

# **Wisconsin Restaurants Group Request for Proposal: Business Process Analytics and Data Science consulting**

## **Table of Content**

<b>1. Abstract .....</b>	<b>2</b>
<b>2. Introduction .....</b>	<b>2</b>
<b>3. Literature review .....</b>	<b>2</b>
<b>4. Methods .....</b>	<b>3</b>
<b>5. Results .....</b>	<b>3</b>
<b>6. Conclusions .....</b>	<b>6</b>
<b>7. References .....</b>	<b>7</b>
<b>8. Appendix .....</b>	<b>8</b>

**MSDS 476 2024, Cohort 5**

**Northwestern University, Business Process Analytics**

**11/03/2024**

## **1. Abstract:**

This research proposal seeks to address critical questions concerning business process analytics and data science for the Wisconsin Restaurant Group's operations. The key questions to be addressed include understanding current operational dynamics, evaluating alternatives for future operational enhancements, and identifying methods to optimize restaurant processes. Prioritizing this list, the primary focus will be on understanding current operations to lay the foundation for informed decision-making, followed by exploring alternatives and finally, implementing optimization strategies.

## **2. Introduction**

Our organization is uniquely positioned to conduct this research for the Wisconsin Restaurant Group due to our extensive experience and expertise in data analytics, particularly within the restaurant industry. With a proven track record of delivering actionable insights to clients, we possess the necessary skills and resources to tackle the complex challenges faced by the restaurant group. Our team comprises seasoned data scientists, analysts, and consultants who are committed to providing tailored solutions to meet the specific needs of our clients. Through a combination of advanced analytical techniques and industry knowledge, we aim to deliver impactful results that drive operational efficiency and business growth for the Wisconsin Restaurant Group.

## **3. Literature review**

Our literature review encompasses a diverse array of studies and publications pertinent to business process analytics and restaurant operations. Notable contributions include Douglas Robert Brown's insights into restaurant management, Andrew Greasley and Arnold H. Buss's methodologies in simulation modeling, and Gartner reports by Marc Kerremans, Tushar Srivastava, and Farhan Choudhary on process mining techniques.

Additionally, works by Wil van der Aalst and H. Paul Williams provide valuable perspectives on data-driven approaches and mathematical programming.

#### 4. Methods

We will employ a mixed-methods approach, combining quantitative analysis with qualitative exploration through interviews and observations. Industry-standard tools like Alteryx for data pre-processing, Tableau for visualization, and Python/R for analytics will be utilized. When evaluating vendors like Alteryx and Celonis, factors such as features, usability, scalability, and cost-effectiveness will be considered. Data sources include internal restaurant data, Yelp reviews, census demographics, and competitor locations.

#### 5. Results

**A. Regarding BPA itself, some members of our group believe that we should utilize the services of a [commercial vendor](#) like Celonis. While other members of our group believe that open-source solutions will suffice. In particular, they suggest that, working with the consulting contractor, we would be able to develop a low/no code system for process mining and discrete event simulation.**

The decision for the Wisconsin Restaurants Group between commercial vendor Celonis and open-source solutions like PM4Py and Kaggle's process mining resources hinges on various factors. Commercial vendors offer advanced features and support but come with high costs and training. Open-source solutions offer flexibility and cost-effectiveness, allowing customization. The prospect of a low /no code system presents an opportunity to tailor solutions. A hybrid approach, combining commercial and open-source technologies, maximizes flexibility and scalability while aligning with budget constraints and long-term goals. Collaboration with a consulting contractor experienced in both areas ensures a good strategy, leveraging commercial robustness and open-source innovation.

**B. Most members of our group have point-of-sale systems in place, but we are continually being asked to upgrade those systems or to add back-end analytical services to complement the systems. What is the value-added of such services?**

See offerings from [Toast](#) and [Square](#)

Integrating back-end analytical services with existing point-of-sale (POS) systems, such as Toast and Square, offers transformative insights for the Wisconsin Restaurants Group. Data analytics uncovers customer behaviour, operational patterns, and revenue drivers, enhancing decision-making and profitability. Streamlined integration enhances productivity, enabling real-time adjustments to staffing and personalized customer experiences. Extracting actionable insights from POS data allows the group to maintain a competitive edge, drive operational excellence, and deliver exceptional dining experiences, fostering customer loyalty and sustained success.

