**Smart Core: A Centralized PC Repair Management**

**System with AI and Analytics Platform**

A Capstone Project

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**Chapter I**

**INTRODUCTION**

#### **Background of the Study**

The rapid advancement of digital technology has significantly reshaped the PC retail and repair industry. In today’s market, customers no longer seek just computer hardware—they expect a streamlined, efficient, and personalized experience from purchase to repair. The reason that many small to mid-sized PC businesses continue to struggle due to outdated and manual processes. These traditional methods, including handwritten service logs, offline quotation sheets, and non-integrated inventory tracking, result in operational delays, decreased customer satisfaction, and inefficient service delivery.

As companies expand to multiple branches, managing service orders and inventory becomes increasingly complex. Without a centralized digital platform, businesses face challenges in maintaining service quality, tracking real-time inventory levels, and extracting useful insights from customer or sales data. These issues not only impact daily operations but also limit strategic planning and decision-making.

To address these concerns, this study presents **Smart Core**—a centralized, AI-enhanced management system tailored for the needs of PC repair and retail businesses. The system is designed to automate quotation generation, streamline

repair tracking, and offer cross-branch inventory visibility. In addition, Smart Core features an analytics dashboard that supports business decision-making through descriptive, diagnostic, predictive, and prescriptive data insights.

By implementing Smart Core, businesses can transition from manual, fragmented processes to a unified and intelligent workflow that enhances customer service, improves operational efficiency, and provides deeper visibility into overall business performance.

### **Project Context**

This project focuses on the development of an automated internal system for PC retail businesses such as REJTECH, a company that operates across two separate branches. Currently, REJTECH handles essential business operations—such as generating quotations, assembling custom PC builds, logging repair requests, and managing inventory—through traditional, manual methods. These disconnected processes often lead to inefficiencies, increased human error, and delays in service delivery.

With growing customer demand and multiple service points, REJTECH requires a centralized digital solution that integrates core operations and supports decision-making through data analysis. The proposed system, **SmartCore**, aims to serve as a comprehensive platform that will enhance cross-branch visibility, streamline repair and quotation workflows, and improve inventory control.

In addition, SmartCore will feature an AI-assisted quotation module and a dynamic analytics dashboard, enabling real-time business insights through descriptive, diagnostic, predictive, and prescriptive analytics. By adopting this system, businesses can reduce the risk of error associated with manual work and benefit from faster, smarter, and more efficient service management that meets modern operational demands.

#### **Statement of the Problem**

Despite the increasing demand for efficiency in PC retail and repair businesses, many companies still rely on outdated methods. These challenges hinder their ability to deliver fast and reliable services. REJTECH, as a growing PC retail and repair provider, experiences several operational difficulties due to the absence of a centralized digital solution.

The following are the specific problems identified:

1. Manual quotation processes that are time-consuming and prone to errors.
2. Limited visibility and control over inventory across multiple branches.
3. Lack of a unified system for logging, tracking, and updating repair requests.
4. No analytics platform to generate reports and support business decision-making.
5. Disconnected workflow between departments handling sales, repair, and inventory.

#### **Objectives of the Study**

To design and develop a centralized AI-powered management system that enhances the efficiency of PC repair services, inventory control, quotation generation, and business decision-making for PC retail companies.

**Specific Objectives:**

1. To develop a smart quotation module that generates compatible PC builds based on user budget and requirements, and also assists first-time buyers by explaining the purpose and value of each component.
2. To automate the tracking and status updates of repair and maintenance requests in order to minimize client waiting time and provide transparency through real-time updates.
3. To enable real-time inventory visibility and management across multiple branches to ensure timely resource allocation and avoid stock issues.
4. To provide a comprehensive dashboard for sales, service, and inventory analytics using descriptive, diagnostic, predictive, and prescriptive analytics, helping business owners make data-driven decisions.
5. To streamline internal workflows and communication between sales, technical, and inventory departments through centralized process integration.  
     
   By achieving these objectives, the study aims to provide REJTECH with a comprehensive and scalable solution tailored to its operational needs. The system will serve as a valuable tool for enhancing service quality, streamlining internal processes, and enabling data-driven management decisions across its branches. Through this initiative, REJTECH can position itself as a more competitive and efficient player in the local PC retail and repair market. To streamline internal workflows between sales, technical, and inventory departments.

