MOBILE APPLICATIONS FOR COLLABORATIVE RESEARCH

An Interactive Qualifying Project Report
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WPI

Sponsoring Agency: Financial University under the Government of the Russian Federation

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Abstract

The Financial University under the Government of the Russian Federation seeks to improve the quality of scientific publications created by student and faculty affiliates. Our team determined that encouraging collaborative research through a mobile application would contribute positively to achieving this goal. Interviews and focus groups with local student and faculty researchers revealed application feature requirements to meet the needs of university affiliates. These features were integrated into a mobile application prototype built to assist researchers in constructing strong teams.

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Executive Summary

Collaboration has proven to be highly useful for conducting research. When team members are distributed in different places, collaboration becomes a greater problem. As one of the best universities in Russia, the Financial University under the Government of the Russian Federation (Financial University, 2015d), has 37 branches across Russia. The university has sought to improve the ability of its researchers to collaborate with one another, as it believes that more can be accomplished in teams than can be done individually. Therefore, the Financial University wanted a solution that would improve communication and enhance collaboration among researchers, so that they can cooperate more efficiently and effectively.

The Financial University researchers are currently storing their research data on FinLab Wiki, a knowledge base built with MediaWiki software. The intent of this software was to provide a tool that would allow researchers to quickly and easily share data and information with one another, regardless of geographic separation. However, while it was acknowledged that this system was a step in the right direction towards solving the larger issue, it has not been able to fully solve the problem, as, among other issues, researchers still often choose to work alone. In order to improve collaboration and communication among researchers, the Financial Laboratory sought to leverage the popularity of mobile applications running on iOS or Android to entice researchers to connect with one another.

Given this, the goal of our project was to develop a prototype form of mobile software that would specifically be tailored to fit the research collaboration needs of the Financial University researchers. Additionally, we were to identify what steps should be taken next to create a fully finished product based upon this prototype. In order to meet these goals, we formed the following objectives:

1. Identify target market;
2. Identify difficulties with carrying out research;
3. Identify possible ways to overcome them and improve research quality and output;
4. Identify explicit and implicit features of a mobile application for use by FU researchers;
5. Identify possibilities for further implementation of the application.

We obtained our information on the state of Financial University research using focus groups, and two interviews. Results from the focus groups and interviews helped us understand what obstacles prevented researchers from working with one another. From these data, we were able to determine:

1. The research techniques of faculty and students of the Financial University;
2. The tools currently in use by these individuals that facilitate either communication or collaboration;
3. Where the resources available to them were lacking.

Overall, we determined that while the researchers had sufficient tools to communicate with one another and share files, one of the largest challenges appeared in the initial formation of teams. Many individuals present in these focus groups explained that finding reliable research partners who would produce quality work was exceedingly difficult. As a result, the pool of individuals that they drew from as collaborators was limited to only close acquaintances, limiting their ability to draw upon a wider variety of points of view. Given this, and the abundant feedback from these same groups telling us not to attempt to replace working tools, our group focused on addressing only the networking issue. From both our research and interactions with members of the Financial University, it is our belief that by remedying this problem, we may see the formation of both more

teams, and teams of higher quality, ultimately resulting in the creation of more quality research publications.

To design this mobile application, it was important to identify the qualities that a user friendly and useful application should be comprised of. To do this, we examined a wide variety of existing mobile applications similar in functionality to our ultimate end goal and identified features commonly shared amongst them. While these functionalities were varied, there were a number of core design principles adhered to by all. For example, all applications favored simplicity and ease of use over complexity and functionality. Often, it was better to do one thing well in a straightforward manner than support a plethora of features in a complex user interface. Using the information obtained from this investigation, combined with that which was gleaned from our interactions with the Financial University researchers, we prepared guidelines for the functionality to be provided by a mobile app that would address the needs of the university's researchers.

The mobile application we have developed addresses the difficulties researchers have in finding research partners by allowing them to rapidly sift through other individuals and projects and find researchers who complement their strengths. More specifically, it provides these two core functionalities:

1. To be able to find and contact other researchers with an intent to recruit them to a project by providing the ability to quickly search all researchers by expertise and view their past research history;
2. To allow researchers looking to become involved in research to browse through projects offered by other researchers by topic, and apply to ones that align with their skills.

By providing researchers with these capabilities wrapped in a simple and easy-to-use interface characteristic of smartphones, this app would facilitate collaborative behavior in researchers.

In order to demonstrate what such an app would look like, our team developed a simple application utilizing the Ionic Framework that served to mirror the functionality of what the real application would provide but on a smaller scale. While this prototype is completely unscalable beyond a handful of users, it demonstrates a number of major principles key to the success of the final product.

1. Methods through which the user navigates the user interface;
2. Layout of elements such as search fields, buttons, etc.;
3. Type of data to be stored by the application.

However, it does *not* cover a number of the more technical aspects of designing a mobile application, such as handling large amounts of user data. Namely:

1. Ensuring secure transmission/storage of data;
2. Network transmission efficiency (caching, compression, long-polling, etc.);
3. Data storage schema.

While these are all important, they, unfortunately, fall outside of the scope of this project based on the amount of time we had to complete it.

Given the information provided in this report and in the prototype, it is now possible for the Financial University under the Government of the Russian Federation to approach the development of a mobile application with substantial direction and information. Having not only determined a mobile application to be feasible in addressing the needs of the Financial University's researchers, and potentially extremely effectively, our team recommends that the university take

the prototype produced by this report and expand it into a fully functional product. Additionally, to make the best use of this mobile application, the Financial University needs to collect demographic and research information from the researchers to build a basic researcher database. After putting the mobile application in use, the Financial University should conduct research on the usage of the application to determine how to improve the application based on user experience and user expectations.

1. Introduction

Communication and collaboration are essential parts of the research process. Technology can facilitate teamwork and idea exchange among individual researchers (Herrick, 2009; Saito, 2014). Keeping collaboration flowing properly, however, has traditionally been difficult.

The Financial University (FU) under the Government of the Russian Federation has sought to increase both the quality and quantity of scientific publications produced by its researchers. According to Professor Alexander Didenko (personal communication, April 9, 2015), the FU is struggling to increase researcher participation and collaboration, both of which he believes contribute heavily to quality of publications. Consisting of students as well as faculty members, researchers at FU face communication and collaboration problems due to both geographical separation and time zone differences. Expanding this participation has proven to be a challenge. However, properly implemented technology may help to resolve this problem.

Collaboration via the use of technology is a frequent focus of research. In 2014, for example, a WPI research team designed a collaborative knowledge base tool for the FU that was implemented with the MediaWiki software. This platform attempted to bring researchers together by centralizing the storage of their work and making it easily accessible. Additionally, the adoption of Google Apps at Colorado State University and in Nova Scotia schools improved working efficiency and fostered collaboration (Herrick, 2009; The Canadian Broadcasting Company, 2015). Research that focused on the use of Skype in distance learning by Nielson and Andreasen (2013) shows that online communication technology fosters student engagement. On the other hand, there is substantial evidence that mobile platforms are experiencing continual growth in popularity (Cho, 2015). Ekins, Clark & Williams (2012) and Herrick (2009) indicated that the use of mobile applications positively impacted both quality of work and team efficiency.

Although the FinLab Wiki developed in 2014 was a milestone in the adoption of technology by researchers at FU, it had unsatisfyingly low usage. So far FU has not yet utilized any mobile platform to encourage researchers. Given the popularity of mobile devices, the head of FU's research division believed that a mobile phone application might enable better communication and collaboration among researchers. At the time, there was no information about the extent to which these mobile device platforms can enable more and better research.

This project's goal was to design a mobile phone application addressing FU's research collaboration needs. First, we identified user needs and wants by conducting focus groups and interviews with current and prospective FU researchers. We then identified a set of requirements for the software. Before building a prototype, we examined existing mobile applications that contained at least some of the desired functionality. While none of the existing applications satisfied all of the requirements, they allowed us to determine what was needed in our own proposed solution. We then developed a prototype application for the FU that specifically focuses on connecting researchers with other suitably focused researchers, with whom they can form collaborative partnerships. Overall, the team created a prototype that attempted to inspire further research and collaboration among the FU's students and faculty at all of its campuses.

2. Background

A strong team is crucial for performing and completing any project (Stokols et al., 2008; Yonge et al., 1996). Keeping proper lines of communication among researchers and students alike can be difficult, even with the advances in technology. In this chapter, we discuss how technology has been adopted to foster collaboration and some successful cases, in which technology improved the team's' efficiency and productivity. As a web-based repository, the FinLab Wiki, has already been used by our sponsor as an attempt to help researchers in communicating and collaborating with each other. We look into another device that can be adopted at the Financial University: mobile devices. It is vital for us to examine what efforts have been made and how widely they have been used, in order not to waste FU's time in repeating an existing or failed solution. Therefore, we discuss mobile applications that are in use in companies and organizations to help team members working together. However, in order to identify the best suggestion for our sponsor, we also explain the design of a mobile application.

2.1 Growth of Technology in a Collaborative Atmosphere

Communication both inside and outside an organization is often extremely rewarding (Stokols et al., 2008). The combined efforts of individuals in a properly functioning team often yields new, powerful ideas. Ralph Waldo Emerson (1993) would have argued that individual thought is more powerful than thoughts of the collective, but Emerson might not have foreseen the creation of communication technologies that could connect many talented individuals who are geographically separated from each other. These virtual teams, composed of individuals who may never meet in person, became increasingly popular in corporations such as Hewlett-Packard and Eastman Chemical Corporation in the 1990s (Lipnack, 1997).

The chief technology officer of Cisco, Padmasree Warrior (2010), has pictured the Next Generation Collaborative Enterprise. Some of its key characteristics include "geographically distributed workforce", "shared ideas", etc. She suggested that, from a technological perspective, the enterprise collaboration platform should not only provide users with easy access to information and the ability to share with others, but also take personalization, active interaction and borderless network into account. Such a platform helps communication and collaboration overcome an organization's hierarchical, geographical and language barriers.

While Warrior (2010) believed that collaboration does not represent agreement among collaborators, Schaffner (2010) further commented "disagreement is good" in collaboration, in that it forces people to rethink their positions. One of technology's benefits for collaboration is that, by providing platforms to reveal people's thoughts, technology prepares people for facing disagreements.

There are cases where companies achieved success with the help of technology (Accenture, 2013). In a survey conducted by Avanade (2013) that involved 4000 end users and 1000 business and IT decision makers, 77 percent of the decision makers and 68 percent of the end users reported using social technologies for work. Eighty-two percent of decision makers revealed their willingness to use more social collaboration tools. As technology evolves, more and more people have turned to technology in a collaborative atmosphere.

2.2 Tying Teams Together with Technology

Collaboration is imperative for a team's success (Bolstad et al., 2003). Salas, Sims, and Burke (2005) have contended that in successful and effective teams, there is a pattern of five core attributes: leadership, mutual performance monitoring, backup behavior, adaptability, and team

orientation. Spreading responsibilities across a number of individuals, rather than just one, leads to a net increase in the performance of the team by increasing the ability of the team to interact with its leaders (Hoch, Pearce and Welzel, 2010).

Simple as it sounds, teams often face difficulties in collaborating in practice. Efforts have been made to foster team collaboration in order to increase the efficiency of the team and the quality of a team's production; some research labs have attempted to use mobile applications to aid them with research in the chemistry/biology field, though the efficiency of these particular apps in research fields is yet to be determined (Ekins, Clark & Williams, 2012). However, in other fields, researchers have found that mobile apps have helped teams to not only exchange ideas among members, but also to share data or resources (Herrick, 2009; Saito, 2014).

Herrick (2009) and The Canadian Broadcasting Company (2015) reveal that for collaboration Google Apps have been one of the most successful platforms for collaborative research in educational environments. Google Apps "is best viewed as one of a suite of tools" (Herrick, 2009, p. 8). It has gained great acceptance at Colorado State University (CSU) (Herrick, 2009). Users enjoy the email filtering function, Google Video, and other tools for their personal needs. Collaborators at CSU have used the set of Google Tools to share documents, calendars, and other resources, and the instant messenger in Google Docs has been used to communicate when they are working on the same document (Herrick, 2009). Not only do Google tools provide users with useful features, they also effectively merge personal needs with team demands, enabling users to use one account for all the features, without the trouble of synchronization when using multiple software programs. Google Apps have clearly been able to foster collaboration and communication among collaborators regardless of geographical area.

Nielsen and Andreasen (2013) have conducted research on how online communication technologies can help in student engagement. They described one case, in which participating students lived in different parts of the country and worked on a project together. The team used Skype for ordinary meetings during a work-intensive period in their project. Moreover, with the Skype audio connection on, the team members overcame the distance problem and worked together as if they were in a shared working office. This case proposed a creative way of using a communication application in distance learning. The use of Skype in distance learning was an effective tool in increasing distance learners' engagement.

In these cases, it can be clearly seen that by using online tools in their work, the individuals have improved their efficiency by working in a team. Moreover, the tools mentioned above also provide services on mobile platforms (Google, Inc., 2015c; Skype, 2015), which infers that people would like to use these tools on their mobile devices. This fact pointed out the possibility that adding a mobile application to the list of tools available to researchers might improve the ability of researchers to complete their tasks.

2.3 Rise of the Smartphone

The growth in the use of smartphones has undergone massive acceleration (Cho, 2015). In this section, we discuss the definition of smartphones, which is one kind of mobile device, and their adoption worldwide and in Russia. Then, we analyze the features of some mobile applications that have already been used in research at companies and organizations to foster communication and collaboration among team members.

2.3.1 What is a Smartphone?

A smartphone device is a mobile device that allows users to run applications and access the Internet, while keeping the original phone features of making phone calls and sending text messages (Vodafone Group Plc, 2013). An operating system, acting as a resource manager, manages processing and memory when the device is performing multiple tasks at the same time (Tanenbaum, 2008). A mobile operating system is an operating system that runs on smartphone devices. The mobile operating system allows smartphones to run complex software programs, called mobile applications. Prior to these devices, software such as this could only have been used on a desktop computer (uSwitch, 2015). These mobile devices differ from desktops in that they are often smaller, lighter, and more portable. The most common mobile operating systems are Android, iOS, Windows and Blackberry OS (IDC, 2015).

2.3.2 Growth in the Global Usage of Smartphones

Over the past few years, and increasingly more so now, the focus of the market has begun to shift to the smartphone and tablet computer (Novosti, 2012). The world sales of smartphones increased by 20.3% in 2014 (Gartner, 2015). As can be seen in Figure 2.1 (Cho, 2015), the sales of mobile devices have expanded every year since 2008.The majority of devices are Android based. eMarketer (2014) claims that: “More than one quarter of the global population will use smartphones in 2015, and by 2018…...over one-third of consumers worldwide will do so” (para 1).

