and member protection. For Double Track KUS, the networks of students, mentor teachers, schools, alumni, and buyers can serve as sources of verification and enforcement, provided that community reputation is translated into transparent procedures on the Ruang Modal platform.

B.2. Digital Capital and Inclusive Fintech Platforms

Digital capital refers to the combination of access to devices and connectivity, digital competence, and the ability to turn technology use into economic and social benefits. In the platform economy, this capital does not stop at smartphone ownership, but includes the skills to create catalogs, receive orders, communicate with customers, record transactions, and maintain a business's digital identity. Riabokin and Kotukh (2025) show that social capital can be extended through digital infrastructure that increases the transparency of community resource mobilization. Nevertheless, digitalization does not automatically eliminate exclusion; differences in the quality of access, literacy, and control over data can carry old inequalities into digital systems.

Inclusive fintech platforms therefore need to function as recording and verification infrastructure, not merely as loan application channels. A platform can store group identities, order evidence, buyer approvals, completion histories, payment flows, and mentor validations in a consistent audit trail. Such infrastructure lowers verification costs and makes the economic activities of thin-file borrowers legible to funders. The International Finance Corporation (2026) report affirms the potential of integrating digital data and analytics to broaden access, but also requires consent for data use, security, explainable decisions, and consumer protection. In the context of Double Track KUS, Ruang Modal needs to build digital capital while also providing valid transaction evidence without burdening students with administration resembling that of large companies.

B.3. Alternative Data and Credit Scoring

Alternative data is information outside financial statements, collateral, and credit bureau histories that is used to assess capacity and willingness to pay. For micro businesses, such data can be grouped into transactional data—sales value and frequency, cash inflows, material purchases, and payment punctuality; behavioral data—consistency of platform use, response speed, order fulfillment punctuality, and cancellation patterns; and network data—length of membership, mentor recommendations, stability of buyer relationships, and group reputation. Empirical evidence from Jiang et al. (2026) shows that behavioral and transaction data can improve the identification of micro-enterprise risk compared with reliance on credit history alone. However, more data is not always an advantage: irrelevant or overly personal variables can lead to excessive surveillance and hidden discrimination.

Artificial intelligence–based techniques, including *gradient boosting*, *random forest*, and other machine learning models, can capture nonlinear relationships and interactions among factors that linear models miss. Chen (2026) shows that gradient boosting can combine operational behavior, supply chain interactions, and online transactions to form a multidimensional risk assessment. This predictive advantage must be balanced with explainable decision reasons, bias testing, data quality, and room for borrowers to seek correction (International Finance Corporation, 2026). For Double Track KUS, scores should be used as a tiered decision aid—for example, to determine financing limits and the need for additional verification—rather than as a single automated decision that closes off students' access.

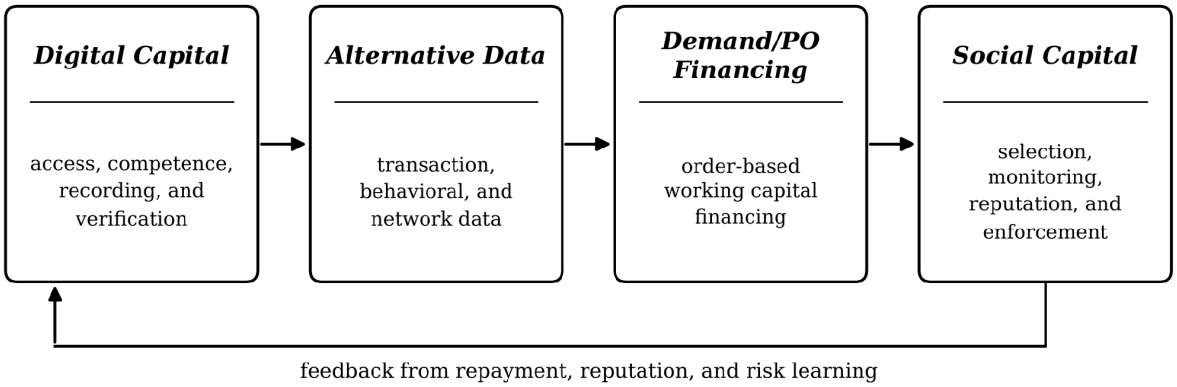
B.4. Demand/PO Financing

Purchase order (PO) financing is working capital financing provided before production or delivery of goods, with a confirmed order serving as the basis of the transaction. After the validity of the order, the creditworthiness of the buyer, production costs, margins, and the supplier's capability have been examined, the funder finances part of the procurement or production needs. Repayment is made from the buyer's payment once the order is fulfilled. Thus, the main object of assessment shifts from the borrower's fixed assets to the quality of demand and the viability of the transaction's cash flow. Tsai and Wu (2025) show that order-based financing can be structured on its own or combined with factoring after shipment; the optimal choice depends on the cost of funds, the advance rate, and the order value. Modalku's (2025) practice likewise places PO validity, buyer reputation, and the business's ability to fulfill the order as the main elements of examination.

