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D2S Smart Order Hub

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Abstract: *D2S Smart Order Hub is a new e-commerce innovation created especially to transform how companies communicate with their suppliers in the current time of digital transformation. While Business-to-Consumer (B2C) platforms such as Amazon, Alibaba, and Flipkart have transformed retail trade, the Business-to-Supplier (B2S) domain has remained relatively underdeveloped. Recognizing this gap, the proposed project — D2S Smart Order Hub — introduces a comprehensive digital platform that facilitates seamless, transparent, and intelligent interactions between enterprises and their network of suppliers.*

The D2S Smart Order Hub acts as a centralized procurement and supplier management system where businesses can easily discover verified suppliers, request and compare quotations, negotiate prices, place bulk orders, and track logistics — all within a unified digital environment. Unlike traditional procurement processes that rely on manual documentation, delayed communication, and limited visibility, this platform leverages automation, analytics, and real-time data integration to streamline operations and support informed decision-making.

Keywords: *D2S Smart Order Hub, B2S E-commerce, Digital Procurement, Supplier Management, Smart Supply Chain, Automated Quotation System, Online Vendor Platform, Business-to-Supplier Model, Procurement Automation, Bulk Order Management etc.*

I. INTRODUCTION

In the modern era of digital transformation, e-commerce has emerged as one of the most dynamic and disruptive forces in global trade and industry. The evolution of online marketplaces such as Amazon, Alibaba, and eBay has revolutionized the traditional retail landscape by enabling seamless transactions between businesses and consumers (B2C). However, while the B2C segment has witnessed tremendous innovation and scalability, there remains a significant gap in platforms that effectively serve the D2S domain — a critical component of the supply chain ecosystem. Recognizing this gap, the present project introduces a comprehensive B2S e-commerce platform designed to facilitate efficient, transparent, and technology-driven interactions between businesses and their suppliers. The proposed system functions as a digital bridge between enterprises seeking goods or services and the network of suppliers providing them. Unlike B2C platforms, where the end consumer is the focal point, the B2S model emphasizes organizational procurement, vendor management, bulk ordering, quotation negotiation, and long-term supply chain collaboration. The platform is conceptualized to streamline procurement operations, reduce manual dependencies, improve decision-making, and ensure that businesses can identify, evaluate, and engage with suppliers in a competitive and data-driven environment.

The idea draws inspiration from established e-commerce systems such as Amazon, Flipkart, and Alibaba but adapts their successful principles to the unique requirements of inter-business supplier relations. The system is designed to support multiple roles, including buyers, suppliers, and administrators, with well-defined workflows for product listing, quotation requests, order approvals, payment processing, and logistics tracking. This ensures not only transactional efficiency but also the cultivation of trust and transparency — two cornerstones of sustainable business collaboration.

In today's globalized market, businesses increasingly depend on digital procurement networks to maintain competitiveness, reduce operational costs, and enhance responsiveness to changing market demands. Traditional supplier management practices — involving manual quotations, paperwork, delayed communication, and limited visibility — have proven inefficient and prone to errors. The emergence of digital B2S platforms, therefore, represents a paradigm shift towards intelligent procurement systems powered by automation, analytics, and integration. The proposed system aligns with this transformation by providing a unified platform where suppliers can showcase their capabilities and businesses can make informed purchasing decisions backed by real-time data and performance metrics. Technologically, the platform is developed using a modular architecture that ensures scalability, reliability, and security. Key features include supplier registration and verification, intelligent search and filtering mechanisms, request-for-quotation (RFQ) automation, order management, payment gateway integration, and performance analytics dashboards. Additional innovations include AI-driven supplier recommendations, dynamic pricing models, and predictive demand analysis — features that collectively enhance the overall efficiency of supply chain management. Furthermore, the system promotes sustainability by optimizing resource allocation, minimizing waste, and fostering ethical supplier practices.

The B2S e-commerce platform represents a significant step forward in digitizing the inter-business procurement process. By automating workflows and centralizing supplier information, the system empowers organizations to make strategic procurement decisions while minimizing risks and administrative burdens. It not only enhances operational performance but also contributes to building resilient supply networks that can adapt to market volatility and global challenges such as disruptions in logistics, raw material shortages, or geopolitical uncertainties.

