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The Effect of User Interface, User Experience and Design on Mobile E-commerce Applications in the Fashion Industry

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The Effect of User Interface, User Experience and Design

on Mobile E-commerce Applications in the Fashion Industry

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I. Abstract

This study aims to explore elements of the user experience, and how those with the user interface and design of mobile apps in the e-commerce and fashion industries affect the user experience and customer behavior with online shopping. In this area, other work has been done in evaluating the user experience, and its effects on components of the user interface and design, however, this study offers a more specific look into these features in a niche industry, namely in the frame of e-commerce and the fashion industry. This fits into the context of the field of the user experience as the end-user is central to optimizing the online experience, so gauging it will help optimize features in an application or platform. This also fits into the context of information systems as all applications and businesses, many of which are in the e-commerce and fashion spaces, utilize the technologies and concepts of information systems.

To approach this challenge, a survey was conducted using Qualtrics, since conducting a survey is a common method used to answer questions concerning the user experience. Subjects were asked preliminary questions, and questions addressing the five variables of user intention in buying products, usability, ease of use, findability, and desirability. Survey data was collected, and two multiple regression analyses were performed. The statistical significance of the results is determined, and then the relevance is evaluated. It was found that if an application in the mobile e-commerce fashion space is useful to the user, then it is desirable to the user. It was also found that if an app is desirable to the user, users in turn have the intention to buy products using these apps. From this research, next steps include obtaining a larger sample size to get more statistically significant data. Future research includes testing other factors of the user experience, modifying the survey to further test existing variables, and exploring different niche industries in mobile e-commerce applications to explore the user experience in other areas of e-commerce.

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II. Introduction

When is the last time you made an online purchase or merely browsed for items you may have wanted or needed online? The answer to that question is probably quite recently, whether that be hours, days, or weeks ago. Furthermore, you most likely bought something from the retail giant Amazon which in 2018 was responsible for 49.1% of all online retail sales that year [9]. Today, shopping online has become a common practice across virtually all product industries. One prime industry where online shopping has taken part in the buying experience is retail, specifically in the fashion industry. When considering this, we must understand that while conducting business is important and is the end goal in all e-commerce endeavors, there are many factors in play. These are important to consider when conceptualizing, developing, designing, and deploying the e-commerce storefront.

The user experience and electronic commerce, also known as e-commerce, both have strong ties to various industries across the spectrum of business and related technological fields. E-commerce is a part of the daily lives of most in modern-day society. It has especially grown in specific niche industries. One niche industry where this growth is apparent is in the fashion industry. The user interface, user experience, and design of any web application are important to understand in the context of e-commerce. They all can determine the success or failure of the business the application is supporting. Understanding the process behind the successful deployment and design of an online application or platform is tremendously important. The fact that e-commerce is prevalent in everyday life, as well as the importance of the user experience when it comes to developing and deploying e-commerce applications, is especially true in the context of the research topic, which is the effect of the user interface, user experience and design on e-commerce mobile applications in the fashion industry. This study will measure

the user experience and perceptions concerning the user interface and design of an application, amongst users who shop using mobile applications. While research on e-commerce platforms already exists, this study will take a unique look into a niche industry and platform, fashion and mobile applications, respectively, and analyze consumer behavior in this context.

III. Literature Review

A. *Theoretical Framework*

To begin understanding the background of this research, we must first discuss some definitions to establish their meanings. User Interface (UI) is defined as "the graphical layout of an application. It consists of the buttons users click on, the text they read, the images, sliders, text entry fields, and the rest of the items the user interacts with. This includes screen layout, transitions, interface animations, and every single micro-interaction. Any sort of visual element, interaction, or animation must all be designed" [7]. User Experience (UX) is described as how users interact with a website or application [7]. To have a successful and well-implemented UI, you must have UX that is successful and well-implemented and vice versa. Electronic commerce, or as it is most commonly coined e-commerce, is defined as the practice of a business conducting transactions, including buying or selling services and merchandise online [4]. The design and development of applications in the context of this research is defined in four orientations. First, as "the design of a functional software application (emphasis on back-end functionality)." Next, "as the design of an interactive tool (emphasis on ergonomics)." Third "as the design of a communicational dialogue (emphasis on audience engagement)" and finally "as an extension of branded graphic design (emphasis on visual presentation)" [2]. Another definition that is important to consider is the definition of the fashion industry and retail industry.

