Understanding Heavy Equipment Rental Services in India: A Managerial Perspective

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Abstract:

Purpose: This study aims to determine key factors impacting the adoption of rental equipment and identify the difficulties experienced by managers in heavy equipment rental services in Assam, India. Given Assam's rapid transformation and growth, having access to heavy machinery is crucial for progress.

Methodology: A qualitative approach was chosen due to the study's exploratory nature. Five in-depth interviews with individual service providers and three case studies with managerial persons from leading heavy equipment rental businesses in Assam were analyzed. Valuable insights into the variables influencing equipment rental decisions and operational difficulties were gathered through semi-structured interview schedules.

Findings: The study reveals main obstacles such as the scarcity of specialized equipment, absence of technical staff, and maintenance problems affecting equipment uptime. Managers emphasized the significance of fleet optimization and proactive maintenance scheduling to provide dependable rental services.

Practical Implication: This research offers suggestions on using fleet management and maintenance information to maximize operational effectiveness and increase equipment uptime, fostering the expansion of the heavy equipment rental service sector in Assam.

Keywords: Heavy equipment rental, managerial perspectives, operational challenges, Assam, India

Type of paper: Empirical

1. Introduction:

India's heavy equipment rental services sector has grown significantly in the last several years due to the nation's swift infrastructure development and rising demand for mining and construction projects. The term "heavy equipment machinery industry" refers to the sector that deals with large power generators, earth-moving equipment, and heavy-duty vehicles. These products are frequently used in manufacturing facilities, power plants, mining, agriculture, and the construction of infrastructure (Soe et al., 2022). With the evolution of the sector, firms may now access specialized machinery without the burden of ownership, leading to a more flexible rental-based approach that replaced the conventional equipment ownership model. When an onsite contractor does not have enough equipment, they might bargain with another contractor from a different bid section to rent their extra equipment. This is known as equipment renting (Liu et al., 2018). For any kind of building project, heavy machinery is a necessary component. It expedites and simplifies construction operations while raising output standards (Bharati, 2018). Contractors in the construction industry frequently rent a wide range of heavy machinery (Soe et al., 2022). To make up for the lack of equipment needed to finish their task, they either lease or rent the necessary equipment. A lease is an agreement whereby the lessor, who owns the capital asset, gives the lessee, who pays rent, only the permission to use the asset long-term (Bharati, 2019). By 2025, the value of India's construction sector is estimated to exceed $1. 4 trillion, and the nation will have invested $777 billion in infrastructure (Market Size, Share, and Analysis of Construction Equipment | Forecast - 2030, 2023). Ensuring that contractors working on the same project at different locations share adequate equipment is one way to reduce the number of delays caused by temporary equipment transporting and installation. Due to its ability to provide businesses and individuals with access to a large variety of specialized equipment without the burden of ownership, the equipment rental industry has grown to be an essential part of the worldwide economy. (*The Rise of Equipment Rental*, n.d.) It has grown significantly in India in recent years due to the growing need for affordable and easily accessible solutions for a range of industries, such as industrial operations, event management, and construction. It is critical to comprehend the existing state of affairs and pinpoint opportunities for innovation and improvement as the market keeps evolving (Harman, M, 2024).

The construction industry has benefited greatly from the usage of heavy machinery. The construction and infrastructure sectors in Assam, a state in north-eastern India, have grown significantly in recent years (Roy, 2023). The need for heavy equipment rental services has increased

as a result of this expansion, resulting in a vibrant and exciting business environment (Agarwal et al., 2023). Heavy machinery and equipment are categorized based on the sectors in which they are used. Agriculture machinery, construction equipment, mining equipment, and general-purpose equipment are a few examples of categories based on usage per sector. Excavators, bulldozers, wheel dozers, backhoe loaders, compactors, articulated dump trucks, motor graders, asphalt finishers, cranes, and forklifts are the machine types that are most used. (Soe et al., 2022).