A. Type of Ecommerce

E-commerce, or electronic commerce, refers to the process of buying and selling goods, services, or information through digital platforms and online networks. Over the years, it has evolved into several distinct models based on the nature of the transactions and the entities involved. The primary types of e-commerce include Business-to-Consumer (B2C), Business-to-Business (B2B), Consumer-to-Consumer (C2C), Consumer-to-Business (C2B), and Business-to-Government (B2G). The B2C model is the most common, where companies sell directly to individual consumers through online stores such as Amazon or Flipkart. The B2B model, on the other hand, involves transactions between two businesses — typically wholesalers, manufacturers, and retailers — emphasizing long-term relationships and large-volume trade. In the C2C model, individuals sell products or services directly to other consumers using intermediary platforms like eBay or OLX, while the C2B model reverses the traditional flow by allowing individuals to offer products, services, or creative content to businesses, often seen in freelance marketplaces. The B2G model facilitates online commercial interactions between businesses and government agencies, such as public procurement or tendering systems. The proposed D2S model introduced in this research paper is a specialized extension of the B2B framework. It focuses specifically on digitalizing the procurement process between companies and their suppliers, offering an organized platform for quotation management, bulk orders, and long-term vendor collaboration. Thus, while traditional e-commerce primarily targets consumer convenience, the B2S model emphasizes operational efficiency, transparency, and sustainability within supply chain networks.

B. Aim

The main aim of D2S Smart Order Hub is to make business-to-supplier (B2S) transactions simple, fast, and transparent. Through this platform, businesses can request quotations, place bulk orders, manage payments, and track deliveries — all in one place. It also helps suppliers reach more customers and manage their sales more efficiently.

C. Objectives

- 1) To design and develop a web-based B2S platform that automates supplier interactions and procurement processes.
- 2) To enhance transparency and competitiveness among suppliers by enabling quotation-based purchasing.
- 3) To facilitate faster decision-making through real-time analytics and supplier performance tracking.
- 4) To create a scalable and secure system that supports multi-user roles, including buyers, suppliers, and administrators.
- 5) To demonstrate the benefits of digital transformation in supply chain management and procurement efficiency.

II. LITERATURE REVIEW

Urbach et al. and his team point out that as digitalization picks up speed, IT isn't just about tech anymore—it's about driving the business forward. IT needs to start thinking more like a product team, speed up how it delivers, and work closely with other departments. So, when you look at something like the D2S SMART ORDER HUB, you can't just build it as a technical platform and call it a day. The modules that dealers and sellers use need to come from both IT and the business side, working together. You want clear rules—like solid SLAs for how quickly orders get processed—and APIs that let sales or logistics teams tweak or upgrade workflows themselves, without always waiting on IT.

Sector-specific cases reinforce these. Nobbay [6] examines social media's innovation potential in oil and gas, where platforms like internal Yammer fostered 25% faster idea-sharing for supply chain tweaks (e.g., predictive maintenance), adaptable to D2S for dealer forums enhancing order accuracy. Similarly, Hiley and Wynn [8] describe the MENTOR simulation game for manufacturing stock control, teaching just-in-time principles via scenario-based planning—reducing simulated holding costs by 18%—mirroring D2S's need for gamified training in production-order linkages. Baker [3] explores immersive tech (VR/AR), predicting 50% adoption by 2025 for training; benefits include 75% retention gains for complex interfaces, but challenges like \$10K–\$50K setup costs suit D2S for virtual dealer simulations, trending toward hybrid realities for sustainable, intuitive user views.

Ismail et al. and his team dug into digital transformation research and cut straight to the point: just buying new tech doesn't give you an edge. Real advantage comes from strategy, capabilities, and getting everyone in the company on the same page. For D2S architecture, that means you've got to spell out how dealer and seller value streams actually change—think order placement, fulfillment, payment reconciliation.

In hospitality—a proxy for retail supply chains—Law et al. [10] trace IT evolution from 1960–2012 via 200+ Cornell Quarterly articles, noting progression from basic reservations to integrated CRM and mobile apps. Key developments include yield management systems reducing overbooking by 15–20% and cloud-based PMS enabling real-time inventory syncing, analogous to D2S's dual-view architecture for dynamic stock control. Barriers like high implementation costs (averaging \$500K–\$2M) underscore the need for phased rollouts, with ROI evident in 25% efficiency gains for order fulfillment.