**C. What is the impact of QR-code ordering on restaurant operations and staffing?**

**Some vendors have proposed expanded cell-phone-based ordering that could further simplify the ordering process. What are the possibilities for studying the effects of such technologies?**

The introduction of QR-code ordering in restaurants significantly streamlines the ordering process, resulting in reduced wait times and heightened operational efficiency. Moreover, it has the potential to increase table turnover rates and enhance overall customer satisfaction. However, implementing such technology may necessitate adjustments in staffing levels and roles, prompting a shift in focus towards other aspects of the dining experience. To study the effects of QR-code and cell-phone-based ordering technologies, various approaches can be employed, including customer surveys, transaction data analysis, observation of staff responsibilities.

**D. What are the possibilities for robot waitstaff, as illustrated by [Jamba](#) and [selected restaurants](#)**

The integration of robot waitstaff, exemplified by Jamba and select restaurants, presents novel solutions to elevate the dining experience and streamline operations. These innovations promise heightened efficiency by swiftly executing tasks, thereby minimizing customer wait times. Moreover, the allure of robotic interaction enhances overall dining experiences, drawing and captivating patrons. With reduced human contact, robot waitstaff contribute to elevated hygiene standards, particularly crucial in food service environments. However, this implementation may prompt adjustments in staffing levels and roles, as certain responsibilities become automated. Additionally, comprehensive staff training and maintenance are imperative for seamless integration.

**E. Extensive restaurant review data are available for Yelp. Yelp provides an [API](#) that developers can use to search, filter and retrieve data for specific business categories in certain [zip codes](#). How can we use these data to guide menu offerings, customer service, and operations?**

Leveraging Yelp review data and its API empowers restaurants to optimize menu offerings, enhance customer service, and streamline operations. Through analysis of customer feedback, restaurants can identify popular dishes, emerging food trends, and monitor competitor offerings to differentiate their menus. Additionally, by analysing reviews for service-related insights, restaurants can improve customer experiences and foster engagement through personalized responses. Furthermore, utilizing review data for demand forecasting, performance evaluation, and strategic decision-making enables restaurants to allocate resources effectively, drive operational efficiency, and stay competitive in the dynamic restaurant industry landscape.

**F. Some in our group are considering expansion into new sites in the Midwest. How can we best evaluate those sites using data we have from current sites, complemented by census demographics and competitor restaurant location data. [Alteryx](#) has been promoting its location-based analytics as a possible platform for guiding restaurant site selection. Does it make sense to pursue a commercial GIS-based solution like Alteryx, or will open-source solutions suffice**

Evaluating potential expansion sites in the Midwest necessitates a comprehensive approach, combining current site data, census demographics, and competitor restaurant location data. While commercial GIS-based solutions like Alteryx offer extensive features, user-friendly interfaces, and dedicated support, they also come with licensing fees and subscription costs. On the other hand, open-source alternatives such as QGIS or R with the sf package provide cost-effectiveness, community support, and greater customization options. The decision hinges on factors like analysis requirements, budget constraints, and long-term strategic goals, emphasizing the need for careful evaluation to determine the most suitable solution.

## **6. Conclusion**

In conclusion, our study results are intrinsically linked to addressing the management problem of providing future research services and making research methods recommendations to the prospective client, the Wisconsin Restaurant Group. By delving into comprehensive data analytics and employing advanced research methodologies, we aim to equip the client with actionable insights and strategic guidance tailored to their specific needs and challenges. Our recommendations extend beyond mere data analysis; they directly inform decision-making processes, enabling the client to navigate industry complexities effectively. Moreover, our study outcomes serve as a foundation for future research endeavours, facilitating continuous improvement and adaptation to evolving

market dynamics. Through our collaborative partnership, we are committed to empowering the Wisconsin Restaurant Group with the tools and knowledge necessary to achieve long-term success in a competitive landscape.