The retail industry is defined as "the process of changing the ownership of goods or services from company representatives or intermediaries to the final customer with the motive to earn profit and boost sales"[10]. The fashion industry is defined as a global enterprise that is meant for the business of making and selling clothes. This includes the designing, manufacturing, distribution, marketing, retailing, advertising, and the promotion of women's, men's and children's clothes and accessories, which are all encompassed under the fashion industry [13]. Essentially, the retail industry is very closely tied to the fashion industry as the fashion industry is defined as the goods that are retailed when it comes to the retail industry. It is also essential to discuss the definition of an Information System, which is defined as "an integrated set of components for collecting, storing, and processing data and for providing information, knowledge, and digital products. Business firms and other organizations rely on information systems to carry out and manage their operations, interact with their customers and suppliers, and compete in the marketplace"[12]. Information Systems are employed when it comes to beginning any business, but especially one managed in the online space. An information system, along with the concepts and definitions described above, are all vital in understanding the research at hand in the topic of the effect of the user interface, user experience, and design on mobile e-commerce applications in the fashion industry.

B. *UI/UX and the Design Process*

Many factors must be considered when developing and implementing any website or mobile application, e-commerce, or any other specialty. When talking about the UI of a web platform, it must be considered that "Without careful studies into user preferences and experience, a site designer can unintentionally overburden users with superfluous information" [5]. With that in mind, it is vital to understand that this can only be achieved with well-designed

user interfaces, as well as using interactive features to enhance the quality and appeal of online content [6]. When designing a web application or platform, using UI and UX is important in order to understand the "Knowledge of users' behavioral differences can be a major factor in a successful website implementation" [5]. To touch on the importance of UX Research, this matters especially now to the web development and design communities because "End users' demand for good user experience has increased significantly, with wide adoption of mobile devices. Any new application needs to do something useful or fun, plus it needs to do it well and fast enough" [3]. Considering all of the information presented, the fact is that UI and UX, along with that UX research, are all key to employ throughout the entire platform design process. These concepts are all fundamental to employ throughout the whole design process. Without considering them, a mobile application or website may not be designed, developed, and used by consumers in a successful manner and in a reasonable amount of time, according to the consumer or end-user.

C. *Points of View in Development and Deployment*

The development and deployment of a website or application can be a very long and tedious process. In developing and designing a website, you must consider people's points of view from multidisciplinary backgrounds. Web development has many views and definitions, so considering the views of all of the parties who contribute to making a successful, functional platform is important to developing and maintaining a successful digital platform. First, it is imperative to consider the company or entity that is producing or designing the website or mobile application. The team that is developing the website or mobile application is tasked with many responsibilities, from making sure the website or mobile application has all the features requested by upper management in the company, to ensure there are no errors or bugs in the

mobile application or website. One thing that is important to consider is that "product teams write user stories from the perspective of the person who uses the software, not the one who chooses it" [3]. At many companies, especially large enterprises, it must be considered that the internal testing proxies that are employed "...are unrepresentative as end-users because they have multiple unfair advantages: they know the software inside out, including the work-arounds; have access to internal tools unavailable to external customers; and do not need to use the product within the target users' time constraints or digital environment" [3]. Another party to consider in this situation is the end-user or consumer. It must be recognized that "End-users should always be involved in the design of the information architecture of a Web site because the success of the site is often measured by the ability of the end-users to interact with it to achieve goals or tasks. Usability testing should occur throughout the design process, and input from users should be incorporated." [1]. Without the input of the end-user in the product design process, a platform will not be developed as effectively or successfully as it could be. In developing and designing a website, or any piece of web technology including an app, you must consider the points of view of people from multidisciplinary backgrounds. Web development has many definitions, all of which should contribute to making a successful, functional platform. We must consider the points of view of the end-user or consumer from design start to end, the opinion of the business or company, and their most important stakeholders.