This research discusses the presence of current suppliers and looks at the products and services they deliver. It aims to determine key factors impacting the heavy equipment rental service and identify challenges experienced by managers in Assam, India. The structure of the article is as follows: Section 2 examines the literature from both Global and Indian perspectives. The research strategy and methodology are explained in Section 3. The study's findings are presented and discussed in Sections 4 and 5. Sections 6 and 7 offer several practical implications and conclusions.

2. Literature Review:

2.1 Heavy Equipment Rental- Global Perspective:

According to a report by Market Research Future (2022), the global heavy equipment rental market is anticipated to reach a size of $122 billion by 2030, growing at a compound annual growth rate (CAGR) of 5.6%. International rental companies are increasingly joining the market through acquisitions or joint ventures (Heavy Construction Equipment Market by Type, End-Use Industry, Application, and Region - Global Forecast to 2021, n.d.). The demand for heavy machinery is directly impacted by the country's economic progress. If greater investment in the construction sector serves as an indicator of infrastructure growth, then demand for heavy equipment will rise (Simatupang & Sridharan, 2016).

Several studies examining the heavy equipment rental business from a variety of perspectives have been conducted worldwide. Prasertrungruang & Hadikusumo, (2009) analyzed present heavy equipment management practices and challenges, as well as identified approaches capable of reducing equipment management concerns for highway contractors in Thailand. Siddharth et al., (2015) suggested a decision support model for private and governmental entities to utilize in determining the optimal acquisition technique between rent and buy. The study found that renting has a substantial influence on a company's profitability, as well as making it more competitive by allowing the firm to use technologically modern equipment and stay on the cutting edge of technology. It lowers the cost of storage, maintenance, and equipment purchases. Simatupang & Sridharan, (2016) examined Indonesia's heavy equipment supply chain and identified opportunities and challenges. A study conducted in China discusses the issue of contractors sharing equipment on large-scale building

projects (Liu et al., 2018). Bharati (2018, 2019) examined the state of Nepal's heavy equipment rental industry and generated an acceptable and standard hire rate by analyzing the rental rate of heavy equipment used in road building. Using the owning and operating cost method, the author determined eight distinct heavy equipment rental rates for backhoe loader/JCB 3DX, loader/JCB 432ZX, vibrating roller/JCB VM1158, excavator/Komatsu PC210, excavator/JCB JS205, excavator/Komatsu PC130, grader/KomatsuGD511, track dozer/KomatsuD39Ex. Harzaviona & Syah, (2020) investigated the impact of customer satisfaction on customer loyalty and marketing organization performance in Indonesia's heavy equipment industry to raise awareness among equipment sellers and rentals that improving customer satisfaction can improve the company's long-term security. According to Susanto & Kurniati, (2020), heavy equipment is an expensive and complicated machinery, leasing the equipment to an outside agent can resolve this problem. Case studies were done on the excavator units rented by heavy equipment rental companies to offer a real-time monitoring strategy based on machine-installed multi-sensor data. Mahalanobis Taguchi System (MTS) technique was used to handle multi-sensor data. Chiu et al., (2021) found that renting heavy-duty machinery and improving arrangements for raw material acquisition can both be useful measures to reduce carbon footprints. Soe et al., (2022) presented the current supply chain management (SCM) practices of the heavy equipment machinery industry in Myanmar using the latest SCOR (Supply Chain Operation Reference) model, SCOR 12.0, and investigated the opportunities, threats, weaknesses, and strengths required to develop the SCM process.

The literature review offers valuable insights into the global heavy equipment rental market and its various aspects. However, a gap exists in understanding the specific factors impacting this business from a managerial perspective in Assam, India. Existing studies have explored general trends, challenges, and decision-making models for the industry, but they lack a regional focus on Assam, India. Most studies analyze the heavy equipment rental business on a national or international scale. However, studies relating to Assam, India, have not been identified yet. While some studies touch upon decision-making for rental companies (Prasertrungruang & Hadikusumo, 2009; Siddharth et al., 2015), a deeper dive into managerial challenges is necessary. Rental companies in Assam, India, might face specific issues regarding fleet management, maintenance practices, manpower availability, or customer preferences that require investigation. This research delves into the heavy equipment rental market in Assam, India, addressing a critical gap in existing academic literature. While studies explore the construction equipment rental market dynamics in a broader sense there is a paucity of research investigating the specific characteristics and challenges faced by various players within a regional Indian market. This study aims to bridge this gap by offering a nuanced analysis of established enterprises, smaller formal service providers, and informal service providers operating in Assam, India.