III. PROPOSED STRUCTURE

A. Overview and Theoretical Foundations

E-commerce research draws on multiple theoretical traditions: transaction-cost economics, platform economics (two-sided markets), supply-chain management theory, and information systems adoption models. Transaction-cost economics (TCE) explains firms' decisions to outsource or vertically integrate by comparing coordination costs (Williamson; classic literature). Platform economics — formalized for two-sided markets — explains the role of intermediaries that reduce search/transaction friction and facilitate multi-agent interactions (e.g., classic work by Rochet & Tirole on platforms). Information systems adoption studies (TAM/UTAUT family) explain organizational acceptance of digital procurement tools. Together these frameworks justify digital B2S marketplaces: they reduce coordination and search costs, create network effects between buyers and suppliers, and require organizational adoption strategies.

B. E-commerce Models and Marketplaces

The literature distinguishes among B2C, B2B, B2G, C2C, and hybrid marketplace models. B2C platforms prioritize consumer experience and fulfillment logistics; B2B focuses on negotiated pricing, long-term contracts, and bulk transactions. Marketplace research shows that digital intermediaries succeed when they (a) reduce search frictions, (b) enforce rules and trust mechanisms, and (c) scale network effects. Marketplace design choices (open marketplace vs. curated catalog, commission models, ranking algorithms) significantly affect supplier participation and buyer satisfaction. Existing B2B platforms (e.g., industry procurement portals and supplier networks) provide functional proxies for B2S systems but seldom center the supplier-discovery + RFQ + supplier-performance analytics triad the B2S model requires.

C. Digital Procurement and e-Procurement Systems

A large body of research investigates e-procurement systems and electronic tendering. Empirical studies commonly report benefits such as cost reduction, faster cycle times, and improved auditability, but also note implementation challenges: organizational resistance, lack of supplier digital readiness, data quality problems, and integration with enterprise resource planning (ERP) systems. Key functionalities studied include supplier registration, catalogs, RFQ workflows, e-tendering, purchase order (PO) automation, invoice reconciliation, and spend analytics. The research repeatedly emphasizes that technology alone is insufficient; governance, process redesign, and supplier enablement are critical success factors.

D. Supplier Selection and Multi-Criteria Decision Making

Selecting suppliers is central to procurement literature. Traditional supplier selection approaches rely on multi-criteria decision making (MCDM) methods such as Analytic Hierarchy Process (AHP), Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), multi-attribute utility theory, and hybrid MCDM/optimization models. Researchers emphasize criteria like cost, quality, delivery reliability, financial stability, and sustainability practices. Many digital procurement systems incorporate such frameworks into their recommendation engines; research shows that automated MCDM combined with human judgment yields better sourcing outcomes than purely manual selection.

E. Gaps Identified in Existing Research

From the surveyed literature, several gaps emerge that motivate the B2S project:

- 1) Lack of B2S-focused solutions: Most studies address B2B broadly but do not examine platforms tailored exclusively to supplier discovery, RFQ optimization, and supplier performance analytics for procurement leaders.

- 2) SME enablement: There is limited literature on lightweight onboarding mechanisms that successfully bring SMEs into enterprise procurement ecosystems at scale.
- 3) Operationalizing AI responsibly: While AI shows promise, few practical frameworks exist for explainable, auditable AI in supplier selection.
- 4) End-to-end integration studies: More empirical work is needed on systems that fully integrate RFQ, contracting, payment, logistics, and warranty/returns in one loop.
- 5) Measurement of long-term supplier relationship outcomes: Many evaluations focus on short-term cost savings; fewer analyze supplier development, resilience, and strategic relationship effects over time.

IV. RESEARCH METHODOLOGY

The research methodology adopted for the development of the Dealer-to-Supplier (D2S) e-commerce platform follows a systematic and structured approach that integrates both theoretical research and practical implementation. The study commenced with an extensive literature review on digital procurement systems, B2B and B2S commerce models, and supplier relationship management to identify technological gaps and opportunities in existing systems. Based on these insights, the research employed a descriptive and applied research design, focusing on understanding the interaction patterns between dealers and suppliers, their transactional workflows, and the technological requirements necessary for efficient procurement. The project followed an Agile software development methodology, enabling continuous feedback, iterative enhancement, and flexible adaptation of new features. Each development sprint focused on a specific module, such as dealer registration, supplier management, quotation requests, product catalog management, payment integration, and real-time analytics.