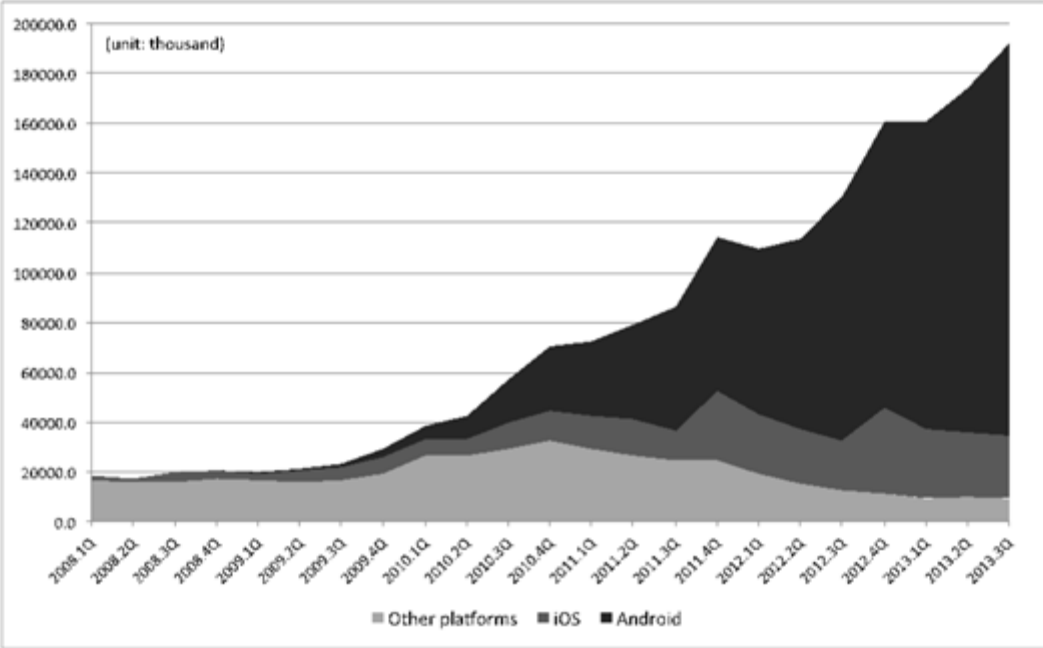

Figure 2.1: Quarterly Sales of iOS and Android Devices

2.3.3 Smartphone Device Adoption in Russia

In 2013, a study of Russian users of the Opera android browser found that there was a 38% usage increase during the third quarter of the year (Bawaba, 2014). In Q2 2015, the smartphone market in Russia increased by 4.1% to RUB 48.7 billion. Five million smartphones were sold in this period, increasing by 36.2% year-over-year (Mobile TeleSystems, 2015b). Given these results, there can be no doubt about the claim that the smartphone is undergoing massive adoption within Russia.

Among different types of mobile operating systems, Android and iOS occupy the largest market share in Russia, similar to the global trend in mobile OS preferences (Statista, 2015a). By the end of 2014, Android had 50.65% of the market share in Russia, while iOS has 43.59% (see Figure 2.2) (Statista, 2015a). In the tablet operating systems market, Android and Windows are dominant, with iOS taking a close third. Figure 2.3 shows the results of a survey question that

asked “Which operating systems do your business’ tablets use?” Eighty-seven percent of the respondents said they use Android tablets, 73% responded that they used Windows, and 46% use iOS, where respondents may have more than one tablet (Statista, 2015b). According to Professor Alexander Didenko of Financial University (personal communication, April 9, 2015), nearly everyone at the Financial University owns either a smartphone or a tablet, if not both. Assuming the usage of mobile and tablet operating systems at the Financial University follows the operating systems’ usage trend in Russia, either iOS or Android apps could be a great help to researchers at the Financial University, based on the app’s great potential user population.

Figure 2.2: Market Share of Mobile Operating Systems in Russia, 2012-2014

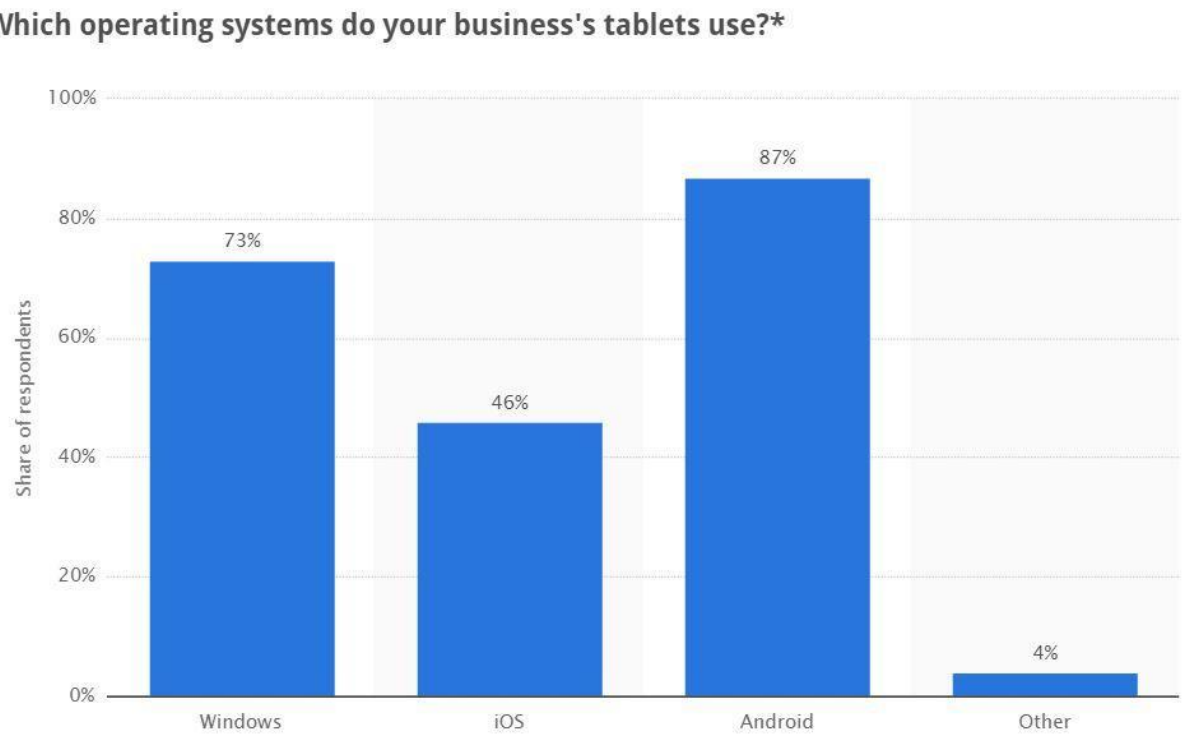

Figure 2.3: Share held by tablet operating systems in Russia, 2014

2.4 Existing Mobile Applications

In order to understand what the best solution for the Financial University may be, it is critical to understand how existing mobile applications solve similar problems. As major areas of this project are related to improving communication, document management, teamwork collaboration and data gathering, we have grouped mobile applications together in that way. Within each category, the applications were examined for the most popular features, and these data were then listed.

Mobile Applications for Communication

While modern mobile devices are capable of much more, interpersonal communication was the original purpose of mobile phones (Murphy, 2010). As such, it should come as no surprise

that currently there exist many applications that have extended basic message passing in their own way. The following applications have been organized by the number of installations (see Table 2.1), as reported by Google Play (Google Inc., 2015h).

Table 2.1: Number of Application Installations Reported by Google Play

Application Name	Number of Installations
Google Hangouts	1,000,000,000+
Facebook Messenger	1,000,000,000+
WhatsApp	1,000,000,000+
Skype	500,000,000+
WeChat	100,000,000+
Kik	100,000,000+
GroupMe	5,000,000+
Slack	1,000,000+

Having examined each of these applications, we have created Table 2.2, describing the most popular features, and which applications in the above list provide each. The most popular applications all share a core set of features, such as messaging, the ability to send multimedia files and free access over Wi-Fi, while some have a few unique features, such as voice call and location sharing. In this way, this sampling of the most popular applications available demonstrates that the best communication applications often do not have functionality past the basics shared by almost all applications. However, almost equally as important is the fact that each of these applications *only* provides messaging features; they do not provide any functionality past these. This further supports the opinion put forth by Prof. Gary Pollice of WPI's Computer Science Department (personal communication, April 14, 2015), that the simplest solution is often the best, and that bundling large numbers of unrelated features together tends to degrade the user experience. The one exception here is Slack, which is in the unique category of handling both messaging and file

management in one app. In this section, we only examined the messaging features of Slack; in the next section we review the Slack's file management feature.

Table 2.2: Features Provided by Top Communication Apps

Feature	Google Hangouts	Facebook Messenger	WhatsApp	Skype	WeChat	Kik	GroupMe	Slack
Group Messaging	X	X	X	X	X	X	X	X
Free over Wi-Fi	X	X	X	X	X	X	X	X
Send Multimedia	X	X	X	X	X	X	X	X
Text Messaging	X	X	X	X	X	X	X	
Send Files	X	X		X	X			X
Send to SMS	X		X	X	X		X*	
Voice Call	X	X		X	X			
Video Call	X	X		X	X			
Message Seen Indicator	X	X				X		
Location Sharing	X				X			
Call Cell Phone Number	X			X				
Message Searching								X

**US Only*

Mobile Applications for Data Management

One goal of any research project is ultimately to produce a record of the data collected. Naturally, each individual on the research team will have his or her own contributions to this final document. However, as Wei et al. (2005) described, sending drafts to one another via a medium such as email could quickly cause confusion in determining the most recent information. This problem gave rise to a slew of mobile applications that were designed to keep the copies of documents held by individuals up to date with those of their teammates. The following applications

represent some of the most installed applications that provide file synchronization among devices See Table 2.3 for the number of data management application installs reported by Google Play (2015h).

Table 2.3: Number of Data Management Application Installs

Application Name	Number of Installations
Google Drive	500,000,000+
Dropbox	100,000,000+
Evernote	100,000,000+
OneDrive	10,000,000+
Slack	1,000,000+
Sync	500,000+
Syncthing	10,000+

As in the above section, the features provided by each application have been condensed into Table 2.4 in order to provide an accurate comparison of their functionality.

Table 2.4: Features provided by top file synchronization apps

Feature	Google Drive	Dropbox	Evernote	OneDrive	Slack	Sync	Syncthing
Cache files for offline use	X	X	X	X	X	X	X
Automatic backup	X	X		X		X	X
Storage space provided	X	X	X	X	X		
Share files with other users	X	X	X	X	X		
Search for files	X	X		X	X		
File versioning	X	X		X			X
Share files with non-users	X	X		X			
View documents in app	X	X	X			X	
Discuss files	X		X		X		
Control where files are synced to						X	X

From this sample of mobile applications, we have drawn a number of conclusions. Primarily, applications of this nature fall into one of two categories: those that store files for the

users, and those that allow users to store files. In the case of the former, any files that the user manages with the application are saved to a server owned by the company that created the application. While this can be a good thing in that it provides a safe storage place for these files, if the data contained within these files is sensitive, this can be a huge problem, as there is an inherent risk in trusting a third party to keep those data safe. This is the niche where the second group of applications fits; with these applications, all the application manages is the transfer of the files between the user's devices. As the data are never stored anywhere else, these applications have a stronger ability to protect the content of the files from access by outsiders. On the downside, however, the user must provide storage space for all of his or her files (Google, Inc., 2015e).

The other major division between these applications lies in their complexity. Applications of the first type, such as Dropbox (2015), OneDrive (2015), and Sync (2015), are designed to simply manage the synchronization of files; all they handle is the transfer of the files. Contrastingly, applications such as Evernote (2015), Google Drive (Google, Inc., 2015g), and Slack (2015) not only manage the files, but provide a layer of collaboration on top of them, in that they provide support for comments, discussion, and organization on each file.

Beyond this, we can also see that the ability to cache files so that they can be used when the device is not connected to a network is a core functionality implemented by every application listed here. They all also maintain the edit history of each file, so that older versions of a file can be retrieved at any point (Dropbox, 2015; Evernote, 2015; Google, Inc., 2015g; OneDrive, 2015; Slack, 2015; Sync, 2015).

Mobile Applications for Organization

Although mobile applications are a new concept that became popular only in recent years, there have already been trial solutions for teamwork collaboration on mobile platforms (Google, Inc., 2015h). Below, we have identified two applications that are explicitly designed to track tasks for each team member, allowing teams to accurately assess how far from the completion of their tasks they are. These applications are compared in Tables 2.5 (Google Inc., 2015h) and 2.6.

Table 2.5: Number of teamwork application installations

Application Name	Number of Installations
Asana	500,000+
Teambition	1,000+

Table 2.6: Features provided by top organization apps

Feature	Asana	Teambition
Per-project tasks	X	X
Receive updates from team	X	X
Track overall goal	X	
Sub-tasks		X
Plan meeting		X
File storage		X
Inbox		X

A typical collaboration mobile application is Teambition (2015), which combines common tools that a team requires to complete the work: to-do list, whiteboard where posts are shared among the team, file storage, event arrangement and e-mail. The combination of these tools allows users to work using only one application, avoiding switching among multiple apps, thus improving the efficiency. Teambition also helps users store files and resources in one place, and organize them under different project folders.

Asana (2015) is a simplified Teambition in terms of functions. Keeping the basic needs of collaboration, Asana removes some functionality, making it neat and simple. It substitutes Inbox

with real time messaging, combing chatting and e-mail function. This collaboration application satisfies users' needs occupying only 60% of the memory storage space needed by Teambition.

We have summarized the functionalities of the two applications, which can be seen in Table 2.6. Asana provides only the core part of what Teambition provides. From the data in Table 2.5, however, we can see Asana is far more popular than Teambition, which again supports Prof. Gary Pollice's (personal communication, April 14, 2015) view of simplicity as being the best solution.

Mobile Applications for Research

Research websites have also migrated to mobile platforms to accommodate to people who heavily depend on mobile devices. In many cases, the use of these mobile applications has improved the ability of the researchers to work. While developing an application for collaboration among chemistry experts, a research team determined that data uploaded to a mobile app by the users or captured by the mobile app itself greatly improved both the quality and quantity of the resulting report (Ekins, Clark & Williams, 2012).

Four research apps that we have found, whether recommended by some university libraries or ranked in the top list of mobile application in research filed on iTunes, are ACS Mobile, iSSRN, the Protocolpedia and the Scientists. The similarities and specialties are discussed below, and their features are summarized in Table 2.7.

ACS Mobile, recommended by Rutgers University Library (2015) as one of the mobile apps for research and study in their Research Guide, is the mobile version for the American Chemistry Society (2015) website, enabling users to search among the up-to-the-minute databases. Besides daily feeds and an add-to-favorites feature, it attracts users by its offline-access function, which allows users to have access to abstracts and 48-hour access to full-text articles offline.

Similarly, iSSRN, the mobile application by Social Science Research Network (2015), is also one of the recommendations for research apps by Rutgers University Library (2015). It provides the users with the function to tie authors to papers, being able to view other works written by the same author, and a feature to track the number of citations and downloads. Moreover, it provides features for authors. The authors can use the app to manage their papers and track rankings when compared with peer authors as well as maintain professional information.

The Scientist (2015) and Protocolpedia (Hue Medscience Pvt Ltd, 2015) are similar: they are all mobile versions of corresponding websites, have search functions, and allow users to organize articles by categories and push daily feeds. Yet they have different features, targeting different groups of users. Protocolpedia provides users with offline access to protocols and allows users to communicate within the app (Hue Medscience Pvt Ltd, 2015). The Scientist allows users to share articles to other websites, without creating a social network within the app. The first one is suitable for users who work with a lot of people who also use Protocolpedia and encourages new colleagues to join the network, while the latter accommodates those whose contacts rely on other social networks.

Table 2.7: Features provided by top research apps

Feature	iSSRN	ACS Mobile	The Scientist Magazine	Protocolpedia
Search Articles	X	X	X	X
Web version	X	X	X	X
Daily Feed		X	X	X
Organize by Categories			X	X
Social Features	X			X
Find Related Articles by Author	X			
Offline Access	X	X		X
Share to other websites		X	X	

2.5 Designing Mobile Applications

While understanding what functionality is provided by mobile applications is necessary, of almost equal importance is qualifying what makes mobile applications both usable and user-friendly on a general level. Elements such as organization, user interaction, and intuitiveness all come together to define how enjoyable the end-user experience is.

2.5.1 Native Applications vs. Web Applications

Many people do not know that there are two kinds of mobile applications: native applications and mobile web applications. From a user's perspective, both are applications on mobile platforms that can perform a series of tasks, e.g. getting information from the Internet, checking a completed task, and so on. However, from a developer's perspective, choosing which form of mobile application to develop is crucial to earn a target population's favor (McWherter and Gowell, 2012).

Native applications are specifically designed for mobile devices and are installed onto the device (Viswanathan, 2015). They can make use of the local functionalities of the mobile devices, e.g. camera, microphone and so on. Companies may find a native application is a good fit when they need to provide service offline. For example, if the application has the function to download pictures and articles and allow users to access them later, it should be built as a native application. If the developers want to notify the user and expect an immediate response, such as alert for an event, an arrival of a new message from the app, etc., native applications are the choice (McWherter and Gowell, 2012).