Adapting it to the micro scale requires a broader definition of an order than a corporate PO. Evidence may take the form of order forms, invoices, simple contracts, digital buyer confirmations, or collective orders verified by schools and mentors. Disbursement can be made in stages or directly to material suppliers to reduce misuse of funds, while customer payments can be routed through an escrow account. Unlike conventional financing, which assesses the debtor's general condition and often requires collateral, this approach limits the amount, tenor, and repayment to a single demand cycle; its risk is more measurable, yet it remains vulnerable to fictitious orders, cancellations, production delays, and buyer concentration. For Double Track KUS, order-based financing allows capital to arrive when it is needed to meet real demand, rather than as general debt detached from sales capacity.

B.5. Initial Conceptual Framework

Based on the literature synthesis, the initial model positions digital capital as a prerequisite for business activities to be recorded and verified; these records generate alternative data to form an eligibility profile; the assessment results determine the limits and terms of demand/PO financing; while social capital provides local validation, monitoring, and reputation-based enforcement. The relationship is not entirely linear, because repayment and order completion in turn enrich the group's data and reputation, thereby forming a learning cycle. This synthesis also underscores that no single pillar is sufficient on its own: technology without governance amplifies data risk, scores without real transactions can miss their target, POs without verification are open to manipulation, and trust without recording is difficult to scale. Therefore, Figure 1 positions Ruang Modal as the link among the four pillars to build financing for Double Track KUS that is evidence-based, measurable, and still rooted in the community.



Source: Author's elaboration (2026)

Figure 1. Initial Conceptual Framework of Community-Based Demand Financing

C. Research Methodology

C.1. Research Design

This study uses a qualitative approach within a *design science research* (DSR) framework. DSR was chosen because the study seeks not only to explain the financing barriers faced by KUS, but also to produce an artifact in the form of a conceptual *community-based demand financing* model that can be translated into features, decision rules, and governance mechanisms on the Ruang Modal platform. In DSR, practical problem relevance is combined with theoretical rigor through the process of building and evaluating artifacts (Hevner et al., 2004). The research stages adapt Peffers et al. (2007), namely problem identification, definition of solution objectives, artifact design, demonstration, evaluation, and communication. In this study, demonstration and evaluation are carried out conceptually by assessing the model's fit with the platform's business processes and the experiences of stakeholders. This design is suited to answering a prescriptive research question, namely how the four pillars can be integrated into a financing design that is feasible to implement.

C.2. Research Site and Subjects

The case study was conducted on the Ruang Modal platform within the Double Track Program KUS ecosystem. Subjects were selected using purposive sampling based on their direct involvement in platform management, group mentoring, or business transactions. The targeted informants comprise 2–3 platform managers, 3–4 KUS mentors from different schools, and student managers from 5–6 business groups. Participating KUS must have actively used the platform or run business transactions for at least six months so that informants have sufficient experience with orders, transaction recording, working capital needs, and payment settlement. Variation in schools and types of business is used to capture differences in practice, while data adequacy is determined by the recurrence of information and the attainment of thematic depth, not statistical representativeness.

C.3. Data Collection Techniques

Primary data were collected through semi-structured interviews lasting 45–60 minutes with each informant. The interview guide was designed flexibly so that core questions remain consistent while the researcher can still explore distinctive experiences. Interviews with platform managers cover verification flows, data availability, and risk governance; interviews with mentors cover validation processes and group monitoring; while interviews with students focus on their experiences in accessing financing, administrative and cash flow barriers, platform use, and perceptions of order- or PO-based financing. With the informants' consent, interviews were recorded, transcribed, and anonymized before analysis.

Interview data were supplemented by document analysis and limited participant observation. The documents examined include order evidence, platform transaction records, KUS activity or financial reports, operational guidelines, and verification forms that are relevant and accessible with permission. Document analysis was used to compare informants' statements with actual transaction traces. Observation focused on KUS interactions with the platform, such as uploading orders, mentor validation, updating production status, and recording payments, without taking over business or financing decisions. The combination of these techniques allows the study to understand both the formal mechanisms and the practices that actually take place.

C.4. Data Analysis Techniques

Data were analyzed using thematic analysis, both inductively and deductively. The process includes repeated reading of transcripts and documents, initial coding, grouping codes into themes, reviewing relationships among themes, and defining and naming themes (Braun & Clarke, 2006). Deductively, coding begins with four theoretical categories, namely digital capital, alternative data, demand/PO financing, and social capital. Inductively, new codes remain open to capture findings not explained by the initial framework, such as issues of parental consent, mentor capacity, seasonal demand, or conflict within groups.

The validity of the findings is maintained through source and method triangulation. Accounts from managers, mentors, and students are compared with one another and checked against documents and observation results. Theme summaries, interpretations of the platform flow, and the artifact design are then confirmed

through *member checking* with Ruang Modal managers. Analytical notes and changes to the code structure are maintained as an audit trail so that the relationship between empirical evidence, interpretation, and design decisions can be traced.

