A Mixed-Methods Study on the Transition to Microservices Architecture

Pouya Ataei

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1 Introduction

This research aims to study the transition from a monolithic system to a microservices architecture within a company (IDEXX in this case), employing a mixed-methods approach integrating the Technology Acceptance Model (TAM) and statistical analysis.

2 Motivation

The motivation behind this study is to understand the dynamics of technology adoption within organizations, particularly focusing on the transition to microservices. It seeks to contribute to the broader field of information systems by providing empirical insights into acceptance and usage patterns of new technological frameworks.

3 Justification for the Research

The research directly aligns with IDEXX's ongoing efforts in the REI Project, aiming to provide a detailed understanding of the transition process, challenges, and potential benefits of adopting microservices architecture. The retros and regular meetings I believe are not offering anything different rather than looking at current challenges in the company and trying to sail away. In fact, they hardly vary from regular company retros and learnings.

REI is supposedly a reference implementation. By studying the REI Project as a reference, the research promises to deliver actionable insights and practical recommendations specifically tailored to IDEXX's needs. These insights are expected to enhance the effectiveness and efficiency of the REI Project, making it a benchmark in the industry.

The findings from this study will aid IDEXX in making informed decisions regarding technology adoption and strategy development, potentially leading to cost savings, improved performance, and increased competitiveness. While focusing on IDEXX's REI Project, the research also aims to contribute to the broader field of information systems and software engineering. This dual contribution ensures that IDEXX is not only a participant in cutting-edge research but also a key contributor to industry-wide advancements.

With an estimated budget of 5 to 10 thousand USD, the research offers a cost-effective opportunity for IDEXX to gain valuable insights and enhance the REI Project's outcomes. Lastly, if we find another sponsor for this paper (suppose my uni) would IDEXX still be against doing this research?

4 Study Duration

The proposed study will span over a period of 6 to 12 months, allowing for comprehensive data collection and analysis across various stages of the transition.

5 Target Journals

The research aims to target high-impact journals in the fields of information systems and software engineering, including:

- MIS Quarterly
- Proceedings of the IEEE
- ACM Computing Surveys
- Journal of Management Information Systems
- Information Systems Research
- Journal of Software: Evolution and Process

6 Research Design

The research will employ a mixed-methods approach, starting with qualitative methods like interviews and observations to understand the initial transition process. This will be followed by a quantitative phase, utilizing surveys based on the TAM framework. Data will be analyzed using statistical methods, including regression analysis and Structural Equation Modeling (SEM). Additionally, AI techniques like Natural Language Processing (NLP) will be applied to qualitative data for sentiment analysis.

The items below provide a sequential step for the research:

1. **Initial Qualitative Phase:**
   - Conducting interviews and observations to gather qualitative data about the transition to microservices architecture.
2. **Quantitative Phase:**
   - Implementing surveys based on the Technology Acceptance Model (TAM) to quantitatively assess aspects related to the acceptance and use of microservices architecture.
3. **Data Analysis:**
   - Applying AI techniques like Natural Language Processing (NLP) for the analysis of qualitative data.
   - Using statistical methods such as regression analysis and Structural Equation Modeling (SEM) for quantitative data analysis.
4. **Final Synthesis:**
   - Combining insights from both qualitative and quantitative phases to provide a comprehensive understanding of the research topic.

7 Conclusion

This research design offers a comprehensive approach to studying the adoption of microservices architecture, combining qualitative insights with quantitative rigor. The findings are expected to contribute valuable knowledge to the academic community and practical implications for the industry, aligning with the standards of top-tier academic journals.

8 Funding

This research does not require substantial financial support, estimated between 5 to 10 thousand USD. The funding is necessary to cover a range of costs including advanced analytical tools, software licenses, publication fees, and other operational expenses associated with a study of this scale and complexity. Securing this funding is crucial for the successful execution and dissemination of the research findings.