Web applications are Internet-enabled apps using browsers to access them without the need to be downloaded onto the device (Viswanathan, 2015). Instead of caching data on the device to allow offline access, web applications direct users to websites. Web applications require less time for development, since they require no approval process in the marketplace and can run on cross-platform, which means it applies to all platforms without creating different versions for each specific mobile operating system: iOS, Android, Blackberry OS and so on. Along with easy maintenance, web applications are best for the companies that need to update the application frequently (McWherter and Gowell, 2012).

While developers are debating over which form of mobile application is a better choice, Asay (2015) proposed a third choice: hybrid apps. He asserted that the debate over native or web application is meaningless, for the ultimate goal is to develop a good mobile application. A hybrid application is built combining the technologies used in native and web application: a combination of HTML, CSS and Javascript. It has access to native functionalities while utilizing the web view. Companies and organizations will want to develop a hybrid application when they want access to the local functionalities as well as distributing the app on a marketplace, while targeting different

platforms. An example is Instagram, which provides a web view while enabling users to access the camera (Bristowe, 2015). It is not worth drawing a line to differentiate between the two when it is possible to choose a hybrid, which makes up for the shortages of one form by using the advantages of the other (Asay, 2015).

2.5.2 Mobile Applications for Humans

In order for a mobile system to be practical and successful, it has to fulfill criteria set by users' and organizations' expectations. These expectations apply regardless of the purpose of the application.

A proper mobile application that addresses the difficulties associated with working as a team must present, at a minimum, the same efficiency of the interface that can be accessed with a personal computer. A 2012 study noted that if a user can accomplish a task from an application that would normally be done from a desktop device, the use of the application will increase over time, potentially surpassing that of desktop usage (Wong, 2012).

In order to get to this point, the mobile application must be attractive and personable. Miguel Redondo (2009) provides some insight into the importance of the user interface. According to him, a good mobile application should be easy to use. Mobile systems have become excellent for children due to their intuitive interfaces. Regardless of the target market, few people will want to sit down and read an instruction manual for a mobile app. We explored this further in an interview with Gary Pollice, a Computer Science Professor of Practice at WPI. In this exchange (personal communication, April 14, 2015), he argued that care should be taken to ensure that a solution does not cause sensory overload in the user. By presenting the user with *too much* information, an app can diminish the user's ability to filter out information useful to him or her

from “noise”-- notifications that do not provide them with relevant information. As such, the superior solution is one that is simple in both use and function. By avoiding doing “too much”, the solution can maximize its usefulness to its users.

It is important to recognize that any recommended mobile app or mobile site for use by Financial University researchers may not mimic the full desktop webpage of FinLab Wiki, or other online repositories of Financial University. This is consistent with the findings of the mobile site of the Burritt Library at Central Connecticut State University (Iglesias, 2011); rather than simply converting the website site of the library into a mobile application, the developers found that it was more effective to focus on a few core features. Likewise, a proper solution will provide its own unique feature set based on expectations of the users.

2.5.3 User Experience and Usability

In order to make a mobile application enjoyable to the user, it helps greatly to embrace design patterns that make the user feel good. Fortunately, this is a well investigated practice: Google (2015a) publishes a guide with its Android SDK that outlines design principles to be employed when developing for Android: the Android Design Principles (ADP). However, these principles are not limited just to Android; the ideals identified in the ADP can be applied to any platform of mobile application development. These design principles focus around three major aspects: **impress**, **simplify**, and **encourage**.

Impress

According to this principle, the ADP specifies that appearance matters (Google, Inc., 2015a, para 2). While impossible to define what beautiful means in the context of a particular mobile application, there are a number of things that give the impression of quality. Subtle

animations, intuitive interfaces, and personalized content all contribute to the overall user experience. For example, rather than having transitions between screens of an application occur instantly, a short transitional animation makes the action appear more natural, and thus, more attractive.

Simplify

Of the three major factors, the requirement to simplify is the most important by far. However, it can be reduced to a simple summary: never show the user more than is needed (Google. Inc., 2015a). Long sentences, extra controls that are rarely needed, all of these add to the perceived complexity of the application, making it intimidating for the user to learn. By using brief, concise statements, pictures if possible, and limiting the readily available buttons to only the most frequently used, the application gives the impression of being easy to use. This falls in line with the ADP's suggestion of "decide for me, but let me have the final say" (Google. Inc., 2015a, para 8). The application should take its best guess at what the user will want to do, but not prevent the user from doing something else if so desired.

Encourage

Finally, no users want to use a mobile application that makes them feel bad. Breaking complex tasks up into a series of simple ones, with positive encouragement in between goes a long way in making the user feel like a professional (Google, Inc., 2015a). Furthermore, by allowing the user to accomplish difficult tasks with relatively little input, the user feels empowered by the application, and as a result, is more likely to enjoy using it.

2.6 Moving Forward

Having determined that smartphones represent a viable option for encouraging research activity, as well as having identified the most common features of successful mobile applications with functionality similar to the objectives of this project, our team was prepared to investigate the specific needs of our sponsor. To improve the ability of researchers to collaborate, mobile devices such as mobile phones and tablets were considered. As can be seen in this chapter, usage of smartphones on both a global scale and within Russia specifically are on the rise. Compared to similar systems such as desktop computers and laptops, these devices provide users with easy access to the Internet with lighter weight and fewer constraints, not to mention that for some, mobile devices are preferred to PCs when it comes to Internet usage (Murtagh, 2014). As such, a mobile application became a particularly attractive potential solution to our sponsor's problems. Given this, we have also identified what characteristics are most important in quality and usable mobile applications.

Smartphones present a fantastic opportunity for researchers and business people alike to improve their work efficiency (Murphy, 2010). By allowing these individuals to work in the absence of a dedicated computer workstation, mobile devices permit individuals to communicate and work together with far fewer needs. In the next chapter we will explain how we determined what the best mobile application for FU researchers could be in order to promote better research collaboration and better quality research.

3. Methodology

The goal of our project was to develop a mobile application by which researchers could connect and collaborate. This mobile app was to assist The Financial University under the Government of the Russian Federation by enhancing communication among students and faculty in order to increase their research productivity and publication output. Mobile device platforms were chosen as a potential medium to facilitate an expansion of communication among researchers, as these devices have become widely used in Russia. In order to determine the requirements of this mobile application, our team developed the following objectives:

1. Identify target market.
2. Identify difficulties with carrying out research.
3. Identify possible ways to overcome difficulties and improve research output and quality.
4. Identify explicit and implicit features of a mobile application for use by FU researchers.
5. Identify possibilities for further implementation of the application.

The project was divided into three stages, data collection (objectives 1, 2, and 3), analysis (objective 4), and prototype development (objective 5). The following sections detail the methods used to gather and analyze the necessary information to achieve our objectives.

Objectives 1, 2, and 3 all shared common methods for data collection. Information was collected from Financial University affiliates through strategies including focus groups, and interviews. This research was conducted in collaboration with two other Financial University Collaborative Research teams who focused on Online Platforms and Gamification.

Six focus groups of six participants each were conducted in the Financial University's Bloomberg Lab. The protocol used for this research can be seen in Appendix J. Each session took 40 minutes. These sessions were assembled by students of the International Finance Faculty at

Financial University. Students from several faculties, including International Finance and International Economic Relations participated in these sessions. Focus groups allowed us to collect information from Financial University professors, master's students, and bachelor's degree students. The focus groups served as a test of our previous theories, ideas, and hypotheses regarding our project.

Interviews were conducted with the Financial University's Professor Alexander Didenko, dean of International Economic Relations faculty, and Vladimir Soloviev, IT Director. See interview protocols in Appendices F and H. Interviews with these individuals allowed us to gather details about the administration of the Financial University and information about the Financial University computer infrastructure, respectively. This information was then used to complement our findings from the focus groups and ensure that we constructed a survey appropriate for our target population at the Financial University.

Finally, a survey was undertaken to broaden the scope of the knowledge collected from our focus groups and interviews by using opinions from a more representative sample of the Financial University research population to extract the features which would be most beneficial for them in a mobile application. Expectations were that the survey would collect feedback from 350 university affiliates from a population of about 10,000. The survey was sent to Financial University students and faculty via electronic mail and hosted on the Qualtrics platform. The survey was made available in the Russian language with help of Financial University students. Unfortunately, due to a number of miscommunications and an overall lack of time, the survey was never realized. The survey questionnaire can be viewed in Appendices P and Q.

3.1 Identify target market (data collection)

The first step of our data collection process involved collecting data regarding the researchers of the Financial University. It was of utmost importance to learn about our target audience, since the product and our final suggestions had to include specifications of any features desired by the users: the researchers. Since we were dealing with a large population, we wanted to ensure that all voices were represented.

Target market data was collected via a few questions in the aforementioned focus groups. These questions included “What sort of research do you do?” and “How do you find your research partners?” This line of questioning allowed us to identify the workflow of most Financial University research within groups of professors and students of differing faculties. Despite differences in demographics, these questions yielded consistent market data.

Additionally, interviews regarding the Financial University’s infrastructure and organization allowed us to build upon our understanding of our target population. We collected infrastructural data with questions such as “What software tools are provided by the University?” This type of question allowed us to understand what is available to researchers at the Financial University. Additionally, some useful information was collected using the question “Can you tell us about the structure of research of the Financial University?” Based upon this information, we were able to understand pre-existing structures in place at the university. We were able to tailor our research in order to seek enhancement of these widely utilized strategies rather than replacing them entirely.

3.2 Identify difficulties with carrying out research (data collection)

Likely some of the most important data, existing difficulties with carrying out research, were identified using the aforementioned focus groups and interviews. This data enabled our project to evaluate existing challenges to research at the Financial University. Focus groups and the assortment of different demographics involved in them enabled us to identify the obstacles to research from several different student groups and even a few professors. Using simple questions such as "What are the factors that block you from creating and publishing papers?" yielded useful results. This, in combination with the same questioning in the aforementioned interviews, allowed us to evaluate potential methods of improving the quality of research at the Financial University.

3.3 Identify possible ways to improve research output and quality (data collection)

Finally, our data collection phase ended once we were able to identify what researchers thought might improve their situation. These included potential ways to improve research output and quality, while removing the roadblocks identified by using the methods mentioned in Section 3.2. This information was collected primarily using focus groups. We first informed the participants that a mobile application is an item of interest for our research. Then, we asked the question: "What features would be useful in this?" To ensure that the question was clear, we provided an example feature: "a function that helps you find researchers with similar interests." This question collected a significant amount of information regarding expectations from a mobile application and gave us hope that we were on the right path.

Overall, the depth of our research served to identify explicit (suggested directly) and implicit (identified through comparison to explicit requirements and workflow) mobile application

product requirements from potential users of the collaborative research platform. Additionally, it provided insight into the reasons working for and against research collaboration at Financial University.

3.4 Identify explicit and implicit features of mobile application (analysis)

We identified the features required of the mobile application by analyzing the needs of the prospective users, the Financial University faculty and students. Most of these parties were familiar with tools used to conduct research in a collaborative environment such as e-mail, Google Docs, etc. This meant that it was of utmost importance to develop a software with a unique and compelling set of features. Keeping this in mind, we translated what the users do and need into what the software should do. From focus groups and responses to a simple questionnaire, we obtained a list of generic expectations. These expectations became functions that the software should be able to perform. In order for these to become actionable items, we had to adjust them according to any technical constraints by looking at usability guidelines published by large, highly successful corporations such as Apple (2015) and Google (2015a), makers of the iOS and Android mobile operating systems, respectively. Generally, analysis of the collected data from Sections 3.1 – 3.3 included the following objectives:

1. Determine what resource the user is trying to access;
2. Identify possible routes to that resource;
3. Determine the ideal workflow to obtain the resource;
4. Develop a concise user story of the following format: “As a user of this mobile application, I want to [action] so that I can [expected result].” For example, “As a student researcher, I want to be able to enter text into a search field so that I can quickly find articles containing specific keywords.”

With an understanding of the required functionalities of this mobile application, we carefully reviewed well-established app marketplaces like Google Play and Apple AppStore. We focused on websites of other universities such as Rutgers (2015), Harvard (2015), and MIT (2015). We discovered that there is a wealth of apps that may satisfy the previously identified features list. In order to compare these applications, we analyzed each app's respective features and compiled them into a matrix like the sample seen in Table 3.1.

Table 3.1: Matrix for application feature comparison

	App 1	App 2
Feature 1	X	X
Feature 2		X

An 'X' denoted that the application in each column contained a functionality represented by features on the left side. This type of matrix allowed us to find the current capabilities of available marketplace applications. Ultimately, we found an application with a feature-set similar to the identified features needed by FU researchers. This application serves as a baseline for comparison and is discussed further in the Results & Analysis chapter.

3.5 Explore possibilities for further implementation of software

The ultimate goal of our project was to provide guidelines for the implementation of a mobile application that would facilitate increased and improved research production at FU. The development process will be executed and completed by the Financial University, as the involved parties see fit. However, there was sufficient time to develop a small prototype as an example for the Financial University.

In order to use our time efficiently, we utilized a development technique referred to as Scrum. Every minute of our project was significant, so Scrum is a strong choice. It favors rapid prototyping and high flexibility to changing requirements. Each requirement we identified from our research translated to a specific objective to be achieved by the team within a specified amount of time. After each of these periods, called "sprints" in Scrum, the team evaluated its current position, where it should be, and what work remained, and if any of the goals had changed, we would re-assess what work each member would take on for the next sprint. According to the 9th Annual State of Agile Survey (VersionOne, Inc., 2015), approximately 53% of software development companies now rely on Scrum to manage their software development cycle. Even if our prototype was used only for demonstration purposes, it would allow us to truly identify guidelines for Financial University developers.

The final step was to ensure that the solution can be implemented with minimal problems. We created a detailed guide to ensure that Financial University development teams could pick up the project where our team left off. In order to do this, we went back to each of the requirements identified earlier and created documentation that explains in great detail how to achieve that objective using the mobile solution. This was as simple as explaining with words, or as complex as creating flowcharts detailing every action that must be taken.

Results from our focus groups, interviews, and mobile application research are presented in the next chapter. Additionally, that chapter includes a description of a potentially usable mobile application for the Financial University environment.

4. Project Results and Analysis

Our research identified a few key areas where the Financial University may take action to strengthen research collaboration. Our findings are discussed in the sections below. These findings reflect on our research into mobile device penetration in Russia, the existing research process at the Financial University, and remarks on the collaborative process. Additionally, we investigated tools that are already used at the University. Finally, a combination of these pieces is used to develop some mobile application requirements which can be used to forward the Financial University's mobile application research.

4.1 Mobile Device Penetration

Observations made in interviews and focus groups conducted at the Financial University found that almost every individual owned either a smartphone or tablet device. Overall, market share was even between iOS and Android devices. We have found that these devices are preferred by researchers as a result of their lighter weight and longer battery life. This lends credibility to the claim that a tool on this platform may enjoy greater use than a desktop-bound equivalent.

Additionally, observations of day to day life in the Moscow region reinforced our expectations of mobile device adoption. Cellular coverage is consistently expanding, and Mobile TeleSystems' (2015a) coverage map reveals an extensive and fast 4G LTE network in most cities, including Moscow and Saint Petersburg (see figure 4.1). Additionally, wireless internet access exists in many locations in Moscow, provided for free by companies or organizations.