3. Research Methodology:

The research adopts a qualitative approach, centered around two key methods: semi-structured in-depth interviews and a multiple-case exploratory study. This approach enables the researchers to explore the dynamics of the heavy equipment rental services in Assam, India, focusing on the role of informal service providers (ISPs) and formal enterprises. A multi-method research design combines different qualitative or quantitative methods to gather and analyze data. This study employs a multi-method qualitative research design, combining semi-structured in-depth interviews and multiple-case exploratory studies (Anguera et al., 2018). These two methods complement each other, offering a holistic and in-depth understanding of Assam's heavy equipment rental service market. The study specifically included five informal service providers and three heavy equipment rental enterprises in Assam, India. Assam is undergoing significant infrastructure development initiatives, including road construction, bridges, and dams (Statesman News Service, 2024).

This fuels demand for heavy equipment rentals, making it ideal to examine the market dynamics catering to such projects. In Assam, the primary actors offering rental services have been the informal service providers. As a result of the state's growth phase, construction activity has intensified during the past five years. In the beginning, the main entities offering heavy equipment rental services in Assam were individual service providers. According to Miyamoto et al., 2024, "Enterprises that employ fewer than ten workers and are not government or public and public or private limited are in the unorganized, or informal, sector. These enterprises can belong to any of the following five categories: (a) proprietary; (b) partnership; (c) cooperative societies, trusts, or other non-profit organizations; (d) employer's households (private households employing maids, watchmen, cooks, etc.); and (e) others." Therefore, enterprises that have less than ten employees have been considered as informal service providers (ISPs) in this study. A purposeful sampling procedure (Patton, 2005) was used to select the formal enterprise and informal service providers from the study region. Regarding the minimum number of interviews, some authors state that anything between five and fifty individuals is sufficient (Dworkin, 2012). Authors also suggest that when considering sample size selections in qualitative research, the idea of saturation should be the most crucial consideration (Mason, 2010). According to Strauss and Corbin (1990), the theoretical saturation principle means that interviews continued until the information gathered was deemed sufficient for the scope of the analysis and no additional interviews were deemed necessary to add any valuable information. Thus, from the standpoint of the heavy equipment rental service phenomena, the sample enterprises have been chosen to represent the primary businesses in this field and to offer an accurate image of the state of the art.

No particular reference to enterprises and research participants will be made to preserve

confidentiality. To do this, the enterprises are referred to as X, Y, and Z, while the participants are identified as P1, P2, P3, P4, and P5. The detailed profile of participants is shown in Table 1 and Table 2. A holistic, thorough, and realistic understanding of a particular phenomenon can be supported by case studies, which are especially helpful in offering in-depth responses to "how" and "why" research questions (Pascucci et al., 2023). Face-to-face in-depth interviews with the enterprise's executives (i.e., general managers and chief executive officer) were conducted because they are involved in the strategic decisions and have knowledge about the operational difficulties in equipment rental service. Additionally, in-depth interviews with the proprietors of the informal service provider were done. The rental approaches of these providers are explained and subsequently examined in terms of the quality of supplier-customer relationships.

A semi-structured interview schedule was used to obtain information about the factors impacting the heavy equipment rental service in Assam, India. The exploratory aim of the study was best served by semi-structured interviews, which give interviewees the freedom to freely share their experiences and ideas while still allowing researchers to follow a systematic method (Yin, 2009). A combination of open-ended and close-ended questions were asked. The questions were linked to types of equipment used for renting, the frequency of their service business, where they place the business in terms of revenue, promotional activities used, how customer relationships are maintained, whether maintenance facilities, spare parts, skill operators available, whether any digital technologies have been implemented, and difficulties faced. The interviews were conducted in two months period August- September 2023 and interviews took 45 minutes on average, and each response was documented.