C.5. Analytical Framework

The analytical framework uses the four pillars as initial categories and as a lens for assessing the completeness of the artifact. Digital capital is used to identify access and recording capacity; alternative data to map eligibility evidence; demand/PO financing to analyze the order financing flow; and social capital to assess selection, monitoring, and enforcement. The analysis moves through reducing data into codes and themes, presenting data in cross-source matrices and process maps, and then drawing and verifying conclusions. The results of each stage form the basis for refining the conceptual model, so that this method connects the empirical experiences of KUS with an implementable Ruang Modal design.

D. Result & Discussion

D.1. Digital Capital: The Ruang Modal Platform as Verification Infrastructure

The design analysis shows that the main function of Ruang Modal is not merely to provide a channel for financing applications, but to form a *verifiable demand infrastructure*. Each order is converted into a digital object containing product specifications, quantity, transaction value, delivery deadline, and the identity of the buyer. This structure makes demand traceable from submission through completion. Unlike informal conversations through messaging apps, records on the platform link evidence of demand to the executing party, the timing, and the fulfillment status. This finding is consistent with Riabokin and Kotukh (2025), who position digital infrastructure as a means of extending social capital through the transparency and traceability of community resource mobilization.

Order verification is designed to work in two directions. The buyer confirms the validity of the order and their commitment to pay, while the KUS confirms its production capacity, material needs, and ability to meet the deadline. An order can become the basis for financing only after both confirmations are available and, for certain transactions, reinforced by mentor validation. This mechanism reduces two risks at once: fictitious orders and the acceptance of orders that exceed the group's capacity. This logic is summarized in the following illustrative statement.

> "*Previously we only looked at chat screenshots. On the platform, the buyer has to confirm the quantity and the deadline, and then the group states that it is able to produce. So what is assessed is not just the students' claim, but an order confirmed by both parties.*" *(Informant 1, platform manager; illustrative quote)*

The value of this information lies in its closeness to actual economic activity. Conventional credit applications generally produce static and *self-reported* data, such as estimated turnover, planned use of funds, or asset ownership at a single point in time. In contrast, Ruang Modal generates transactional data that is continuously updated as orders are confirmed, production is reported, goods are delivered, and payments are settled. Another informant described the difference as follows.

> *"A form can say that turnover is large, but the order history shows whether the group is really able to complete the work. For us, that execution pattern is more informative than a single turnover figure." (Informant 2, platform manager; illustrative quote)*

Although richer, platform data is not automatically of high quality. Its reliability depends on user authentication, completeness of entries, proof of handover, and prevention of sham transactions. For this reason, the IFC emphasizes that the use of digital data for financial inclusion must be accompanied by governance, consent, security, and explainable decisions (International Finance Corporation, 2026). In the KUS context, digital capital therefore includes the ability to generate verifiable transaction evidence, not merely the ability to operate an application.

D.2. Alternative Data: Digital Footprints as a Substitute for Collateral

Accumulated order records form four types of alternative data. First, the order fulfillment track record shows the on-time completion ratio, cancellations, and product conformity. Second, consistency of production activity captures the frequency of progress uploads, regularity of status updates, and speed of response to buyers. Third, transaction patterns reveal changes in the volume, value, and frequency of orders. Fourth, the buyer network shows customer diversity and the proportion of repeat buyers. Together these four shift the focus from assets owned to business behavior already demonstrated, as summarized in Table 1.

Table 1. Four Types of Alternative Data and Their Indicators

Data type	Main indicators
Order fulfillment track record	Ratio of orders completed on time, cancellation rate, delays, and conformity of output with specifications.
Consistency of production activity	Frequency of progress uploads, regularity of status updates, response time, and completion of production stages.
Transaction patterns	Number, value, frequency, growth, volatility, and seasonal patterns of orders.
Buyer network	Number of unique buyers, repeat purchase rate, buyer concentration, and diversity of buyer origins.

Source: Author's elaboration (2026)

The practical relevance of these data is evident in the difference between formal assets and the performance evidence held by the group. A student described it in the following illustrative quote.

> *"We don't have assets to pledge, but the platform can show that our orders are completed and that buyers come back to order again. That history describes our business better than collateral documents, which we simply don't have." (Informant 3, KUS student manager; illustrative quote)*

Analytically, these indicators do not carry the same meaning. The on-time ratio reflects execution capability, while growth in order value may indicate market capacity but also increases operational risk. Repeat buyers signal satisfaction and trust, but dependence on a single buyer creates concentration risk. Therefore, alternative data should not be summed mechanically; indicators need to be read according to business type, season, group age, and order complexity. This finding is consistent with Jiang et al. (2026), who show that combining behavioral and transaction data enriches micro-enterprise risk assessment.

At the implementation stage, these data could potentially be processed into an alternative credit score using *gradient boosting*. Such a model can capture nonlinear relationships, for example an increase in order value that becomes a positive signal only when the completion ratio and buyer diversity remain stable. Chen (2026) shows that gradient boosting algorithms can integrate operational data, online transactions, and supply chain interactions to predict risk multidimensionally. The resulting score can be used to set financing limits, tenor, or the need for additional validation, rather than replacing human decisions entirely.

