

Pages to Pixels – Modernizing a Used Bookstore for Online Success with Inventory Management and Hidden Value Data Mining

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Abstract

This case study examines the digital transformation of Big John's Books, a used bookstore in Lethbridge, Alberta, Canada. By implementing an inventory management system that requires minimal intervention and leveraging data mining techniques, the bookstore aims to uncover hidden values within its extensive inventory. The modernization project will also enhance the business's online presence, improve operational efficiency, and boost customer satisfaction. Through these efforts, the bookstore expands its market reach and ensures its competitiveness in the digital age.

Introduction

Big John's Books, originally named Baxter's Books, has been a cornerstone in Lethbridge, a city in Southern Alberta, Canada, for over 70 years. John Pyska, the current owner, has managed the store for the past two decades, having inherited it from his aunt. The bookstore's charm lies in its vast and eclectic collection, which, although well-loved, presents significant organizational challenges. John emphasizes the cultural and historical value of the store: "I think it's an important hub for a lot of reasons, one of them being literature and literacy is something we want to push for everyone. I

enjoy it.”⁹ This sentiment reflects the bookstore's role as more than just a retail space; it is a vital community hub promoting literature and literacy to all.

While impressive, the store's extensive collection has made inventory management very challenging. The sheer volume of books and a lack of modern cataloging systems have led to inefficiencies and difficulty maintaining order. Despite these challenges, the commitment to preserving Big John's Books' unique atmosphere and cultural significance remains strong. The project to modernize its operations aims to balance this rich heritage with the need for contemporary efficiency, ensuring that the bookstore can continue serving its community effectively for many more years.

Recognizing the necessity of digital transformation for business sustainability, Big John's Books, a family-owned used bookstore, embarked on a project to modernize its operations. This case study details implementing a comprehensive inventory management system and the exploration of data mining to unearth hidden values in the bookstore's extensive collection. By integrating these technologies, Big John's Books aims to enhance operational efficiency, boost customer satisfaction, and expand its market reach. The project highlights how traditional businesses can adapt to changing market conditions by leveraging modern tools to improve inventory accuracy, streamline processes, and discover valuable insights within their existing assets.

Background

The Market for Books

In 2023, the United States had approximately 2,185 independent bookselling companies¹. Despite threats from large chains, digital booksellers, and online marketplaces, there is a strong demand for print books. Recent surveys have shown that “20 percent of respondents stated that they still purchase most of their print books in-store, compared to 22 percent who stated that they mostly buy books online.”¹ In 2022, bookstore sales in the United States amounted to less than nine billion U.S. dollars, a decrease from over 12 billion U.S. dollars a decade earlier¹. Despite the decline, the sustained demand for print books suggests that physical bookstores still hold significant value for consumers, highlighting the importance of modernizing operations to stay competitive.

Bookstores evoke nostalgia and continuity² and play an important role in the community,³ having remained largely unchanged despite technological shifts in the industry.⁴ Used bookstores have carved out a niche by repurposing books and offering economical and environmentally friendly

alternatives to new-book purchases. These stores provide a unique shopping experience where customers can find rare and out-of-print books, often with unknown value. Their sustainable practices appeal to eco-conscious consumers and encourage re-using books that would otherwise be thrown out.

Small bookstores continue attracting patrons and are an environmentally friendly choice.^{4,5} These visitors are typically interested in culture, reading, and interacting with real books.⁶ Compared to large chain bookstores or online book platforms, small bookstores offer more personalized and thoughtfully curated book selections, appealing to those seeking unique books and cultural exchanges. Bookstores serve as social and cultural gathering places, drawing people with shared interests.^{7,8} They frequently host reading sessions, literary events, and author signings, providing community members opportunities to interact with writers and engage in in-depth discussions about books.