## References:

- Brown, Douglas Robert. 2019. *The Restaurant Manager's Handbook: How to Set Up, Operate, and Manage a Financially Successful Food Service Operation*. Ocala, FL: Atlantic Publishing Group. ISBN-13: 978-162023263-7.
- Buss, Arnold H. 1996. "Modeling with Event Graphs." In *Proceedings of the 1996 Winter Simulation Conference*, edited by John M. Charnes, Douglas J. Morrice, Daniel T. Brunner, and James J. Swain, 153-160. Washington, DC: IEEE Computer Society.
- Kerremans, Marc, Tushar Srivastava, and Farhan Choudhary. 2021. *Gartner Report on Process Mining*. Retrieved from the World Wide Web, February 14, 2022, at Gartner via Northwestern Library.
- Miller, Thomas W. 2016. *Sports Analytics and Data Science: Winning the Game with Methods and Models*. Old Tappan, NJ: Pearson Education. ISBN-13: 978-0-13-388643-6.
- Van der Aalst, Wil. 2016. *Process Mining: Data Science in Action* (2nd edition). New York: Springer. ISBN: 978-3662498507.
- Williams, H. Paul. 2013. *Model Building in Mathematical Programming* (fifth ed.). New York: Wiley. ISBN-13: 978-111844333-0.