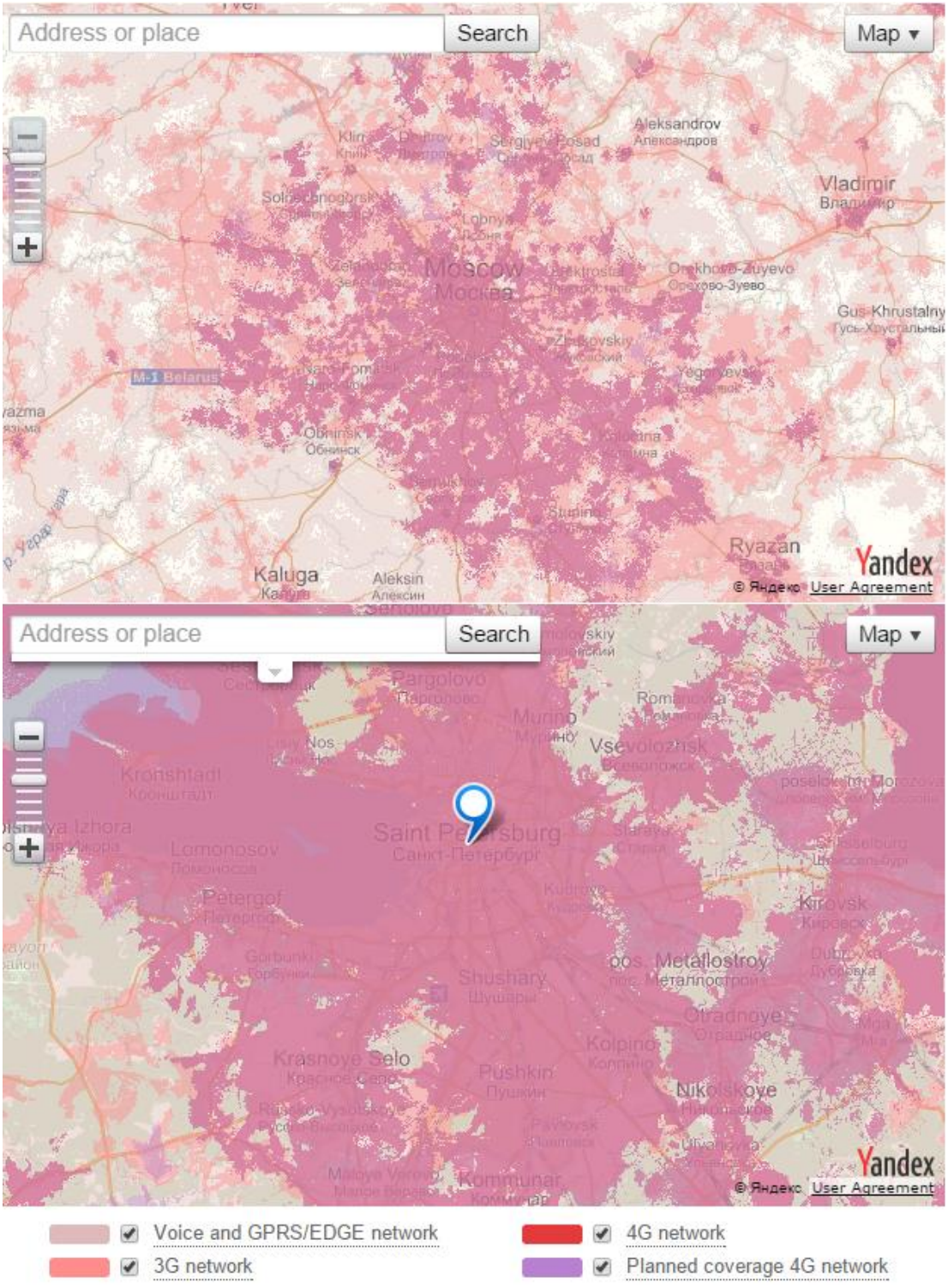

Figure 4.1: Cellular Network Coverage in Greater Moscow and St. Petersburg

(Mobile Telesystems, 2015a).

4.2 Research Process at Financial University

Focus groups and interviews revealed that the researcher population at the Financial University is diverse. First-year students have limited experience with research, whereas third-year students have often written a few papers as course assignments only. Few students have had papers published in scholarly journals. Faculty in the university reported that they are obliged to publish papers. All of these groups reported that finding a hard-working research partner can be difficult.

Professors of the Financial University suggested that when working with undergraduate and graduate students, research teams are put together in one of three ways:

1. Professors may request a list of students with a general research focus from the university administration and invite students from this list to collaborate.
2. Professors may invite students whom they personally know to collaborate on research.
3. A professor announces a research opportunity to his or her class, and the students must then take the initiative to voluntarily join this research project.

In general, collaboration appears to be advantageous for affiliates of the Financial University. By supervising student research, professors can complete an obligatory publishing requirement. Students enjoy the concept of publishing and are interested in it. Some students suggested that quantity was preferred over quality in some cases. Some Russian journals can be paid for an article to be published, foregoing any peer review or strict quality standards.

4.3 Remarks on the Collaborative Process

We sought to determine *how* researchers worked with one another. Most often, when working with other researchers, the pattern for work was to "divide and conquer". The group divided the task into smaller tasks and gave each person a piece. Individuals would then go and complete this task by themselves, and return their component to an individual designated by the group to assemble the pieces. In this way, assembling documents with massively varying styles into a cohesive document became a formidable task. In attempting to understand why this was the preferred method, we found that there were generally two reasons:

1. Researchers felt a substantial risk of research results being stolen before they could be published. Therefore, researchers had a strong preference for working alone. If they found themselves working in teams, the "divide and conquer" strategy was the work model that most closely approximated working alone.
2. Researchers do not trust the ability of their colleagues. Often, when researchers are working in a group, they do not know anything about their partners. They have no idea how credible/reliable they are. This lack of acquaintance leads to lack of faith in the ability of their teammates, eventually resulting in a strategy that involves the least amount of interaction, which would be "divide and conquer".

The issue here is not that researchers are unable to communicate with one another; all our informants made it clear that they possess reliable, direct lines of communication once they have the contact information of their teammates. Rather, from almost every focus group we conducted, we found that the problem is that it is difficult for these researchers to build strong, effective teams.

As a result, the currently available tools can only help to a certain point; it is clear that something more is needed to fill the gap.

4.4 Collaborative Tools Currently in Use

In order to fill this gap, we sought to first determine which tools researchers already used to accomplish their tasks. In general, we found that younger individuals, such as Master's students and younger professors were more likely to use collaboration tools in general, while their older colleagues tended towards email as a means of communication and file transfer.

Face-to-face communication was mentioned as the most desirable method of exchange in every sample of individuals. Yet, from conducting focus groups, we found that most researchers found this to be impractical and difficult to plan. As an alternative, many of the people most actively involved in research, Master's students and younger professors, preferred Skype or Facebook Messenger for instant messaging, with email used for long-form messaging and formal contacts. The reason these tools were preferred stems from a number of factors. From speaking with students working towards a Master's degree, the common consensus was that these tools are popular among their peers because they support group chat, and allow users to send files to one another quickly. This was echoed in talking with the group of younger professors. However, in almost every other group, email was the standard form of communication. Younger students, such as those in an undergraduate program, preferred email because typically all members had accounts, while older individuals preferred email because of familiarity.

Furthermore, groups that reported more frequent meetings and interaction between co-workers tended towards instant messaging services such as Skype and Facebook Messenger, while

those who reported divide-and-conquer strategies were more likely to make use of email. This fits the model suggested by the participants of the focus groups: those who reported preferring email also reported that they typically attacked a problem via divide-and-conquer. In these groups, email is used until it becomes inefficient, at which point the group will use an instant messaging service.

With regards to storing and sharing data among researchers, Dropbox or Google Drive were commonly used. The reasoning was that these tools were simple, familiar to users, and did not require the teams to set up a central computer to store the files (i.e. everything is handled by either Google or Dropbox). In any situation where teams have more than one or two files to manage, which is almost all of them, one of these solutions has been employed.

In an interview with Vladimir Soloviev (personal communication, September 24, 2015), the Director of Information Technology at the Financial University, he revealed that the university now subscribes to Office 365, a suite including tools such as Microsoft Word, PowerPoint and Excel in addition to more powerful tools like Exchange and SharePoint. University affiliates can now access to a multitude of tools previously unavailable to students and faculty. This suite of tools provides a paid subscription to Microsoft's equivalents to the above: communication applications, file sharing and storage and simultaneous editing of documents. Soloviev stated that he would like to see these tools used more going forward. This suite would allow for interaction among all affiliates of the Financial University, since all students and faculty can have accounts on the Office 365 platform.

Overall, Table 4.1 details what applications Financial University affiliates use for completing various research-related tasks. This table provides points of comparison and allowed us to further evaluate the features of our mobile application.

Table 4.1: Tools used by Financial University affiliates

Functionalities	Applications
File storage	• Dropbox, Google Drive, Office 365
Instant messaging	• Facebook Messenger, Skype, WhatsApp, Facebook, text messages, phone calls, Office 365
File transfer	• Facebook Messenger, Email, Office 365
Group chat	• Facebook messenger, Skype, Email, Office 365
Find contact information	• Facebook, Skype, Email

As can be seen in Table 4.1, the applications currently in use each solve one of two general problems: communication or file management. Although everything in our research and derived from our focus groups and interviews indicated that team composition can affect the performance of a team in a major way, there is not a single piece of software in use to facilitate this. As such, our team outlined the features for a mobile application to address this specific problem, outlined below.

4.5 Mobile Application Requirements

Cross-sectional data taken from the population of the Financial University revealed that users, while having somewhat differing needs, possess similar core requirements.

Ultimately, in every focus group, the participants warned against duplication of effort. There are already many tools that provide file sharing; likewise, there are just as many that provide instant messaging and chat. As such, it would do the researchers of the University no good to re-implement these features for two reasons:

1. Currently, researchers tend to be conservative in their technology use, typically favoring the tools that they are already familiar with.
2. An application that attempts to do everything will appear to be too complicated, potentially intimidating new users. This will further discourage adoption by the research community.

Furthermore, in every focus group, we asked participants to identify the largest difficulties in the process of creating and publishing scientific work-- not a single one reported that communication between willing, active coworkers presented an obstacle. As mentioned in Section 4.3, every affiliate of the Financial University has reported that their current communication methods are adequate for their purposes, and there exist much larger obstacles that are impeding their progress. In five out of the six focus groups, the participants stated that it was easier to work alone because quality research partners were too difficult to find. Within the group of young professors, it came to light that common professional networks, such as LinkedIn, fell short due to the lack of participation in the network. Often, individuals have a profile set up simply to display information, with no intent to receive messages through it, much less to meet potential co-researchers. Among the potential obstacles to researchers, this is the most consistent one with no readily available solution.

Our team has designed a prototype application, titled Ignite, to serve as the basis for a complete mobile application. In designing this, our team had three main objectives:

1. Allow users to browse available projects, and request to join them as a collaborator
2. Provide users with the ability to create their own projects
3. Help users build their professional network by allowing them to browse the profiles of other users

To elaborate, the mobile application will have the following features:

User Profiles

Each user within the application will have a profile that includes two parts: basic information and research information. The basic information includes name, contact information, year in college or position in the university, and a profile picture. The research information details their past research history, feedback from their peers, and a brief introduction about their specialties and research focus. The form of feedback is not yet decided. It can be a few comments, tags or ratings defined by other app users.

User Discovery Process

In order to find potential research partners, the application will include the functionalities to search for researchers by name and receive recommendations on potential connections based on desired specialty and/or by geographic location. The searching function enables researchers to take the initiative to find other researchers with specific specialties or in certain locations. The recommendation function suggests researchers whom the user might be interested in working with. Recommendations might be based on users' search histories and overlapped research focuses. This would help users to build up their research network and get to know people early so that they can save these contacts for their own use or to recommend to other researchers later.

Project Offerings

Each user can create projects within the application. These projects include basic information, such as primary area of focus, overseeing professor, other collaborators, and proposed timeline. The creator of the project can control what sort of users the project will be shown to. For example, they could restrict its visibility by geographic location or by school year (e.g. graduate

student or above). Users can then view these project offerings and request a position on the team. The project owner will then receive a notification with the request and can then view the profile of the requester. At this point, they must either accept or reject the request.

From speaking with the group of young professors, an important feature in this proposed system is that it forces a response from the owner. Often, requests via email can sit unanswered for extended periods of time before being forgotten. By requiring a definitive response one way or another within a set timeframe, it ensures that researchers interested in a project are not ignored or forgotten. Additionally, Ignite should also be advertised as a network explicitly for finding research partners, so the assumption upon installing the application would be that the users will either submit requests and/or respond to them.

Finally, the owner of a project will have the ability to send invitations to users whom they feel are a good fit for their project. Like applying to a project, these users will have a set amount of time within which to respond one way or another.

Integration with SharePoint

While Ignite could be constructed to work independently of any other piece of software, by leveraging the work of the two other IQP teams that worked concurrently with this team at the FU, this application completes the suite of tools provided by their Microsoft SharePoint prototype. As can be seen in Figure 4.2, Ignite makes use of SharePoint in the following ways:

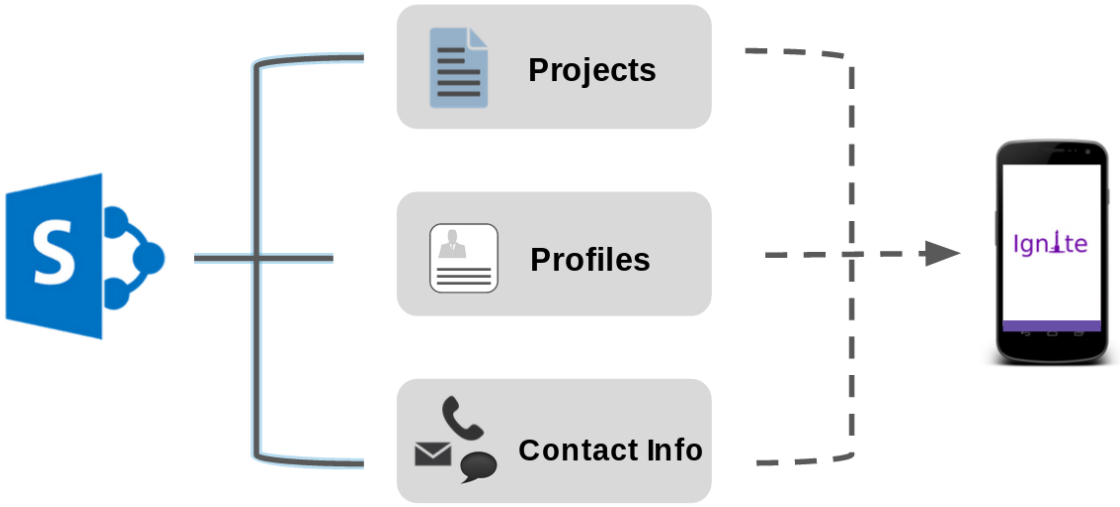

Figure 4.2: SharePoint Integration with Ignite

Primarily, SharePoint serves as the source of all information in Ignite. Projects correspond to SharePoint workspaces, so creating a project in Ignite automatically creates a corresponding workspace. In this way, when a user in Ignite is accepted as a collaborator on a project, they are given access to this workspace, providing them with critical collaborative functionality, such as chat and file management. User profiles are tied to the credentials the user utilizes to access SharePoint, and all profile information is pulled from the information stores in that user's personal page within SharePoint. This includes all relevant contact information, making it easy for users newly-added to a project to contact their colleagues.

4.6 Summary

Our research has revealed that our target market, researchers at the Financial University, including both major researchers and student researchers, have full access to smartphones and the Internet. The biggest obstacle the researchers are facing is to find reliable research partners. They lack a way to reach out to new people who might qualify for their requirements. It is not time and cost efficient to develop a mobile application that include every functionality that the researchers need to collaborate, as this application can leverage Microsoft SharePoint to provide this functionality. Therefore, we have designed the prototype application Ignite to exemplify the features have found to be most critical in our recommendation. These features are to enable researchers to keep a research profile which is open to other users and project information. In this way, this mobile application is designed to be the first step in starting a project. It allows researchers to set up a competent team before transitioning to SharePoint, where the tools in place allow them to work effectively. However, these features were derived from data gathered from researchers at the FU, meaning that this application is targeted only at users within the university. Investigation could be conducted to expand its scope, but this is outside of the realm of this project.