#### **Significance of the Study**

The SmartCore system is designed to solve real problems that REJTECH faces in its day-to-day operations. By replacing manual processes with an automated and centralized platform, the system is expected to make work easier and more efficient for everyone involved—from staff handling quotations and repairs to managers overseeing sales and inventory.

This system could help the business become more organized, especially with inventory and service tracking across two branches. It also gives the owner a clearer view of how the business is doing by using data to generate reports and dashboards.

Technicians can spend less time on paperwork and more time on actual repair work, while customers can get updates about their service requests without having to make frequent follow-ups.

For employees, SmartCore provides a more convenient and reliable system that helps reduce mistakes and confusion. With everything stored and tracked digitally, staff can focus more on their actual tasks rather than dealing with repetitive paperwork. It also helps make their work environment more productive and less stressful.

Aside from helping the company internally, this study may also serve as a practical example for other small and medium PC businesses looking to modernize. It shows how integrating AI and analytics in a management system can improve both customer service and internal decision-making.

Overall, SmartCore aims to help REJTECH grow into a more efficient and competitive business in today’s digital environment.

#### **Scope and Delimitation**

#### **Scope**

This study focuses on creating SmartCore, a centralized web-based system aimed at improving REJTECH’s internal operations. The platform will support essential processes such as quotation generation, repair tracking, inventory monitoring, and

business analytics. It is designed for internal use by REJTECH staff, but select features—such as PC build quoting—will be available to customers through the website.

Customers will be able to input their preferred usage and budget to receive a recommended PC build. Basic customer information like name and address will also be collected during this process to associate them with their request and enable service tracking. Meanwhile, REJTECH owners and employees can manage operations and monitor analytics across the company's two branches.

#### **Delimitation**

This project is limited to the internal operations and customer support functions of REJTECH. While it includes features such as budget-based PC build recommendations and repair tracking, it does not offer full online ordering or payment capabilities. Customers can view recommendations and provide basic details, but transactions will still be handled manually or in-store.

These boundaries ensure the project remains achievable within the timeframe and resources of a student capstone, while still addressing REJTECH's key operational challenges.

**Chapter II**

**REVIEW OF RELATED LITERATURE**

**Foreign Literature**

AI-driven personalization has become an essential component in enhancing the digital shopping experience. According to Kuuno Rinne (2025), his study AI-Powered Customer Engagement: How Personalization, Chatbots, and Recommendation Systems Influence E-commerce Customer Satisfaction investigates how AI tools improve or potentially hinder customer satisfaction in the context of e-commerce. By using a mixed-method approach involving both a quantitative survey of online shoppers and qualitative interviews with small business owners, the research gathered multi-dimensional insights. The findings indicate that AI-powered systems such as chatbots, tailored product recommendations, and adaptive content delivery positively influence consumer behavior. Respondents appreciated the relevance and convenience of personalized interfaces, leading to improved trust and higher chances of repeat purchases. The study’s context aligns with SmartCore's goal to utilize AI in crafting personalized quotations and enhancing user interaction within a PC retail environment. Just as recommendation systems streamline e-commerce decisions, SmartCore aims to assist customers in configuring optimal PC builds based on needs and budget, ultimately boosting satisfaction and engagement.

Erdal Ozcelik (2024), is Analysing the Role of AI-poweredRecommender Systems in Enhancing Customer Engagement in Online Marketplaces: Developing a Product Recommendation System, dives deeper into the implementation of intelligent recommendation systems in online sales platforms. The study focuses on collaborative filtering and hybrid recommendation models that integrate machine learning and natural language processing (NLP). Using the Amazon Sales Dataset from Kaggle, Ozcelik built and tested a series of algorithms that measure recommendation effectiveness based on factors like relevance, diversity, satisfaction, and visual appeal. Through user feedback and system performance metrics, the study concluded that hybrid AI models significantly increase engagement and conversion rates by providing users with more accurate and personalized product suggestions. This insight is directly applicable to SmartCore, particularly its smart quotation module, which seeks to replicate a similar recommendation mechanism for PC parts. By factoring in budget constraints and user needs, SmartCore can deliver intelligent, curated PC build suggestions that improve the customer journey and decision-making process.