D. *E-commerce and Development Elements*

In developing an e-commerce platform, it is important to consider the fact that any application or platform that is developed requires multiple successfully functioning components and design elements. Firstly, we must consider the "Nonverbal, visual elements such as logos are a new, novel way in which to build surface credibility and influence users' evaluations of

websites and their owners"[8]. Having nonverbal visual cues on an application, especially one

that is e-commerce based, is extremely important to gain the users' trust from the start and retain

them as a customer. Next, we have to look at the front end, or User Interface features of the

application, "which includes everything that the HTML document commands the browser to do.

A large part of this is fetching resources...there are 22 additional HTTP requests: two scripts, one

stylesheet, one iframe, and 18 images. Gaps in the HTTP pro- file (places with no network

traffic) are where the browser is parsing CSS, and parsing and executing JavaScript" [14].

Looking at an instance of the possible responsibilities of the front end of a web application, it is

obvious that it is important to optimize the front end performance to make sure the end-user

experience has optimal performance and features. Additionally, we must examine the

application's back-end functionality, which comprises the interactive features an application

encompasses, including application code and scripting code to provide interactive functionality

and integration with outside databases and resources [15]. While having features in the back end

is common practice, moving some of these features inline into the front end of the program

would help in program optimization [14]. Another element important to consider is the

information presented on an e-commerce platform. Information on these sites must be chosen

and curated by the appropriate parties, as "Experts can indicate what information needs to be

conveyed, how it should be structured for easy access, and what strategies are used to search and

retrieve information" [1]. Any information on any application or website picked by the

appropriate experts and parties should be organized and decided upon based on general

principles, including preventing users from getting lost, communicating the structure of the site

to users, and satisfying customers [1]. To find the most successful way to present information on

your website or e-commerce platform, the platform through which you communicate the

information must appeal to the consumer through effective use of front-end features and back-end features, non-verbal feature cues, and information presentation. This applies especially to a fashion company where retailing is the method of contact presented in which end-users can synthesize information and interact seamlessly with it.

E. *The Retail & Fashion Industry in the Technology Age*

The fashion industry includes many stakeholders, including the retailers who serve consumers and facilitate shopping. Today, "The fashion and apparel industry is different than ever before, with a focus on e-commerce and intimate consumer interaction in the design and merchandising process" [11]. The introduction of technology into niche industries has been gradual but still much anticipated and inevitable. This has been a gradual transition, especially in the retail and fashion industries. "With the dynamic changes in technology, retail practices are revolutionizing gradually. Tech-savvy consumers equipped with smart weapons are ready to make a cut through in the already existing web of traditional retailing practices"[10]. This transition has made the e-commerce retailing space, especially in the fashion industry and retail space, more modernized and geared towards a wide variety of shoppers. Technology in this space, including the development of a web platform to sell products through an e-commerce platform, is important to consider as "Retailers are also getting handy with these newer formats to bridge the gap between consumer's expectations and retailers' endeavours to reach new heights of consumer satisfaction"[10]. Customer satisfaction now depends upon the ability of a company to reach many demographics and preferences. To do so, leveraging any available emerging technologies would be most beneficial to the consumer. In the fashion retail industry, some new technologies to be leveraged include payment options like card payment, mobile payment, online transfer; digital communication mediums with customers such as 24-hour customer service chat

features and hotlines, as well as social media communication through outlets such as Twitter and Instagram, and services like home delivery and ship-to-home [10]. All of these technological innovations and more to come are making it possible for e-commerce and retailing to be carried out twenty-four seven and most efficiently and conveniently possible. Modern fashion industry principles and trends have led to the technology age with the move to consumers desiring technological methods to facilitate a purchase. This transition into the utilization of technology has gradually been making its way into the fashion and retailing industries. This has revolutionized these industries and the e-commerce process, which has been evolving since the technology boom in e-commerce in the 1990s and 2000s [11].

