

Thesis Project Portfolio

**A Systems Analysis Approach for Business Optimization: Integrating Technology
Development with Data Analytics and Marketing for GolfCask**

(Technical Report)

Paying to Play: How Digital Technologies Are Rewriting Sports Commercialization

(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

Matthew Tan

Spring, 2025

Department of Systems and Information Engineering

Table of Contents

Executive Summary

A Systems Analysis Approach for Business Optimization: Integrating Technology Development with Data Analytics and Marketing for GolfCask

Paying to Play: How Digital Technologies Are Rewriting Sports Commercialization

Prospectus

Executive Summary

Commented [BS1]: Insert your executive summary
BELOW this title

The rise of digital technologies has impacted many different industries and has had a profound impact on shaping everyday activities for many around the world. Particularly in sports industries, those engaged in sport have been exposed to completely different experiences now than they had been exposed to merely 10 to 15 years ago. In both the technical and sociotechnical aspects of this research, the intersection between digital technologies and the sports world is examined. The technical portion of the research will investigate utilizing a systems analysis approach to optimize the business strategies of a small business operating within the golf and whiskey space through the suggestion and implementation of recommendation algorithms, data analytics, UI/UX, and marketing strategies. The sociotechnical portion of the research seeks to investigate the effects of recent digital technologies on the commercialization of sports-related industries. Specifically, the sociotechnical research will investigate the impacts of media platformization and digital gambling applications on the industries of sports media broadcasting and sports wagering. These aspects of research will both aim to investigate the presence of technologies and their impact on the world of sports. The work will also identify and explore strategies to employ digital strategies in sports-related industries.

A Systems Analysis Approach for Business Optimization: Integrating Technology

Development with Data Analytics and Marketing for GolfCask

GolfCask, a newly established technology-based start-up in Charlottesville, Virginia, is dedicated to cultivating a vibrant online community centered around the shared passions of golf, travel, and whiskey. Employing a systems analysis framework, this project leverages data-driven insights to refine performance indicators and enhance system efficiency within the online

community. The strategic objectives, initially structured within an objective tree, prioritize establishing a sustainable and profitable business model, fostering strong community engagement, and attracting and retaining members. A key component involves designing, validating, and deploying an innovative recommendation system to match user profiles with customized whiskey suggestions. Additional tactics in marketing and data processing are implemented and guided by data analytics and visualization tools to strengthen the technology's development and enhance user engagement. Research on user acceptance testing and data integration supplies further insight into developing a user-centric design. Incorporating feedback loops and continuous data analytics refines system outputs, ensuring the recommendations and marketing strategies align with user preferences and business objectives. Integrating a comprehensive system analysis with personalized recommendations and marketing strategies, this project seeks to evaluate the effectiveness of these approaches and provide actionable recommendations for GolfCask's future technical and business developments.

Paying to Play: How Digital Technologies Are Rewriting Sports Commercialization

This paper explores how digital technologies such as platform streaming and sports gambling apps are radically transforming the worlds of sports broadcasting and wagering, using the concept of technological momentum to unpack their accelerating influence. The goal of this research is to assess the true impact of emerging technologies in the live sports broadcasting and sports gambling industries on the commercialization of athletics. Live sports broadcasting has benefited from the proliferation of high-speed internet and streaming platforms, which has transformed the industry by challenging traditional broadcasting models at the expense of the consumer. Sports gambling has also benefitted from the digital era, as the instant availability of data and statistics alongside the development of mobile gambling applications has revolutionized how consumers place bets on countless sporting events. Recent legislation has also greatly impacted the availability of legal sports gambling across the United States. Utilizing

technological momentum as a framework for analyzing the impact of these technologies, this paper will investigate how these technological developments have impacted their respective industries as well as the overall commercialization of sports. The analysis aims to look at the opportunities for growth and profit opened by these developments, as well as how public perception and engagement with these industries has changed because of significant developments. Ultimately, this research will highlight the importance of further research into the evolving landscape of sports commercialization shaped by these digital technologies and investigate potential solutions to address the rapid transformation of the industries.

Conclusion

Working on these two projects has been an experience that has had a profound impact on my perception of technology within the sports world and the industrialization of business within sports. As someone who has followed and been engaged with many different sports communities throughout my life, working within these spaces from a different perspective has been eye-opening. Not only do sports provide an environment where people from all walks of life come together to enjoy a common game, but the business and industrial side of sports offers massive financial and growth opportunities. Working with the technical aspect of my work I was able to gain significant experience working alongside a small business aiming to carve out its own space within both the sports and alcohol industries simultaneously. Concurrently, while conducting research on the sociotechnical aspect of my work, I was able to gain insight into how stakeholders in the sports media broadcasting and sports wagering industries have altered their approaches in accordance with technological developments to grow their influence and financial opportunities alongside sports. Insight from how these stakeholders have utilized digital technologies has also had a significant effect in understanding how those same principles can be applied to the client referenced in the technical component of the research. This portfolio is a collection of work that exemplifies the impact of digital technology development within industries related to sports.