Challenges Faced by Big John's Books

Inventory Management

Managing the inventory at Big John's Books presents a significant challenge due to the sheer volume of books, estimated at over 100,000, on two floors. This extensive collection is manually cataloged, which is labor-intensive and prone to human error. John emphasizes that the bookstore has been in the family for 70 years and that the current manual system makes it difficult for both staff and customers. "I use my brain most of the time," Pyska explains, "I can tell you which book behind you came in and what time, but it gets overwhelming."⁹ This lack of a systematic inventory management system often leaves customers struggling to locate specific titles, causing them to seek assistance frequently. Pyska notes, "Sometimes it's like 10-15 minutes depending on how willing you are to look for things. And then sometimes they still don't find it. So they'll ask me."⁹ This manual process also complicates tracking book sales and arrivals, leading to potential inaccuracies in stock levels and making it harder to manage the bookstore effectively.

The extensive collection at Big John's Books often overwhelms customers by the vast selection, making it challenging to locate specific titles. Without a systematic inventory management system, the manual cataloging is labor-intensive and prone to human error. Consequently, staff members spend considerable time assisting customers, as highlighted by Pyska, "Some people feel overwhelmed. I have to usually help them and direct them to the area they need to be because there's just so much to see."⁹ This inefficient process hampers effective bookstore management, complicating the tracking of book

sales and arrivals and leading to potential inaccuracies in stock levels. Pyska underscores the importance of moving towards a digital system, stating, "We're going to be moving everything I have onto an inventory program and then onto a website,"⁹ aiming to streamline operations and improve the customer experience.

Customer Engagement

The physical space of Big John's Books limits customer engagement due to its confusing layout. The bookstore's arrangement can be overwhelming for visitors, particularly those unfamiliar with the store's organization. John describes the challenges of navigating the store: "There's lots of books here. A lot of books. We try to keep it as organized as possible but I don't keep it like a library."⁹ This confusion can detract from the shopping experience, as customers may need help finding the books they are interested in. Enhancing the layout and providing more precise navigation aids could improve the overall customer experience, making it more inviting and user-friendly.

The current setup does not encourage prolonged browsing or discovery, which are critical components of customer engagement in a bookstore setting. Pyska notes, "Some people feel overwhelmed. I usually help them and direct them to the area they need to be because there's just so much to see."⁹ This assistance is time-consuming and detracts from the potential for spontaneous discovery and prolonged engagement with the store's offerings. Improving the physical layout and introducing a more systematic organization would likely foster a more enjoyable and efficient shopping experience.

Competition

Competing with big box stores and the growing trend of e-books presents a formidable challenge for Big John's Books. Large retailers have the advantage of scale, offering extensive inventories and competitive pricing that smaller bookstores like Big John's Books cannot easily match. John Pyska, the owner, reflects on this struggle: "If you think the competition is bad in Lethbridge where we have three bookstores, the competition [in] the world is a lot bigger."⁹ The convenience and accessibility of e-books appeal to a broad audience, drawing potential customers away from physical bookstores. This shift in consumer preferences makes it increasingly difficult for traditional bookstores to maintain their market share, as the "competition is giant corporations and you're not gonna win against them."⁹

Big John's Books must find ways to differentiate itself, such as emphasizing the unique experience of shopping in a physical store and the value of owning physical books. Pyska underscores the importance of

creating a distinctive in-store experience: "I think it's an important hub for a lot of reasons, one of them being literature and literacy is something we want to push for everyone."⁹ Big John's Books can attract customers who appreciate these aspects by highlighting the tactile pleasure of browsing through shelves and the sentimental value of printed books. Pyska also believes in the nostalgic and cultural value of the bookstore, stating, "A lot of people remember when they were kids, their family bringing them into bookstores and getting some of their first books."⁹ These strategies can help Big John's Books carve out a niche in a market dominated by large retailers and digital formats.

Operational Efficiency

The bookstore's operational efficiency could be improved by its reliance on manual processes. Currently, logging new arrivals and sales depends heavily on John's memory. This approach is unsustainable and increases the risk of errors and inefficiencies. As Pyska notes, "I use my brain most of the time. For example, I can tell you which book behind you came in and what time. And I can also tell you which ones I sold in the last three days and which ones were sold previously." However, as the volume of inventory grows, maintaining accurate records and managing daily operations become increasingly challenging. This inefficiency can lead to John being unable to take a break, misplaced books, inaccurate stock levels, and a general decline in the quality of service.