## Appendix

## BPMN Diagram

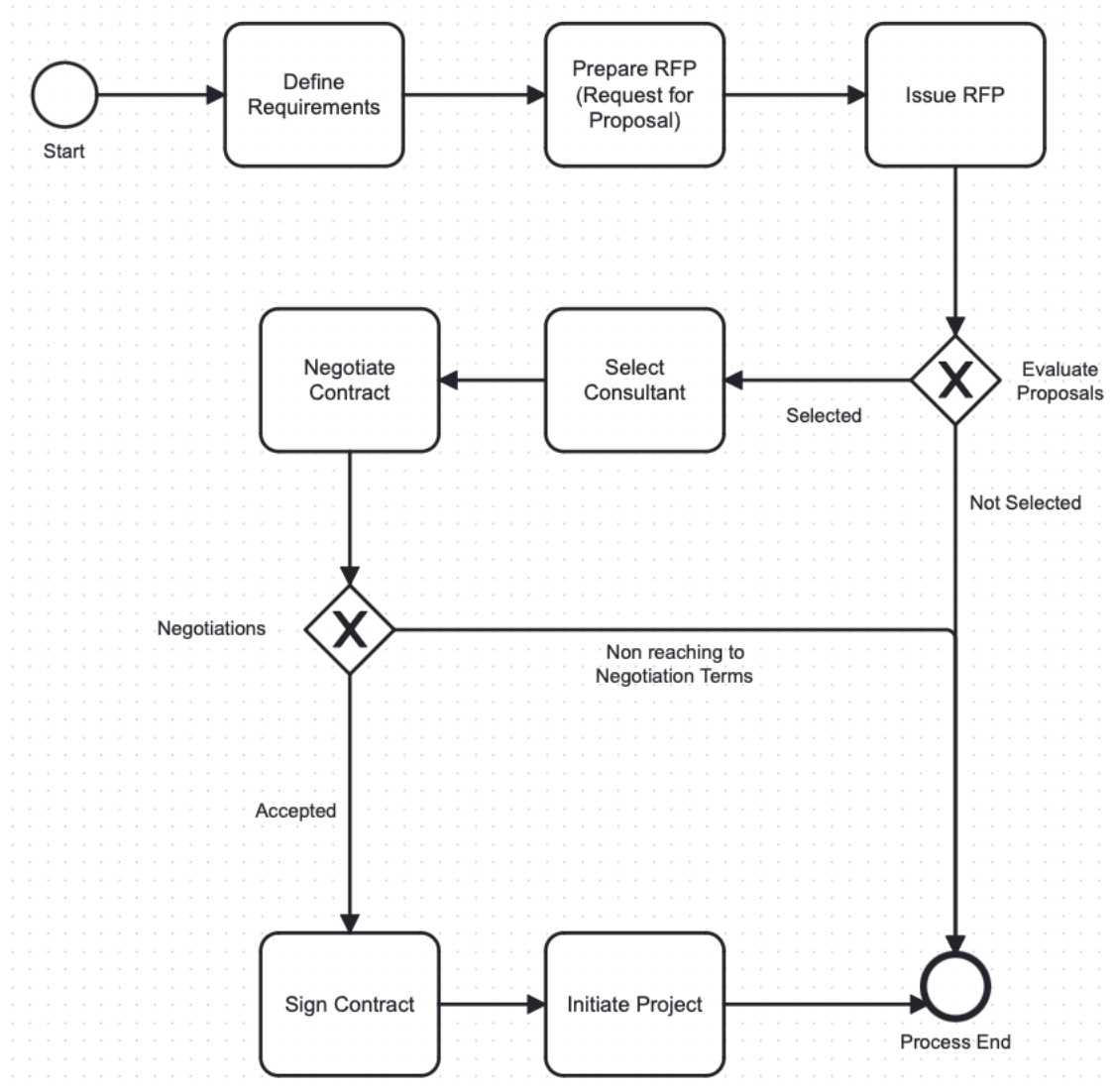


Fig 1: BPMN Diagram for RFP



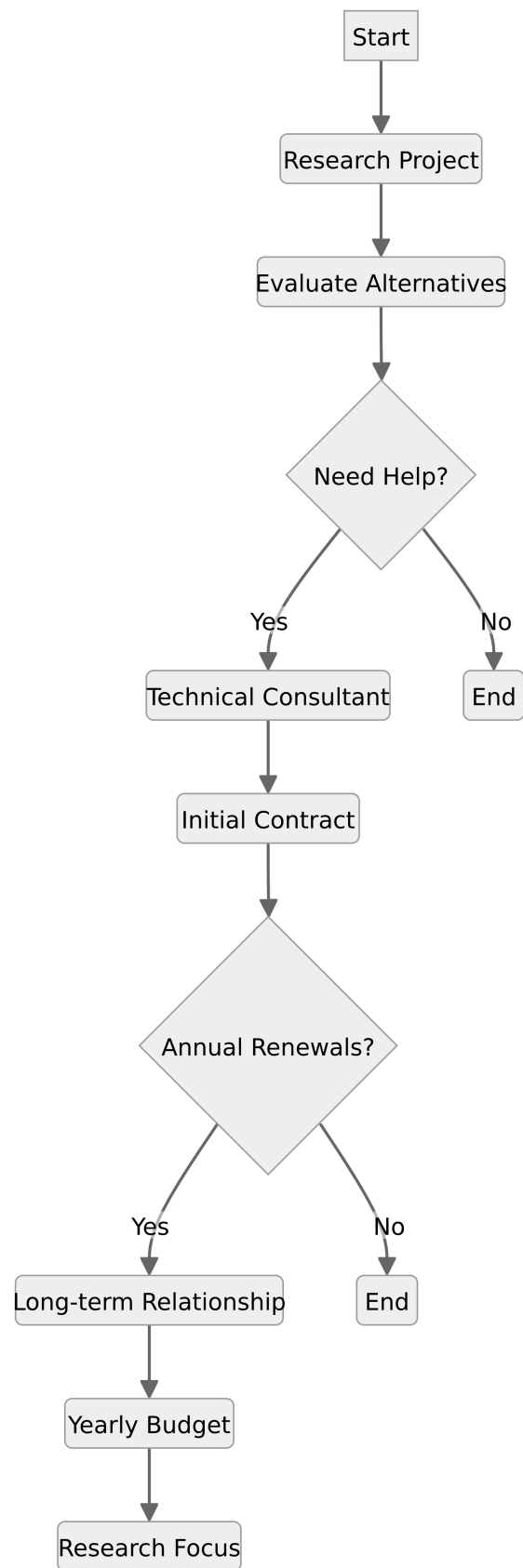
**Process Flow Diagram**

Fig 2: Process Flow Diagram for RFP