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Connecting Users and Providers in the Construction Equipment Industry: A Conceptual Framework Motivated by the Ridesharing Industry

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Abstract: Despite the popularity of platform models in consumer-oriented industries like ridesharing and accommodation, the construction equipment industry is an environment that has not received enough attention. This study creates an integrated conceptual framework for sharing-economy platforms in this sector. Construction equipment industry is capital-intensive, diverse, safety-critical, and closely linked to project schedules, in contrast to standardized and low-risk services. Such factors, thus create special operational and informational constraints that restrict the direct transferability of current sharing-economy models. Inspired by these gaps, the paper conceptualizes a two-way digital platform that links equipment users (small contractors) and owners (big contractors and dealers), with a focus on generating shared value through better coordination and use of idle assets. Along with important operations management levers like speed, pricing, availability, and suitability, as well as bundled service packages like skilled operators, maintenance, and insurance, the suggested framework incorporates information management dimensions like information sharing, quality, correctness, symmetry, and continuity. In asset-heavy, project-based environments, the framework delineates how platform design decisions influence users' behavioral intention to adopt by specifically taking asset specificity, downtime risk, and service bundling into account. The study provides a theory-driven basis for subsequent empirical research and platform design in capital-intensive businesses, expanding the scope of sharing-economy studies beyond traditional service-centric contexts.

Keywords: ridesharing; sharing economy; construction equipment; information management; operations management

1. Introduction

1.1. The Preliminaries

Sharing economy (SE), also termed as Shared Economy or Collaborative Consumption, has gained strong traction in the last few years across the globe, in that this still-evolving paradigm helps people gain and provide access to goods and services in a coordinated customer-to-customer (C2C) mode and business-to-customer (B2C) settings [1–4]. By connecting the two-sided market (characterized by service providers and service receivers), SE enables a win-win business solution via web-enabled as well as app-based platform models [2,5]. In the sectors of accommodation and point-to-point transportation, companies such as Airbnb and Uber have already achieved tremendous success. For instance, Uber, the cab aggregator, was valued at 68 billion dollars by the end of 2015 [5]. A few underlying characteristics of the sharing economy pertain to the utilization of idle assets, temporary access to goods and services, and competitive monetization of assets for both the service providers and service receivers. SE

platforms have been increasingly adopted by firms across various service verticals, including transportation, accommodation, finance, labor market, tourism, and healthcare [3]. The critical success factors, key operational levers, and drivers of intention for adoption associated with SE platforms, with a focus on matchmaking in the context of traditional service verticals like hospitality, accommodation, transportation, etc., are fairly understood [6–8]. For instance, in the context of Uber's platform, the key to the success of the matchmaking between drivers and riders boils down to the platform's ability to do two things: (a) maximizing the number of successful matches the platform can provide in a given amount of time; (b) monetizing these matches in a way that this provides a win-win for both the parties involved. Broadly, the platform must make matches quickly, efficiently, and with as little friction as possible, and it must do so at a price that incentivizes both drivers and riders. Thus, Uber's important levers are speed and price [9]. Apart from the operational drivers, factors related to information management also influence the intention of adoption of SE platforms for both service providers and service receivers. The role of information processing mechanisms was highlighted to enhance the effectiveness of matchmaking and suggested leveraging information capacity management to achieve effectiveness, efficiency, and adoption rate for service industry-focused SE platforms [2]. A study related to factors influencing people's participation in a collaborative economy emphasized the role of information management and technologies [1]. The positive role of information management-related nuances such as information capability, information support, information quality, information reach, etc., on acceptance and usage of SE platforms by service receivers in the context of pure service industry verticals has also been adequately established [10–12].

Apart from the vast majority of SE platforms that are often associated with pure services, there has been increased traction in terms of the adoption of SE-type platforms in the world of capital equipment as well. Firms like United Rentals in the United States or Trringo in India have connected equipment owners and end users, thus creating a win-win proposition for platform owners, service providers, and service receivers. Trringo, for instance, is India's foremost tractor and farm equipment rental services company in that it is considered a one-stop solution for farm mechanization needs, because the vast majority of farmers in India have relatively modest capabilities to acquire capital-intensive equipment. The mission statement of Trringo reads "*Trringo aims to raise the level of mechanisation in farming through the power of technology and a strong franchisee network. The vision is to make farm mechanisation easily accessible and affordable to farmers all over India*" (https://www.engineeringforchange.org/solutions/product/trringo/, accessed on 10 December 2025). As clearly evident in the aforementioned mission statement, Trringo's two broad operational levers pertain to the price of offering to end users and accessibility for farming needs. To the best of the authors' knowledge, there is hardly any study that articulates users' (service receivers) intention to adopt SE platforms in the context of capital equipment rental services from information management and operational perspectives. Of particular interest would be to understand ways in which key operational and information management aspects can influence end users' intention to adopt the SE platform in capital equipment-intensive rental services. From an information management perspective, two primary dimensions of information sharing, and information quality have been considered based on the pertinent arguments [13]. Further, since explicit considerations related to information and communications technology (ICT) are beyond the scope of this study, other ICT-related nuances, such as information-sharing support technology, as argued for by [14] are not considered in this study. From an operations management perspective, we aim to conceptualize the role of key operational levers, i.e., price, speed, availability, and suitability, and dimensions of service package on the behavioral intention of adoption of end users (service receivers).

