

**Thesis Project Portfolio**

**A New Technological Management System Brings Growth and Success to a Home Services Franchising Company**

(Technical Report)

**The Techniques that Drive Company Success Around the World**

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

**Jessie Eoff**

Spring, 2022

Department of Computer Science

## **INTRODUCTION**

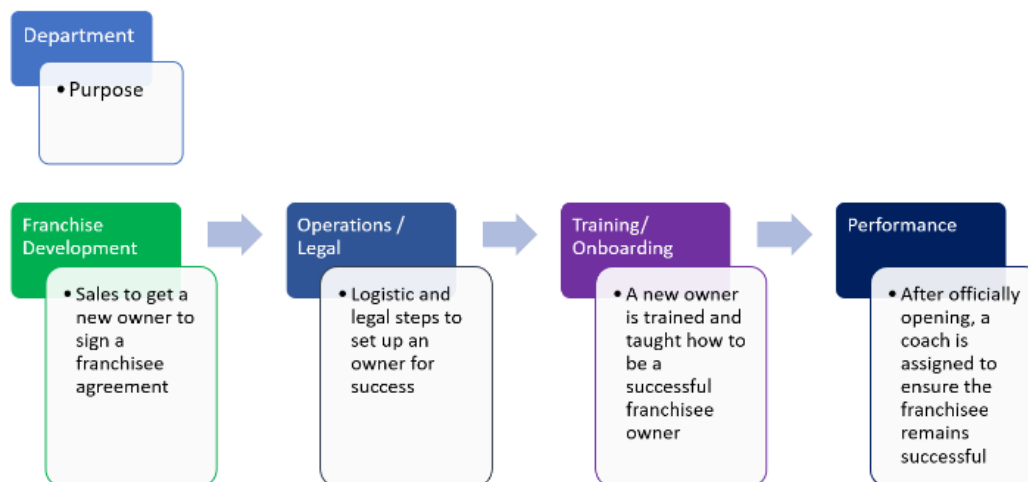
The relationship between innovation and motivation to create unique business ideas Innovation can drive the motivation to create unique business ideas. A single cause to innovation is difficult to identify. Profit incentive, capitalist institutions, financing, and intellectual property institutions are argued to be important factors that drive innovation. (Nicholas, 2011) The Premium Brand, using innovation to its advantage, has designed a unique solution to the standard home services franchising structure. Instead of separating individual brands' operations like other franchisors, The Premium Brand combines all brands under the same operational umbrella creating flexibility and unity between brands. (Turner, 2018)

The Premium Brand, an industry leader in home services franchising centered in Charlottesville, VA, sought out technological management system solutions during Q2 of 2020 to support the growth of the company. Since being founded, The Premium Brand had experienced linear growth. During the rise of COVID-19, while most companies found themselves experiencing decreases in profit and a difficult time to remain afloat, The Premium Brand found itself experiencing exponential growth for the first time in years. As individuals found themselves stuck indoors, interest in home improvement and therefore home services dramatically increased overnight. The Premium Brand wisely recognized the need for a customer relationship management system, which I was asked to design, build, analyze, and deploy. The need, process, and results of building out this technological management system will be outlined as a part of my technical topic.

This investment of time and resources into new technological management solutions was not done first by The Premium Brand. In fact, the success of investing in new technologies has proven to be so successful in other companies, like Wal-Mart, that these companies have now been able to grow to a size where they have a direct impact on the global economy. (Gereffi & Christian, 2009) Today, there is no manual that outlines the best way to introduce a new technological management system into a business. This lack of a predefined way to success can result in failure or even market domination for companies. By using a framework of unintended consequences, I intend to analyze how successful companies have learned to integrate new technological systems with ease and investigate how these integrations could be used by smaller companies to drive their success.

## **TECHNICAL TOPIC**

Until early in 2020, The Premium Brand, a home services franchising company consisted of seven brands and just under two-hundred franchisees. By utilizing the multi-unit franchisor structure, the growing trend in franchising when compared to the basic franchise structure (Seid, 2019), The Premium Brand was able to sustain a steady increase in their customer base. All internal business, which flowed between departments as shown in Figure 1, was solely managed using excel sheets. Popularly known, managing a business on excel sheets increases data inconsistencies, increases manual hours of inputting data, and contains low security. (Karlson, 2021) These poor business practices were multiplied by the lack of technological platforms being utilized to support workflows or customer management. As the number of franchisees approached two-hundred, there was an extreme need for a more efficient way to manage franchisees.



**Figure 1.** The Premium Brand's workflow between departments.

To address The Premium Brand's needs for a technological management system, a planned approach needed to be taken. Because The Premium Brand had no data organization to begin with, several methods needed to be utilized to ensure that the implementation of a new technological management system went smoothly. These methods included performing a systems audit, conducting conversational interviews, and taking advantage of an Agile methodology.

