

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

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

ABSTRACT

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. The Premium Brand recognized the need for a technological management system as business grew. I was asked to design, build, analyze, and deploy this new system. By conducting conversational interviews with employees in every department, evaluating and auditing all systems currently in place, and utilizing an Agile methodology, I was able to successfully roll out a new technological management system to support The Premium Brand's new aspirations.

Since implementing this new technological management system, The Premium Brand's customer base has increased 25% and now has the foundation to apply further improvements. This ability to move away from all outdated systems is due to the successful implementation of a new technological management system. The operations department has already begun implementing new workflows for all departments and the legal department has initiated acquisitions for new brands. Because of a new management system, The Premium Brand has the ability to support new processes and new growth.

INTRODUCTION

Innovation has driven the motivation to create unique business ideas. A single cause for 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 franchising structure. Instead of separating brands completely like most franchisors in the home services franchising industry, The Premium Brand combines all brands under the same umbrella creating flexibility and unity among brands.

Since being founded, The Premium Brand has experienced linear growth, but during the rise of COVID-19, while most companies experienced decreases in profit and difficulty remaining afloat, The Premium Brand found itself experiencing exponential growth for the first time. As

individuals found themselves stuck indoors, interest in home improvement and therefore home services dramatically increased overnight.

Until early 2020, The Premium Brand consisted of seven brands and fewer than 200 franchisees. All internal business, which flows between departments as shown in **Figure 1**, was solely managed using excel sheets, and there was a lack of any technological platforms being utilized to support workflows or customer management. As the number of franchisees approached 200, there was an extreme need for a more efficient way to manage franchisees.

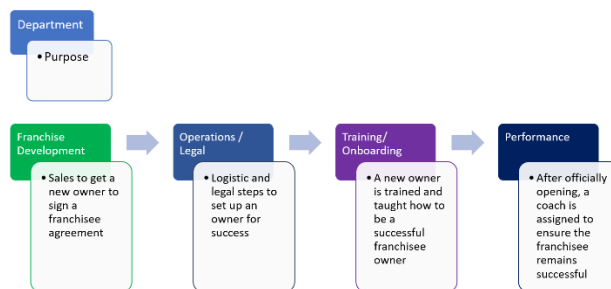


Figure 1. The Premium Brand's workflow between departments

RELATED WORK

The urgency of a new technological management system was felt within The Premium Brand as data inconsistencies multiplied. To address such a large and impactful issue within a company, I turned to experienced developers for their input and recommendations.

First, I read about the weaknesses that result from operating off of excel. It seemed obvious that it was malpractice, however, I wanted to pinpoint sources of weakness. I found that the biggest danger when it came to excel sheets was the requirement for manual input. These manual hours of inputting data are what lead to increases in data inconsistencies and security issues. (Karlson, 2021) From this, it was clear that a new system altogether needed to be built, like a DataHub. To further explore the idea of a DataHub, where different platforms can communicate with one another, I read about the successes of other DataHubs. DataHubs have been shown to unify ecosystems allowing for conflicts to be inspected, analyzation to be performed constantly, and data storage to remain flexible. (Bhardwaj & Karger, 2016) Lastly, continuous integration and continuous development (CI/CD) and Agile methodologies were chosen as implementation strategies. These were chosen because they have been argued to accelerate development, assure quality, and simplify the deployment phase. (Wikstrom, 2017) By learning from the experience of

past and current developers, I was able to build the knowledge base required for building an implementing a new technological management system.

METHODS

To address The Premium Brand's needs for a technological management system, a planned approach needed to be taken.

3.1 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 the systems' audit took place before product development, a continuous integration/continuous development (CI/CD) approach was taken, meaning through all phases of development for the new technological management system, different phases of auditing were also taking place.

3.2 Departmental Conversational Interviews

As a primary step to build and deploy a new technological management system, a conversational interview was conducted 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 for ranking priorities and gathering raw work activity data, because in industry the "ground truth" must be observed closing the gap between reality and ideality. (Harston & Pyla, 2018)

3.4 Agile Software Development

As a secondary step, after collecting raw activity data from individual departments, I created an outline of a long-term development plan using an Agile approach. This required taking the notes from conversational interviews, initiating a plan, proposing design suggestions, developing approved designs, testing implemented development, and finally deploying and evaluating new implemented work. To keep department leads and all departments in the loop,

Agile sprints were kept at a length of two weeks. Because each department at The Premium Brands 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, which 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)

RESULTS & IMPACT

After three months of development, a new technological management system was being implemented and introduced to each department at The Premium Brand. 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 25 percent, and within nine months, two more brands were acquired (an increase of ~29 percent).

Additionally, because the new technological management system gave other systems a concrete endpoint for all data, new technologies and workflows have been integrated into the new system. For instance, Zapier, a new automated workflow technology solution, is now being utilized to reduce manual labor. Due to the implementation of a new technological management system, manual labor decreased, workflows became more efficient, and company data remained consistent and clean.

CONCLUSION

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 technological management system was able to bring new and improved workflows to The Premium Brand and allow for growth to take place.

FUTURE WORK

The Premium Brand, now having a central technological management system, can integrate all existing platforms into the new system. For instance, an in-house platform can be created using

MongoDB and Angular, which would allow territory management platforms, estimating platforms, document creation platforms, and service management platforms to communicate seamlessly. By allowing these platforms to communicate, human error would be eliminated as the need for manual input from platform to platform would be eliminated. Implementing these integrations would bring new levels of success to The Premium Brand and take full advantage of the new technological management system.

REFERENCES

Al-Saqqa, S., Sawalha, S., & AbdelNabi, H. (2020, November 1). Agile Software Development: Methodologies and Trends. *International Journal of Interactive Mobile Technologies*, 14(11)

Bhardwaj, A., Karger, D., Subramanyam, H., Deshpande, A., Madden, S., Wu, E., ... ZZhang, R. (2016). *Collaborative Data Analytics*.

Harston, R., Pyla, P. S. (2018). Contextual Inquiry: Eliciting Work Activity Data. In *The UX Book: Process and Guidelines for Ensuring a Quality User Experience* (2nd ed., pp. 87-120).

Karlson, K. (2021). Spreadsheets Are Bad for Your Business.

Nicholas, T. (2011). What Drives Innovation? . *Antitrust Law Journal* 77, no.3, (pp. 787-809).

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>