1.2. Research Context and Contributions

The specific motivation that relates to our research pertains to the conceptualization of a capital equipment SE platform that seeks to connect a two-sided market, in that large contractors and dealers owning such assets act as asset suppliers. Small contractors and farmers play the role of equipment end users. The platform thus acts as a digital intermediary between the two sides of the market in such a way that the platform provider's share of transactional value is based on the transaction between suppliers and end users of equipment. The equipment under consideration primarily refers to construction and earth-moving equipment such as wheel loaders, excavators, and backhoe loaders, as these equipments typically constitutes the largest chunk as far as the construction equipment sector is concerned [15]. In such a decentralized platform, the equipment owners set the terms and conditions and offer directly to equipment end users. From the equipment owners' perspective, the value proposition lies in the fact that they can monetize their idle assets. From the equipment end users' perspective, the value proposition lies in the fact that such small contractors having modest financial capabilities do not have to purchase expensive capital equipment and do not have to get the equipment financed at high interest charges, particularly in the context of developing countries, wherein credit rates are higher than in the developed world.

While the sharing economy has achieved considerable success in retail consumer-centric sectors such as ridesharing and accommodation, the direct migration of these platform models to the construction equipment industry presents challenges that remain insufficiently examined in the literature. Existing platforms in transportation and hospitality typically involve standardized or easily substitutable assets, short transaction cycles, relatively low safety risk, and limited operational interdependence between service delivery and project outcomes. In contrast, construction equipment sharing operates in a fundamentally different environment characterized by capital-intensive, heterogeneous, and safety-critical assets. Further, utilization is tightly coupled with project timelines and contractual obligations.

The aforementioned discussions highlight that existing sharing-economy research, largely grounded in consumer-oriented service platforms, does not adequately capture the operational and informational complexities of capital-intensive, project-based construction environments such as those encountered in construction equipment. To the best of the authors' knowledge, prior studies have not examined how information management mechanisms and operational design choices jointly shape adoption behavior when assets are highly specific, downtime costs are substantial, and services are frequently bundled with equipment. Addressing these gaps, our study adopts an integrated perspective and is guided by the following research questions.

RQ1. What information management dimensions and operational levers are critical in influencing users' behavioral intention to adopt sharing-economy platforms in capital-intensive construction equipment contexts?

RQ2. How do information management mechanisms and operational design choices, particularly service bundling, pricing, speed, availability, and suitability, etc. interact to shape adoption behavior and perceived value in construction equipment sharing platforms?

2. Literature Review

The focus of our research broadly lies at the intersection of two major research streams, i.e., (a) adoption and intention of adoption of SE platforms by end users (service receivers), and (b) operational and information management levers for orchestration of SE platforms. In this section, we present the recent and relevant research literature about both research streams.

2.1. Adoption and Intention of Adoption of SE Platforms by End Users

The study by [16] explored factors affecting Chinese travelers' behavioral intention toward room-sharing platforms. Considering characteristics of room-sharing and inspired by utilitarian motivation (measured by service experience, information acquisition, cost savings, and resource efficiency), the study carried out survey-based research of 445 samples. An important contribution of this study was that it was one of the first studies that empirically examined Chinese consumers' behavioral intention (BI) to adopt the SE platform in the context of room-sharing. Of particular importance was the finding that utilitarian motivation is positively related to BI adoption. The factors pertaining to intention to adopt internet shopping technology amongst non-shoppers in developing economies were examined by [17]. The proposed factors in the study were drawn from popular IS (information systems)/IT (information management) literature, in that the moderating effect of gender was also examined. The study also demonstrated statistical differences between online shoppers and non-shoppers. The study by [10] examined the effects of inhibiting, motivating, and technological factors on users' intention to participate in the sharing economy. Based on the self-reported online survey of UBER users in Hong Kong, the study empirically validated that perceived risks, perceived benefits, trust in the SE platform, and perceived quality attributes of the SE platform are significant predictors of users' intention to participate in UBER services. Indian travelers' intention to adopt the Airbnb platform by employing a unified theory of acceptance and use of technology (UTAUT), using a sample of 301 potential Indian consumers, was examined by [18]. In particular, the study uncovered the role of attitude that significantly mediates the effects of effort expectancy, social influences, and facilitating conditions. The model proposed in the study thus explained about 65% variance in Indian consumers' intention to use Airbnb. The antecedents for hostel consumers' switching intentions using the push-pull-mooring model were examined by [19]. Employing a total of 292 valid data collected from user surveys, the study concluded that mooring factors have a significant moderating effect on the relationship between pull factors and switching intentions. The study contributed in that it was one of the first studies to pay attention to switching intentions from hostels. The factors that influence the adoption of IT platforms by software developers were investigated by [20]. Employing a multi-methodological approach beginning with a field study, the newer constructs of the study were identified. Importantly, the study observed the importance of network externality conditions when developers make adoption decisions (as opposed to end-users).