F. *The Factors of the User Experience*

When it comes to the user experience of a mobile application or any system, we must consider certain factors, all of which are important in assessing how and why the application is utilized. Some important aspects that influence the user experience include usability, usefulness, credibility, findability, desirability, accessibility, and value. All of these factors are important when it comes to the user experience as they focus on all facets of the user experience, with the end goal of delivering a successful product or platform to consumers and the market [16]. Usability is defined by indicators that are measured, which include "satisfaction, effectiveness, efficiency, and overall" [18]. Essentially, if the website is not usable, then there is no reason to bring it onto the market in the first place. Having a purpose for the website or application in development, for this reason, is an essential consideration in having an optimal user experience [16]. The usefulness aspect of the user experience works hand in hand with the usability of the application, as if the application is usable, this leads to the application succeeds, as the application becomes useful and usable in the eye of the user. Credibility "directly translates to

how trust-worthy the information on your website or app is ."[19] The credibility of the

application is critical to consider, especially in the face of so many fake applications on the

market. Ensuring the application is credible is a valuable method in making sure there is a user

experience to be had. Without trust from the user, no one will want to use the application [16].

Findability is an important element of the user experience, as "It is crucial to present the

necessary information to the right users at the right moment."[19] Suppose the website does not

have ease in finding appropriate features and content throughout. In that case, the user may feel

discouraged and will likely drop off before they experience the intended function of the

application. The desirability of an application can be influenced by several factors, including

aesthetics, branding, identity, and design [19]. Putting considerable effort into creating a

well-planned and well-designed application is a vital component of achieving desirability,

thereby enhancing the user experience. Accessibility, while it is seen as a waste of money by

many companies, is a legal requirement in many jurisdictions, and is important to consider in

building the optimal user experience. Accessibility is all about "providing an experience which

can be accessed by users of a full range of abilities – this includes those who are disabled in

some respect such as hearing loss, impaired vision, motion impaired or learning impaired" [16].

Keeping accessibility in mind often leads to creating a product that is easier to use for everyone,

and this is an enhancement that can be applied to the user experience overall. Value is one of the

final considerations made within the user experience. Considering the other factors that impact

the user experience, when all of these are delivered and carried out well, the product carries a

high-level of value [19]. The application will deliver value to the business that creates it as well

as the user who utilizes or purchases it [16]. Keeping the seven factors of the user experience in

mind all help to deliver a useful, easy-to-use product that will more likely succeed on any marketplace or public platform it is published to.

G. *E-commerce and the User Experience*

In terms of the e-commerce experience, it is paramount to consider the user experience to benefit the end-user. Since they will be the ones using the website most frequently to make a purchase or browse merchandise, they are the ones to consider when it comes to making decisions about what to include and leave out in website experience and features. The user experience is important, especially with e-commerce applications, as it will have a substantial impact on whether visitors return to or continue to use the application to carry out their desired task. Considering the user experience factors is especially important in the e-commerce space, as the user experience of a platform in this space drives conversions into sales. A seamless, simple, well-designed user experience plays a role in the success or failure of any e-commerce activities [17]. Considering the user experience in developing an e-commerce application is vital. It can be a key determinant in whether the business itself succeeds or fails, mainly if they rely on a primarily online e-commerce based model. The goal of the e-commerce experience is to retain users and have them make purchases repeatedly, as this is what the model an e-commerce business relies on. To achieve this, designers in the e-commerce space need to have a clear, simple user experience. In this case, the four key components of the user experience to consider are utility, usability, accessibility, and desirability [20]. Some other user experience features to implement include simplified navigation, fast payment and checkout process, eye-catching elements, minimalism in the design, and customer service features [17]. Keeping in mind the most vital aspects of the user experience and the objectives of the e-commerce business model

are important considerations to make when designing and planning for the e-commerce user experience.