This potential must still be constrained by the principles of proportionality and explainability. The small KUS sample, changes in student behavior, and differences in business fields can produce bias and model instability. The IFC recommends data quality testing, bias audits, explanation of decision factors, and correction mechanisms for borrowers (International Finance Corporation, 2026). Thus, digital footprints function as a functional substitute for collateral only if the indicators are relevant, verifiable, and used to broaden access rather than to create new forms of algorithmic exclusion.

D.3. Demand/PO Financing: Bridging the KUS Cash Flow Gap

The design process produced a PO financing scheme adapted to the transaction size and administrative capacity of KUS. The main problem for groups is not always the absence of demand, but the lag between receiving an order and receiving the customer's payment. During this lag, KUS must buy materials, pay for packaging, or fund distribution before earning revenue. A mentor explained the situation in the following illustrative quote.

> *"The orders are there and the buyers are clear, but the students don't always have the money to buy materials in large quantities. If they wait for a down payment or save up first, the deadline passes and the customer may switch." (Informant 4, KUS mentor; illustrative quote)*

The proposed scheme consists of four stages. First, the platform verifies the buyer's identity and the order's specifications, value, and deadline through two-way confirmation. Second, the KUS's eligibility is assessed using alternative data, especially completion history, transaction patterns, production capacity, and the stability of its buyer network. Third, once the order and the group are deemed eligible, funds are disbursed at an indicative 70–80% of the order value or the verified production requirement, whichever is lower. Part of the funds can be paid directly to material suppliers to reduce the risk of misuse. Fourth, after the goods are received, the buyer's payment flows through an escrow account to repay the principal and the financing fee, with the remainder distributed to the KUS.

This disbursement range provides a buffer against cancellations, margin erosion, and unexpected costs; however, the percentage should not be applied uniformly. Orders from repeat buyers with a strong track record may qualify for higher limits, while first orders require a self-contribution or staged disbursement. This logic is in line with Tsai and Wu (2025), who show that the benefits of order-based financing are influenced by order value, down payment needs, and the cost of funds. Modalku's (2025) practice also stresses checking PO validity, buyer reputation, and the business's ability to fulfill the order before disbursement.

The key distinction of the Ruang Modal model is that the platform performs the functions of transaction verifier, risk assessor, and fund distributor within a single digital flow. This integration can lower *transaction costs* because documents, assessment, disbursement, and repayment are not processed by separate institutions. This efficiency matters for small-value financing that would be uneconomical if examined like corporate credit. However, the concentration of functions also creates conflicts of interest; therefore, the rules for scoring, approval, and disbursement need to be operationally separated and auditable. With this design, PO financing bridges cash flow without turning productive orders into general debt unconnected to their source of repayment.

D.4. Social Capital: Enforcement without Collateral

The analysis identifies three layers of social capital that support enforcement without collateral. The first layer is school accountability: the conduct of a KUS carries the school's reputation within the Double Track ecosystem, so teachers and school administrators have an interest in ensuring that orders are completed and obligations paid. The second layer is the inter-KUS network as a community of practice. A history of sharing suppliers, joint promotion, and access to subsequent programs creates incentives to protect the group's reputation. The third layer is community trust formed through repeated relationships with local buyers. These three layers provide information, monitoring, and social consequences that are not available in document-based assessment alone.

These mechanisms appear in two illustrative quotes. A student emphasized that a group's failure does not stop at being an individual matter.

> *"If our group is late or doesn't finish an order, it's not only the members' names that are judged, but the school's as well. We'll also find it hard to be trusted when joining joint orders with other KUS." (Informant 5, KUS student manager; illustrative quote)*

A mentor added the role of local relationships in monitoring.

> *"Buyers around the school usually know the teachers or group members. Information gets back to us quickly if quality drops or payment runs into problems, so oversight doesn't come only from the app." (Informant 6, KUS mentor; illustrative quote)*

These findings show that social capital works as a *collateral substitute*, not because reputation can be seized like an asset, but because the loss of access, trust, and transaction opportunities imposes real costs. Payment timing strengthens this commitment function when the source of repayment and the consequences of delay are set from the outset. However, Casaburi and Macchiavello (2019) caution that commitment devices are effective only if their enforcement is credible. Therefore, reprimands, recovery periods, reduced financing limits, and temporary suspension of access must be graduated and documented, rather than left to informal social pressure.