2.2. Operational and Information Management Levers for Orchestration of SE Platforms

Several innovative models in service delivery, such as ridesharing services and work-from-home call centers, studied capacity management when workers self-schedule were conceptualized by [21]. The study illustrated that service providers benefit from the flexibility to adjust their capacity from period to period depending upon the variation in demand over the horizon. The service staff's flexibility would be driven by the flexibility to choose when they will or will not work. The study emphasized the role of compensation as a lever through which service firms can control their capacity. The study by [22] related to what assets to own in the service economy identified asset categories that allow a firm to appropriate value. This study concluded that resource-based assets, platform-based assets, and market-based assets are pivotal to the success of the platform economy. In particular, within the platform-based assets, physical and intellectual platform assets, critical mass, and volume-based advantages. The impact of policies pertaining to pricing, taxi fares, regulations, etc., on on-demand ride services was examined by [2]. By analyzing a two-period dynamic game involving stakeholders (service receivers and service providers), the study concluded that a government can reform the taxi industry by adjusting the taxi fare, then lowering the taxi fare instead of imposing a strict policy towards on-demand ride services, can improve the total social welfare. In the context of an on-demand service platform connecting waiting-time-sensitive customers with independent service providers (agents), how two features of the on-demand service platform, i.e., delayed sensitivity and agent independence, impact the platform's optimal per-service page and wage [23]. The study illustrated that delayed sensitivity increases the optimal prices when customer valuation uncertainty moderates. The impact of on-demand platform operations with hired agents considering service pricing with consumers having different risk attitudes were examined by [24]. The research applied the mean-risk theory to analytically explore how the risk attitudes of customers influence the optimal service pricing of the on-demand platforms. An important finding of this study was that the more customers become risk averse (risk seeking), the more optimal service price drops(increases). The primary contribution of the study was that it highlighted that the risk attitudes of customers play a critical role in determining the optimal on-demand service pricing. The price value construct in a unified theory of acceptance and use of technology was examined by [18]. One of the key findings of the study was the fact that around 41% of UTAUT empirical studies utilized price value as an important operational construct. A reason for this exclusion was that these studies examined technologies such as mobile applications and social networking sites that are typically available free of cost.

Several technical and operational bottlenecks constrain the straightforward application of conventional sharing economy models to heavy construction equipment. First, construction machinery exhibits high asset specificity and low substitutability, implying that inappropriate equipment matching can lead to substantial productivity losses and project delays. Second, downtime costs are significantly higher, as equipment availability is often synchronized with critical construction milestones. Third, the operations of heavy equipment frequently require skilled operators, introducing labor dependencies that are absent in most consumer sharing platforms. Fourth, liability, insurance, and regulatory compliance requirements are considerably more complex, increasing perceived risk for both equipment providers and users. Finally, transactions in this context are often embedded within bundled service arrangements involving maintenance, operators, time-based usage, and insurance, rather than simple pay-per-use models.

Despite these distinctive characteristics, the extant sharing economy literature remains largely service-oriented and consumer-focused, with empirical and conceptual studies predominantly examining sectors such as ridesharing, accommodation, and peer-to-peer services. Research on equipment sharing has been comparatively sparse and fragmented, often addressing isolated issues such as utilization or pricing without integrating broader platform design considerations. More importantly, prior studies rarely examine how information management dimensions (e.g., information quality, transparency, and symmetry) and operations management levers (e.g., speed, availability, pricing, and service bundling) jointly shape adoption behavior in capital-intensive, project-based settings. Thus, our study is an attempt to abridge such a gap.

3. The Framework

3.1. Framework Rationale

The study is explicitly positioned as a conceptual, theory-building research effort, rather than an empirical hypothesis-testing study. The methodology involves a structured synthesis of prior peer-reviewed literature spanning sharing economy platforms, operations management, information systems, and construction equipment rental domains. Instead of primary data collection, the study systematically identifies, adapts, and integrates constructs from established adoption theories (e.g., platform adoption and information management literature) and domain-specific operational studies to develop the proposed framework. The dimensions included in our developed framework are derived through a three-layered synthesis approach which are as follows.

(a) Technology and platform adoption theories: Core behavioral constructs such as perceived usefulness, perceived risk, trust, and adoption intention are adapted from well-established adoption models, including TAM, UTAUT, and Diffusion of Innovations, ensuring consistency with the broader information systems and operations management literature.
(b) Sharing economy and platform-mediated resource utilization literature: Constructs such as information asymmetry, asset specificity, pricing transparency, and platform governance are grounded in prior research on ridesharing, accommodation sharing, and industrial platform ecosystems. These dimensions capture the unique coordination and trust challenges inherent in platform-based sharing systems.
(c) Domain-specific adaptation to heavy construction equipment context: Additional pertinent dimensions such as insurance packages, liability coverage, asset reliability, and operational risk exposure are introduced to reflect the high-value, safety-critical, and capital-intensive nature of construction equipment. These factors are repeatedly emphasized in construction management and equipment literature but remain underrepresented in conventional sharing-economy adoption models.

3.2. Joint Information Management and Operational Perspective

Figure 1 shows the two-sided market wherein the SE platform acts as a central entity with which both the user side and the provider side are connected. The entire ecosystem is developed in such a way that satisfied end users and satisfied providers are in a mutually reinforcing loop, thus creating a network effect. With more and more dealers and large contractors signing up for the SE platform, it leads to more satisfied end users, given increased choices. This, in turn, attracts more and more end users to sign up for the SE platform, which again creates attraction for more and more dealers and larger contractors. However, such a mutually reinforcing cycle is contingent upon both the supply side density and the demand side density mediated by the central platform coordination mechanism, as denoted in Figure 2.