To address challenges in monitoring and evaluating sales performance, Madhumidha et al. (2025) proposed an advanced Salesforce-integrated solution in their study *Automated Real-Time Sales Performance Analysis with Salesforce*. Their research focuses on the limitations of traditional sales tracking—such as delayed reporting, lack of actionable insights, and poor integration across departments. The proposed

system introduces real-time dashboards, tailored analytics, and automated data collection processes, all intended to empower decision-makers with accurate and up-to-date sales information. By leveraging automation and visualization tools, the system offers modules that streamline performance evaluation, goal tracking, and operational adjustments. These features resonate with SmartCore’s analytics dashboard, which aims to equip REJTECH with a data-driven management tool. Similar to the Salesforce-based system, SmartCore seeks to implement descriptive, diagnostic, and predictive analytics to help business owners make strategic decisions regarding inventory, sales trends, and service delivery efficiency.

Rahman and Abdullah (2022), in their work AI in Retail: Enhancing Customer Service and Inventory Management, discuss the integration of AI tools in retail operations, including demand forecasting, automated customer support, and dynamic pricing strategies. The authors note that AI-based platforms allow retailers to maintain optimal stock levels, reduce product wastage, and improve customer satisfaction through personalized shopping experiences. This literature supports SmartCore’s aim to merge AI-powered customer interaction with efficient inventory forecasting, ensuring both customer needs and operational requirements are met effectively.

Choi et al. (2021), in the study Web-Based Analytics Platforms for Multi-Branch Businesses, examine the use of cloud-based dashboards that provide real-time

operational visibility for companies with multiple locations. Their research reveals that businesses utilizing centralized analytics tools experienced improved coordination, faster decision-making, and greater consistency in operational performance. This is directly aligned with SmartCore’s vision of integrating sales, repair tracking, and inventory data into a unified platform that can be accessed and managed seamlessly across REJTECH’s two branches.

**Local Literature**

Manual inventory processes have long posed challenges for small businesses in the Philippines, especially those with multiple branches. According to Maredel T. Tanaman et al. (2023), their study *Web-Based Inventory Management System* addresses this issue by developing a web platform for a small business in Pagadian City, Zamboanga del Sur. The enterprise previously relied on paper-based documentation to track inventory across four branches and a mobile store, which led to inefficiencies, inaccurate data, and delays in generating reports. The newly developed system allowed real-time data entry, automated reporting, and digital inventory processing. This significantly improved business operations and decision-making, offering the owner the ability to manage stock efficiently anytime, anywhere. The study reinforces the benefits of centralizing operations using a digital platform —

a principle SmartCore adopts in its goal to unify REJTECH’s inventory management across multiple locations.

In a similar vein, Abao Jr., Baja, and Taqueban (2024), in their study *Motormania’s Web-Based Streamlined Point-of-Sales Inventory Management with Predictive Analytics*, developed a web-based POS system integrated with predictive modeling. Designed for a retail setting, the system provides real-time inventory status with visual indicators (orange for low stock and red for out-of-stock) and features a forecasting function using linear regression based on historical sales data. The dashboard offers administrators direct access to sales trends and inventory performance, allowing proactive decisions to prevent overstocking and improve customer service. This mirrors SmartCore’s intention to embed sales analytics and inventory forecasting to optimize inventory control and elevate operational awareness at REJTECH. The study also highlights the system’s high usability, with a 78.58% satisfaction score, indicating success in real-world deployment — something SmartCore similarly aims to achieve.

Focusing on the repair service process, Santos et al. (2019) developed a *Repair Management System with an Integrated Parts Inventory Stock Handling System* using Agile methodology. Their client, XYZ Company, faced challenges due to a lack of digital infrastructure in its repair service department. Customer, repair, and parts information was manually written and stored, resulting in delays, errors, and a lack of transparency. The developed system introduced digital repair service reports, parts

inventory tracking, and profile management for customers, mechanics, and suppliers. This not only improved internal organization but also increased customer satisfaction due to faster and more accurate service handling. This study is highly relevant to SmartCore’s repair tracking module, which aims to automate repair workflows, link inventory to service tickets, and create a transparent, real-time status update for customers.

Furthermore, an undergraduate capstone study by Rosales, Ferrer, and Tan (2022), *SmartPOS: A Web-Based Inventory and Sales Tracking System for Local Retailers*, focused on small-to-medium retail stores in Metro Manila. The system provided synchronized data access across multiple branches, automated sales reports, and customer profiling. The study found that digital integration significantly reduced manual errors and helped owners identify best-selling products, reorder trends, and seasonal demand cycles. The relevance to SmartCore lies in its intent to offer similar data visibility through a centralized dashboard, aiding REJTECH’s management in tracking both sales and repair performance.