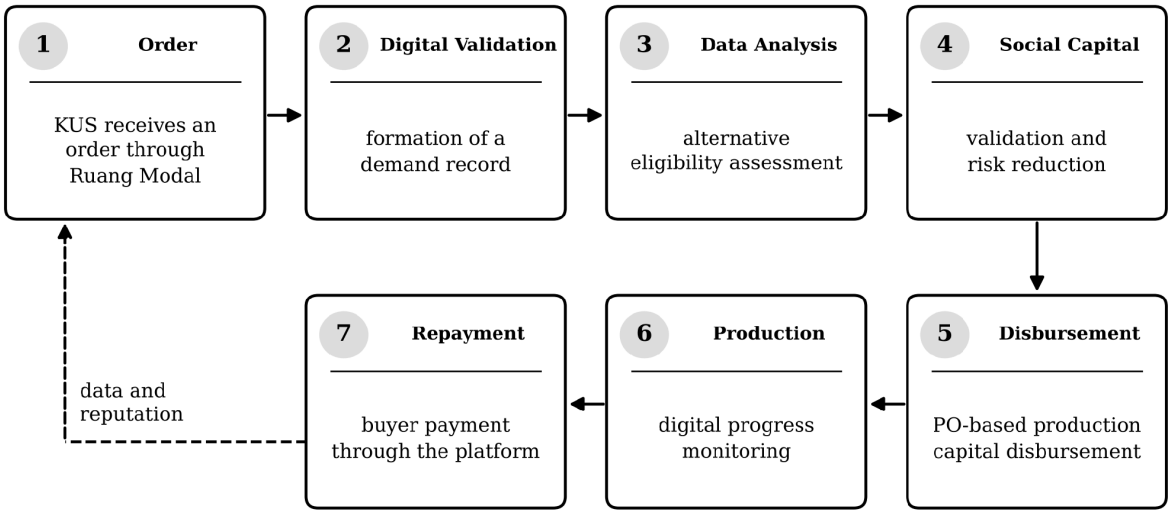
This model differs from a ROSCA, which pools internal funds and allocates them in rotation among members. Although Manea (2024) shows that ROSCA logic can be strengthened through digital infrastructure, Ruang Modal uses social capital to secure external funds from the platform based on specific transactions. The community is not the main source of funds, but provides local verification and

enforcement that lower the funder's risk. This synthesis extends the reach of social capital, while also requiring safeguards against favoritism, stigma, and excessive sanctions so that community governance remains inclusive.

D.5. Integrating the Four Pillars: The Community-Based Demand Financing Model

The synthesis of findings produces a *community-based demand financing* model with seven stages linking demand, data, capital, and enforcement. First, the KUS receives an order through Ruang Modal with information on the product, quantity, price, buyer, and deadline. Second, buyer and KUS confirmation turns the order into a verifiable *demand record*. Third, the platform analyzes *alternative data*, including completion punctuality, production consistency, transaction patterns, and the buyer network. Fourth, the results of the analysis are combined with *social capital* in the form of mentor validation, school accountability, inter-KUS reputation, and local buyer trust. This combination determines the financing limit and risk mitigation requirements.

Fifth, after approval, PO financing funds are disbursed for validated production needs, either to the KUS or directly to suppliers. Sixth, production is monitored through progress updates, evidence of material use, delivery status, and buyer confirmation. Seventh, the buyer's payment is processed through the platform to repay the financing along with the service fee, and the remainder is then distributed to the KUS. Figure 2 depicts this flow as a sequential chain with feedback: completion and repayment enrich the data, update the score, and strengthen reputation for the next transaction.



Source: Author's elaboration (2026)

Figure 2. Flow of the Integrative Community-Based Demand Financing Model

The integrative advantage of the model lies in the division of functions among the pillars. *Digital capital* addresses recording limitations; *alternative data* reduces information asymmetry when collateral and credit history are unavailable; PO financing closes the cash flow gap; while *social capital* strengthens monitoring and enforcement. Integrating platform data with analytics can indeed lower assessment costs and tailor financing to the character of transactions (International Finance

Corporation, 2026; Song et al., 2021), but decisions still require human governance and grievance mechanisms.

The model's sustainability stems from three cycles. First, transaction-based service fees can fund verification, platform maintenance, and risk management without burdening KUS with fixed costs. Second, successful fulfillment and repayment strengthen social capital through visible reputation. Third, every transaction enriches the data, so that subsequent assessments become more accurate and financing can increase gradually. Thus, growth depends not only on adding funds, but on the accumulation of performance evidence that lowers risk over time.

D.6. Theoretical and Practical Discussion

Theoretically, this model unites four streams of literature that usually stand apart: digital capital as the capacity to convert technology, alternative data as the basis for risk prediction, PO financing as a working capital instrument, and social capital as an enforcement mechanism. Its contribution is not merely placing four components on one platform, but explaining their causal sequence: digital infrastructure generates evidence; evidence forms the assessment; the assessment activates financing; and social capital safeguards execution and repayment. The next cycle then enriches the evidence and reputation. This relationship extends PO financing from formal supply chain transactions to *thin-file* micro-enterprise communities (International Finance Corporation, 2026; Reindorp et al., 2018).

The comparison in Table 2 shows the position of the proposed model. ROSCAs rely on internal funds and member discipline; commercial fintech relies on scores and external funds; while corporate PO financing depends on formal buyer and supplier documents. The Ruang Modal model combines order-based external funds with digital evidence and community governance.

