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Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

Stock Auction System with Automatic Costing and Price Scraping for Mazuma Mobile Australia

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Received:14 June 2024 **Revised**: 17 July 2024 **Accepted**: 18 July 2024

Available Online: 18 July 2024

Volume III (2024), Issue 3, P-ISSN – 2984-7567; E-ISSN - 2945-3577

Abstract

Aim: This study aimed to develop a scoring system for mobile phones sold by Mazuma Mobile Australia that targets the highest profit margin for each device.
Methodology: This study utilized scenario planning as its research design. Scenario planning is a qualitative research methodology that involves creating multiple future scenarios based on different assumptions or variables to forecast potential outcomes. The process includes identifying the focus, defining key factors, developing scenarios, analyzing outcomes, developing flexible strategies, communicating, and implementing them, and continuously monitoring and updating the scenarios. By systematically considering uncertainties and their implications, scenario planning enables organizations to prepare for a range of possible futures and make informed decisions to manage risks and seize opportunities.
Results: Results show that the system is extremely satisfactory. Results reveal that the total mean of the findings for the qualities used in the analysis is 4.7, which indicates that the study's participants firmly agreed that the system is acceptable to users and suitable for use in the company because it met the ISO standard.
Conclusion: The development of a scoring system for mobile phones sold by Mazuma Mobile Australia is a significant undertaking that holds great importance for various stakeholders. The scoring system aimed to optimize pricing strategies and maximize profit margins for each device sold. By considering factors such as stock age, demand per sale, expected margins, and competitor prices, Mazuma Mobile can ensure that its pricing decisions are data-driven and objective, leading to increased profitability and better resource utilization.

Keywords: Mobile Phones, Phone Recycling, Stock auctions, Price Scraping

INTRODUCTION

The process of recycling mobile phones has become an increasingly important component of maintaining the health of the environment in this age of rapid technological innovation. This trend was facilitated by Mazuma Mobile, which was at the vanguard of the business and one of the earliest and leading firms in Australia's phone recycling sector. Mazuma Mobile promotes the proper disposal of unwanted mobile devices and phones. Mazuma Mobile not only encouraged people to recycle their electronic devices by providing financial compensation in return for outdated phones, but it also ensured that these devices were disposed of and recycled properly.

Nevertheless, the process of selling these recycled phones presented Mazuma Mobile with a number of obstacles to overcome. The existing manual analysis and pricing approach used by the company's sales personnel often resulted in price inconsistencies, which led to possible lost chances for increasing profit margins. These differences were also caused by the company's inability to accurately forecast future costs. In addition, dealers found a gaping vacuum in the stock offerings, which they used to their advantage by taking advantage of the bidding timetable and buying stocks at reduced prices without making use of Mazuma Mobile's online platform.

This project is intended to design a scoring system that would enable Mazuma Mobile to identify appropriate pricing for each mobile phone device, with the end goal of achieving the largest possible profit margin. This scoring method aimed to provide a more efficient and effective strategy for pricing the devices by taking into consideration a variety of parameters, including but not limited to stock age, demand per sale, estimated margins, and competition

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prices. The dealer portal, retail shops on eBay, and wholesale sales were recognized as possible routes via which products might be sold, with retail stores on eBay providing a fallback option for products that were challenging to move through the other channels.

The goal of this project was to create a score system for Mazuma Mobile Australia's mobile phone sales. The scoring system aimed to optimize the profit margin for each gadget sold by taking into account several aspects that impact the price in the used market. By implementing this system, Mazuma Mobile sought to enhance its pricing strategies and increase profitability in the sale of recycled mobile phones.

This study entailed a thorough examination of the variables influencing the cost of used mobile phones. Stock age, demand per sale, estimated margins, and competition prices were discovered and examined to understand their influence on pricing.