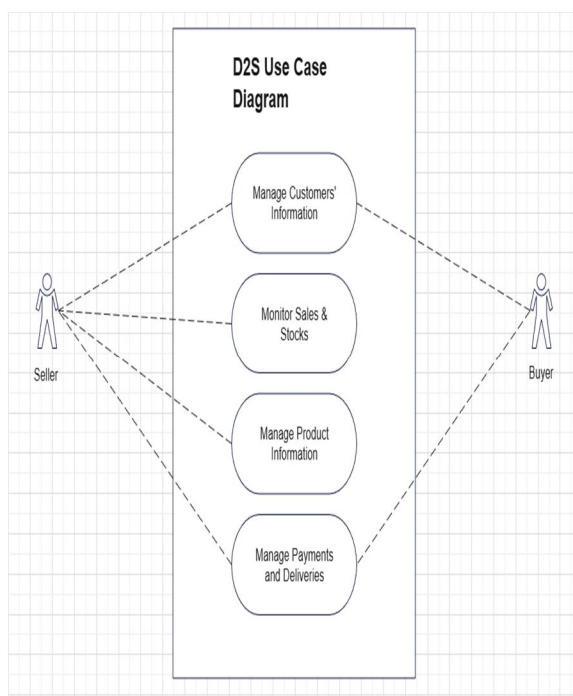


Fig No. 1 User Case diagram of D2S model

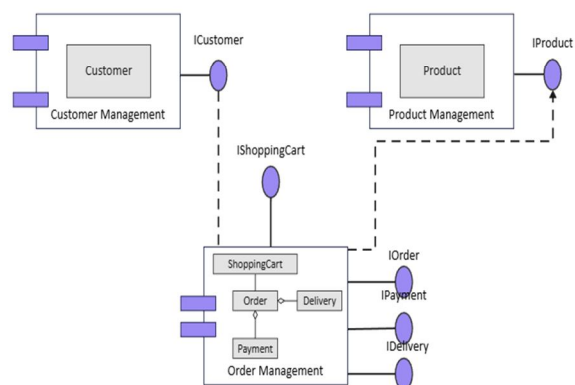


Fig No. 2 Component diagram of the Ecommerce

The system was developed using React.js for front-end design due to its modular component-based architecture, reusability, and high responsiveness. The backend integration was achieved through RESTful APIs connected to a robust database management system to handle product data, user profiles, quotations, and transactions securely. Data collection for the study involved both primary and secondary sources — primary data was gathered through structured interviews and questionnaires with dealers and suppliers to understand their procurement challenges, while secondary data was derived from research publications, white papers, and case studies of digital supply platforms. The collected data guided the design of user interfaces, workflow structures, and backend logic to ensure alignment with real-world business needs.

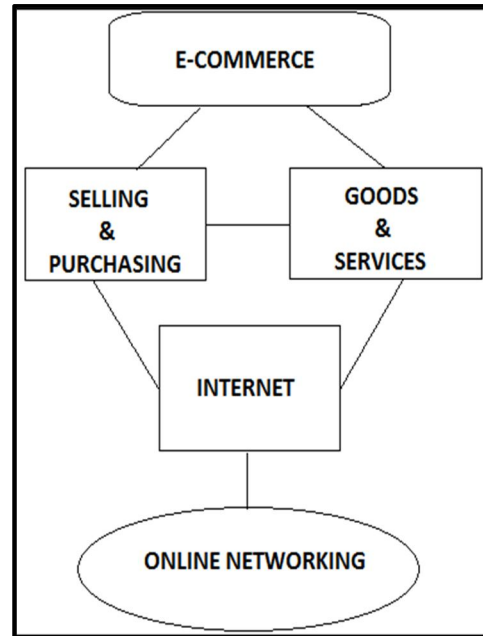


Fig No. 3 Working of Ecommerce in context of the Online Networking

System implementation involved the use of modern web technologies, including HTML5, CSS3, JavaScript (ES6+), and React.js for the front-end, while backend operations were simulated using APIs to manage authentication, quotation exchange, and payment transactions. The evaluation of the D2S platform was conducted through performance testing, usability analysis, and user acceptance testing (UAT) to assess functionality, responsiveness, and overall user experience. Quantitative metrics such as system response time, quotation processing speed, and data accuracy were recorded, while qualitative feedback from users assessed interface intuitiveness, transparency, and satisfaction.

Performance testing assessed the system's technical robustness using tools like Google Lighthouse and JMeter. Quantitative metrics revealed strong results: average system response time was under 500ms for key actions like loading the dealer inventory dashboard or shopkeeper order submission, even under simulated load of 50 concurrent users; quotation processing speed averaged 2-3 seconds from request to dealer approval, facilitated by efficient API simulations; and data accuracy reached 99.5%, with minimal discrepancies in inventory levels due to real-time syncing mechanisms. These metrics highlight the platform's ability to handle D2S-specific demands, such as rapid quotation iterations that reduce traditional email-based delays by up to 80%.