Table 2. Comparison of Financing Models

Model	Funding/eligibility basis	Strengths	Limitations
ROSCA	Member contributions and trust	Simple; strong discipline and community ownership	Limited funds; shared risk; dependent on member contributions
Commercial fintech	External funds and individual digital scores	Fast, measurable, and scalable	Cost, data bias, and relatively weak community ties
Corporate PO financing	Formal POs, buyer and supplier reputation	Repayment tied to transactions and real cash flow	Requires documents and formal buyers; costly for micro transactions
Proposed model	Verified orders, alternative data, and social capital	Contextual for thin-file businesses; integrates verification, capital, and enforcement	Requires data quality, conflict governance, and mentor capacity

Source: Author's elaboration (2026)

In practice, this architecture can be replicated in pesantren (Islamic boarding school) cooperatives, BUMDes (village-owned enterprises), farmer communities, or other producer groups that have real demand but are weak in collateral and documentation. Replication cannot be done by copying scores directly; indicators,

validating actors, production cycles, and forms of sanction must be adapted to local governance. Compared with ROSCAs, the model attracts external funds; compared with commercial fintech, it adds community accountability; and compared with corporate supply chain finance, it simplifies verification for small transactions. The main implication is that financial inclusion requires a combination of technology and local institutions, not merely the digitalization of conventional credit processes.

E. Conclusions & Policy Recommendation

E.1. Conclusions

This study answers the research question by formulating a *community-based demand financing* model that integrates four pillars into a single KUS financing cycle. First, *digital capital* positions Ruang Modal as verification infrastructure that turns orders into structured and traceable demand records. Second, *alternative data* from order fulfillment, production activity, transaction patterns, and buyer networks provides a functional substitute for collateral and formal credit history. Third, PO financing links financing directly to production needs and the source of repayment, thereby bridging the *cash flow gap* between order receipt and buyer payment. Fourth, the *social capital* embedded in schools, inter-KUS networks, and buyer communities provides reputation-based validation, monitoring, and enforcement without relying on physical collateral.

The novelty of this study lies in the operational relationships among these pillars. Digital infrastructure generates transaction evidence; evidence becomes the basis for eligibility assessment; the assessment activates order-based financing; while social capital reduces execution and repayment risk. Completed transactions then enrich the data and reputation for the next cycle. Thus, the model does not merely combine four concepts, but explains the sequence by which financing eligibility is formed for *thin-file* community businesses.

Theoretically, this model brings together the literature on digital capital, alternative credit assessment, supply chain finance, and social capital in the context of student businesses. Practically, the model provides a design basis for order verification, risk assessment, production capital disbursement, monitoring, and repayment features on Ruang Modal. However, the results demonstrate conceptual feasibility and design fit, not causal evidence that the model has increased the income or sustainability of KUS.

E.2. Policy Recommendations

Local governments and relevant authorities need to provide a regulatory framework that enables order-based financing at the community scale, including standards for order validation, data protection, fee transparency, and dispute resolution. Ruang Modal can be gradually integrated with Prokesra and Bank UMKM Jawa Timur services as a verification and mentoring channel, without replacing the prudential assessment of financial institutions. Financing support needs to be accompanied by digital and financial literacy training for KUS, mentor teachers, and platform managers so that recording, use of funds, account protection, and understanding of repayment obligations develop alongside access to capital.

E.3. Limitations and Future Research

The study focuses on a single platform and a single program context, namely East Java Double Track KUS. Student characteristics, the role of schools, mentoring, transaction size, and the density of local networks may differ from those of other business communities. In addition, the artifact evaluation is still qualitative and conceptual, while the quotes presented in the model are illustrative and need to be replaced with validated field transcripts. Therefore, the findings cannot be statistically generalized and still require empirical testing across locations and types of communities.

Future research should validate the model in pesantren cooperatives, BUMDes, farmer communities, and other producer groups to test which components are general and which are contextual. Implementation impact can be measured quantitatively through financing approval rates, order fulfillment punctuality, production volume, income, repayment, and business sustainability. Developing an *AI-based scoring* prototype, including gradient boosting, is also needed to test the accuracy and explainability of scores based on alternative data. Testing should use adequate samples, relevant comparators, bias audits, consent for data use, and correction mechanisms for KUS.

REFERENCES

Agarwal, S., Alok, S., Ghosh, P., & Gupta, S. (2023). *Financial inclusion and alternate credit scoring: Role of big data and machine learning in fintech*. Indian School of Business. https://doi.org/10.2139/ssrn.3507827

Al-Azzam, M., Parmeter, C. F., & Sarangi, S. (2020). On the complex relationship between different aspects of social capital and group loan repayment. *Economic Modelling*, *90*, 92–107. https://doi.org/10.1016/j.econmod.2020.04.027

Asian Development Bank. (2024). *Asia small and medium-sized enterprise monitor 2024: Designing an MSME ecosystem for resilient growth in Asia and the Pacific*. Asian Development Bank. https://doi.org/10.22617/SGP240536-2

Babich, V., & Hilary, G. (2020). OM forum—Distributed ledgers and operations: What operations management researchers should know about blockchain technology. *Manufacturing & Service Operations Management*, *22*(2), 223–240. https://doi.org/10.1287/msom.2018.0752