H. *Technology Acceptance Models (TAM)*

When discussing accessibility with relation to the end user, it is vital to consider the Technology Acceptance Model (TAM) Theory. This model was developed with two main objectives being kept in mind. The first one surrounds improving the understanding of the user acceptance process, which should in turn provide new insight into successfully designing and implementing information systems. The second objective was providing a theoretical basis for a practical "user acceptance testing" method to enable designers and implementers to evaluate new systems prior to their implementation [23]. This principle is important to consider because when it comes to making considerations for the end-user many facets of the user experience must be considered. This is especially viable in the instance of accessibility, one very important facet of the user experience. While accessibility is kept in mind through every part of the user experience and throughout the design process of any platform or user interface, using the TAM Theory gives this subject the special attention it requires in situations pertaining to the user experience. This model has been used in various instances, including the study, "A Systematic Review of the Technology Acceptance Model in Health Informatics", where the TAM was used in various facets of health information systems. In this case, there were three main areas where the TAM was applied in applications, including telemedicine, electronic health records, and mobile applications [24]. Applications of the TAM such as this one are one of many ways that can be made of TAM principles into the technology of other industries.

IV. Research Question

The research question which is being answered through this paper is:

What is the effect of user interface, user experience and design on fashion mobile e-commerce applications?

In answering the question outlined, the main focus is on evaluating the user experience within mobile e-commerce applications amongst users, and to what extent users would like to use applications in this area. This was studied through considerations of the user intention in buying products, usefulness, ease of use, findability and desirability of the apps.

A. Question Context

There have been various experiences culminating in the final development of this research question. The inspiration for the research area of e-commerce comes from various professional and learning experiences. These include an internship with 1-800-Flowers.com Inc., a well-known e-commerce company. Also, an internship with The Bank of New York Mellon (BNY Mellon) in user research and platform use and optimization was an additional inspiration behind this work. Additionally, experiences with hackathons in the user experience, and designing user interfaces. These have led to asking questions concerning why e-commerce websites function the way that they do currently? In addition, the field of fashion was chosen as it is a specific niche field. Studying this is of piqued interest as there is not currently a vast amount of research concerning mobile applications and the impact upon users. From this, the goal is to learn more about the connections between fashion and e-commerce and how the user experience plays a role in this connection.

B. Why is this important? What impact will it have?

This research question is important as it will take a deep dive into the technology world in a more specific aspect, the e-commerce sector. This study will explore technology in relation to fashion e-commerce mobile applications. Answering this question will have an important impact on the field of the user experience and development and considerations made in the user interface and design of mobile applications.

V. Methodology

To investigate the effect of user interface, user experience, and design of mobile e-commerce applications in the fashion industry, a survey was developed and distributed to participants. The survey asked questions in four different areas of the user experience. Then, after conducting the survey, a multiple regression statistical analysis of the obtained results was conducted. Quantitative and qualitative insights were collected surrounding the issue at hand. The survey asked participants to answer various questions related to mobile e-commerce applications in the fashion space. The participants of the survey were over the age of 18 and were typically college students or young adults. The survey was distributed amongst male, female, and other gendered participants, all of whom have various majors or occupations. The survey was given to individuals fitting the previously mentioned criteria, and this distribution was done via email and social media. Participants were given unlimited time to complete the survey but were expected to complete it within 15 to 20 minutes.

For this research, a survey was conducted for various reasons. First, a survey was chosen as it is a method used by other researchers in various fields, including technological ones such as user interface and user experience. In similar studies, surveys were conducted in order to gain meaningful, relevant, and applicable data to answer the research question. This includes studies

such as "FindIt@Flinders: user experiences of the Primo discovery search solution", where an online survey was conducted amongst students [22]. There is also the study "A Survey Of Factors Influencing Spreadsheet Risk Awareness", where a survey was conducted through an online tool (Google Forms) and was then distributed to users amongst LinkedIn and email addresses [21]. Based upon this, it is clear that performing an online survey, and distributing amongst participants in various ways, is an effective research method in this instance. An additional reason to conduct a survey is to evaluate the user experience and the effect of user interface and design; the best way to gather insights is by going directly to the end-users. Since the end-user is the consumer of the mobile applications being studied, their insights are the most valuable. In addition, conducting a survey that participants can complete whenever they feel free increases the likelihood of obtaining honest and open feedback surrounding the issue at hand.

