Optimizing Athletic Team Management through Django-Powered Website Development

(Technical Paper)

Exploring Technological Momentum and How Technological Lock-In can Lead to Inefficiency

(STS Paper)

A Thesis Prospectus Submitted to the

Faculty of the School of Engineering and Applied Science University of Virginia •
Charlottesville, Virginia

In Partial Fulfillment of the Requirements of the Degree Bachelor of Science in Computer
Science

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Fall 2023

On my honor as a University Student, I have neither given nor received unauthorized aid on this
assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

Athletic team management is often incredibly complex and chaotic, which poses challenges for team managers and captains (Covell, 2012, p. 38). Many athletic teams have a group chat with miscellaneous links to spreadsheets, playbooks and film– the use of which requires multiple applications. One specific example of this problem is the Club Ultimate Frisbee Team at the University of Virginia – Virginia Night Train. The Night Train frisbee team employs a host of tools for team management. These tools include various Slack channels for discussions and planning; a Google Drive containing spreadsheets, documents, and PDFs for team logistics; a digital playbook hosted on the website UltiPlays; and film stored on personal Google Drives and a team YouTube channel. Another Club Ultimate Frisbee Team, Arizona Lawless, has a similarly dispersed system for team management, as their tools include the GroupMe app for group discussions and planning, a compiled Google Sheet of all team logistics and plays, and a YouTube channel dedicated to hosting game films.

UltiHub, a Django-Powered web portal, aims to assist in athletic team management by providing a customizable portal to help achieve each team's off-the-field needs. These non-athletic needs such as cohesion through team building (Carron, 2002, p. 123-124), watching film to review techniques and plays (Shenk, 2020), and having easy access to all playbooks, upcoming events, and practice schedules should contribute to greater success on the field. Unlike other group management platforms, UltiHub will provide tailor-made features that offer solutions to the above needs as well as many others. These features include internal playbooks, indexed film, chat rooms, and specific pages for team events. Individual team administrators will be able to further customize each feature to adapt their team portal to specific team needs. This platform requires a consistent user base to ensure success, which will involve convincing

numerous individuals and teams to stop using their current system and switch to UltiHub's more efficient one. Thus a subset of past revolutionary technologies should be analyzed in-depth to identify common factors that lead to their success or failure. By exploring these past technologies through the lens of Actor-Network Theory, the analysis will help identify human actors, non-human actors, and important relationships within those inventions to establish common themes within failed technologies and attempt to mitigate them. All of this will be done with the intent of helping new innovations that could greatly influence society for the better become mainstream.

Technical Topic

Across the world, many people participate in team sports. According to the Sports Business Journal, "in 2021, 232.6 million Americans took part in sports and fitness activities" (Broughton, 2022). Most teams utilize some combination of Discord, Slack, Email, and GroupMe for team communication and some combination of Google Suite tools, external playbooks, and YouTube for team logistics. While these platforms provide an excellent service, the dispersion of team information over multiple platforms is overwhelming and can make it difficult to find important resources. These platforms also lack key features that would make athletic team management much easier: a centralized space for film, digital playbooks, template for event details, and an admin page allowing for individual portal customization.

UltiHub, a Django-Based Web Portal, provides the above features along with a user-friendly interface, offering a centralized team management space. UltiHub uses Django as its framework because it provides an authentication system, which ensures that each user is who they claim to be. Django also comes with a full-fledged developer admin interface, making it

easy for developers to control their website data (Getting Started with Django). Lastly, Django's framework architecture uses the Model-View-Controller (MVC) Architecture, a design pattern convenient for web applications. The Model contains data needing to be rendered, the View renders the data, and the Controller handles the logic and operates on the data. This separation of concerns promotes better organization for large code bases, which makes applications easier to understand and maintain (Syromiatnikov, 2014).

While Django fulfills most of the application feature requirements, it only partially meets the requirement of user authentication and authorization. This feature is essential, as each team's portal may hold sensitive information such as playbooks and film. In addition to the Django Authentication system, UltiHub employs the Google Authentication framework– a well-accepted security framework that pairs something you know with something you have, for example a password and your browser respectively, in a manner that is convenient for its users (Grosse et. al, 2013), to ensure authentication and authorization is upheld.

The control flow of creating a new team in UltiHub best exemplifies how UltiHub upholds security standards. Upon arriving at the homepage, the user must log into their Google Account. Once done, they will have the option to request access to existing team portals or to create their own. To create a new team portal, the user must fill out basic information about their team. The portal creator will initially be the only team member with portal access, and they will be designated portal Admin. Team Admins can grant portal access to other users logged into the UltiHub main platform and they can grant admin privileges to up to three other users. Thus, the team portals remain secure, as users will only be able to see the information displayed on a team's portal once they have been granted access.

Currently, UltiHub's services only consist of a web application, but expansion plans include developing a mobile application to increase accessibility. This accessibility metric is based on a study performed in Hong Kong, where a small scale mobile application and website providing the same services were launched simultaneously. The study found that 52% of user traffic came from the website, while 48% came from the mobile application. When this study was performed, approximately half of Hong Kong owned a smartphone (Wong, 2012). Today, roughly 90% of Hong Kong owns one (Slotta, 2023). Because of this, if UltiHub expands to include a mobile application, the increased accessibility could be reasonably expected to double or even triple UltiHub's website-only user base.

One platform that consists of a mobile application and a website, which heavily influenced UltiHub's design is Slack. According to an analysis by the Journal of the Medical Library Association, Slack has led to increased efficiency, transparency, and improved team culture by increasing team connectivity. This analysis states that Slack has increased platform organization by splitting up communications into channels dedicated to certain projects and by indexing messages. The analysis also notes that Slack increases accessibility by having a web-based platform as well as Android and iOS applications. However, a disadvantage of Slack is that it limits users to 5GB of storage, 10 external application integrations, and 10,000 saved messages unless they upgrade to a subscription-based account (Johnson, 2018, p. 148-150). UltiHub will utilize the successes of Slack, while adding features that are better suited for athletic team management. If successful, UltiHub will diminish the momentum of applications like Slack and Discord, and start acquiring its own momentum.