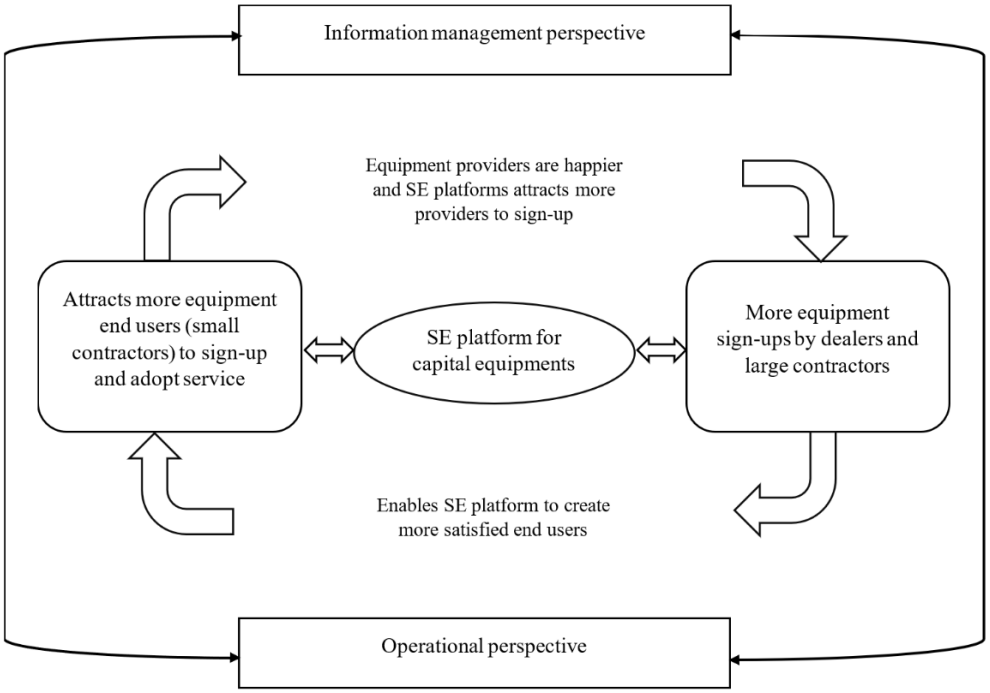

Figure 1. The platform's two-sided market.

Figure 2 depicts the dynamic interaction between supply-side and demand-side densities in a two-sided construction equipment sharing platform. Platform coordination mechanisms such as information quality, pricing transparency, insurance coverage, and governance mediate these interactions and activate reinforcing feedback loops. As supply density increases, asset availability and reliability, demand density improves utilization and revenue attractiveness, further incentivizing supplier participation. These reciprocal network effects collectively generate synergistic value and platform scalability over time. Further, from an information-sharing and operational perspective, we seek to develop a framework that can assess the influence of both perspectives on the behavioral intention to adopt, as denoted in Figure 3. Referring to Figure 3, we posit that both the operational and information management perspectives drive the behavioral intention to adopt.

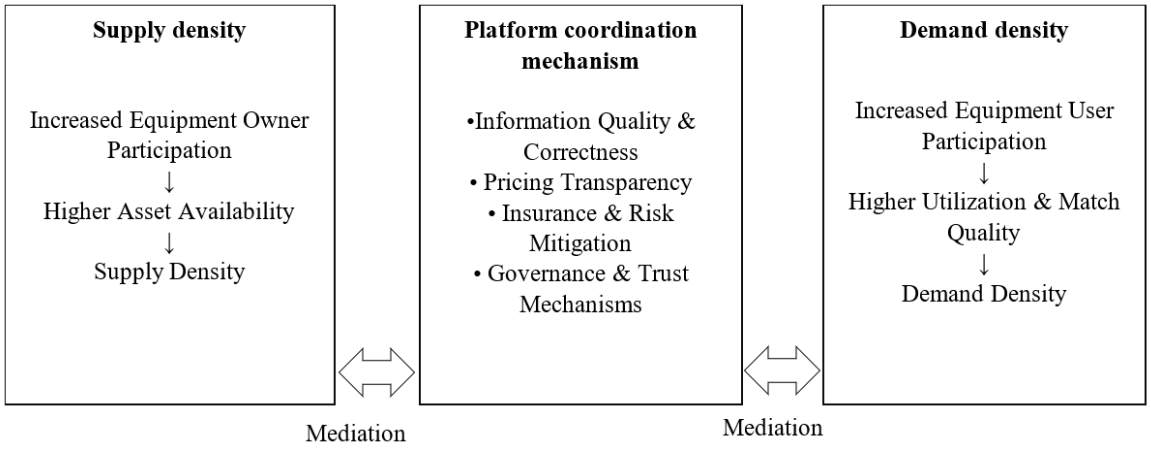

Figure 2. Supply and demand side coordination by central platform.