Implementing a robust inventory management system could streamline operations, reduce the workload on staff, and enhance the accuracy of inventory records, ultimately improving the overall efficiency of the bookstore. Pyska acknowledges the need for this change: "We're going to be moving everything I have onto an inventory program and then onto a website."⁹ By adopting a systematic approach to inventory management, Big John's Books can significantly reduce the likelihood of human error, ensure better tracking of book sales and arrivals, and improve customer satisfaction. This transition to digital inventory management is essential for maintaining the bookstore's competitiveness and providing a higher quality of service.

Addressing Challenges

To address these challenges, Big John's Books is embarking on a project to digitize its inventory and improve its operational systems. By adopting modern inventory management software, the bookstore aims to enhance accuracy and efficiency in tracking its vast collection. Redesigning the store layout and providing better signage can improve customer engagement, making it easier for visitors to find what they want. Embracing e-commerce

and creating an online presence will allow the bookstore to reach a wider audience and compete more effectively with large retailers and digital platforms. Through these efforts, Big John's Books hopes to modernize its operations while preserving the unique, nostalgic experience that sets it apart from its competitors.

The Digital Transformation Project: Pages to Pixels

Project Overview

The “Pages to Pixels” project aimed to digitize Big John's Books' operations by implementing a comprehensive inventory management system and developing an e-commerce platform. From John Pyska's perspective, this initiative was essential for modernizing the bookstore and ensuring its survival in a digital age. The new inventory management system automated the cataloging of books, which was previously labor-intensive and prone to errors. The system maintained accurate and up-to-date inventory records by utilizing barcode scanning and integrating this data into a centralized database. This improvement facilitated better stock-level tracking, streamlined new arrivals' management, and provided insights into sales patterns.

In parallel, the development of the e-commerce platform extended the bookstore's reach beyond its physical location. This platform enabled customers to browse and purchase books online, thus tapping into a broader audience. The platform was designed to be user-friendly and featured robust search functionality, personalized recommendations, and secure payment options. By enhancing the customer experience online, Big John's Books aimed to drive additional sales and increase its market reach.

The project also addressed several critical questions essential for its success. For instance, how could the inventory management system reduce human error and enhance accuracy? By employing barcode scanning and automated data entry, the system ensured that each book was cataloged correctly, minimizing the risk of mistakes. The project explored how to make the e-commerce platform intuitive and engaging for users, ensuring a seamless transition from in-store to online interactions.

Motivations and Goals

Motivated by the urgent need for survival and a strong desire to increase operational efficiency, Pyska has set several key goals for transforming Big John's Books. One primary objective is to enable easier book discovery for customers, making the browsing experience more user-friendly and enjoyable. This improvement addresses the challenge of overwhelming inventory and confusing store layouts, ensuring customers can quickly find

the books they seek. The bookstore can enhance customer satisfaction and engagement by streamlining this process, ultimately driving more in-store visits and sales.

Pyska's straightforward motivation for survival in an increasingly competitive market is a key driver behind these efforts. He puts it plainly: "Survival. That would be my motivation. If I can't get people to come into the store, I've got to get the books to them without having them have to come in."⁹ This emphasis on survival underscores the necessity of adapting to the evolving retail landscape. Pyska's candid acknowledgment of the need to adapt reflects a broader reality many traditional businesses face.

In addition to improving the in-store experience, Pyska is keen to tap into the online market to sell valuable titles at their true worth. This strategy involves developing an e-commerce platform that allows the bookstore to reach a broader audience beyond its physical location. By leveraging the digital marketplace, Big John's Books can maximize the value of rare and high-demand books, which may need to fetch their full potential in the local market. This online presence is crucial for competing effectively on a global scale.