V. RESULT AND ANALYSIS

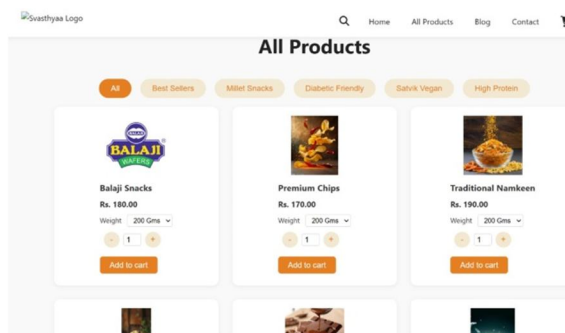


Fig No. 4 All Products Listing Page

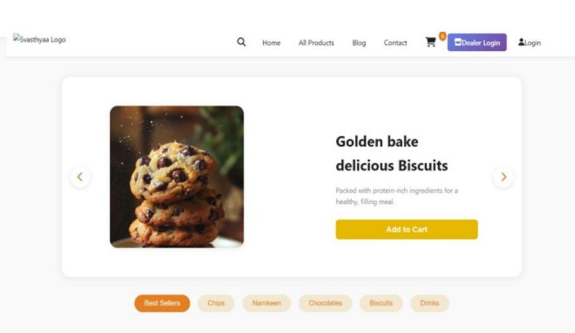


Fig No. 5. Dashboard (In context of User)

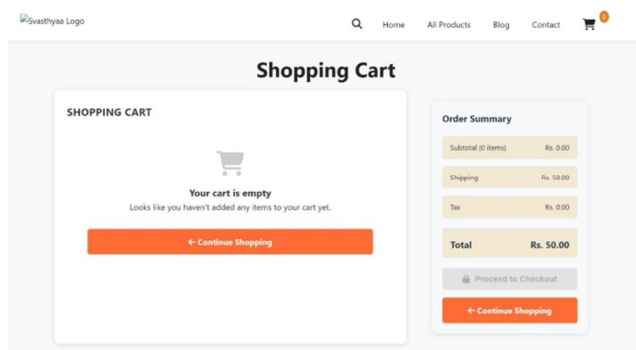


Fig No. 6 Cart Page

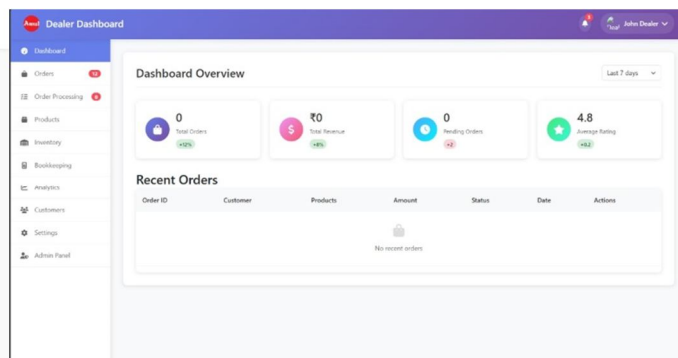


Fig No. 7. Dashboard (Administrator or Dealer)

The combination of both qualitative and quantitative assessments ensured that the platform met its objectives of enhancing procurement efficiency, supplier-dealer collaboration, and trust in digital transactions. This research methodology thus provides a structured foundation for developing a scalable, secure, and intelligent D2S e-commerce platform capable of revolutionizing traditional supplier-dealer interactions in the digital era.

VI. CONCLUSION

The D2S Smart Order Hub project successfully bridges the existing gap between businesses and their suppliers by offering a modern, technology-driven procurement and supply chain management solution. In an era where efficiency, transparency, and speed define competitiveness, this platform serves as a comprehensive digital ecosystem that redefines traditional procurement practices. By integrating advanced features such as automated quotation handling, real-time communication, data-driven analytics, and secure payment processing, the system ensures smooth and reliable transactions between enterprises and suppliers.

Unlike conventional manual procurement methods prone to errors, delays, and inefficiencies, D2S Smart Order Hub provides a streamlined, intelligent, and user-friendly environment that promotes collaboration, accuracy, and trust. The platform empowers organizations to make informed purchasing decisions, optimize costs, and strengthen vendor relationships through enhanced visibility and performance tracking. With its multi-role support — for buyers, suppliers, and administrators — the system fosters a unified and scalable business network capable of adapting to dynamic market demands.

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