Lastly, Aquino et al. (2022), in their study *Design and Implementation of a Multi-Branch Inventory Control System with Real-Time Analytics*, created a centralized platform for a retail chain in Bulacan. The system integrated inventory control from multiple branches with real-time analytics to identify fast-moving items, track low stock levels, and assist in procurement planning. By providing managers with accurate and timely information, the system enhanced decision-making and reduced

operational bottlenecks. This approach directly supports SmartCore’s analytics and reporting capabilities, ensuring REJTECH can maintain optimal stock levels and operational efficiency across all branches.

**REVIEW OF RELATED STUDIES**

**Foreign studies**

Patel and Kumar (2021), in their study titled *Design and Development of an AI-Based Customer Quotation System for Retail Electronics*, developed an intelligent quotation tool tailored for retail environments. The system allowed users to input preferences such as budget, intended use, and preferred brands to generate a compatible product bundle. Conducted in India, the research utilized rule-based algorithms and emphasized how AI-assisted quotation systems can improve customer satisfaction and streamline decision-making. The study's findings indicated that customers experienced shorter waiting times and reduced confusion when choosing products. This relates closely to the SmartCore system, which also integrates a smart quotation module designed to assist customers in generating compatible PC builds based on their needs and budget.

A study by Nguyen and Tran (2023), *AI-Enabled Product Configuration System for Customized Electronics*, was conducted for an online electronics business in Vietnam. The system used decision-tree algorithms and sales data to suggest optimal product configurations for users based on their usage and budget. The researchers

reported a 40% boost in customer satisfaction and a 25% increase in conversion rates. These results highlight how AI-based product recommendation systems can significantly improve user experience. SmartCore aims to implement a similar feature through its intelligent quotation module, helping customers—especially first-time PC buyers—make more informed purchasing decisions.

Hernandez and Silva (2022), in their research titled *Intelligent Customer Interaction System for Electronics Retail*, developed a conversational AI chatbot designed to assist customers in selecting compatible computer components based on specific needs and technical requirements. The study revealed that the chatbot reduced product selection time by 33% and improved satisfaction rates among less tech-savvy customers. This aligns with SmartCore’s AI-driven quotation assistant, which aims to simplify the PC-building process and enhance customer experience.

Watanabe and Kimura (2020), in *Integrated Repair and Inventory Management for Electronics Service Centers*, examined a centralized system that connected repair tracking and parts inventory in a Japanese electronics service company. The study found that integrating these modules allowed technicians to confirm part availability in real time, significantly reducing delays caused by missing components. This mirrors SmartCore’s approach of linking its repair management and inventory systems to ensure faster and more efficient service delivery.

In a system development study by Owens, Mitchell, and Rivera (2019) called A Centralized Service Tracking System for Multi-Branch IT Providers, the authors introduced a web-based platform that monitored repair requests and technician activity across multiple service locations. The study was conducted in the U.S. and

highlighted the need for centralized systems to avoid service delays and inconsistencies. This approach supports SmartCore’s repair tracking feature, which also aims to provide cross-branch visibility and improve turnaround time by digitizing service processes.

**Local Studies**

Cruz and Valdez (2021), in their study titled *Development of an Integrated Inventory and Quotation Management System for Local Gadget Shops*, created a system for small electronics retailers in Metro Manila that combined real-time inventory control with an auto-generated quotation feature. The platform streamlined sales transactions by linking inventory data directly to the quotation process, reducing manual errors and speeding up customer service. This aligns with SmartCore’s goal of integrating quotation and inventory management into a unified system for efficiency and accuracy.

Lopez, Garcia, and Tan (2022) developed *Repair Tracker PH*, a repair monitoring system implemented in a PC repair shop in Laguna. The system featured an online ticketing module that allowed customers to submit service requests and receive real-

time updates via SMS or web interface. Their findings showed improved service transparency, faster turnaround times, and higher customer satisfaction. SmartCore’s repair tracking module shares this objective of increasing efficiency and visibility in service processes.