Pyska aims to maintain the cultural and nostalgic value of the physical bookstore. Embracing modern digital solutions does not mean sacrificing the unique charm and personal touch customers love about Big John's Books. Instead, the goal is to balance tradition with innovation, preserving the bookstore's distinctive character while enhancing its competitiveness and sustainability in the digital age. This balanced approach ensures that Big John's Books remains a cherished community hub while evolving to meet contemporary demands.

The Decision-Making Process

Adopting Digital Solutions

The decision to digitize Big John's Books was influenced by several key factors. First and foremost was the potential for increased sales and expanded market reach. By embracing digital solutions, the bookstore could tap into a broader audience beyond its physical location, thereby increasing its revenue streams. John explained that "the primary goal would be to have someone come into the store, ask me for a book, and I'll be able to bring it up right away and tell them yes or no. We also want to be able to sell something online for much more than it's worth in my store."⁹

Another significant factor was managing inventory better and discovering the true value of books. With a comprehensive inventory management system, the bookstore could efficiently track its vast collection, reduce human errors, and uncover the hidden value of rare or high-demand titles.

This system would also streamline operations, making managing day-to-day tasks easier and improving overall efficiency.

The necessity to adapt to changing consumer behaviors favoring online shopping played a crucial role in the decision-making process. As more customers turned to the convenience of online shopping, it became essential for Big John's Books to establish a strong online presence. This adaptation would ensure the bookstore remains competitive in an increasingly digital marketplace, meeting the evolving preferences of its customers.

Risk Assessment and Alternative Strategies

While the benefits of digitizing the inventory at Big John's Books were clear, potential risks included the significant time and effort required for the project and the possibility of neglecting the physical store and implementing the new system involved scanning and cataloging over 100,000 books, which was a daunting task. John Pyska acknowledged the magnitude of this effort, noting that the sheer volume of work was one reason they had previously avoided this step. The focus on digital transformation could divert attention from in-store operations, potentially impacting the customer experience for those who visit the physical location.

Selling on alternative marketplaces like eBay and Kijiji were considered but ultimately proved ineffective due to high competition and various operational challenges. Pyska highlighted that these platforms needed to provide visibility or control over the sales process. The competitive nature of these sites often resulted in minimal returns for the effort invested.⁹ To mitigate these risks, the bookstore decided to develop its own e-commerce platform, allowing for better inventory management and customer interactions. This strategic move aimed to balance the need for an expanded online presence with maintaining the charm and personalized service of the physical store, ensuring that both aspects of the business could thrive.

Implementation Process

Inventory Management System and E-commerce Solutions

The first step involved scanning and cataloging the entire inventory, a daunting and necessary task. John Pyska highlighted the magnitude of this effort: "Scanning 100,000 books—that's the part that's a little bit daunting, I'm not going to lie to you. Even me, that was one of the reasons why we've never done this before because just thinking about that is like, that's a lot of work." This process began with selecting an inventory management system capable of handling the extensive collection of Big John's Books. This system needed to be user-friendly, scalable, and able to integrate with e-commerce platforms. The bookstore invested in barcode scanners and software that

efficiently cataloged books, capturing detailed information such as title, author, genre, condition, and price. Each book was assigned a unique identifier, making tracking and managing inventory easier.

In addition to cataloging, integrating machine learning algorithms played a crucial role in the transformation. These algorithms were designed to predict book values and sales trends, helping to identify undervalued books with high online demand{citation}. Pyska noted: "I know quite a bit about books, but I don't know everything. So, it could bring up that information and I can learn from that. I would definitely learn a lot on that because I don't know, I've been trying to learn but that's going to be a learning curve for me."⁹ The machine learning algorithms analyzed historical sales data and market trends to optimize pricing strategies and identify books likely to attract high demand. This integration allowed for more informed pricing and stock management decision-making, ultimately enhancing the bookstore's operational efficiency.