Bank Indonesia. (2024). *Kajian inovasi model bisnis pembiayaan digital kepada UMKM* [Study of business model innovation in digital financing for MSMEs]. Bank Indonesia. Retrieved September 29, 2026, from https://www.bi.go.id/id/publikasi/kajian/Pages/Kajian-Inovasi-Model-Bisnis-Pembiayaan-Digital-Kepada-UMKM.aspx

Bank UMKM Jawa Timur. (2025, February 24). *Pemprov Jatim bersama Bank UMKM hadirkan Prokesra suku bunga 3 persen* [East Java Provincial Government and Bank UMKM launch Prokesra at 3 percent interest]. ANTARA News Jawa Timur. Retrieved September 29, 2026, from https://jatim.antaranews.com/berita/886533/pemprov-jatim-bersama-bank-umkm-hadirkan-prokesra-suku-bunga-3-persen

Berg, T., Burg, V., Gombović, A., & Puri, M. (2020). On the rise of fintechs: Credit scoring using digital footprints. *The Review of Financial Studies*, *33*(7), 2845–2897. https://doi.org/10.1093/rfs/hhz099

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Calderón Gómez, D. (2021). The third digital divide and Bourdieu: Bidirectional conversion of economic, cultural, and social capital to (and from) digital capital among young people in Madrid. *New Media & Society*, *23*(9), 2534–2553. https://doi.org/10.1177/1461444820933252

Casaburi, L., & Macchiavello, R. (2019). Demand and supply of infrequent payments as a commitment device: Evidence from Kenya. *American Economic Review*, *109*(2), 523–555. https://doi.org/10.1257/aer.20180281

Chen, S. (2026). Credit scoring prediction for small and medium-sized enterprises based on alternative data and gradient boosting algorithms. *Information Resources Management Journal*, *39*(1), 1–19. https://doi.org/10.4018/IRMJ.400759

Chod, J., Trichakis, N., Tsoukalas, G., Aspegren, H., & Weber, M. (2020). On the financing benefits of supply chain transparency and blockchain adoption. *Management Science*, *66*(10), 4378–4396. https://doi.org/10.1287/mnsc.2019.3434

Cornée, S., & Masclet, D. (2022). Long-term relationships, group lending, and peer monitoring in microfinance: Experimental evidence. *Journal of Behavioral and Experimental Economics*, *100*, 101921. https://doi.org/10.1016/j.socec.2022.101921

Cornelli, G., Frost, J., Gambacorta, L., Rau, P. R., Wardrop, R., & Ziegler, T. (2023). Fintech and big tech credit: Drivers of the growth of digital lending. *Journal of Banking & Finance*, *148*, 106742. https://doi.org/10.1016/j.jbankfin.2022.106742

Cusumano, M. A., Gawer, A., & Yoffie, D. B. (2019). *The business of platforms: Strategy in the age of digital competition, innovation, and power*. Harper Business.

Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2022). *The Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19*. World Bank. https://doi.org/10.1596/978-1-4648-1897-4

Dinas Komunikasi dan Informatika Provinsi Jawa Timur. (2025, October 9). *Gubernur Khofifah bangga siswa Double Track di Jatim bentuk 1.600 kelompok usaha siswa di tahun 2025, pecahkan rekor MURI!* [Governor Khofifah proud as Double Track students in East Java form 1,600 student business groups in 2025, breaking a MURI record!]. Retrieved September 29, 2026, from https://mail.bakorwilbojonegoro.jatimprov.go.id/gubernur-khofifah-bangga-siswa-jatim-bentuk-1600-kelompok-usaha-siswa-2025-pecahkan-rekor

Djeundje, V. A. B., Crook, J., Calabrese, R., & Hamid, M. (2021). Enhancing credit scoring with alternative data. *Expert Systems with Applications*, *163*, 113766. https://doi.org/10.1016/j.eswa.2020.113766

Frost, J., Gambacorta, L., Huang, Y., Shin, H. S., & Zbinden, P. (2019). BigTech and the changing structure of financial intermediation. *Economic Policy*, *34*(100), 761–799. https://doi.org/10.1093/epolic/eiaa003

Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS Quarterly*, *28*(1), 75–105. https://doi.org/10.2307/25148625

Hozairi, Asrori, M. Z., Wijaya, A. Y., & Baskoro, F. (2024). *Jejak sukses program Double Track dalam cipta karya, cipta usaha, cipta kerja untuk sekolah menengah atas (SMA)* [The success story of the Double Track program in creating works, businesses, and jobs for senior high schools]. Widina Media Utama. Retrieved September 29, 2026, from https://repository.penerbitwidina.com/media/publications/567962-jejak-sukses-program-double-track-dalam-356164d2.pdf

International Finance Corporation. (2026, May). *Cracking the credit code: Alternative data and AI for financial inclusion*. International Finance Corporation. https://www.ifc.org/en/insights-reports/2026/cracking-the-credit-code-alternative-data-and-ai-for-financial-inclusion