5. Conclusions and Recommendations

The goal of our project was to develop a prototype of a mobile application that fosters collaboration among researchers at the Financial University. In this chapter, we sum up our findings and present our recommendations developed for our sponsor.

5.1 Conclusions

A “divide and conquer” strategy is widely used among researchers at the Financial University when they are working on a team. By breaking down work and assigning small tasks to each team member, the risk of being plagiarized and interactions with partners who may not be trustworthy are reduced. Yet, our research shows that working individually is the most common way of doing research at the Financial University, even though to collaborate with other researchers might be more beneficial.

The reason for the failure of collaboration among researchers does not lie in a lack of communication tools that could be used among partners. Our focus groups reported that once researchers have the correct contact information, they have reliable and familiar ways to get in touch with others. The absence of a tool that satisfies all needs in collaboration did not lead to the problem either. On the contrary, a number of collaborative tools are in use. The researchers have found several free, easy-to-use and reliable tools to transfer and store files and to communicate, e.g. email, Facebook, Skype, etc. As a matter of fact, these tools performed so well that the researchers do not want any substitute for these tools that would take time to adapt to such as a multi-functional application.

The biggest obstacle for researchers is to find a reliable partner. Our focus groups revealed that there are only limited ways to find partners, mainly depending on personal connections. Knowing this, we determined that providing a platform for researchers to get to know each other will improve the situation.

A mobile application is a good fit to serve as the platform for facilitating networking, as our focus group and interview results show that almost everyone at the Financial University has a smartphone. Cellular coverage in Russia is expanding, with 4G networks available in big cities like Moscow and St. Petersburg. With Wi-Fi and data services by carriers, it is convenient to access the internet via mobile devices.

In this mobile application, researchers can keep a research profile that is open to other researchers. With tags on skills, people's expertise and locations, it is easy to search for potential partners. Users can decide whether a user in the search result is reliable by looking at his or her profile as well as using feedback from peers. All users can create projects and maintain a project information page, on which other researchers can know the field, abstract, timeline and overseeing professors for the project. The owners of the project information page can invite other researchers to join the group, and researchers can apply to join a project when they have found a suitable group. A time restriction will be set for project owners and invitees to respond, so that no application or invitation will be ignored.

5.2 Recommendations

Our analysis has shown that using a mobile application such as Ignite is a feasible way for researchers to find suitable partners, thus fostering collaboration and communication among research communities at Financial University. We have made the following recommendations for the Financial University.

a. Develop a mobile application.

The Financial University should develop a mobile application using Ignite as a guide for the user interface. Our sponsor should first communicate with the IT department at Financial University to see if they have the capability to develop a mobile application. If yes, it is the IT department's job to develop the application, costing less and being more reliable and trustworthy. If the IT department is not able to develop the mobile application, we suggest the Financial University contract with a software development company to have the application developed.

b. Require researchers to fill out their personal information page.

In order to make the best use of the mobile application and set up the researcher network, there must be as many users as possible. Since the application is not open to the public, our sponsor must get as many as FU researchers as possible to register and set up their profiles with the intention of actively using it. For this mobile application to gain users, it is crucial that users sending requests not feel that their messages are being ignored; whether this response is a "yes" or "no" is irrelevant.

c. Create a tutorial.

No matter how simple the mobile application is, providing a walk-through tutorial to guide users to set up their accounts and show them what the application can do, in only a few minutes, is beneficial. We suggest the Financial University communicate with the development team to create such a tutorial.

d. Usability test.

Once the first two steps are done, we believe that the Financial University should determine the amount of usage of the mobile application. A usability test should be conducted to get feedback on user experience and user expectations. If the usage is low among researchers, the Financial University should conduct research on why researchers are not using the mobile application, and what may attract them to use the app. If the usage is high, the Financial University should still identify what other features can be added to the app to keep current users satisfied.

5.3 Summary

The mobile application proposed by this team attempts to remedy a major issue identified through our interactions with researchers at the Financial University. By providing the ability to build stronger, more compatible teams, there is strong evidence that this will improve both the quality and quantity of scientific publications created at the FU. When coupled with the proposals of the other two teams that worked alongside this one, the combined proposal offers a complete suite of tools for researchers to employ when conducting their studies. Ultimately, it is

the belief of these teams that such a solution, should the FU choose to implement it, would dramatically improve the capacity of the university for scientific publication.

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Appendices

Appendix A: Sponsor Description

The Financial University under the Government of the Russian Federation (2015a) is a federally funded institution of higher education with campuses throughout Russia. Since its founding in 1919 as Russia's first educational institution of higher education in finance, the Financial University (2015a) has developed into a major research and education center, ranking number 151 in the BRICS ranking by Quacquarelli Symonds (2014). Figure A-1 below displays the complexity of the Financial University's organization. Figure A-2 provides a visual of the leadership structure at the Financial University. According to the official website of the Financial University (2015d), the university now consists of 19 faculties, 192 chairs, 13 institutes, 2 higher schools, 6 research institutes and centers, 3 educational research laboratories and 37 university branches in various Russian regions (paragraph 2). There are 2,887 academic staff and more than 84,000 students at the Financial University (2015a), including full-time, part-time and distant students, among whom 1,064 are international students (paragraph 3). Figure A-3 displays the growth of the Financial University recently up to 2012.

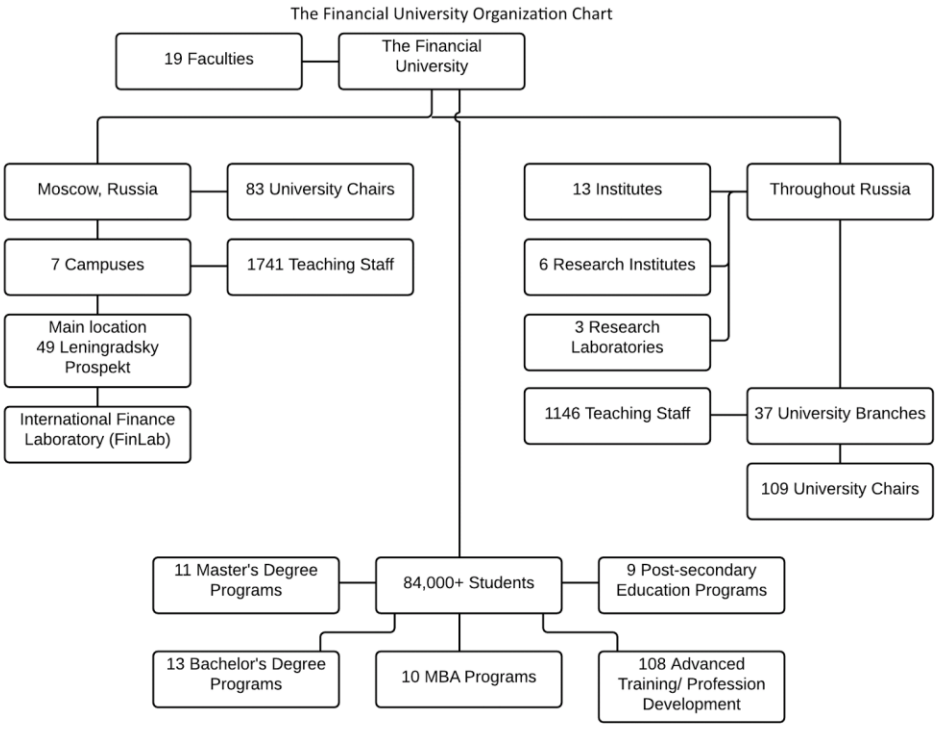

Figure A- 1: Organization of the Financial University

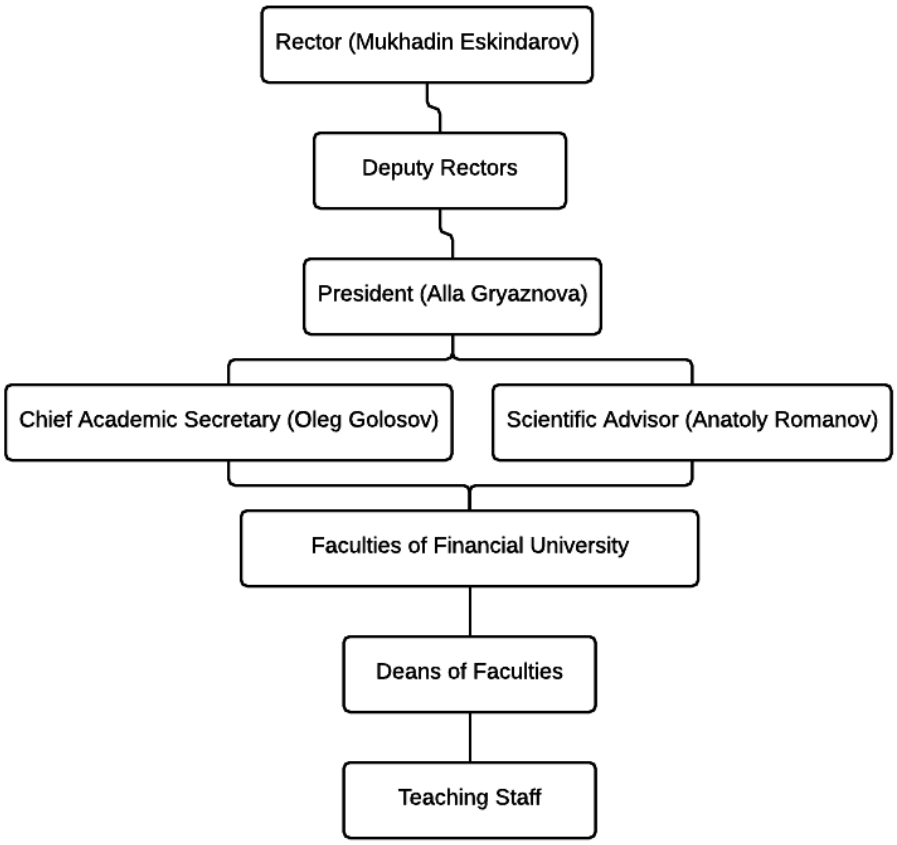

Figure A- 2: Organization of Financial University Leadership

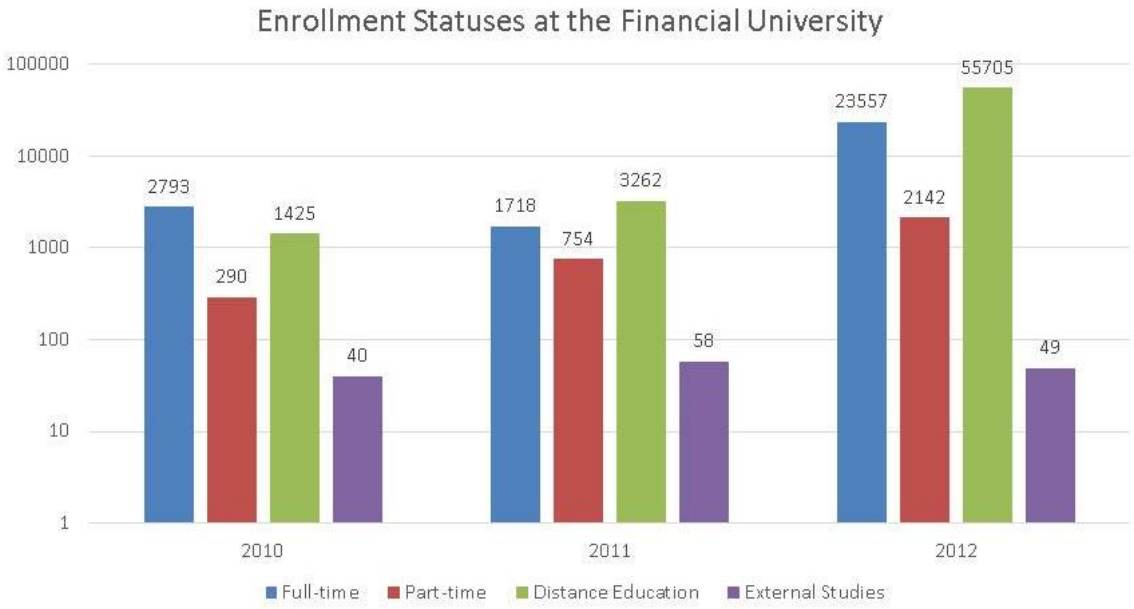

Figure A- 3: Distribution of Student Enrollment status at the Financial University

The International Finance Faculty (IFF, 2015) is one of the 19 faculties within the Financial University (paragraph 1). This faculty offers bachelor's and master's degree programs in Economics concentrating in International Finance. To generate quantitative and empirical knowledge in economics and finance, the IFF operates the International Financial Laboratory (IFL). Through its work, it:

- Develops and maintains research agendas relevant to contemporary challenges in financial and economic science;
- Provides infrastructure for research projects (library, knowledge base, research data, computer cluster, internal research seminars and workgroups);
- Facilitates communication of lab staff with external researchers in the form of finding partners, collaboration on projects, publication of results of lab research in international scientific journals, participation in international scientific events;
- Ensures international standards of quality of research projects done by masters students as their qualification projects;
- Promotes applied science among students of Financial University.

The research at IFL (2015) includes, but is not limited to, Sustainable Development, Energy Economics and Growth, State Capitalism and Public-Private Partnership, and Policy Analysis and Impact Assessment. In conducting research, the IFL researchers use technology such as R project, OxMetrics, MATLAB, etc. (paragraph 1). This project was developed in direct communication with Professor Alexander Didenko, Dean of International Economic Relations.

Appendix B: Nathan Longnecker Interview Protocol

Background to Project:

The Moscow Project Team is looking to help the Financial University in Moscow investigate the potential use of smartphones in collaborating with one another over long distances. We're looking for input on what factors are important for team collaboration, and how we can capitalize on this technology to bring these users closer together.

1. Please describe your experiences with projects where teams need to work together to achieve a common goal? What was the size of the team?

2. What do you think would help team to collaborate?

3. What is your experience with teamwork? For example, your experience in Software Engineering class and/or in Wayfair?

4. What is typically the largest obstacle groups encounter when trying to keep everybody on the same page?

5. Have you used software in the past that has made working on a team easier? What about it helped you?

6. You mentioned using both Dropbox and Google Docs. Why did you choose Dropbox to share files instead of using Google Drive?

7. What do you think of smartphones? How do you think you could use smartphones in facilitating teamwork?

8. What about tablets? Do you think tablets will be better with a larger screen?

9. Features to expect in software?

Appendix C: Nathan Longnecker Interview Notes

Interviewee: Nathan Longnecker, Candidate of Master in Computer Science at WPI.
Tech suite 120 at Gordon Library.
11:10 -11:40 a.m..

Background to Project:

The Moscow Project Team is looking to help the Financial University in Moscow investigate the potential use of smartphones in collaborating with one another over long distances. We're looking for input on what factors are important for team collaboration, and how we can capitalize on this technology to bring these users closer together.

1. Please describe your experiences with projects where teams need to work together to achieve a common goal? What was the size of the team?

Nathan: I have worked in a few teams. The team sizes varied from 4 people to 12 people.

2. What do you think would help team to collaborate?

A ticketing system is typically used in software [development]. Also a to-do list can be helpful for one person to review his or her tasks. Group messaging is also good to keep everybody up to date.

3. What is your experience with teamwork? For example, your experience in Software Engineering class and/or in Wayfair?

In Software Engineering class, I worked in a team of 12. Some people did not show up at meetings constantly because they did not want to contribute. We only assigned work to those who showed up.

There were 7 people on my IQP team. Four WPI students and three Thai students. We did not communicate before our arrival in Thailand, but we have all done preparation beforehand. We spent some time with the Thai students to determine what the workflow should be. Two Thai students did not show good working ethics but they changed the manner at the end of the project.