### *Systems Audit*

Before the development of a new technological management system could take place, a complete systems audit was needed to identify incorrect data, missing data, and common points of error. This process required using data analytic tools such as Tableau and manual examination to clean all of The Premium Brand's data. Although a large portion of the systems' audit took place before product development, a continuous integration/continuous development (CI/CD) approach was taken. This meant that through all phases of development for the new technological management system different phases of auditing were also taking place. This approach was taken since it has been argued to accelerate development, assure quality, and simplify the deployment phase. (Wikstrom, 2017)

### *Departmental Conversational Interviews*

As a primary step to build and deploy the new system, conversational interviews were performed with multiple employees from each department. These conversational interviews consisted of (1) taking notes while shadowing said employee during a typical day at work and (2) asking work specific questions to gather complaints, domain knowledge, and general opinions. These interviews were extremely important to rank priorities and gather raw work activity data, because in industry the "ground truth" must be observed to close the gap between reality and ideality. (Harston & Pyla, 2018) Members of the onboarding team, accounting team, operational team, and even legal team had conflicting priorities ranging from territory management to workflow handoffs to legal agreement creation. These priorities were all noticed and accounted for during development.

### *Agile Software Development*

After collecting raw activity data from individual departments, an outline of a long-term development plan was created using an Agile approach. This required taking the notes from conversational interviews to initiate a plan, propose design suggestions, develop approved designs, test implemented development, and finally deploy and evaluate new implemented work. To keep The Premium Brand's management and all departments in the loop, Agile sprints were kept to a length of two weeks. Because each department at The Premium Brand had different and even conflicting aspirations for the new technological management system, Agile was truly advantageous. Individuals were able to be prioritized, collaboration was continuous, and any changes were easily accounted for. These advantages are all typically seen when drifting from

traditional software development methods such as the waterfall approach, spiral approach, evolutionary approach, and so on. (Al-Saqqa, Sawalha, & AbdelNabi, 2020)

After three months of development, a new technological management system was being implemented and introduced to each department at The Premium Brand. The management system contained all audited franchisee data and was the facilitator to all workflows. After personally onboarding multiple departments onto the platform, there were immediate and immense improvements to workflows, data consistency, and customer growth. Within six months, the number of franchisees increased by twenty-five percent, and within nine months, two more brands were acquired (an increase of roughly twenty-nine percent). Additionally, because the new technological management system gave other systems a concrete endpoint for communication, all systems are now able to integrate and form a DataHub. For instance, Zapier, a new automated workflow technology solution, is now being utilized to reduce manual labor after being directly integrated with the new system. In industry, DataHubs have demonstrated the ability to create unified ecosystems allowing for conflicts to be inspected, analyzation to be performed constantly, and data storage to remain flexible. (Bhardwaj & Karger, 2016). It is clear that the new technological management system will be the heart of The Premium Brand's DataHub, and with just one integration it has shown to decrease manual labor, increase the customer base, and automate workflows.

The Premium Brand, faced with issues of scaling, sought after a technological solution to help manage workflows, franchisees, and internal data. After using conversational interviews, strategic audits, and an agile methodology during development, a successful technological management system was able to be built. This resulted in new and improved workflows and leaves room for growth and countless more integrations to take place.

## **TECHNOLOGY IMPLEMENTATION THROUGH AN STS LENS**

The Premium Brand has stayed successful and is now predicting to grow due to the CEO's ability to adapt to change, prioritize people, and implement new technologies. Adaptation is mandatory for a business to succeed. If a business leader struggles to adapt to change, then the company focuses only on existing products and processes. This non adaptive approach ultimately leads a business to its failure. (Reeves & Deimler, 2011) Another popular reason for failure to integrate new systems within a company stems from disengaged employees. This could also be described as an unappreciation for people doing their jobs. When new technologies are being

used and taught directly to employees, employees stay engaged, involved, and perform more productively. (Osborne & Hammoud, 2017) If a company wants to succeed, it is vital to understand the importance of people and how the integration of new technologies impacts those people. Currently, there is no recommended path on how to use or implement new technologies that internally manage a company. This lack of a recommended path can decrease adaptation and innovation when success requires the opposite.

It is clear businesses understand the need for human engagement. This is understood so much so that private companies compensate employees an average of \$38.91/hour plus an additional \$12/hour for health insurance and governmental companies compensate employees an average of \$53.59/hour plus an additional \$20.50/hour for health insurance. (Department of Labor, 2021) With this, compensations round out to be around 10-30% of a company's revenue, meanwhile, companies spend only 4-6% of their revenue on IT solutions. (Morley, 2015) These statistics highlight that a company is not spending a predominant amount to find or sustain technological solutions.