Mendoza and Santos (2023), in their capstone *Development of a Web-Based Sales and Inventory Monitoring System with Data Visualization for Multi-Branch Tech Shops*, designed a centralized dashboard for computer hardware stores in Quezon City. The system provided real-time sales summaries, inventory alerts, and visual analytics, enabling management to compare branch performance and make data-driven decisions. This is directly parallel to SmartCore’s analytics component, which provides REJTECH management with a centralized view of branch operations.

Reyes and Bautista (2020), in their research *Implementation of a Predictive Analytics Module in Inventory Systems for Small Electronics Retailers*, explored the use of regression-based forecasting to anticipate product demand in a gadget store in Cavite. The system reduced overstocking by 22% and minimized lost sales due to stockouts. This directly supports SmartCore’s inventory forecasting feature, which similarly leverages sales data trends to optimize stock levels.

Del Rosario et al. (2022) developed *Service and Parts Inventory Management System for Appliance Repair Centers* for a repair shop in Batangas. The system allowed real-time tracking of both repair tickets and spare parts inventory, ensuring

that repair jobs could be scheduled only when necessary parts were available. This integrated approach reduced repair delays and improved workflow efficiency — a concept SmartCore also adopts by linking its repair tracking and inventory modules.

**Synthesis**

The reviewed literature and studies both foreign and local demonstrate a growing reliance on artificial intelligence, web-based systems, and predictive analytics to streamline business processes in various industries, particularly in retail, repair services, and inventory management.

Foreign literature such as the works of Rinne (2025) and Ozcelik (2024) emphasize the impact of AI-powered tools on customer satisfaction and engagement. These studies affirm the value of intelligent recommendation and quotation systems, particularly in enhancing personalized user experiences. Similarly, local literature by Tanaman et al. (2023) and Abao et al. (2024) presents successful implementations of web-based POS and inventory systems, proving that even small enterprises in the Philippines benefit significantly from centralized platforms and real-time data access.

Studies from Patel & Kumar (2021) and Nguyen & Tran (2023) further reinforce the effectiveness of AI-driven configuration tools in retail settings. Their systems not only improved efficiency but also led to measurable increases in customer satisfaction and

conversion rates—outcomes directly relevant to the goals of SmartCore’s quotation feature. Meanwhile, forecasting techniques and sales analytics, as seen in the works of Li & Zhang (2020) and Mendoza & Santos (2023), illustrate the power of data-driven decision-making in inventory control and business planning.

From the local perspective, Cruz & Valdez (2021) and Lopez et al. (2022) developed systems that combine quotation, inventory, and repair tracking—features similar to those integrated in SmartCore. These projects demonstrate the practical application of centralized systems in small business settings and confirm the need for automation and data visibility in improving operational performance and customer experience.

However, while these existing studies showcase various elements of business automation, most focus on **only one or two aspects** of operations (e.g., inventory, POS, or quotation), and often lack AI integration or advanced analytics. There remains a noticeable gap in **fully centralized platforms** that consolidate **repair tracking, sales quotations, inventory monitoring, and AI-based analytics** into a **single intelligent system,** particularly for **multi-branch PC retail and service businesses**.

SmartCore aims to bridge this gap by combining the strengths of the systems reviewed—automation, centralization, AI-enhanced features, and predictive analytics—into a single platform tailored specifically for REJTECH. The system not only addresses the operational pain points identified in both literature and studies,

but also introduces **smart quotation logic and analytics dashboards** that can evolve with user input and sales trends, making it a more adaptive and scalable solution.

**Technical Background**

The proposed system, SmartCore, will be developed as a centralized web-based platform that integrates core functionalities such as quotation generation, repair tracking, inventory monitoring, and analytics. The technologies used in this project include a combination of web development software, database management tools, and data visualization platforms suitable for building scalable and interactive systems.

Instead of using manual processes, SmartCore will rely on software tools that allow the creation of a responsive and user-friendly interface accessible across multiple devices. A relational database management system will be utilized to handle structured data, including inventory logs, service records, and user information.

The system will also include AI-assisted logic to support smart PC build recommendations based on customer preferences, budget, and intended use. Predictive analytics features such as sales forecasting will be implemented using statistical modeling techniques, allowing the business to plan inventory and resources more effectively.

To guide development, the project will adopt the Agile methodology, which supports continuous collaboration and allows the system to evolve through incremental

updates based on user feedback. By combining these software tools and development practices, SmartCore aims to provide a modern, intelligent, and reliable solution that meets the operational needs of REJTECH’s multi-branch PC retail and repair business.