4. What is typically the largest obstacle groups encounter when trying to keep everybody on the same page?

Keeping everyone up to date is definitely a problem. It's hard to get people to follow up on doing stuff. Also communication is a challenge. Hard to decide to what level of details each member should know of. It slowed down the whole team to get everyone's input to make a

decision. However, when we trust each other and let other people figure out how to do his/her tasks (instead of deciding how to do in a group meeting), the team worked better. In other groups, there is a situation when one person wanted to do everything, and that caused interval problems. It is challenging to decide how to distribute work.

5. Have you used software in the past that has made working on a team easier? What about it helped you?

For my IQP, we used Dropbox, Google Docs and emails. We also created a group Facebook page. We drafted using Google Docs, because it enables people to edit the same file simultaneously. When it comes to sharing files, we use Dropbox. Because Google Docs are not good in formatting, we chose to edit with Microsoft Word and upload it to Dropbox. We also have a folder for each of us. The folders contained the files we needed to work on. Other teammates could access the folders to hand the files they have done working onto the next person. For example, when we all need to proofread an article, I can put it in the next person's folder once I finished reading.

6. You mentioned using both Dropbox and Google Docs. Why did you choose Dropbox to share files instead of using Google Drive?

Google Docs have issues in formatting, and we also have other files to share, e.g. spreadsheets. Dropbox is good for transferring files, however, it did not do a great job in dealing with conflicts [of multiple versions of a same file].

7. What do you think of smartphones? How do you think you could use smartphones in facilitating teamwork?

Smartphones are great. But I got mine (smartphone) after IQP, it did not help [with my projects]. I think it is handy to check to-do list. It is also good for group messaging and preview files stored on drive. I don't think smartphones are powerful enough to do editing. But if it is possible, I don't think the screen has enough room for tool bars like the one in Microsoft Word. And there is no keyboard.

8. What about tablets? Do you think tablets will be better with a larger screen?

I personally think tablets are harder to use compared to computer. But more and more people like to carry tablets with them and use the external keyboards.

9. Features to expect in software?

First of all there should be something like Dropbox to share documents. A problem we have with Dropbox is that there is space limit. Second, it would be good to have edit function like Google Docs. Also group message. Recording feature can be helpful with interview. It is

also good to share videos, audios and other media files. We also had a problem in finding documents. We were not sure the file was in which platform: Google Docs or Dropbox. [A good thing about having these features in one app is that] we don't have to worry about having multiple accounts and dealing with different passwords. And of course the to-do list, which should be easily accessible, for one to review his/her to-do tasks. Also the reviewing system as stated before. When I finish the file I was working on, the file can be sent to the next person to review [following the workflow].

Appendix D: Gary Pollice Interview Protocol

Interviewee: Gary Pollice, Professor of Practice in the WPI Computer Science Dept.

Background to Project:

The Moscow Project Team is looking to help the Financial University in Moscow investigate the potential use of smartphones in collaborating with one another over long distances. We're looking for input on what factors are important for team collaboration, and how we can capitalize on this technology to bring these users closer together.

1. Please describe your experiences with projects where large teams need to work together to achieve a common goal?
2. We know that you have advised an IQP project before. What sort of issues have these IQP teams addressed?
3. What is typically the largest obstacle groups encounter when trying to keep everybody on the same page?
4. How do you see technology fitting into this? For example, does technology typically hinder teams or help them improve efficiency?

a. If it hinders them, what about it is the problem?
b. Otherwise, what are the key improvements it brings?

5. Have you used software in the past that has made working on a team easier? What about it helped you?
6. What do you think of smartphones? What is their potential place in the industry?

Appendix E: Gary Pollice Interview Notes

FinLab Apps
14 April 2015, 9:00
Prof. Pollice's Office

Interviewer: Josh Hebert
Interviewee: Professor Gary Pollice

Interviewer Summary:

I had sent Professor Pollice a very general idea of what the project was about, so the first discussion we had was one to clarify the constraints of the project. I explained that the Financial University in Russia had a network of researchers who were geographically distributed across the continent. The University currently utilizes a wiki to maintain communication between these individuals; however, it is looking to investigate the practicality of smartphones for improving collaboration.

It is this last word that was the most interesting-- Prof. Pollice has suggested that the idea of "collaboration" is often taken incorrectly, as it can mean many different things. For example, in the context of a wiki, collaboration means being able to access and search work done by others. However, it lacks in direct communication. On the other side, something like email or phone provide the synchronous communication, but do little in the way of producing artifacts. So, in this way, one of the priorities for this project should be to establish what sort of collaboration the researchers of the University need. Prof. Pollice provided three examples of types of collaboration tool functionality:

- Find new collaboration i.e. identifying individuals working on similar research and group them
- Allow individuals actively working together to improve efficiency
- Search through past work in order to use it for current work

In this way, it becomes critical to understand the features that the researchers need. However, when I asked what typically stood in the way of teams efficiently working together, Prof. Pollice responded that typically it was not the technology that was the problem, but rather the expectation of how it was to be used. Often what we think would make a good tool turns out to fail entirely.

Surely though, in an ideal world, the perfect tool would do all of these things. Yet, this is not the case. Prof. Pollice and I discussed how having too much functionality can be almost as bad as having not enough. The reasoning was this: there is only so much information a user can take in at once. At some point, the amount of information provided by a tool will become too much, and will begin to become noise to the user. Their ability to filter out useful information and differentiate it from non-relevant bits begins to greatly suffer. Two of the examples Prof. Pollice used to explain this were software developer mailing lists and software called IBM Jazz.

Software developer mailing lists, typically used to keep all maintainers of a piece of software on the same page, have the unfortunate drawback of notifying every single user when one user makes an announcement, even if that announcement is only relevant to a small subset. As a result, the other developers begin to tune these messages out. The mailing list loses efficiency, and the ability of the individuals to collaborate suffers. Similarly, IBM Jazz was a software suite for developers that integrated tools such as instant messaging, team planning, and task tracking into their development environment. However, according to Prof. Pollice, this tool failed to gain traction because the amount of noise it introduced into developer's workflows greatly reduced their ability to work efficiently.

The last item Prof. Pollice and I talked about was how to measure if a particular solution has improved the efficiency of the workers, and if so, how? For this to work, we need to devise a concrete metric for measuring this. For example, if we were measuring the Wiki itself, we could look at a heat map of user interactions. This would let us see which pages users click through, allowing us to see what information is most important on the wiki. This information similarly could be applied to an app, where the measure of efficiency could be the number of taps a user needs to make to complete their desired task. We could compare existing products using this metric by establishing test groups where each group is given a different tool to work with. Using the aggregate of this data, we should be able to determine not only the objective needs of the users, but the most efficient ways to achieve them as well.

As far as follow up information, Prof. Pollice strongly recommended that I look into the journal titled "Computer Supported Cooperative Work (CSCW)" and skim through a few articles. He believes that these articles would be directly pertinent to this project. For other people that may be of interest to interview, he suggested Prof. Jeanine Skorinko of the Psychological Science program here at WPI. In theory, she may be able to help us understand what facilitates collaboration from a humanistic perspective. Additionally, he suggested that we talk to other professors in the business/social studies discipline and inquire what tools they use to collaborate with other researchers.

Appendix F: Sponsor Interview Protocol

Introduction

- We are students from Worcester Polytechnic Institute (WPI) located in Worcester, Massachusetts, USA. Our group is studying in Moscow in order to complete an important degree requirement by completing this research project. Our project involves looking at potential ways to increase research collaboration among researchers within the Financial University, particularly among users of FinLab Wiki. Your responses will help us understand the actual usage of FinLab Wiki and investigate potential ways to improve it.
- Confidentiality:
- Before we start this interview we want to make sure that you give us your permission to use any information you provide in our final report. We will keep your identity anonymous (if desired), and we can stop the interview at any time if you feel uncomfortable. You also do not have to answer any questions that would make you uncomfortable.
- **(*If previously contacted about recording the interview, check once more.)**
- Mission Statement:
- The goal of the project is to determine how to improve Financial University's knowledge and research management software so that the researchers at the Financial University's many campuses can collaborate on their research more effectively and efficiently.

Questions

1. As the new Dean of IER Faculty (International Economic Relations), what do your duties include?

2. Can you tell us about the structure of researchers of the Financial University?
3. Can you tell us about the details of the research situation at this university?

4. What were your original intentions with the WPI project last year? Do you think the project was successful?

5. What do you see as a major roadblock to research productivity: within FU and worldwide?

Appendix G: Sponsor Interview Notes

Introduction:

We are students from Worcester Polytechnic Institute (WPI) located in Worcester, Massachusetts, USA. Our group is studying in Moscow in order to complete an important degree requirement by completing this research project. Our project involves looking at potential ways to increase research collaboration among researchers within the Financial University, particularly among users of FinLab Wiki. Your responses will help us understand the actual usage of FinLab Wiki and investigate potential ways to improve it.

Mission Statement:

The goal of the project is to determine how to improve Financial University's knowledge and research management software so that the researchers at the Financial University's many campuses can collaborate on their research more effectively and efficiently.

Confidentiality:

Before we start this interview we want to make sure that you give us your permission to use any information you provide in our final report. We will keep your identity anonymous (if desired), and we can stop the interview at any time if you feel uncomfortable. You also do not have to answer any questions that would make you uncomfortable.

Conductors of Interview:

Han Junxiu

Ying Lu

Time, Date, and Location:

14:00-15:15, September 21, 2015, Room 315, Financial University

Interviewee:

Name:	***Relationship with FU:***
Prof. Alexander Didenko (Permission given to use name)	Dean of IER Faculty (International Economic Relations)

Interview Questions

1. As the new Dean of IER Faculty (International Economic Relations), what do your duties include?
    - *Everything:*
        - *More specifically, everything that will make students happy.*
        - *Prepare students to write their dissertations*
        - *Instruct students in activities, such as:*
            - *competitions*
            - *conferences*
            - *etc.*
    - *Key Performance Indicators (KPI):*
        - *Short Term:*
            - *Make students desirable to employers*
        - *Long Term:*
            - *Make students influential in the industry/world*

2. Can you tell us about the structure of researchers of the Financial University?
    - *There are two types of researcher at FU: major researchers and student researchers.*
        - *Major Researchers (such as PhDs)*
            - *They teach and do research at FU*
            - *They are paid for researching*
                - *Topics of their research are normally chosen from proposed government plan so that they are funded, as opposed to self-created topics.*
            - *Incentives:*
                - *Personal interest/curiosity*
                - *In order to be re-elected (re-hired) they must produce a certain number of publications*
        - *Student Researchers (Bachelors and Masters):*
            - *Research and take courses at FU*
                - *They must apply for certain research topics which are advertised by the different departments at FU*
            - *Incentives:*
                - *Degree requirements:*
                    - *Grades*
                    - *Dissertations*
                - *Published papers reflect well on student portfolios*
                - *Government is more likely to provide money to student who participates in research*
            - *Do Students work for major researchers?*
                - *Theoretically, yes; however, departments do not trust the students to arrange these relationships and lack time for arranging them themselves.*

3. Can you tell us about the details of the research situation at this university?
    - *Not happy about the current situation:*
        - *Sometimes departments won't change the topic of the research topic year-to-year.*
            - *This is easy for departments and poses less risks to serve as a student's dissertation topic.*
            - *Faculties tend to focus on teaching, not researching due to their tendency to do the minimum amount of work.*
        - *Students will give up when encountering problems in research, causing departments to lose students or have low-quality students.*
            - *Students lack the experience to gauge the difficulty of performing a task, and often take on more than they can handle.*
                - *The Pros and Cons section of FinLab Wiki was intended to help inform students of the risks of certain tasks.*
            - *Didenko blames the reporting culture of research publications in Russia for this problem.*

4. What were your original intentions with the WPI project last year? Do you think the project was successful?
    - *Original intentions:*
        - *To increase the cooperation among FU and match students and professors based on research interests.*
        - *Provide a platform where researchers can share results, and build on each other's findings, thus promoting a higher quality of research output.*
    - *Was it successful?*
        - *Yes*
            - *FinLab Wiki satisfied the original goals; however, it can be more successful.*
            - *FinLab Wiki's major obstacle is lack of usage and not enough people realize its value. It has all of the functionality needed, but is not enticing to researchers.*

5. What do you see as a major roadblock to research productivity: within FU and worldwide?
    - *Within FU:*
        - *Lack of motivation*
        - *Language barriers*
        - *Hard To Find trustworthy cooperators*
        - *Students don't have enough experience:*
            - *They don't put in enough effort to produce high quality research*
            - *They often give up*
            - *Don't know how much they can handle*
    - *Worldwide:*

        - *The Western world of research is ideal compared to the current situation in FU and Russia*

6. For the gamification team, we are looking to provide tangible incentives, such as small research grants, a free trip to a conference in their field, or anything similar. Is this a possibility within the University?
    - *Incentives for major researchers:*
        - *Hard to provide money*
            - *It isn't a good way to encourage researchers; it will spoil them.*
        - *Inviting a professor to a conference might be a bad idea.*
            - *They would have fun instead of working.*
    - *Incentives for students:*
        - *Recognition:*
            - *Certificates*
            - *Diplomas*
        - *Educational grants, such as a reduction in tuition*

Appendix H: IT Representative Interview Protocol

Interviewee's Name and Position: Vladimir I. Soloviev, Director of IT

- Introduction
    - We are students from Worcester Polytechnic Institute (WPI) located in Worcester, Massachusetts, USA. Our group is studying in Moscow in order to complete an important degree requirement by completing this research project. Our project involves looking at potential ways to increase research collaboration among researchers within the Financial University, particularly among users of FinLab Wiki. Your responses will help us understand the actual usage of FinLab Wiki and investigate potential ways to improve it.
- Confidentiality:
    - Before we start this interview we want to make sure that you give us your permission to use any information you provide in our final report. We will keep your identity anonymous (if desired), and we can stop the interview at any time if you feel uncomfortable. You also do not have to answer any questions that would make you uncomfortable.
    - (***If previously contacted about recording the interview, check once more.)**
- Mission Statement:
    - The goal of the project is to determine how to improve Financial University's knowledge and research management software so that the researchers at the Financial University's many campuses can collaborate on their research more effectively and efficiently.

Interview Questions

1. As the head of Information Technology at Financial University, what do your duties include?

2. What software tools are provided by the University?

3. How is your user-base using the tools currently available to them?

4. What are your opinions on using FinLab Wiki as the premiere collaboration tool for Financial University?

5. Which tools do you think Financial University should use for online research collaboration

6. Do you know what incentives/rewards could be offered as part of this collaboration tool?

7. Would it be possible to get your contact information as well as the contact information of other IT faculty members that could potentially answer our questions if we decide to follow-up?

Appendix I: IT Representative Interview Notes

Introduction:

We are students from Worcester Polytechnic Institute (WPI) located in Worcester, Massachusetts, USA. Our group is studying in Moscow in order to complete an important degree requirement by completing this research project. Our project involves looking at potential ways to increase research collaboration among researchers within the Financial University, particularly among users of FinLab Wiki. Your responses will help us understand the actual usage of FinLab Wiki and investigate potential ways to improve it.

Mission Statement:

The goal of the project is to determine how to improve Financial University's knowledge and research management software so that the researchers at the Financial University's many campuses can collaborate on their research more effectively and efficiently.

Confidentiality:

Before we start this interview we want to make sure that you give us your permission to use any information you provide in our final report. We will keep your identity anonymous (if desired), and we can stop the interview at any time if you feel uncomfortable. You also do not have to answer any questions that would make you uncomfortable.