Overview of the Case Studies:

Three businesses that offer heavy equipment rental services in Assam are taken into consideration in this study. These three businesses are the leading providers of heavy equipment rental services in Assam and the north-eastern and northern regions of India. Below is a description of the case enterprises.

Enterprise X: This is the leading supplier of heavy equipment and construction rentals in the north-eastern and Himalayan regions of India. The enterprise was founded in 2017. Its service area was initially limited to Northeast India. It began offering services in the Indian region of Leh-Ladakh from 2021. The enterprise is a partnership business. This business has expertise in managing fleets of equipment for a variety of construction projects, including bridges, buildings, highways, and refineries. Earthmoving equipment like excavators, backhoe loaders, dozers, wheel loaders, and

motor graders; Compaction equipment like soil compactors, roller static, and roller mini; Concrete equipment like batching plants, transit mixtures, and self-loading mixtures; and Lifting equipment like hydra cranes are among the equipment that is available for rent. Their clients include engineering businesses, Indian Oil, Numaligarh Refinery Limited, Power Grid, TATA projects, construction companies, and the Public Works Department of Assam.

Enterprise Y: The enterprise was founded in 2018. The enterprise is a limited partnership business. Most of the services they offer are in Assam. Dumpers, transit mixtures, excavators, motor graders, soil compactors, pavers, concrete pavers, and piling rigs are among the equipment that is available to be rented. This enterprise is the only one that supplies Concrete Pavers in Assam. They offer their services to builders, engineers, contractors, and construction firms.

Enterprise Z: The business was established in 1963. It is a manufacturer and fabricator of water and oil storage steel tanks, as well as heavy steel constructions of all kinds. It began offering rental services in 2018. The enterprise is a sole proprietary. Crane, roller, backhoe loader, and piling rigs are among the equipment that can be rented. They offer service to 50 local organizations and 20 individuals

Table 1: Details of Enterprises Considered.

Enterprise	*Participants*	*Business Type*	*Establishment Year*	*Product used in rental service*	*Employees*
X	General Manager	Partnership	2017	excavators, backhoe loaders, dozers, wheel loaders, motor graders; soil compactors, roller static, roller mini; batching plants, transit mixtures, self-loading mixtures, and hydra cranes	250
Y	CEO	Limited Partnership	2018	Dumpers, transit mixtures, excavators, motor graders, soil compactors, pavers, concrete pavers, and piling rigs	100
Z	General Manager	Sole Proprietary	2018	Crane, roller, backhoe loader, and piling rigs	73

3.1 In-depth Interviews: Five of Assam's informal service providers were interviewed for in-depth conversations. These individuals or so-called "informal service providers" (ISPs) were also taken into

consideration because they met the requirement of having been in business for the last five years or more. Table 2 below depicts the participants' details:

Table 2: Overview of the sample characteristics.

Participants	*Gender*	*Designation*	*Occupation*	*Business Type*	*Year of incorporation*	*Product used in rental service*	*Employees*
P1	Male	Owner	Business	Sole Proprietary	2015	Backhoe Loader	4
P2	Male	Owner	Business	Sole Proprietary	2016	Road Roller, Transit Mixture, Backhoe Loader	8
P3	Male	Owner	Business	Sole Proprietary	2015	Motor Grader, Road Roller, Transit Mixture, Wheel Loader, Dumper	8
P4	Male	Owner	Business	Sole Proprietary	2012	Backhoe Loader, Dumper	5
P5	Male	Owner	Business	Sole Proprietary	2016	Dumper	8