As the uses of technology advance and popularize, it is surprising that companies are not directing their income towards technological solutions as much as human solutions. To better understand this reasoning, it is appropriate to analyze what successful companies have done. Amazon, for instance, reaching just under 400 billion dollars in net revenue expands its technological presence and advancement by spending approximately 11.1% of revenue towards technological solutions and an equivalent amount around 11.6% towards payroll (Bajpai, 2021). Internally, technological solutions are successfully integrated into such a complex company by utilizing an innovative management style. Each team at Amazon is small (typically around 4-6 people), using Agile methods, and making quick decisions. They even utilize a 'Working Backwards' approach where any major new idea is released to the press before it is actually implemented to gauge public opinion. (Galetti, Golden III, & Brozovich, 2019) Jeff Bezos, Bill Gates, Sam Walton and other well-known names were all able to master the connection between innovation, adaptation, and implementation. This required recognizing a need, adapting that need to current needs, and developing technologies to distribute and expand upon that need. Alongside the need itself, an extensive understanding in people and technology coexist.

Small businesses are still unable to execute these connections and relationships successfully. Small business owners provide 41.2% of the total U.S private payroll, yet 50% of

small business startups are still failing within the first five years. These failures typically rise simply from a lack of preparation and inability to identify interrelationships within a system. (Turner & Endres, 2017).

To truly understand and analyze why many small businesses today are struggling to integrate new technological solutions by connecting humanity to technology, a lens of unintended consequences will be used. Michael Harrison, Ross Koppel, and Shirly Bar-Lev all investigated the ways in which unintended consequences can arise. These consequences can appear in five different forms involving some combination of the new system, current system, social system, and technical and physical infrastructure. (Harrison, Koppel, & Bar-Lev, 2007) The structure of small businesses, both successful and unsuccessful, and large businesses, both failing and thriving, will need to be broken down into their five forms highlighting where weaknesses may lie. It should be noted that even successful companies experience unintended consequences by impacting the social system in unforeseen ways. By performing these comparisons and analyzations, an understanding of what makes large businesses so successful when managing and implementing many technological solutions may come to light. This would then be able to be used by many small businesses.

## **RESEARCH QUESTION AND METHODS**

As demonstrated above, the majority of companies aren't investing an overwhelming amount into new technological solutions, however, Amazon spends relatively an equal amount on technological solutions and people, which raises the question: What balance and techniques are being used by successful companies to implement new technological solutions? By understanding the most optimal method to introduce new technological solutions, small businesses may have higher success rates and there may even be a more level playing field among large and small businesses. To form this understanding, a historical analysis will be performed.

As the three largest companies headquartered in the United States of America on the Fortune Global 500, Wal-Mart, Amazon, and Apple's development and company strategies will be primarily analyzed. Wal-Mart, the oldest of the three, has roots reaching beyond the 1940s, which can be traced through the eyes of Vance and Scott as they outline Walton's ideologies, transformations, and techniques (Vance & Scott, 1992). Today, societies experience some of Wal-Mart's unintended consequences. These consequences may not be obvious to everyone, but

to small businesses and their experience with a 2.7% deduced rate of employment when a Wal-Mart is opened nearby, the consequences are noticed and impactful (Neumark, Zhang, & Ciccarella, 2007). Amazon's lifetime will be partially investigated through Krishnamurthy's work and his observations as Amazon began to make an online appearance (Krishnamurthy, 2005), and partially through a lens highlighting their technological strategies (Tou, Watanabe, & Moriya, 2019). Finally, the development and management of Apple will be analyzed through a business and technological lens (Allafari, 2016). These stories drawn from history will draw a more complete picture of successful strategies used to implement new technological solutions.

Although Wal-Mart, Apple, and Amazon will be three large examples used to better understand successful implementation strategies, a variety of smaller businesses and industry experts will also be utilized. This broad analysis over the years will help encapsulate what has been successful for companies versus what has ultimately led to forms of unintended consequences.

## **CONCLUSION**

With my time spent at The Premium Brand, I was able to learn management development techniques that led to the successful development of a technological management system. The process of building out such a complex system brought to light the issues that many other companies face when attempting to implement new technological management systems. Through the perspective of an unintended consequences STS framework, I hope to conclude how companies are able to successfully implement new technology platforms, specifically technological management systems. Countless companies have failed due to new technological implementation failures. By taking my experiences at The Premium Brand and looking throughout history to identify successful implementation strategies, an understanding around what drives companies' technological success can be gathered and used by companies hoping to grow.