Conductors of Interview:

Dylan Baranik

Justin Vitiello

Time, Date, and Location:

15:00-15:30, September 24, 2015, Bloomberg Lab, Financial University

Interviewee:

Name:	***Relationship with FU:***
Vladimir I. Soloviev (Permission given to use name)	Director of IT

Interview Questions

1. As the head of Information Technology at Financial University, what do your duties include?
    - *Strategic development of information technology:*
        - *Change infrastructure to meet expectations for current and future use*
        - *Develop network/services for user convenience*
        - *Allow home access to FU software*
        - *Constant learning environment for users*
        - *Currently, the system in place is cheaper*
    - *Bringing new technology to education and scientific process at FU:*
        - *Large focus on financial simulator creation*
    - *Transforming research processes:*
        - *Make things more automated*
    - *Inform society:*
        - *Development of new portals to inform society about research and education within FU*

2. What software tools are provided by the University?
    - *Office 365*
    - *Android/iPhone integration*
        - *Access to remote apps to use financial software*

3. How is your user-base using the tools currently available to them?
    - *(Skipped)*

4. What are your opinions on using FinLab Wiki as the premiere collaboration tool for Financial University?
    - *It was a large stepping stone but has limitations.*
    - *Limitations:*
        - *Slow*
        - *Not fully customizable*
    - *FU needs to move forward to another tool.*

5. Which tools do you think Financial University should use for online research collaboration?
    - *SharePoint*
        - *Would be better than FinLab Wiki*
        - *Already have Office 365 at FU*
        - *Easier integration with existing systems; however, there is a lack of SharePoint Developers*
    - *Alfresco*
        - *Content management system that uses Java programming*

6. Do you know what incentives/rewards could be offered as part of this collaboration tool?
    - *Grade students within the system:*
        - *Provide the top 20% with rewards*
            - *Rewards should be dependent on faculty*
    - *For Professors:*
        - *Ratings on system might affect earnings*

7. Would it be possible to get your contact information as well as the contact information of other IT faculty members that could potentially answer our questions if we decide to follow-up?
    - *Email given:*
        - *[Redacted from publication]*

Appendix J: General Focus Group Protocol

Introduction:

We are students from Worcester Polytechnic Institute (WPI) located in Worcester, Massachusetts, USA. Our group is studying in Moscow in order to complete an important academic requirement for graduation. Our project involves determining potential ways to increase research collaboration within the Financial University through the use of an online collaboration platform.

Mission Statement:

The goal of our project is to determine how to improve Financial University's knowledge and research management software so that the researchers at the Financial University's many campuses can collaborate on their research more effectively and efficiently.

Ice Breaker:

Introduce Name, where you are from and one interesting hobby

Focus Group Questions

General Research

1. What sort of research do you do? How often do you write research papers? How often do you publish these papers?

2. How do you find your research partners?

3. What current tools do you use for research collaboration? (Google Docs, Email, etc.). What do you like about these tools? What do you dislike?

4. What are the factors that block you from creating and publishing papers? Are there other, larger obstacles for collaboration?

Mobile Applications

5. We want to design a mobile application to connect researchers with each other. What features would be useful in this? What about a function that helps you find researchers with similar interests? (the network will be internal for now but expandable)

End

6. Is there anything else anyone wants to add that we didn't touch upon?

Appendix K: Undergraduates (IFF) Focus Group Notes

Introduction:

We are students from Worcester Polytechnic Institute (WPI) located in Worcester, Massachusetts, USA. Our group is studying in Moscow in order to complete an important academic requirement for graduation. Our project involves determining potential ways to increase research collaboration within the Financial University (FU) through the use of an online collaboration platform.

Mission Statement:

The goal of our project is to determine how to improve Financial University's knowledge and research management software so that the researchers at the Financial University's many campuses can collaborate on their research more effectively and efficiently.

Conductors of Focus Group:

Dylan Baranik

Elijah Gonzalez

Han Junxiu

Time, Date, and Location:

13:20-14:00, September 16, 2015, Bloomberg Lab, Financial University

Participants: (Skipped)

Name:	***Relationship with FU:***
5 Student Participants	*All IFF Undergraduates

Focus Group Questions

General Research

1. What sort of research do you do? How often do you write research papers? How often do you publish these papers?
    - What sort of research do you do?
        - Trading research, company relations, investor strategies, accounting, analyzing key performances and futures of companies
    - How often do you publish papers?
        - Three of the members had published before
            - Approximately once a year
            - Some have this as a requirement for their degree

2. How do you find your research partners?
    - No standardized process to do this
    - Most people just end up working with familiar acquaintances
    - Sometimes teachers will delegate people to work together
    - Team member makes you more productive, more efficient
        - Perception is that working with more people would lead to a better quality of work

3. What current tools do you use for research collaboration? (Google Docs, Email, etc.). What do you like about these tools? What do you dislike?
    - Not a lot of tools are used, instead there is a lot of face-to-face communication
        - Meeting in person is better than email; phone communication is not preferred
    - Email is common and the preferred method for communication and sharing ideas

4. What are the factors that block you from creating and publishing papers? Are there other, larger obstacles for collaboration?
    - Different standards and requirements for different journals are boring to learn and difficult to deal with
    - Waste time making work appropriate for different magazines with different standards
    - You have to pay to get your work published
    - Collaboration obstacles:
        - Haven’t found an ideal partner
            - Would prefer a partner, but it's difficult to find one
            - process of finding a partner is difficult and can be inconsistent

- Very difficult to find time to work with group members: can delegate to get around this problem, however this commonly leads to people becoming more separated from the rest of the group
- General strategy is talk about tasks to be accomplished face-to-face and then separate to do delegated tasks

Gamification

5. What are the incentives for you to conduct research? If a collaboration platform had rewards based on use (grants for researchers, prizes for students, etc.), would more people use it?
    - Be able to market previous research to companies to provide career opportunities
    - Improve grades, get extra credit
    - Doing research projects helps you learn
    - Scholarships
        - Many aren't compensated, so there is no incentive for these students
        - There are only 9 scholarship students in International Finance Faculty at any given time

Mobile Applications

6. We want to design a mobile application to connect researchers with each other. What features would be useful in this? What about a function that helps you find researchers with similar interests? (the network will be internal for now but expandable)
    - Profile should have all of these things:
        - Photo, resume, spheres of interest, previous works, age, gender, competitions or conferences they are in, magazines published in, future career plans, language, location, notes about themselves, what personality traits are they looking for, skills (programming, etc.) they have and skills they are looking for
        - Everyone has a smartphone ~95% percent

Reproducible Research

7. Are you familiar with the principles of reproducible research? (If no, explain) Would you be willing to incorporate these principles into your research?
    - Somewhat familiar (only one student knew about it)
    - Definitely, useful for teachers as well
    - Teachers can control working process, have to show your results
    - Useful for future publications

End

8. Is there anything else anyone wants to add that we didn't touch upon?
    - *(Skipped)*

Appendix L: Undergraduates (IER) Focus Group Notes

Introduction:

We are students from Worcester Polytechnic Institute (WPI) located in Worcester, Massachusetts, USA. Our group is studying in Moscow in order to complete an important academic requirement for graduation. Our project involves determining potential ways to increase research collaboration within the Financial University (FU) through the use of an online collaboration platform.

Mission Statement:

The goal of our project is to determine how to improve Financial University's knowledge and research management software so that the researchers at the Financial University's many campuses can collaborate on their research more effectively and efficiently.

Conductors of Focus Group:

Josh Hebert

Qiaoyu Liao

Justin Vitiello

Time, Date, and Location:

15:40-16:10, September 15, 2015, Bloomberg, Financial University

Participants: Three Undergraduates from the Department of International Economic Relations

Focus Group Questions

General Research

1. What sort of research do you do? How often do you write research papers? How often do you publish these papers?
    - *Most research pertains to academic requirements*
    - *Published a couple papers within the University; however, this is a low level/college level of publication*
    - *There isn't a lot of collaboration*

2. How do you find your research partners?

- *Through Professors*
- *Through own personal networks or friends and associates*

3. What current tools do you use for research collaboration? (Google Docs, Email, etc.). What do you like about these tools? What do you dislike?
    - *A majority of research is done individually*
    - *Face-to-face meetings/communication*
    - *Dropbox*
    - *Email*

4. What are the factors that block you from creating and publishing papers? Are there other, larger obstacles for collaboration?
    - *Difficult to find useful material*
        - *Hard to use search engines to find specific information*
        - *Library at FU is complicated to use*
        - *A lot of potential resources cost money*

Mobile Applications

5. We want to design a mobile application to connect researchers with each other. What features would be useful in this? What about a function that helps you find researchers with similar interests? (the network will be internal for now but expandable)
    - *Keep files private to avoid plagiarism*
    - *Implement notification system with file sharing*

End

6. Is there anything else anyone wants to add that we didn't touch upon?
    - *Potential solutions to get people to collaborate*
        - *Insure competitions are fair, otherwise motivation will diminish*
    - *Scholarship*
        - *The current system is not clear enough*
        - *The requirements for scholarships are too high*
        - *Not enough recognition*
    - *Referencing Research:*
        - *There is no Russian standard to do it*

Appendix M: Masters Students Focus Group Notes

Introduction:

We are students from Worcester Polytechnic Institute (WPI) located in Worcester, Massachusetts, USA. Our group is studying in Moscow in order to complete an important academic requirement for graduation. Our project involves determining potential ways to increase research collaboration within the Financial University (FU) through the use of an online collaboration platform.

Mission Statement:

The goal of our project is to determine how to improve Financial University's knowledge and research management software so that the researchers at the Financial University's many campuses can collaborate on their research more effectively and efficiently.

Conductors of Focus Group:

Ying Lu

Christopher Navarro

Nicholas Wong

Time, Date, and Location:

17:00-17:50 September 14, 2015, Bloomberg Lab, Financial University

Participants: Six 1st Year Masters Students

Focus Group Questions

General Research

1. What sort of research do you do? How often do you write research papers? How often do you publish these papers?
    - *What sort of research do you do?*
        - *Corporate findings*
        - *Managing business data*
        - *Master dissertations*
        - *Writing and presenting financial findings*
        - *The study of theory versus practice*

        - *Through the use of Bloomberg*
- *How often do you write research papers?*
    - *Approximately 2 times per semester*
- *How often do you publish these?*
    - *Sometimes, more so when there is a competition.*
        - *Some members had published up to 30 articles*
    - *There is a large gap between the quality and quantity of published papers.*

2. How do you find your research partners?
    - *Scientific advisors*
    - *Addressing a professor who is an expert in your research topic.*
    - *Through student societies*
        - *Every faculty has a local society that can help find you partners.*
    - *The students mentioned a lot of individual work is required to find research partners.*

3. What current tools do you use for research collaboration? (Google Docs, Email, etc.). What do you like about these tools? What do you dislike?
    - *What current tools do you use for collaboration?*
        - *Social networks*
        - *Skype*
        - *Email*
        - *Dropbox*
        - *Google Drive*
        - *FinLab Wiki*
    - *What do you like about them?*
        - *Ability to send documents*
        - *Version control*
        - *Easy to use*
        - *Privacy control*
        - *Chat system capability*
    - *What do you dislike?*
        - *A lot of the dislikes focused around FinLab Wiki*
            - *FinLab Wiki:*
                - *Not user friendly*
                - *Sometimes broke with file upload*
                - *No privacy*
                - *No file or message sending*

4. What are the factors that block you from creating and publishing papers? Are there other, larger obstacles for collaboration?
    - *Other priorities*
    - *Finding the right people to work with*

Mobile Applications

5. We want to design a mobile application to connect researchers with each other. What features would be useful in this? What about a function that helps you find researchers with similar interests? (the network will be internal for now but expandable)
    - *Features:*
        - *File sharing*
        - *Chat*
        - *Newsfeed/timeline of current work*
        - *Ability to follow other researchers*

End

6. Is there anything else anyone wants to add that we didn't touch upon?
    - Exchanged emails
    - Handed out paper survey to participants

Appendix N: Professors Focus Group Notes

Introduction:

We are students from Worcester Polytechnic Institute (WPI) located in Worcester, Massachusetts, USA. Our group is studying in Moscow in order to complete an important academic requirement for graduation. Our project involves determining potential ways to increase research collaboration within the Financial University (FU) through the use of an online collaboration platform.

Mission Statement:

The goal of our project is to determine how to improve Financial University's knowledge and research management software so that the researchers at the Financial University's many campuses can collaborate on their research more effectively and efficiently.

Conductors of Focus Group:

Josh Hebert

Qiaoyu Liao

Justin Vitiello

Time, Date, and Location:

13:40-14:23, September 15, 2015, Bloomberg Lab, Financial University

Participants: Two Professors of the Financial University

Focus Group Questions

General Research

1. What sort of research do you do? How often do you write research papers? How often do you publish these papers?
    - *What sort of research do you do?*
        - *Articles in foreign and Russian journals*
        - *Conference and roundtable meetings*
            - *For degrees, PhD, etc.*
        - *Supervise students articles*
        - *Professional work related to expertise*
    - *There is difference between Russian and international journals*

- *Quality for international journals is higher*

2. How do you find your research partners?
    - *Through Dean's office resources*
        - *Masters:*
            - *need to submit their working area to dean's office and professors will assign them to projects*
        - *Bachelors:*
            - *Professors create offers involving different research topics, and students apply for them*
        - *Professors will supervise 5-7 students, and then build a team*
    - *Need to keep in touch with Prof. and Dean's office to get information for available research opportunities*

3. What current tools do you use for research collaboration? (Google Docs, Email, etc.). What do you like about these tools? What do you dislike?
    - *Google drive/Email:*
        - *There is no time to study other platforms; Drive is simple and open source*
    - *Alternatives:*
        - *Dropbox for students*

4. What are the factors that block you from creating and publishing papers? Are there other, larger obstacles for collaboration?
    - *Supervisors need to be motivated so that students will publish consistently; however, it is easier to work with an individual student.*
        - *More efficient to work alone*
    - *Journals may not accept a paper*
    - *Time constraints*
    - *Lack of interest/motivation from students*

Mobile Applications

5. We want to design a mobile application to connect researchers with each other. What features would be useful in this? What about a function that helps you find researchers with similar interests? (the network will be internal for now but expandable)
    - *Have a progress bar for each researcher*
        - *Researchers will usually not share their data and progress*
        - *This will create competition*
        - *Easy to measure*
    - *Why avoid sharing?*
        - *Plagiarism*
        - *Afraid to have similar work to present at the same time*
        - *Want to be unique and individual*

End

6. Is there anything else anyone wants to add that we didn't touch upon?
    - *System that allows students to continue research from previous students*
        - *No research focus with 1st and 2nd year students*
            - *Teach students about researching earlier (publication and writing)*
        - *FU is an educational university, so there shouldn't be too much focus on research*
    - *Contact Info:*
        - *Can be found at Room 343*

Appendix O: Young Scientist Representatives Focus Group Notes

Introduction:

We are students from Worcester Polytechnic Institute (WPI) located in Worcester, Massachusetts, USA. Our group is studying in Moscow in order to complete an important academic requirement for graduation. Our project involves determining potential ways to increase research collaboration within the Financial University (FU) through the use of an online collaboration platform.

Mission Statement:

The goal of our project is to determine how to improve Financial University's knowledge and research management software so that the researchers at the Financial University's many campuses can collaborate on their research more effectively and efficiently.