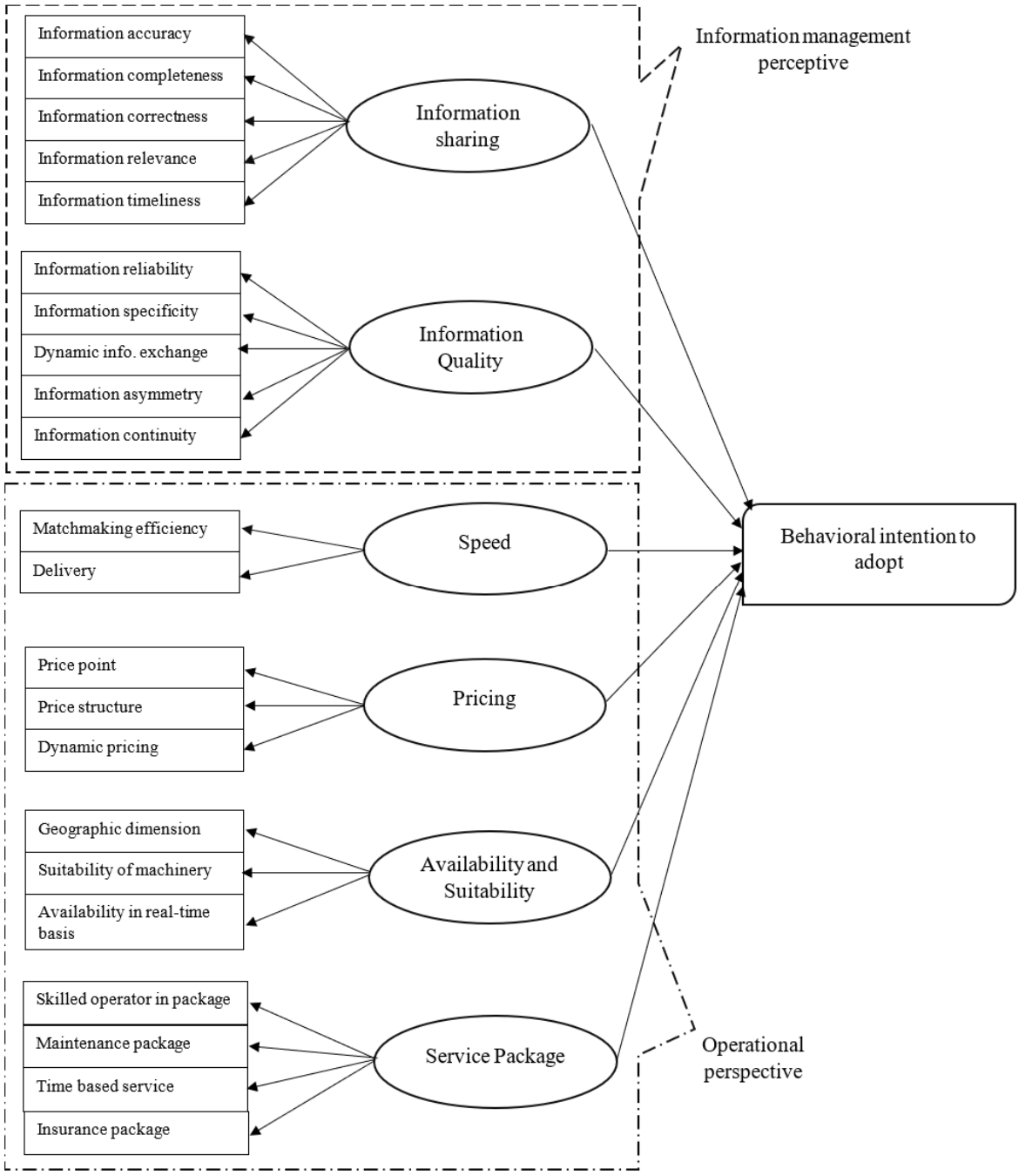

Figure 3. Perspectives and intention to adopt.

3.2.1. Information Management Related Constructs

Information Sharing

Following detailed constructs qualifies the information sharing construct.

- Information accuracy

Accurate information about equipment specifications, availability, and rental rates helps users choose the right equipment for their needs and budget, reducing the risk of project delays and additional costs due to equipment misfits. Accurate information about equipment condition, usage history, and location ensures that providers can maintain their equipment properly and offer reliable service to users.

- Information completeness

Complete information about rental terms, equipment features, usage instructions, and support services allows users to make informed decisions and utilize the equipment effectively and safely. Further, complete information about user requirements, project details, and expected usage helps providers offer suitable equipment and additional services if needed, enhancing customer satisfaction.

- Information correctness

Correct information about rental agreements, insurance coverage, and billing details ensures that users understand their responsibilities and avoid disputes over costs or liabilities. Moreover, Correct records of equipment usage, maintenance schedules, and transaction details ensure that providers can manage their inventory, plan maintenance, and bill users accurately.

- Information relevance

Relevant information about equipment performance, compatibility with project requirements, and user reviews helps users select the most appropriate and reliable equipment for their tasks. Additionally, relevant market data, user preferences, and demand trends allow providers to optimize their inventory, pricing strategies, and service offerings to meet market needs effectively.

- Information timeliness

Timely updates on equipment availability, delivery schedules, and maintenance issues enable users to plan their projects efficiently and avoid delays. Timely notifications about rental requests, equipment returns, and maintenance needs help providers manage their operations smoothly and respond promptly to user needs.

Information Quality

Another important dimension related to the information management perspective is the information quality. Dimensions related to information quality would be helpful to both asset users and providers in the following ways.

- Information reliability

Reliable information about equipment availability, performance and condition ensures that users can depend on the equipment to meet their project needs without unexpected failures or delays. Reliable information about user requirements, usage patterns, and feedback helps providers maintain trust with their clients and ensures that equipment is used appropriately and returned in good condition.