4. **Findings:**

Enterprise ‘X’ is a leading heavy equipment rental service provider in Assam, India. It boasts a comprehensive fleet of 190 equipment units, catering specifically to high-demand machinery in the region. Rental agreements primarily involve monthly leases with the inclusion of operator and maintenance services. However, the client incurs the cost of operator sustenance (nourishment and accommodation). Rental costs are determined by the type and category of equipment selected. The company enjoys consistent revenue generation due to ongoing project-based client engagements. Banks serve as the primary source of external financial support. It offers skilled technical operators to ensure efficient equipment operation, dedicated repair and maintenance facilities for equipment upkeep, and prompt supervision to address client concerns and optimize service delivery. Each machine is integrated with advanced technology features which helps in reducing downtime through

remote monitoring and real-time status updates on machine functionality. Enterprise ‘X’ leverages digital platforms like Google Promotions, Just Dial, and IndiaMART (India's leading B2B marketplace) for service promotion. Notably, IndiaMART serves as the primary channel for client acquisition. The company is actively developing its software application to streamline the equipment rental process. It prioritizes building strong customer relationships through timely service delivery, meticulous equipment maintenance, and effective communication. The company boasts readily available service infrastructure, including maintenance workshops, skilled technical personnel, and easily accessible spare parts. However, operational challenges include difficulties in recruiting and retaining skilled operators, and delays in client payments, often requiring partial upfront payments with outstanding balances settled after service completion. Also, labor scarcity during peak demand periods impacts service delivery timelines.

Enterprise ‘Y’ maintains a substantial fleet of 123 equipment units and caters to local clientele. The enterprise demonstrates year-round operational success, generating significant profits. Funding relies on established financial institutions like banks and local financing entities. Promotional activities leverage online platforms (e.g., IndiaMART) alongside traditional word-of-mouth marketing. It prioritizes offering both equipment rentals and operator services alongside maintenance support. Achieving customer satisfaction hinges on the effectiveness of equipment maintenance and timely service delivery. The enterprise faces difficulties in recruiting and retaining skilled technical personnel. Limitations exist in terms of accessing proper facilities for equipment repair and maintenance. Delays in service provision by equipment dealers or manufacturers pose a challenge. The scarcity of local skilled operators necessitates recruitment from other regions, leading to increased operational costs

Enterprise ‘Z’ is another player in Assam's heavy equipment rental landscape. Enterprise Z maintains a smaller fleet of 34 equipment units, focusing on serving clientele within the local area. Similar to its competitors, it relies on banks for financial support. The company demonstrates consistent profitability, generating a steady annual income. Unlike competitors venturing into digital marketing, Enterprise ‘Z’ solely relies on traditional word-of-mouth promotion for service outreach. The interviewee suggests that “software development, such as a mobile application, might not be a suitable solution for Enterprise ‘Z’ at this stage. While an app could potentially streamline equipment availability checks, it would not necessarily offer functionalities like negotiating rental rates. Furthermore, he suggests that the regional market might not be ready for such an app for another 5-10 years.” Enterprise Z offers a similar service package as its competitors, providing equipment rentals with operators and maintenance included. A key challenge faced by Enterprise Z is the inability to meet peak season demand due to limited fleet size. To address this, the company resorts

to renting additional equipment from Enterprise Y. The interviewee opines that “this dependence on competitors to fulfil peak demand might negatively impact Enterprise Z's long-term business growth.” The findings of informal service providers (ISPs) in Assam's heavy equipment rental landscape are based on data collected from participants P1, P2, P3, P4, and P5. The study reveals that the ISPs operate in a predominantly seasonal business environment. These providers typically possess a limited fleet size, ranging from 2 to 5 equipment units. ISPs primarily cater to small-scale contractors and builders undertaking short-term projects. The average annual customer base for each ISP ranges from 30 to 80 clients. Profit margins for these providers are typically modest. Rental agreements with ISPs involve daily rentals, encompassing the provision of equipment with operators, operator sustenance (nourishment and accommodation), and basic equipment maintenance. ISPs secure funding through a combination of sources, including banks, semi-formal financial institutions, and personal networks (friends and relatives). Promotion relies heavily on traditional word-of-mouth communication and established connections within the industry. Building strong customer relationships is crucial for ISPs, achieved through proper equipment maintenance and timely service delivery. Unlike larger companies that utilize advanced equipment, ISPs typically operate with less sophisticated machinery. This translates to a potential advantage in terms of reduced reliance on skilled operators, mitigating recruitment challenges. The primary operational hurdle for ISPs is the seasonal nature of the business. To supplement income during off-seasons (i.e. May to August, the monsoon season) ISPs might need to explore alternative income sources.