Another inspiration for UltiHub is Monday.com. According to the Journal of Information Technology Teaching Cases, Monday.com is an all-in-one platform that easily adapts to business

needs. Monday.com's user-friendly dashboard and customizable settings attempt to fulfill each company's needs. Platforms like Monday.com allow companies to automate their communications, which leads to higher degrees of consistency and efficiency (Manko, 2021). UltiHub pulls from Monday.com's customizable and user-friendly platform, but it will add free, tailor-made features designed to enhance athletic team coordination, efficiency, and consistency.

STS Topic

Throughout history, there have been numerous innovations and technologies that have flourished, often gaining popularity and momentum within certain social groups. There have also been many innovations that should have been extremely successful but instead failed to gain momentum. Some of these failed technologies may have had a significant positive impact on society if they had been able to identify and overcome the unfortunate factors that stopped them from gaining traction. This paper will examine some of these notable failures through the lens of Actor-Network Theory. Actor-Network Theory is a framework which values both the sociological and technological aspects of innovation equally. It achieves this by considering all humans and non-humans as actors, given their ability to influence technology and society. Further, this theory considers interactions between these actors, as they comprise a dynamic and ever-growing network (Latour, 1992).

The first non-human actor that may play a role in determining the success of an innovation is the phenomenon known as technological lock-in. Technological lock-in is the event where the established dominance of certain technology makes it difficult for other technologies to gain traction, despite the fact they may be technically superior. The prime example of this is

the QWERTY keyboard. Originally, keyboard keys were purposely arranged inefficiently as a way to slow typists down, as typing too quickly on a typewriter would lead to jammed keys. Despite the fact that typing speed is no longer an issue on newer computers, so much of the population has been trained using QWERTY keyboards that the cost of transitioning to a more efficient alternative outweighs the benefits (Shogren, 2013, p.123-124). Due to the concept of technological lock-in, whether or not an invention is successful may involve more than just the quality of the creation, and other actors such as existing technologies and their relationships in the market should also be considered.

Presently, there are two general classifications for technologies: radical and conservative. Innovations are generally considered radical if they instantiate a new technological system, while conservative innovations expand and improve upon existing technological systems. These two classes can be considered non-human actors within the lens of Actor-Network Theory. Typically, these actors have a negative interaction, as large conservative organizations are not fond of radical innovations aiming to challenge existing systems (Hughes, 1987, p. 51). Currently, Facebook, Amazon, Apple, Microsoft, and Google compromise 26% of the S&P 500 (Bowman, 2023). This has led to an increase in conservative innovation and a decrease in radical innovation, as these companies have all established their own systems and the majority of technology they create is dedicated to improving those systems (Stringer, 2000, p. 71-72). This negative interaction between the actors of radical and conservative classifications should be further explored through case studies to examine if this conflict is involved in the demise of seemingly impressive technologies.

One case study that showcases this radical and conservative conflict is the development of the electric car in France. In this case, the contest was between the radical inventors of the

electric car, EDF, and the existing conservative car manufacturer, Renault. While the electric car was originally supported by both social and academic "hype", the change was ultimately too large to succeed as the catalysts became contaminated easily making the fuel cell unusable, which in turn made the car battery unviable. Further, the technologically conservative Renault engineers launched numerous attacks against the electric car, which annihilated any remaining hope of success for EDF (Callon, 1987).

While the electric car case study illustrates how conservative innovations can actively oppose radical innovations, it also brings to light a new potential non-human actor with the notion of "hype" regarding an invention. As seen in the electric car case study, the engineers at EDF may have originally set their expectations too high, which led to their fallout being more severe. In general, innovation is a future-oriented business and setting expectations can help drive technical activity. However, if initial expectations for technologies are set too high, the "hype" around the innovation can quickly turn into disillusionment or abandonment of the product (Borup, 2006). This means that innovators need to develop ways of effectively advertising their creations without setting unrealistic or unattainable expectations for that product. Consistently maintaining this balance should be a goal for all innovators. Brown states that, in order to determine whether to trust a current actors' expectations, consumers will often look to the past to see if the actors' previous expectations were met (Brown et al, 2003). In summary, not only could current expectations play a role in the success of a new innovation, but whether or not previous expectations were met may as well.

Overall, potential non-human actors such as technological lock-in and the notion of setting expectations can provide valuable insights into why some outstanding innovations have previously failed. Furthermore, an examination of the relationship between conservative and

radical innovations illustrates why radical innovations have failed in the past. Next semester, a deeper exploration of these three non-human actors and their relationships with each other will be performed. Other actors will also be investigated through case studies, such as the timing of failed inventions and the ability of the developer to identify relevant social groups when marketing the product.

Conclusion

Once the technical project is completed, UltiHub should be a platform that provides complete flexibility to team administrators, such that they can efficiently and transparently lead their teams. If developed successfully in ways that combine pre-existing technical knowledge with new found insights gained from the sociotechnical research paper, the platform should hopefully become a successful technology that is able to help thousands of individuals on an everyday basis with general team logistics.

Once the STS project is completed, a multitude of actors that contribute to determining the fate of a new technology will have been investigated, as well as these actors' relationships with one another. By detailing these actors, this STS project will hopefully be able to give new, societally-important innovations that would have otherwise failed insight into factors necessary for success. With that knowledge, these useful innovations will hopefully be able to gain traction and make society as a whole more efficient and technologically advanced.

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