Conductors of Focus Group:

Josh Hebert

Elijah Gonzalez

Justin Vitiello

Time, Date, and Location:

16:00-17:15, September 25, 2015, Bloomberg Lab, Financial University

Participants: Five Young Scientists Representatives

Focus Group Questions

General Research

1. What sort of research do you do? How often do you write research papers? How often do you publish these papers?
    - *Opportunities for publishing to major journal several times per year, and one or two magazine publications*
    - *dependent on workload, however, it is required to publish a number per year*
        - *Sometimes 1 or 2 per year (below average), 5 or 6 average, up to 10*
        - *If they take part in a round table, they will publish proceedings*
    - *Collaborative research is often easier to publish, as co-authors may have connections*
        - *More authors, more connections*
        - *If you do not have particularly strong network, it is better to collaborate*

2. How do you find your research partners?
    - *Through own personal networks*

3. What current tools do you use for research collaboration? (Google Docs, Email, etc.). What do you like about these tools? What do you dislike?
    - *Russia is very conservative in this respective*
        - *WhatsApp, Skype, text messaging very popular*
        - *Typical to meet once per month to divide work*
            - *However, there are teams that meet far more often*

4. What are the factors that block you from creating and publishing papers? Are there other, larger obstacles for collaboration?
    - *No real obstacles to publishing in Russia*
        - *The main issue with Russian journals is the quality. They tend to not have high quality articles*
    - *International articles*
        - *Charge money just to look at article. Does not guarantee publication*
        - *In Russia, publication is guaranteed if the fee is paid*

Mobile Applications

5. We want to design a mobile application to connect researchers with each other. What features would be useful in this? What about a function that helps you find researchers with similar interests? (the network will be internal for now but expandable)
    - *The idea is good. Should not be just a tool to view papers; plenty of tools that do that.*
        - *Should force public profiles and focus on providing contact information*
    - *Will likely only be popular in major cities with colleges/universities*
    - *Should establish a precedent that if you have an account, you are expected to reply*
    - *Replying should prevent ambiguity. Responses should be yes or no*

End

6. Is there anything else anyone wants to add that we didn't touch upon?
    - *(Skipped)*

Appendix P: Survey Protocol in English, not conducted

Financial University under the government of the Russian Federation

Questionnaire

Dear respondent,

We ask you to participate in a sociological survey about the integration of the students of the Financial University under the government of the Russian Federation in the international scientific life. We guarantee you the full confidentiality of your answers, which will subsequently be used only in conjunction with the answers of all other respondents.

How to fill out the questionnaire: carefully read the questions and circle the answer that best matches your point of view. If none of the options fit your point of view, please give your opinion on the following line.

Your answers will be used only for research purposes. If you are interested, we will provide you with the results of the survey.

We appreciate your participation!

Moscow, 2015.

Demographic Information

1. YOUR SEX

Male Female

2. WHAT IS YOUR ROLE AT FINANCIAL UNIVERSITY?

Student – bachelor	1st year	2nd year	3rd year	4th year
Student – master	1st year		2nd year	
Postgraduate student	1st year	2nd year		3rd year
Professor				
Scientist				

General questions

3. WHY IS IT IMPORTANT FOR YOUTH (STUDENTS) TO ENGAGE IN SCIENTIFIC ACTIVITY? (CIRCLE ALL THAT APPLY)

A. It is necessary for youth to have an understanding of science in this day and age
B. They will need these skills in the work environment
C. To meet the requirements and demands of university, department, professors, etc.
D. Personal desire
E. I do not know
F. Other (please, answer on the line provided)_____

4. RATE YOUR ACTIVITY IN SCIENTIFIC LIFE (From 1 till 5, where 1 – min, 5 – max)

1	2	3	4	5

5. HOW OFTEN DO YOU USE SCIENTIFIC LITERATURE FROM THE INTERNET?

A. Often
B. Only when necessary
C. Rarely
D. I prefer to use only written texts

6. DO YOU HAVE YOUR OWN PROFILE ON ANY PLATFORMS?

A. YES, in Russian platform
B. YES, in foreign platform
C. YES, in Russian and foreign platforms
D. NO, but I would like to create a profile
E. NO, I do not desire the profile

7. IN WHICH FORMS ARE YOU READY TO PARTICIPATE IN SCIENTIFIC ACTIVITY? (CIRCLE ALL THAT APPLY)

A. Publications in written texts/journals
B. Publication in web-journals

C. Research activity
D. Presentations at conferences, discussions
E. Activity to acquire grants
F. Other (please, answer on the line provided)_____
_____
G. Nowhere

8. LIST THE REASONS FOR YOUR INTEREST IN SCIENTIFIC ACTIVITY? (CIRCLE ALL THAT APPLY)

A. Self help
B. Interest in learning/science
C. A desire to improve the world
D. An opportunity for work
E. Other (please, answer on the line provided)_____
_____
F. I am still not ready to engage in scientific activity

9. HOW OFTEN DO YOU PUBLISH YOUR SCIENTIFIC WORK? (**CIRCLE ALL THAT APPLY**)
_____
_____

10. WOULD YOU LIKE TO PUBLISH YOUR SCIENTIFIC WORK MORE OFTEN?

- YES

- NO, I am not interested in publishing my work

- NO, currently I have enough publications

11. ARE YOU PLANNING TO CONTINUE YOUR SCIENTIFIC ACTIVITIES?

- YES

- NO

- I am undecided

12. IN WHICH WEB-PLATFORM(S) DO YOU PUBLISH YOUR SCIENTIFIC WORK? (CIRCLE ALL THAT APPLY)

A. E-library
B. Lambert publisher
C. Scopus
D. Web of Science

E. Other (please, answer on the line provided)

_____

_____

F. I do not publish my scientific work in any platform

G. I did not know about the existence of these platforms

13. IS THERE A PARTICULAR REASON WHY YOU DO NOT PUBLISH YOUR WORK ON WEB-PLATFORMS? (CIRCLE ALL THAT APPLY)

A. The need to translate academic work into a foreign language (for foreign web-platforms)

B. Concerns about copyright infringement

C. The time needed for placement of material

D. The uncertainty in the quality of the scientific work performed

E. I do not know how to do that

F. I do not have scientific work to publish

G. Other (please, answer on the line provided)

_____

14. WHAT ASPECTS OF AN INTERNET PLATFORM WOULD BE IMPORTANT TO YOU? (CIRCLE ALL THAT APPLY)

A. Technical availability of scientific publications

B. Free to use

C. Appropriate topics

D. Open access to scientific papers of colleagues

E. The reliability of saving publications

F. Other (please, answer on the line provided)_____

_____

Financial University under the government of the Russian Federation with Worcester Polytechnic Institute are creating a platform for the dissemination of scientific knowledge: A place where students and researchers can share their scientific work (articles, monographs, books), find colleagues with similar interests, be able to communicate with one another, and create joint projects. This platform should give an opportunity for students and researchers to collaborate with both domestic and foreign colleagues, to follow the news in their disciplines, to communicate directly with leading scientists, and to find resident and scientific leaders for collaboration.

15. DO YOU KNOW ANY OF THESE PLATFORMS? (CIRCLE ALL THAT APPLY)

A. Academia.edu

B. Finlabwiki.org

C. Mendeley.com
D. Researchgate.net
E. Linkedin.com
F. Quizlet.com
G. I know none of them

16. IN YOUR OPINION, WHAT CHARACTERISTICS AND POSSIBILITIES OF THE WEB-SITE ARE REQUIRED FOR THIS PLATFORM? (FROM 1 TILL 5, WHERE 1- MIN, 5- MAX)
(PLEASE GIVE AN ANSWER TO EACH LINE)

Opportunity to communicate (chats)	1	2	3	4	5
Opportunity to freely publish scientific work	1	2	3	4	5
Opportunity to edit your work	1	2	3	4	5
Opportunity to review the works of other participants	1	2	3	4	5
Opportunity to create tags for publications	1	2	3	4	5
Opportunity to “subscribe” to the publications and disciplines you are interested in	1	2	3	4	5
Opportunity to find co-authors for joint projects	1	2	3	4	5
Opportunity to find a list of conferences and scientific events	1	2	3	4	5
Other (please, answer on the line provided)	1	2	3	4	5

Thank you for participating in our survey!

Appendix Q: Survey Protocol in Russian, sent out incorrectly

Финансовый университет при Правительстве РФ

Анкета

Уважаемый участник опроса,

Приглашаем Вас принять участие в социологическом опросе, посвященном вовлеченности студентов Финансового университета в международную научную жизнь. Мы гарантируем полную конфиденциальность Ваших ответов, которые впоследствии будут использованы только в совокупности с ответами других респондентов.

Техника заполнения: прочтите внимательно вопросы анкеты и обведите кружком тот ответ, который наиболее полно совпадает с Вашей точкой зрения. Если ни один из вариантов не соответствует ей, изложите свое мнение на отдельных строках.

Результаты исследования будут использованы в научных целях, и при вашей заинтересованности мы можем предоставить вам результаты проведенного исследования.

Заранее благодарим Вас за сотрудничество!

Москва, 2015

Несколько слов о Вас…

1. ВАШ ПОЛ

A. - мужской
B. - женский

2. В ФИНАНСОВОМ УНИВЕРСИТЕТЕ ВЫ…

Студент – бакалавр	1 курс	2 курс	3 курс	4 курс
Студент – магистр	1 курс	2 курс		
Студент – аспирант	1 курс	2 курс	3 курс	
Преподаватель (ст. преподаватель, доц., профессор)	1 ст.преподаватель	2 доцент	3 профессор	
Научный работник	1 с.н.с.	2 в.н.с.	3 г.н.с.	

3. ПОЧЕМУ ДЛЯ ВАС ВАЖНА НАУЧНАЯ ДЕЯТЕЛЬНОСТЬ? (можно отметить несколько вариантов)

A. это требование времени
B. Эти навыки необходимы в рабочей среде
C. заставляет вуз, кафедры, преподаватели
D. личная потребность
E. не знаю
F. иное(допишите)_____
_____

4. ОЦЕНИТЕ СВОЮ НЫНЕШНЮЮ АКТИВНОСТЬ В НАУЧНОЙ ДЕЯТЕЛЬНОСТИ (ОТ 1 ДО 7, ГДЕ 1- МИНИМАЛЬНОЕ УЧАСТИЕ, А 5 МАКСИМАЛЬНОЕ)

1	2	3	4	5

5. КАК ЧАСТО ВЫ ОБРАЩАЕТЕСЬ К НАУЧНОЙ ЛИТЕРАТУРЕ В ИНТЕРНЕТЕ?

A. - ежедневно
B. - каждые три дня
C. - каждую неделю
D. - иное (пожалуйста уточнит)_____

6. ЕСТЬ ЛИ У ВАС ПРОФАЙЛЫ НА КАКИХ-ЛИБО ПЛАТФОРМАХ?

A. - да, на российских
B. - да, на зарубежных
C. - да, и на российских, и на зарубежных
D. - нет, но хотелось бы
E. -нет, и нет необходимости

7. В КАКОЙ ФОРМЕ ВЫ ГОТОВЫ УЧАСТВОВАТЬ В НАУЧНОЙ ДЕЯТЕЛЬНОСТИ? (можно отметить несколько вариантов)

A. публикации в бумажных журналах
B. публикации в электронных журналах
C. участие в исследовании
D. выступление на конференциях, дискуссиях
E. получение гранта
F. другое (допишите)

_____
_____

G. ни в какой

8. **ПЕРЕЧИСЛИТЕ ПРИЧИНЫ ВАШЕЙ ЗАИНТЕРЕСОВАННОСТИ В НАУЧНОЙ ДЕЯТЕЛЬНОСТИ? (можно отметить несколько вариантов)**

A. самоутверждение
B. интерес к науке, познанию, исследованию
C. желание улучшить мир
D. возможность заработать
E. другое (допишите)

_____
_____

F. пока не готов заниматься научной деятельностью

9. **КАК ЧАСТО ВЫ ПУБЛИКУЕТЕ СВОИ НАУЧНЫЕ РАБОТЫ?**

A. Часто
B. Раз в год
C. Раз в месяц
D. Несколько раз в месяц
E. Иное _____

10. ХОТЕЛИ ЛИ БЫ ВЫ ПУБЛИКОВАТЬСЯ ЧАЩЕ?

A. - да
B. - нет, у меня достаточно публикаций
C. - нет, мне это не интересно

11. ПЛАНИРУЕТЕ ЛИ ВЫ В ДАЛЬНЕЙШЕМ ЗАНИМАТЬСЯ НАУЧНОЙ ДЕЯТЕЛЬНОСТЬЮ?

A. - да
B. - нет

C. - пока не решил

12. Вы предпочитаете работать с партнерами или в одиночку? Почему?

A. С Партнерами , потому что_____

_____

B. Один, потому что_____

_____

C. Нет предпочтения

13. Как вы находите партнеров для работы?

A. Назначенный профессором

B. Работа с друзьями

C. Использование социальных сетей

D. Рекомендуется другом или профессором

E. Другое _____

14. НА КАКИХ ИНТЕРНЕТ-ПЛАТФОРМАХ ВЫ ПУБЛИКУЕТЕСЬ? (МОЖНО ОТМЕТИТЬ НЕСКОЛЬКО ВАРИАНТОВ)

A. E-library
B. Lambert publisher
C. Scopus
D. Web of Science
E. Social Science Research Network (SSRN)
F. Gutenberg
G. другие (допишите)

_____

_____

H. ни на каких
I. я не знаю о существовании таких платформ

15. ЕСЛИ ВЫ НЕ ПОМЕЩАЕТЕ СВОИ ПУБЛИКАЦИИ НА ИНТЕРНЕТЕ, ПО КАКИМ ПРИЧИНАМ?? (можно отметить несколько вариантов)

A. Я публикую свои работы в интернете
B. необходимость переводить научную работу на иностранный язык (для зарубежных веб-платформ)
C. возможность нарушения авторского права
D. публикация занимает много времени
E. затраты времени на размещение материала
F. неуверенность в качестве выполненной работы

G. не знаю как это сделать
H. нечего публиковать, нет работ/идей
I. другое (допишите)

_____
_____

16. КАКИЕ ПЛАТФОРМЫ ВЫ ИСПОЛЬЗУЕТЕ ? (можно отметить несколько вариантов)

A. Academia.edu
B. Finlabwiki.org
C. Mendeley.com
D. Researchgate.net
E. Linkedin.com
F. Facebook
G. VKontakte
H. Skype
I. SSRN
J. Gutenberg
K. Microsoft Sharepoint
L. Google Docs
M. Open Science Framework
N. Quizlet.com

никакие не знаю

17. ЧТО ДЛЯ ВАС МОЖЕТ ЯВЛЯТЬСЯ ПРИОРИТЕТОМ ДЛЯ ПУБЛИКАЦИИ НА ВЕБ-ПЛАТФОРМАХ? (можно отметить несколько вариантов)

A. техническая доступность публикации научной работы на платформе
B. отсутствие платы за публикацию работы
C. подходящая тематика
D. открытый доступ к научным трудам коллег
E. надежность сохранения публикаций
F. другое (допишите)

_____
_____1

Финансовый университет совместно с институтом Worcester Polytechnic Institute (WPI) создает площадку для распространения научного знания, место, где студенты и ученые могли бы обмениваться своими научные работами (статьями, монографиями, книгами), находить коллег по интересам, иметь возможность общаться и создавать совместные проекты. Данная платформа должна дать возможность мгновенной связи с коллегами по всему миру, следить за новостями в своих дисциплинах и напрямую связываться с ведущими учеными, находить резидентов, научных руководителей и соавторов для совместной работы.

18. **КАКИЕ ХАРАКТЕРИСТИКИ И ВОЗМОЖНОСТИ САЙТА, ПО ВАШЕМУ МНЕНИЮ, НЕОБХОДИМЫ ДЛЯ ДАННОЙ ПЛАТФОРМЫ? ОТМЕТЬТЕ ПО 5-БАЛЬНОЙ ШКАЛЕ НЕОБХОДИМОСТЬ ДАННЫХ ОПЦИЙ, ГДЕ 1 – НИЗШАЯ СТЕПЕНЬ, А5 – ВЫСШАЯ СТЕПЕНЬ НЕОБХОДИМОСТИ . (ответы даются по каждой строке)**

Возможность общения (внутренний чат)	1	2	3	4	5
Возможность публикации своих работ	1	2	3	4	5
редактирования своих работ	1	2	3	4	5
Рецензирование работ других участников	1	2	3	4	5
Создание “тегов” публикаций	1	2	3	4	5
Возможность “подписки” на публикации по интересующей Вас дисциплине	1	2	3	4	5
Возможность поиска соавтора для совместной научной работы	1	2	3	4	5
Поиск авторов для совместной публикации	1	2	3	4	5
Перечень конференции и иных научных мероприятий	1	2	3	4	5
Возможность обмениваться файлами с коллегами…..	1	2	3	4	5
Возможность иметь личный профиль	1	2	3	4	5
Временная шкала или прогресс-бар вашей работы	1	2	3	4	5
Другое (допишите)_____	1	2	3	4	5

Благодарим вас за участие в опросе!