5. Discussions:

This section discusses the diverse operational characteristics and challenges faced by various stakeholders within Assam's heavy equipment rental market. Established enterprises ‘X’ and ‘Y’ boast larger fleets catering to a wider range of high-demand equipment. This allows them to address diverse project requirements and potentially capture a larger market share. Contractors in the construction business often rent a variety of heavy machinery, even for small-scale projects (Simatupang & Sridharan, 2016). Formal enterprises primarily rely on banks for funding, reflecting a structured approach to financial management. This stability might fuel growth and technology adoption. The source of funding for the informal service provider approach might limit access to larger capital, but it fosters agility and faster decision-making. The study highlights the varying marketing approaches adopted by different players. Enterprises ‘X’ and ‘Y’ leverage digital platforms for promotion, reflecting a trend toward digitalization in the construction sector. While informal service providers might not require sophisticated applications like rental negotiation tools currently, exploring digital solutions for equipment availability checks could enhance their efficiency in the future. A key challenge for all service providers is the seasonal nature of the business. Enterprises

like ‘Z’ resort to renting equipment from competitors ‘Y’ during peak seasons (i.e. September to April), highlighting potential limitations in fleet capacity and lost revenue opportunities. Informal service providers face a similar challenge but might have the advantage of operational flexibility to pursue alternative income sources during off-seasons. Skilled labor scarcity is another hurdle, particularly for enterprises ‘X’ and ‘Y’ that utilize advanced equipment. Exploring training programs or offering competitive compensation packages could be potential solutions. Similar to studies conducted in other developing regions, (Bharati, 2018) the study reveals that factors such as the scarcity of specialized equipment and maintenance problems affect equipment uptime. While spare parts for heavy machinery repair and maintenance are widely available, owners feel they are too expensive. Subsequently, managers should emphasize the significance of fleet optimization and proactive maintenance scheduling to provide dependable rental services.

6. Practical Implications:

This study contributes to a deeper understanding of the heavy equipment rental market in Assam. The findings reveal a multi-tiered landscape with established enterprises, smaller formal service providers, and informal players, each catering to distinct market segments and facing unique challenges. The findings suggest that formal enterprises should invest in expanding fleet size and diversifying equipment offerings, developing operator training programs to address skilled labor shortages, and considering geographically strategic branch expansions to cater to a wider clientele. The informal service providers should explore digital solutions for basic functionalities like equipment availability checks, build networks and partnerships with larger companies for potential subcontracting opportunities during peak seasons, and collaborate with government agencies or training institutions to access skill development programs for operators. By understanding these factors and implementing appropriate strategies, stakeholders within Assam's heavy equipment rental market can navigate challenges, optimize operations, and drive sustainable growth.

7. Conclusion

This research study attempts to offer important insights into the present situation and potential future growth of the heavy equipment rental service industry in Assam through this thorough examination. It will serve as a valuable resource for researchers, entrepreneurs, and established businesses alike, offering a deeper understanding of this rapidly growing market. There are certain drawbacks in the present study. The study's qualitative design restricts how broadly the results may be applied through generalizability and statistical validation of the results. Incorporating quantitative data analysis alongside qualitative findings would provide a more comprehensive understanding of the market dynamics. Future researchers may also broaden the study's geographic scope as well as

investigate the impact of government policies and infrastructure development projects on the heavy equipment rental market in Assam in comparison with trends of other Indian states. By acknowledging these limitations and outlining potential areas for further investigation, this study encourages a more comprehensive understanding of the evolving heavy equipment rental market landscape in India. The heavy equipment rental services industry in India offers opportunities as well as problems for managers. To maximize profits, rental firms have to manage a broad fleet of equipment, make sure that maintenance and repairs are done on schedule, and optimize utilization rates. Rental service providers must recognize and take advantage of the particular factors that apply to this industry to stay competitive and grow their business.

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