- Bajpai, P. (2021). *Which Companies Spend the Most in Research and Development (R&D)?* Retrieved from <https://www.nasdaq.com/articles/which-companies-spend-the-most-in-research-and-development-rd-2021-06-21>
- Bhardwaj, A., Karger, D., Subramanyam, H., Deshpande, A., Madden, S., Wu, E., ... ZZhang, R. (2016). *Collaborative Data Analytics*.
- Cavalla, A. (2018). *More Amazon Effects: Online Competition and Pricing Behaviors*. Retrieved from [https://www.hbs.edu/ris/Publication%20Files/Cavallo\\_Alberto\\_J2\\_More%20Amazon%20Effects-Online%20Competition%20and%20Pricing%20Behaviors\\_61ab3273-d446-4dd5-9e71-469c54c46662.pdf](https://www.hbs.edu/ris/Publication%20Files/Cavallo_Alberto_J2_More%20Amazon%20Effects-Online%20Competition%20and%20Pricing%20Behaviors_61ab3273-d446-4dd5-9e71-469c54c46662.pdf)
- Department of Labor. (2021, September 16). *News Release*. pp. 1–10.
- Galetti, B., Golden III, J., & Brozovich, S. (2019). Inside Day 1: How Amazon Uses Agile Team Structures and Adaptive Practices to Innovate. Retrieved from Executive Network website: <https://www.shrm.org/executive/resources/people-strategy-journal/spring2019/pages/galetti-golden.aspx>
- Garcia, G. (2020). *Information Systems Utilization of an Organization: The Case of Walmart Inc.* <https://doi.org/10.13140/RG.2.2.34979.81447>
- Gereffi, G., & Christian, M. (2009). The Impacts of Wal-Mart: The Rise and Consequences of the World's Dominant Retailer. *Annual Review of Sociology*, 1–23. <https://doi.org/10.1146/annurev-soc-070308-115947>
- Harston R., & Pyla, S. (2018). Contextual Inquiry: Eliciting Work Activity Data. In *The US Book: Process and Guidelines for Ensuring a Quality User Experience* (2<sup>nd</sup> ed., pp. 87-120).
- Karson, K. (2021). Spreadsheets Are Bad for Your Business.
- Krishnamurthy, S. (2005). Amazon.com—A Comprehensive Case History. *University of Washington Bothell*. Retrieved from

[https://www.researchgate.net/publication/228319552\\_Amazoncom\\_-\\_A\\_Comprehensive\\_Case\\_History](https://www.researchgate.net/publication/228319552_Amazoncom_-_A_Comprehensive_Case_History)

Morley, L. (2015, February 5). How Much Should A Company Spend On It? . Retrieved from <https://techvera.com/how-much-should-a-company-spend-on-it/>

Neumark, D., Zhang, J., & Ciccarella, S. (2007). *The effects of Wal-Mart on local labor markets*. 405–430.

Nicholas, T. (2011). *What drives innovation?* In *Antitrust Law Journal: Vol. 77* (3rd ed., pp. 787–809).

Osborne, S., & Hammoud, M. (2017). *Effective Employee Engagement in the Workplace*. 16(1), 50–67. <https://doi.org/10.5590/IJAMT.2017.16.1.04>

Reeves, M., & Diemler, M. (2011, August). Adaptability: The New Competitive Advantage.

Seid, M. (2019, February 10). Franchise Relationship Structures. Retrieved from The balance small business website: <https://www.thebalancesmb.com/franchise-relationship-structures-1350436>

Tou, Y., Watanabe, C., Moriya, K., Naveed, N., Vurpillat, V., & Neittaanmaki, P. (2019). The transformation of R&D into neo open innovation—A new concept in R&D endeavor triggered by amazon. *Technology in Society*, 58. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0160791X19301022>

Turner, L. (2021, January 28). Premium Service Brands Launches “Own the Home” Program, Positions Franchise Owners to Dominate Local Markets. Retrieved from PRWeb website: [https://www.prweb.com/releases/premium\\_service\\_brands\\_launches\\_own\\_the\\_home\\_program\\_positions\\_franchise\\_owners\\_to\\_dominate\\_local\\_markets/prweb17693714.htm](https://www.prweb.com/releases/premium_service_brands_launches_own_the_home_program_positions_franchise_owners_to_dominate_local_markets/prweb17693714.htm)

Turner, S., & Endres, A. (n.d.). *Strategies for Enhancing Small-Business Owners’ Success Rates*. 16(1), 34–49. <https://doi.org/10.5590/IJAMT.2017.16.1.03>

Vance, S., & Scott, R. (1992). Sam Walton and Wal-Mart Stores, Inc.: A Study in Modern Southern Entrepreneurship. *Southern Historical Association*, 58, 231–252. Retrieved from [https://www.jstor.org/stable/2210861?seq=2#metadata\\_info\\_tab\\_contents](https://www.jstor.org/stable/2210861?seq=2#metadata_info_tab_contents)

Wikstrom, A. (2019, February 22). *Benefits and challenges of Continuous Integration and Delivery—A Case Study*. 1–38. Retrieved from <https://core.ac.uk/download/pdf/226768285.pdf>