A rating system was developed based on the findings. This scoring algorithm took into account a number of factors to estimate the best price for each mobile phone. The criteria included stock age to determine market relevance, demand per sale to measure consumer interest, estimated margins to assure profitability, and rival pricing to ensure market competitiveness.

The established scoring system was applied to Mazuma Mobile's selling platforms, including the dealer site, eBay storefronts, and wholesale sales. The system generated automatic price suggestions for each device based on the detected elements and criteria.

The scoring system's ability to maximize profit margins was assessed. The study included examining sales data and comparing the attained profit margins with Mazuma Mobile's past pricing schemes. The assessment findings provided insight into the system's performance and its influence on profitability.

Based on the assessment findings, suggestions for additional upgrades and changes to the scoring system were offered. These suggestions aimed to fine-tune the system, taking into account any limits or opportunities for improvement found throughout the review process.

Overall, this project provided Mazuma Mobile with a robust scoring system that improved pricing strategies and increased revenue from the sale of recycled mobile phones.

Objectives

This study aimed to develop a scoring system for mobile phones sold by Mazuma Mobile Australia that targets the highest profit margin for each device.

Specifically, this study aimed to:

1. identify and analyze the factors influencing the pricing of mobile phones in the second-hand market;
2. design a comprehensive scoring system that considers criteria such as stock age, demand per sale, expected margins, and competitor prices;
3. design a system that implements the scoring system on Mazuma Mobile's selling platforms, including the dealer portal, eBay stores, and wholesale sales; and
4. test the effectiveness of the scoring system in maximizing profit margins for mobile phones.

METHODS

Research Design

This study utilized scenario planning as its research design. Scenario planning is a qualitative research methodology that involves creating multiple future scenarios based on different assumptions or variables to forecast potential outcomes. The process includes identifying the focus, defining key factors, developing scenarios, analyzing outcomes, developing flexible strategies, communicating, and implementing them, and continuously monitoring and updating the scenarios. By systematically considering uncertainties and their implications, scenario planning enables organizations to prepare for a range of possible futures and make informed decisions to manage risks and seize opportunities.

Participants of the Study

The study encompassed a cohort of individuals with varied roles and duties. The project was overseen by a proficient project manager possessing a decade of industry expertise. Playing crucial roles in the development and implementation of the project were a senior software engineer and a software engineer, who provided assistance to the project manager.

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The individual assuming the role of Managing Director served as the Project Sponsor, offering guidance and supervision throughout the duration of the project. The genesis of the project's concept can be attributed to the collaborative endeavours of a business analyst and an operations manager, both of whom made significant contributions by leveraging their respective expertise to shape the project's trajectory and objectives. During the testing phase, a team of three staff members was assigned the responsibility of conducting comprehensive testing and ensuring strict adherence to the prescribed order flow. The user's diligent efforts made a significant contribution to the overall excellence and dependability of the project.

The comprehensive and well-executed study was made possible by the collaboration and combined expertise of individuals with diverse roles and backgrounds.

Data and Process Modeling

In terms of scenario planning, the scoring system for mobile phones offered by Mazuma Mobile Australia may be developed using the Agile approach (Smith 2022). Here is how the research design might use the Agile methodology:

Agile Methodology: Adopt an agile research design strategy that prioritizes adaptability, teamwork, and iterative development. This method enables ongoing feedback and adaptability to needs and environmental changes (Jones, 2018).