Jagtiani, J., & Lemieux, C. (2019). The roles of alternative data and machine learning in fintech lending: Evidence from the LendingClub consumer platform. *Financial Management*, *48*(4), 1009–1029. https://doi.org/10.1111/fima.12295

Jiang, M., Shi, J., Zheng, Y., & Zhou, W. (2026). The role of alternative data in micro-enterprises' credit risk assessment in China: Empirical evidence based on machine learning. *Journal of Behavioral and Experimental Finance*, *49*, 101154. https://doi.org/10.1016/j.jbef.2026.101154

Lima, Z., & Huchzermeier, A. (2019). Managing supplier financial distress with advance payment discount and purchase order financing. *Omega*, *88*, 77–90. https://doi.org/10.1016/j.omega.2018.10.019

Manea, A. N. (2024). *Distributed ledger technology based multi-energy service provision* [PhD thesis]. Cardiff University. Retrieved September 29, 2026, from https://orca.cardiff.ac.uk/id/eprint/180082/

Modalku. (2025, November 27). *Serba-serbi pinjaman modal usaha dengan PO financing* [All about business capital loans with PO financing]. Retrieved September 29, 2026, from https://blog.modalku.co.id/bisnis/sektor-umkm/serba-serbi-pinjaman-modal-usaha-dengan-po-financing/

Museum Rekor Dunia Indonesia. (2025, October 8). *Program Double Track SMA dengan kelompok usaha siswa terbanyak* [Senior high school Double Track program with the most student business groups]. Retrieved September 29, 2026, from https://www.muri.org/Website/Rekor_detail/program-double-track-sma-dengan-kelompok-usaha-siswa-terbanyak

Ofosu, A., Minh, T. T., Dickson, D. N., Okem, A. E., Barry, I., & Schmitter, P. S. (2025, November). *Co-identifying collective investment models for solar-based irrigation bundles in northern Ghana*. International Water Management Institute. Retrieved September 29, 2026, from https://www.iwmi.org/people/abena-ofosu/

Ofosu, G., Arthur-Holmes, F., Siaw, D., & Sarpong, D. (2025). Friends or foes: Can large-scale mining companies partner with small-scale miners? Yes, they can?

Journal of Rural Studies, *119*, 103709. https://doi.org/10.1016/j.jrurstud.2025.103709

Organisation for Economic Co-operation and Development. (2024). *Financing SMEs and entrepreneurs 2024: An OECD scoreboard*. OECD Publishing. https://doi.org/10.1787/fa521246-en

Otoritas Jasa Keuangan. (2023). *Roadmap pengembangan dan penguatan layanan pendanaan bersama berbasis teknologi informasi (LPBBTI) 2023–2028* [Roadmap for the development and strengthening of information technology–based joint funding services (LPBBTI) 2023–2028]. Otoritas Jasa Keuangan. Retrieved September 29, 2026, from https://ojk.go.id/id/berita-dan-kegiatan/info-terkini/Pages/Roadmap-Pengembangan-dan-Penguatan-Layanan-Pendanaan-Bersama-Berbasis-Teknologi-Informasi-2023-2028.aspx

Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A design science research methodology for information systems research. *Journal of Management Information Systems*, *24*(3), 45–77. https://doi.org/10.2753/MIS0742-1222240302

Pemerintah Provinsi Jawa Timur. (2025, October 9). *Gubernur Khofifah bangga siswa Double Track di Jatim bentuk 1.600 kelompok usaha siswa di tahun 2025, pecahkan rekor MURI!* [Governor Khofifah proud as Double Track students in East Java form 1,600 student business groups in 2025, breaking a MURI record!]. Retrieved September 29, 2026, from https://mail.bakorwilbojonegoro.jatimprov.go.id/gubernur-khofifah-bangga-siswa-jatim-bentuk-1600-kelompok-usaha-siswa-2025-pecahkan-rekor

Reindorp, M., Tanrisever, F., & Lange, A. (2018). Purchase order financing: Credit, commitment, and supply chain consequences. *Operations Research*, *66*(5), 1287–1303. https://doi.org/10.1287/opre.2018.1727

Riabokin, M., & Kotukh, Y. (2025). Social capital in the digital economy: Transforming hromada project financing models using RWA tokenisation. *E-Forum Working Papers*, *15*(3), 112–122. https://doi.org/10.62763/ef/3.2025.112

Saunders, M. N. K., Lewis, P., & Thornhill, A. (2023). *Research methods for business students* (9th ed.). Pearson.

Song, H., Yu, K., & Lu, Q. (2021). Big data analytics in digital platforms: How do financial service providers customise supply chain finance? *International Journal of Operations & Production Management*, *41*(4), 410–435. https://doi.org/10.1108/IJOPM-07-2020-0485

Tsai, M.-C., & Wu, A. (2025). Order to optimize: Evaluating the role of purchase orders and receivables in corporate financing. *Cogent Business & Management*, *12*(1), 2577863. https://doi.org/10.1080/23311975.2025.2577863