- Information specificity

Specific information about equipment capabilities, operating instructions, and compatibility with project requirements helps users select the right tools for their tasks, improving efficiency and outcomes. Specific details about rental agreements, maintenance schedules, and usage limits help providers set clear expectations and manage their inventory more effectively.

- Information exchange

Efficient and clear information exchange regarding booking confirmations, delivery schedules, and support requests helps users plan their projects better and address any issues promptly. Seamless information exchange about rental inquiries, equipment status updates, and user feedback allows providers to respond quickly to market demand and enhance service quality.

- Information symmetry

Symmetric information sharing ensures that users are as informed as providers about rental terms, equipment conditions, and usage policies, thus reducing misunderstandings and disputes. Further, symmetric information

sharing also ensures that providers are aware of user needs, project timelines, and any specific requirements, enabling them to offer tailored solutions and support.

- Information continuity

Continuous updates on equipment status, maintenance alerts, and any changes in rental terms help users manage their projects without interruptions and adjust plans as needed. Continuous information flow regarding user feedback, equipment performance, and market trends helps providers maintain their equipment proactively, plan for demand, and improve their services over time.

Table 1 captures information management dimensions in construction equipment sharing platforms focused on the individual definitions, value for users, and value for providers. These dimensions are adapted from established information quality and information sharing literature and contextualized for construction equipment sharing platforms.

Table 1. Information Management Dimensions in Construction Equipment Sharing Platforms.

Construct	Dimension	Meaning	Value for Users	Value for Providers	Reference
Information Sharing	Information Accuracy	Correct representation of equipment and terms	Avoids mismatch and delays	Supports reliable asset deployment	[25,26]
	Information Completeness	Coverage of all relevant transaction details	Enables informed decisions	Reduces rework and conflict	[10,25]
	Information Correctness	Granularity tailored to equipment and task	Improves task–equipment fit	Enhances service differentiation	[13]
	Information Relevance	Decision usefulness for project context	Improves adoption confidence	Supports targeted offerings	[27]
	Information Timeliness	Availability of up-to-date information	Aligns with project timelines	Improves capacity planning	[28]
Information Quality	Information Reliability	Consistency and dependability over time	Builds platform trust	Encourages repeat participation	[27]
	Information Asymmetry	Minimization of hidden or incomplete information	Enhances trust and adoption	Reduces disputes and misuse	[28]
	Dynamic Information Exchange	Real-time updates on availability, delivery, and equipment status	Enables project scheduling and responsiveness	Improves utilization and coordination	[29]
	Information Continuity	Continuous information flow across transaction stages	Reduces disruption risk	Supports proactive asset management	[30]

3.2.2. Practice Informed Operational Management Related Constructs

To augment the construct identification, exploratory semi-structured interviews were also conducted with practitioners on both sides of the construction equipment sharing market. Service providers highlighted concerns related to idle asset utilization, pricing transparency, maintenance responsibility, and liability exposure, while service receivers emphasized speed of access, real-time availability, equipment suitability, and bundled services such as operators and insurance. The convergence of perspectives across both groups reinforced the salience of a limited set of operational levers. These practitioner-derived insights were then mapped onto and refined using established operations management and platform literature, resulting in the final operational dimensions incorporated into the framework.

From an operational perspective, speed, pricing, availability & suitability, and service package can augment the behavioral intention to adopt such equipment sharing arrangement for both parties involved. The following are how speed can positively impact the behavioral intention to adopt for both parties.

- Matchmaking efficiency

Efficient matchmaking ensures that users can quickly find and secure the equipment that best suits their project needs. This reduces downtime and project delays, thus allowing users to start and complete tasks as scheduled. For providers, efficient matchmaking increases the utilization rate of their equipment, ensuring that their assets are rented out as frequently as possible, leading to better revenue turnover and reduced idle time for the equipment.

- Delivery

Reliable and timely delivery of equipment ensures that users receive the tools they need exactly when they need them. This allows for seamless project execution without the need to store or transport bulky equipment themselves. Efficient delivery systems help providers ensure that their equipment reaches users on time, maintaining customer satisfaction and reducing the risk of cancellations or negative reviews. It also helps in coordinating the logistics of equipment pickup after the rental period ends.

The following are how pricing can positively impact the behavioral intention to adopt for both parties.

- Pricing point

The price point must be competitive and affordable to attract users. A fair and transparent price point ensures that users can budget accurately for their projects, reducing financial uncertainty and allowing them to choose equipment that meets their needs without overspending. For providers, setting an appropriate price point is crucial for maximizing revenue while remaining competitive. It should reflect the value and condition of the equipment, ensuring profitability while attracting a steady stream of customers.

- Price structure

A clear and flexible price structure (e.g., hourly, daily, weekly rates) allows users to choose the most cost-effective rental period based on their project duration. This flexibility can lead to cost savings and better budget management. Providers benefit from a structured pricing system that can accommodate different rental durations and customer needs. Offering tiered pricing can help providers maximize revenue by appealing to a broader range of customers, from short-term renters to long-term users.

- Dynamic Pricing

Dynamic pricing, where rates fluctuate based on demand, availability, and other factors, can offer users potential cost savings during off-peak times. Users can plan their rentals during these periods to take advantage of lower rates. For providers, dynamic pricing allows for optimized revenue management by adjusting prices in real time based on market conditions. This ensures that equipment is rented out at the best possible rates, maximizing income during high-demand periods, and encouraging rentals during slower times

The following are the ways in which availability and suitability can positively impact the behavioral intention to adopt for both parties.