Developing a user-friendly website for online sales and customer engagement was another key component. This website aims to provide a seamless shopping experience for customers, both local and remote. "We want to be able to sell something online for much more than it's worth in my store. Like an example, I just got a graphic novel that's worth a total of \$10 in here, and it's an \$80 graphic novel. So, I could sell it for \$80 online"⁹ By integrating these solutions, Big John's Books aimed to modernize its operations, improve customer satisfaction, and increase its market reach, all while maintaining the unique traditional charm that has defined the bookstore for decades.

Role of Machine Learning

The inclusion of machine learning algorithms is one of the important features that completely changed Big John's Books. These algorithms forecast book prices and sales patterns which could be used to find underpriced books with a strong online demand. The machine learning infrastructure, using historical sales data and reading upcoming market trends in order to price products appropriately was responsible for establishing the pricing correctly as well as predicting what books were going to be desired most. This integration enabled pricing decisions and stock management know-how, improving the efficiency of bookstores.¹⁰

For inventory management, machine learning enabled the prediction of stock requirements and reduced inaccuracies, which helped optimize levels of inventory and decreased costs from overstocking or understocking.¹¹ Moreover, spinning up customer segmentation with ML empowered proactive marketing by personalizing campaigns & promotions for various

segments of customers creating value on both consumer engagement and sales.¹² Proactive decision-making was built on the ability to process data in real-time - they could respond quickly and nimbly as a bookstore. Big John's Books increased operational efficiencies and customer satisfaction and returned hidden value from its inventory through these ML techniques.

Outcomes

Measuring Success

Success metrics for the transformation of Big John's Books included several key indicators. One of the primary metrics was increased sales from online channels. By expanding their reach through e-commerce platforms, the bookstore aimed to boost revenue and attract a broader customer base. This shift to online sales was critical in adapting to changing consumer behaviors and capitalizing on the growing trend of online book purchases.

Based on the business logic, the business determined that improved customer satisfaction and ease of finding books are critical success metrics. Implementing an efficient inventory management system made it easier for customers to locate specific titles, enhancing their overall shopping experience. The bookstore aimed to increase customer engagement and loyalty by streamlining the book discovery process, ultimately driving more repeat business. Enhanced operational efficiency and better inventory management were also crucial success metrics. By leveraging technology to predict stock needs and sales patterns, the bookstore could maintain optimal stock levels, reduce human error, and ensure a more organized and efficient operation. This improvement not only helped reduce costs but also provided better customer service.

There is important value of these improvements: "If we made more money, even if I made a 20% increase in my sales because specifically of that—like not just online selling but just because this thing is so much more efficient—the computers would be much more efficient. That would be worth it to me, even a 20% increase."⁹ Pyska underscores the significance of operational efficiency and how even a modest increase in sales, driven by improved processes and technology, would be considered a success for the project.

Discussion

The primary challenge faced during the transformation of Big John's Books was the extensive time required to digitize the inventory. With a vast collection of over 100,000 books, the process was labor-intensive and time-consuming. However, this project also underscored the importance of

adaptability and the potential for small businesses to thrive in the digital age by embracing technological advancements.

John Pyska acknowledged the potential hurdles but remained optimistic about the benefits. He stated, "I can hope that that's not what's going to happen but it might. It might, but they're still going to come because they've got to pick up the books and then I can still get them to browse while they're here."⁹ This reflects his realistic view of the challenges while highlighting his belief in the continued importance of the physical store experience. To successfully navigate this transformation, John needs to learn and master the new systems, navigate the technology, and ensure that customers adopt and use it effectively.

Getting customers to engage with the new online platform and ensuring a smooth transition or supplemental benefit for customers migrating from in-store to online interactions was a challenge. This means creating a user-friendly software interface, providing clear instructions, and offering customer support as they adapt to the new system. Ensuring the technology enhances rather than detracts from the customer experience is key to maintaining customer loyalty and satisfaction.