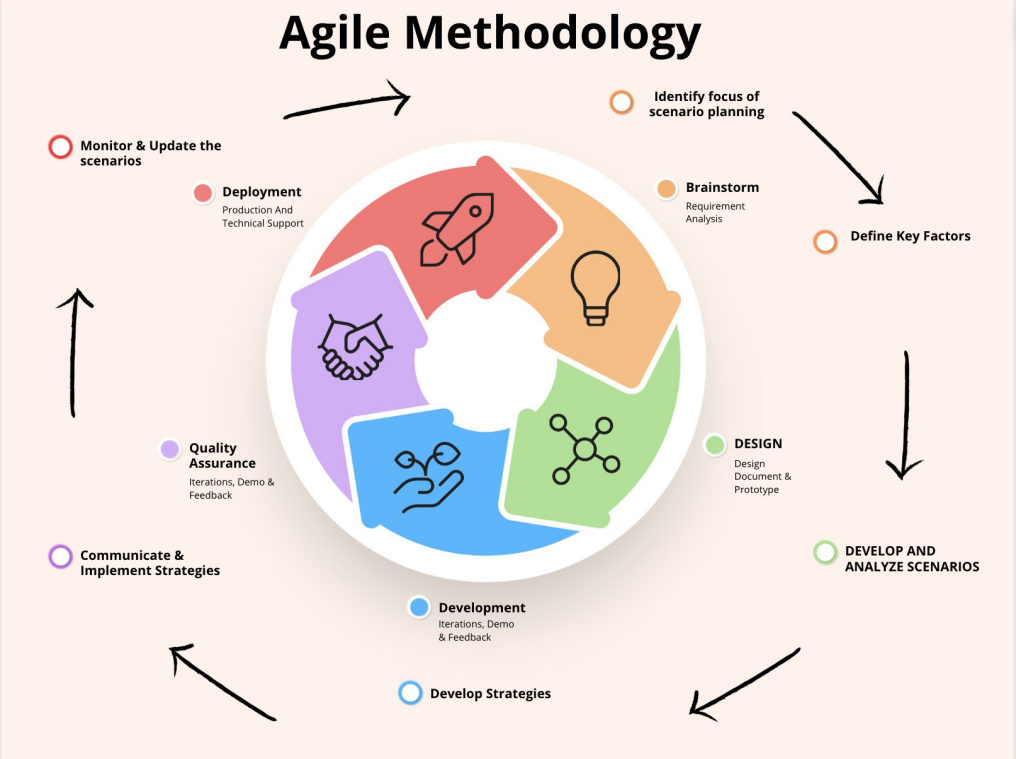

Figure 1: Agile Development Life Cycle

Agile Team: Create a Scrum team with essential stakeholders including Mazuma Mobile reps, researchers, developers, and data analysts. Throughout the project, this cross-functional team will collaborate to ensure efficient communication and information exchange (Brown & White, 2019).

Backlog of products: Make a product backlog that lists the main characteristics and specifications for the scoring system. The activities and deliverables that need to be finished will be included in this backlog in order of priority (Johnson, 2017).

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Sprint Planning: Hold sprint planning sessions to specify each sprint's parameters, which are time-boxed development iterations. Establish together the objectives, deliverables, and duties that must be completed throughout each sprint (Smith & White, 2020).

Implement a continuous integration and testing procedure to make sure the scoring system is reliable and functioning. Integrate newly created features often, and test them to find and fix any flaws or problems (Johnson, Smith & Anderson, 2019).

Hold a sprint review meeting to present the finished work to stakeholders and get feedback at the conclusion of each sprint. To evaluate the sprint process, pinpoint areas for improvement, and make the required modifications for future sprints, do a retrospective. Integration of scenario planning: Techniques for scenario planning should be included in the study strategy. Identify the main variables and presumptions that could affect the cost of used mobile phones. Create many scenarios based on these elements, and use them as the scoring system's inputs. Examine each scenario's results to see how they may affect pricing and profit margins. Updates and Continuous Monitoring: Keep an eye on competition pricing, market dynamics, and other important details that might affect how well the scoring system works. To keep the system current and accurate, update it often, depending on new information and insights.

The research design can provide a flexible and adaptable framework for creating the scoring system by fusing the Agile approach with scenario planning methodologies. With this strategy, effective teamwork, iterative development, and the incorporation of potential future situations into the decision-making process are all made possible

Project Design and Development Process

Materials

The right materials, including both hardware and software components, were carefully chosen in the context of agile development and in compliance with the project's specifications. This careful process makes sure that the desired result may be accomplished.