- Geographic Dimensions

The geographic dimension ensures that equipment is available within a feasible distance from the project site. This reduces transportation costs and time, making it easier and more efficient to access necessary machinery. For providers, understanding geographic dimensions allows them to target their marketing efforts to areas with high demand. It also helps in optimizing logistics for equipment delivery and pickup, improving operational efficiency and customer satisfaction.

- Suitability of Machinery

Access to the right type of machinery that matches the specific requirements of their project ensures efficient and effective work. This reduces the risk of project delays and ensures safety and quality in execution. Providers benefit from offering a well-maintained and diverse range of machinery that meets various project needs. This increases the likelihood of rentals, improves customer satisfaction, and builds a reputation for reliability and comprehensiveness.

- Availability on a real-time basis

Real-time availability information allows users to quickly find and book the equipment they need, ensuring that project timelines are not disrupted. This also helps in making informed decisions based on current availability and avoiding double-booking issues. For providers, offering real-time availability updates helps in managing inventory efficiently. It reduces the chances of overbooking, optimizes equipment utilization, and provides a clear picture of equipment status, facilitating better planning and maintenance.

Finally, the following are how the service package can enable both parties to adopt the equipment sharing arrangement.

- Skilled Operators in the Package

Including skilled operators ensures that the equipment is used correctly and efficiently, which can lead to higher productivity and safety on the job site. This is particularly important for complex or specialized machinery that requires specific expertise to operate. Offering skilled operators can be a unique selling point that differentiates

their service from competitors. It also reduces the risk of equipment damage due to improper use, which can lead to lower maintenance costs and increased equipment lifespan.

- Maintenance Package

A maintenance package ensures that the equipment is kept in optimal working condition, minimizing the risk of breakdowns during the rental period. This leads to fewer project delays and a smoother workflow. Regular maintenance helps in keeping the equipment in good condition, extending its life and reliability. This reduces long-term maintenance costs and increases customer satisfaction by providing dependable machinery.

- Time-Based Service

Time-based services (e.g., hourly, daily, weekly rentals) provide flexibility, allowing users to rent equipment for exactly the period they need, which can lead to cost savings and better budget management. Offering a range of time-based services can attract a broader customer base with varying needs, from short-term projects to long-term commitments. This can maximize equipment utilization and revenue potential.

- Insurance Package

An insurance package provides users with peace of mind, knowing they are protected against potential liabilities, damages, or accidents. This can be a crucial factor in deciding to rent high-value equipment. Offering insurance reduces the financial risk associated with equipment rental. It protects the provider from significant losses due to damage or theft and enhances trust with customers, knowing that both parties are covered in case of incidents. Table 2 encapsulates the aspects related to service package and how it interacts with price and speed leading to differentiation. Service package dimensions and interaction effects are grounded in service operations, maintenance economics, risk management, and platform differentiation literature and contextualized for our research.

Table 2. Service package, interactions, and differentiation.

Service Package Element	Interaction with Price	Interaction with Speed	Platform Differentiation Logic	Reference
Skilled Operator	Converts a higher nominal rental price into a lower *effective project cost* by reducing misuse, rework, and idle time	Eliminates onboarding and learning delays	Traditional rental price operators separate or leave the responsibility to users	[31]
Maintenance Package	Reduces cost uncertainty and downside risk embedded in price	Prevents mid-project downtime	Rentals transfer maintenance risk to users	[32]
Insurance Package	Reduces the perceived risk premium embedded in the price	Accelerates contracting and approval cycles	Rentals rely on external insurance or deposits	[29]
Time-based Bundling	Enables price-speed trade-off optimization	Aligns equipment availability with project milestones	Rentals follow rigid day-based billing	[32]

3.3. Interaction with Technology

Beyond its immediate operational and informational value propositions, the proposed framework is inherently extensible to emerging digital technologies, underscoring its long-term relevance for capital-intensive sharing platforms. For instance, the integration of Internet of Things (IoT) enabled real-time equipment tracking can substantially enhance information accuracy, timeliness, and continuity by providing continuous visibility into equipment location, usage hours, and health status. Such real-time intelligence strengthens matchmaking speed, reduces downtime risk, and improves alignment between equipment availability and project schedules, thereby reinforcing the dynamic supply-demand feedback loops emphasized in this study. Similarly, blockchain-enabled smart contracts and distributed ledgers can operationalize information correctness, reliability, and pricing transparency by enabling immutable rental agreements, automated billing based on actual usage, and verifiable activation of insurance and liability clauses. These technologies directly address trust, governance, and risk-sharing concerns that are particularly salient in construction equipment sharing, while remaining fully consistent with the existing dimensions of the framework rather than introducing additional constructs. Consequently, the framework should be viewed not as a static representation of current platform practices but as a future-ready conceptual architecture capable of accommodating technological advances and supporting subsequent empirical research on digitally enabled coordination, risk mitigation, and adoption behavior in asset-heavy sharing ecosystems.

4. Illustrative Transaction Scenario in a Construction Equipment Sharing Platform

To demonstrate the practical applicability of the proposed framework and reduce abstraction, we present a transaction-level simulation illustrating a complete closed-loop interaction on a SE-platform. The scenario

involves the rental of an excavator for a mid-scale construction project and reflects typical operational and informational requirements in the industry, involving six major stages.