Future Plans

Pyska plans to explore third-party e-commerce platforms to expand Big John's Books' reach further. He aims to tap into a larger audience and boost online sales by utilizing established online marketplaces. "I'll be able to sell online," he explains, highlighting the importance of extending the bookstore's digital footprint to reach more customers.⁹

In addition to expanding e-commerce efforts, Pyska intends to continue leveraging data analytics to refine inventory and pricing strategies. This ongoing analysis will help optimize stock levels, ensure competitive pricing, and identify trends that could enhance sales performance. He notes, "I'll be able to, when something is brought in, check to see if I've sold it before, what the quality of it is like, how sellable it actually is for me"⁹ This approach underscores his commitment to making informed decisions based on accurate data.

Pyska is considering integrating additional technologies, such as security cameras, to improve operational efficiency. These measures will help streamline business operations and enhance the overall customer experience. Pyska envisions a more streamlined business where he has comprehensive knowledge about inventory needs and sales trends. "I think it'll be a much more streamlined business where I'll be able to have much more knowledge about what I need and what sells in my store,"⁹ he adds, emphasizing the benefits of a well-managed, tech-enabled operation. This strategic approach

underscores his commitment to modernizing the bookstore while maintaining its charm.

Advice for Other Bookstores

Pyska advises other small-scale bookstores to embrace digital transformation, emphasizing the importance of online presence and efficient inventory management to stay competitive. The traditional model of solely relying on in-store sales is no longer sufficient in an era where consumer behavior increasingly favors the convenience of online shopping. Pyska stresses that adopting digital tools and strategies is not just a matter of enhancing operational efficiency but a necessity for survival in the modern market.

John advises small booksellers to digitize: "I would say that you should do it. I think that we're all in now in a weird position where we have to. Because even if you're a small new bookstore, being able to sell online and being able to do those things is going to be so important in the future here,"⁹ he explains. This insight underscores the urgency for small bookstores to adapt to the changing landscape by developing a robust online presence and integrating efficient inventory management systems.

By leveraging digital platforms, bookstores can expand their reach beyond their immediate geographical area, tapping into a global market of book enthusiasts. Effective inventory management systems can streamline operations, reduce human error, and ensure that stock levels are accurately tracked, improving customer satisfaction by ensuring that popular titles are always available. Digital transformation is not solely about technology but also about enhancing the overall customer experience. Online platforms can offer personalized recommendations and reviews, creating an interactive community of readers. This engagement can foster a loyal customer base that appreciates the unique value of small bookstores.

Conclusion

The transformation of Big John's Books demonstrates that traditional businesses can effectively adapt to modern market demands through strategic digital transformation. Implementing an efficient inventory management system and establishing an online presence has allowed Big John's Books to enhance its operations while preserving its unique character.

This case sets a practical example for similar businesses to start the process of digital transformation and succeed online. By embracing digital tools, small-scale businesses can improve inventory management and find hidden value and new opportunities through improved efficiency and market reach. The key takeaway is that digital transformation does not mean

abandoning core values; instead, it involves integrating modern solutions to support and enhance traditional business models. As this case has shown, the right approach can lead to sustainable growth and continued relevance in an evolving marketplace.

Discussion Questions

Digital Transformation Justification:

What motivated Big John's Books to pursue digital transformation? Discuss the primary benefits they sought and the main challenges they anticipated.

Inventory Management Improvement:

How did implementing an inventory management system address Big John's Books' organizational challenges? Evaluate the potential impact on customer satisfaction and operational efficiency.

Customer Engagement in a Digital Era:

How can digital solutions enhance customer engagement for a traditional bookstore? Analyze how these changes might affect both in-store and online customer experiences.

Machine Learning Applications:

What roles did machine learning play in the modernization efforts of Big John's Books? Discuss how it influenced inventory control and pricing decisions.

Competing with Large Retailers:

In an increasingly digital market, how can small bookstores like Big John's Books differentiate themselves from larger competitors? Consider both online and in-store strategies.

Risk Management and Sustainability:

What risks were associated with Big John's digital transformation, and how were these addressed? Suggest additional strategies for sustaining growth in the evolving bookstore landscape.

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