Software

A thorough examination of the software was carried out at each step of data collection, design, development, and testing for the system application. The performance, functionality, and compatibility of the program with the project's stated goals were all evaluated throughout this procedure. The development team made sure the program complied with the essential standards and specifications by thoroughly analyzing it at each stage, which helped to guarantee the system's smooth deployment.

Table 1
Software in the Study

Software	Version
Microsoft Power BI	Version: 2.114.864.0 64-bit (February 2023)
Microsoft Power Automate Pro	Cloud Version (Flow Controller)
Microsoft Power Automate Desktop App	Version: 2.3.96.23172
Visual Studio Code	Version: 1.70.0
Windows Server 2019 Datacenter	Version: 1809

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GitKraken	Version: 9.1.1
MySQL Server 2019 Configuration Manager	Version: 2019.0150.2000.05
MySQL Workbench 8.0	Version: 8.0.25 Build 788958 CE
Visual Studio 2022	Version: 17.4.2
XAMPP	Version: 3.2.4
Microsoft On-Premise Data Gateway	Version: 3000.174.13 (May 2023)
RaiDrive	Version: 2022.6.92
AWS EC2 Instance (Test Server)	t3.medium
AWS EC2 Instance (Live Server)	m5a.2xlarge

Table 1 shows the software list consists of various tools and applications used for different purposes.

Microsoft Power BI is utilized for generating reports, while Microsoft Power Automate Pro is a cloud-based tool for controlling automated flows. The Microsoft Power Automate Desktop App is specifically designed for creating web scrapers, and Visual Studio Code serves as a code editor primarily used for code checking. For operating systems, the list includes Windows Server 2019

Datacenter. GitKraken is a software used for code repository management, and MySQL Server 2019 Configuration Manager is employed for managing database configurations. MySQL Workbench 8.0 is a tool used for SQL queries and connection management. Visual Studio 2022 is used for backend development, and XAMPP is employed for website hosting using Apache as the web server.

To facilitate the connection between servers and Power Automate Cloud, the Microsoft On-Premise Data Gateway is used. RaiDrive is a software used for deploying backend applications.

In addition, the list includes AWS EC2 instances for cloud-based tests and live servers. The t3.medium instance is utilized as a test server, while the m5a.2xlarge instance serves as the live server.

Statistical Tool

The statistical tool employed for data interpretation was the calculation of percentages. Percentages were obtained using the following formula:

$$P = n / N \times 100$$

Where P = percent symbol
n = number of responses

RESULTS and DISCUSSION

This project aimed to develop a scoring system for Mazuma Mobile Australia's mobile phone sales to maximize profit margins. By considering factors such as stock age, demand, expected margins, and competitor prices, the scoring system optimized pricing strategies. It was implemented on various platforms, including the dealer portal, eBay stores, and wholesale sales. The effectiveness of the system was evaluated, and recommendations for enhancements were provided. The study's significance lies in its benefits to Mazuma Mobile, environmental sustainability, customers, competitiveness, and the research community. The scope included developing the scoring system, addressing limitations, and providing valuable insights for the mobile phone recycling industry.

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Table 2
Summary of the Results of Evaluation of Software

Characteristics	Mean	Verbal Interpretation
Functional suitability	4.67	Strongly Agree (Outstanding)
Performance efficiency	4.62	Strongly Agree (Outstanding)
Compatibility	4.7	Strongly Agree (Outstanding)
Usability	4.72	Strongly Agree (Outstanding)
Reliability	4.73	Strongly Agree (Outstanding)
Security	4.69	Strongly Agree (Outstanding)
Maintainability	4.71	Strongly Agree (Outstanding)
Portability	4.77	Strongly Agree (Outstanding)

According to the statistics above, the system is extremely satisfactory, as shown in Table 2. This shows that the total mean of the findings for the qualities mentioned above is 4.7, which indicates that the study's participants firmly agreed that the system is acceptable to users and suitable for use in the company because it met the ISO standard.