Stage 1: Equipment listing by provider

A large contractor lists a hydraulic excavator on the platform, specifying equipment type, technical specifications, geographic location, base rental price, availability window, and optional service bundles (e.g., skilled operator, maintenance support, insurance coverage). Information sharing at this stage emphasizes accuracy, completeness, and correctness, ensuring that the listing aligns with contractual and regulatory requirements.

Stage 2: Information disclosure and quality assurance

The platform verifies the listed information through standardized templates and historical usage records. High information quality including relevance, timeliness, and reliability. This allows potential users to assess equipment suitability for their specific project requirements.

Stage 3: Matchmaking and pricing confirmation

A small contractor searching for an excavator receives platform recommendations based on project location, duration, and equipment suitability. The platform enables rapid matchmaking, supported by real-time availability information and dynamic pricing mechanisms that reflect demand conditions and service package selection.

Stage 4: Contract finalization and delivery coordination

Once the user confirms the booking, the platform generates a formal rental agreement. Information correctness ensures that platform-displayed terms (pricing, insurance, operator inclusion) are fully consistent with contractual documents and billing rules. Delivery schedules are coordinated using real-time information exchange, enhancing speed and reliability.

Stage 5: Equipment usage and service execution

During the rental period, the excavator is deployed on-site, potentially with a skilled operator included in the service package. Continuous information sharing supports monitoring of usage duration and compliance with contractual terms, reducing downtime and operational risk.

Stage 6: Return, billing, and feedback Loop

Upon completion, the equipment is returned, and billing is generated based on actual usage. Correct mapping between usage data and invoices ensures billing accuracy. Post-transaction feedback updates provider reputation scores and availability status, reinforcing network effects and improving future matchmaking efficiency.

5. Managerial Insights and Recommendations

The proposed framework enables managers designing construction equipment sharing platforms to go beyond conventional ridesharing-style matchmaking and instead prioritize risk mitigation, information transparency, and operational integration to enhance adoption intention. In capital-intensive, safety-critical environments, reducing downtime risk and contractual remain imperative, therefore, platforms should embed insurance, maintenance tracking, skilled operators, and standardized digital contracts within the service architecture. Information quality, accuracy, completeness, timeliness, symmetry, and continuity should be treated as a strategic asset, supported by real-time availability dashboards, verified listings, and transparent pricing structures to build trust and minimize disputes. Service bundling should be positioned not as an added cost but as a productivity-enhancing solution that transforms higher nominal rental prices into lower effective project costs by reducing misuse, rework, and delays. Managers should also strategically build localized supply–demand density using geo-analytics and dynamic pricing mechanisms to optimize utilization while maintaining transparency. Finally, the integration of technology such as IoT-enabled monitoring, AI-driven matchmaking, and blockchain-based smart contracts can strengthen coordination, information correctness, and governance, thereby activating reinforcing network effects between equipment providers and users and enabling sustainable platform scalability in asset-heavy construction ecosystems.

6. Conclusions and Future Research Direction

This study develops an integrated conceptual framework for sharing-economy platforms in the construction equipment industry by jointly synthesizing information management and operations management perspectives. While prior sharing-economy research has largely focused on consumer-oriented service sectors such as ridesharing and accommodation, this paper extends the discourse to asset-heavy, project-based environments characterized by capital intensity, asset specificity, safety risks, and high downtime costs. By explicitly accounting for these contextual differences, the proposed framework clarifies why conventional service-centric platform

models cannot be directly transferred to construction equipment sharing without significant adaptation. The study demonstrates that platform adoption in this context is shaped not only by traditional operational levers such as price, speed, and availability, but also by nuanced information-related dimensions including information accuracy, correctness, symmetry, continuity, and quality. In addition, the paper highlights the critical role of bundled service packages such as skilled operators, maintenance, time-based services, and insurance in mitigating operational risk and transforming price–speed trade-offs into differentiated value propositions. Collectively, these insights advance sharing-economy theory by offering a coherent, domain-sensitive framework tailored to capital-intensive industries.

Despite its contributions, this study is conceptual in nature and therefore subject to several limitations that open avenues for future research. First, empirical validation of the proposed framework remains an important next step. Future studies may operationalize the identified constructs and test their effects on adoption intention using survey-based methods, structural equation modeling, or experimental designs across different stakeholder groups. Second, the framework can be extended to explicitly incorporate the supply-side perspective of equipment owners, enabling a more comprehensive examination of two-sided adoption dynamics and cross-side network effects. Third, analytical and simulation-based research could investigate how pricing mechanisms, service bundling strategies, and information quality interact under varying demand and supply densities to influence platform performance and welfare outcomes.

Further research may also explore the role of emerging digital technologies such as IoT-enabled equipment monitoring, blockchain-based smart contracts, and AI-driven matchmaking in strengthening information correctness, trust, and operational efficiency within construction equipment sharing platforms. Finally, comparative studies across asset-heavy sectors (e.g., mining, logistics, agriculture, or industrial manufacturing) would help assess the generalizability of the framework and refine its applicability across different capital-intensive sharing ecosystems

Author Contributions

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Given the conceptual nature of study, this study does not use any quantitative data.

Conflicts of Interest

The authors declare no conflict of interest.

Use of AI and AI-Assisted Technologies

During the preparation of this work, the author used ChatGPT to Proofread. After using ChatGPT, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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