The development of a scoring system for mobile phones sold by Mazuma Mobile Australia is a significant undertaking that holds great importance for various stakeholders. The scoring system aimed to optimize pricing strategies and maximize profit margins for each device sold. By considering factors such as stock age, demand per sale, expected margins, and competitor prices, Mazuma Mobile can ensure that its pricing decisions are data-driven and objective, leading to increased profitability and better resource utilization.

The implementation of the scoring system on Mazuma Mobile's selling platforms, including the dealer portal, eBay stores, and wholesale sales, enhanced the company's competitiveness in the phone recycling industry. It attracts a larger customer base by offering fair and competitive prices for used mobile phones, thereby fostering customer satisfaction and trust. Furthermore, the scoring system benefits wholesale customers by creating a transparent and level playing field for bulk stock purchases, preventing the exploitation of stock offers.

While the study acknowledges certain limitations, such as the geographical focus on Mazuma Mobile Australia and potential challenges related to data availability and market dynamics, it provides valuable insights and a practical solution for optimizing pricing strategies. The findings and recommendations of this study contribute to the existing body of knowledge in mobile phone recycling, pricing strategies, and e-commerce, benefiting not only Mazuma Mobile but also the research and academic community. Overall, the scoring system developed in this study has the potential to drive environmental sustainability, enhance profitability, and establish Mazuma Mobile as a leader in the phone recycling market.

The primary objective of Mazuma Mobile Australia's endeavour is to enhance pricing strategies and achieve maximum profitability through the establishment of a scoring system for their mobile phone offerings. The scoring system incorporates various factors, including the age of stocks, demand per sale, anticipated profit margins, and competitor prices, in order to ascertain the most advantageous pricing strategy for each device. Through the implementation of this system, Mazuma Mobile has the potential to optimize its pricing strategies and bolster profitability in the market for recycled mobile phones. Drawing upon the underlying conceptual framework, the subsequent recommendations can be posited:

1. The implementation of data integration and automation tools is recommended for Mazuma Mobile in order to optimize the efficiency of data collection and analysis pertaining to historical sales, acquisition costs, and competitor prices. This functionality will facilitate the ability of the scoring system to generate precise and evidence-based pricing suggestions.
2. The regular updating and adaptation of the scoring system by Mazuma Mobile is of utmost importance in order to effectively account for the dynamic changes in the market. The implementation of real-time

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market analysis techniques facilitates the acquisition of current information pertaining to market demand, competitor pricing, and other external factors that exert an influence on pricing decisions.

3. Mazuma Mobile should contemplate engaging in collaborative efforts with its business competitors in order to obtain comprehensive data on acquisition prices. This approach will facilitate a more holistic assessment of the market and empower Mazuma Mobile to make appropriate adjustments to its pricing strategies. The utilization of web scraping enables the automation of data collection from the websites of competitors.
4. In order to assess the efficacy of the scoring system in optimizing profit margins, it is recommended that Mazuma Mobile establish a set of key performance indicators (KPIs) for performance evaluation and continuous improvement purposes. Through consistent monitoring and comprehensive analysis of sales data, Mazuma Mobile is able to discern areas that require enhancement and subsequently modify the scoring system to optimize its performance in the long run.
5. Scalability and generalizability: Although the scoring system is currently being designed for Mazuma Mobile Australia, it is crucial to contemplate its scalability and potential transferability to other geographical areas or markets. The design of the system should prioritize modularity and flexibility in order to effectively accommodate future expansion and adapt to varying market conditions.

In summary, the establishment and execution of the scoring system, in conjunction with the suggested improvements, will empower Mazuma Mobile to optimize pricing strategies, enhance profitability, and sustain a competitive advantage within the phone recycling sector.

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