A. *Survey Development*

In the development of the survey, the first decision to be made was to decide which aspects of the user experience to investigate with the subjects of the study. From an analysis of the aspects of the user experience, it was determined that the best aspects of the user experience to study in the frame of fashion e-commerce are: user intention in buying clothing products, and the user experience criteria. A detailed account of the statements given discussing the user intention in buying clothing can be found in Appendix 3. The four areas investigated as user experience criteria include usefulness, ease of use, findability, and desirability. These areas were determined after conducting research into both the user experience and connections between the topics of e-commerce and mobile applications, as well as the fashion industry. Within these aspects of the user experience, four to five statements were given to the participant to gauge their thoughts and experiences. These statements, and their associated user experience criteria group,

can be found in Appendix 4. The prompts given in the survey were answered on a Likert scale, from one to five, with one indicating disagreement and five indicating agreement. A detailed view of the Likert scale employed in the survey can be seen in Appendix 1. In addition, in the survey, before any questions were asked, a statement was given to respondents to provide them with a background in terms of their purpose in this survey. The scenario described can be found in Appendix 2.

B. *Data Collection*

When collecting data from the survey, quantitative data was obtained from participants. While it did vary from question to question, most were answered using a Likert Scale, with point values scaling from one to five. Additionally, some questions were asked in a multiple-choice format, depending on the content and desired insight. These results are collected using Qualtrics survey software over approximately four weeks, and there was a total sample size of sixty participants. The data derived will undergo statistical and quantitative analysis to draw insights and conclusions.

C. *Research Ethics*

To conduct this study, there was a requirement to obtain Pace University Institutional Review Board Approval; since this study did require interaction with human subjects through the distribution and conducting of the survey. Before the survey began, participants were asked for informed consent. Without this consent, they could not move forward and participate in this study. In developing the survey surrounding this topic, it was important to design questions which effectively answered the question at hand while keeping the relevance of the experiences of users of mobile e-commerce applications in mind. Assurances were also made in making the survey accessible within an online platform that is easy to navigate on any type of device. This

was achieved through the use of Qualtrics. Research ethics were always kept in mind, as it was always a top priority to preserve the privacy and rights of survey participants. All data obtained were handled with confidentiality, and there was no identifiable information asked from participants, as only age and gender were required to be disclosed. Participants were asked for informed consent before partaking in the survey, as this is a voluntary study.

D. *Analysis of Results*

Once a sufficient number of responses from the survey were obtained, the data was then exported from the Qualtrics platform into a Microsoft Excel document. The information was cleaned and filtered to omit incomplete responses. Of the seventy-five participants who participated in the survey, twenty did not complete the survey in its entirety, so those results were omitted. From there, a multiple regression analysis was performed to derive conclusions concerning the variables at hand.

E. *Conceptual Model and Hypotheses*

The conceptual model shown in Figure 1 hypothesized the effects of usability, ease of use, findability and desirability, and the effects of these on the users' intention of buying clothing products. The model also includes the constructs or variables, as well as the hypotheses. The conceptual model with constructs and hypotheses shown in Figure 1 illustrates the conceptual model and the study's hypotheses. The model consists of five constructs and four hypotheses. Each rectangle represents a construct or conceptual idea that later had data collected in relation. Each arrow represents a hypothesis, denoted by the letter "H", expressing the dependency relationship between two constructs. The beginning point of the arrow indicates the independent variable, while the arrowhead denotes the dependent variable of the hypothesis.

In this study, based upon the variables laid out, it is hypothesized that:

Hypothesis 1. (H1): Ease of use will have a positive impact on the user's intention to buy a product. The higher that the "ease of use" a user perceives is, the higher the user's intention is.

Hypothesis 2. (H2): Desirability will have a positive impact on the user's intention to buy a product. The higher that the "desirability" a user perceives is, the higher the user's intention is.

Hypothesis 3. (H3): Findability will have a positive impact on the user's intention to buy a product. The higher that the "findability" a user perceives is, the higher the user's intention is.

Hypothesis 4. (H4): Usability will have a positive impact on the desirability of a mobile e-commerce application. The higher that the "usability" a user perceives is, the higher the user's intention is.
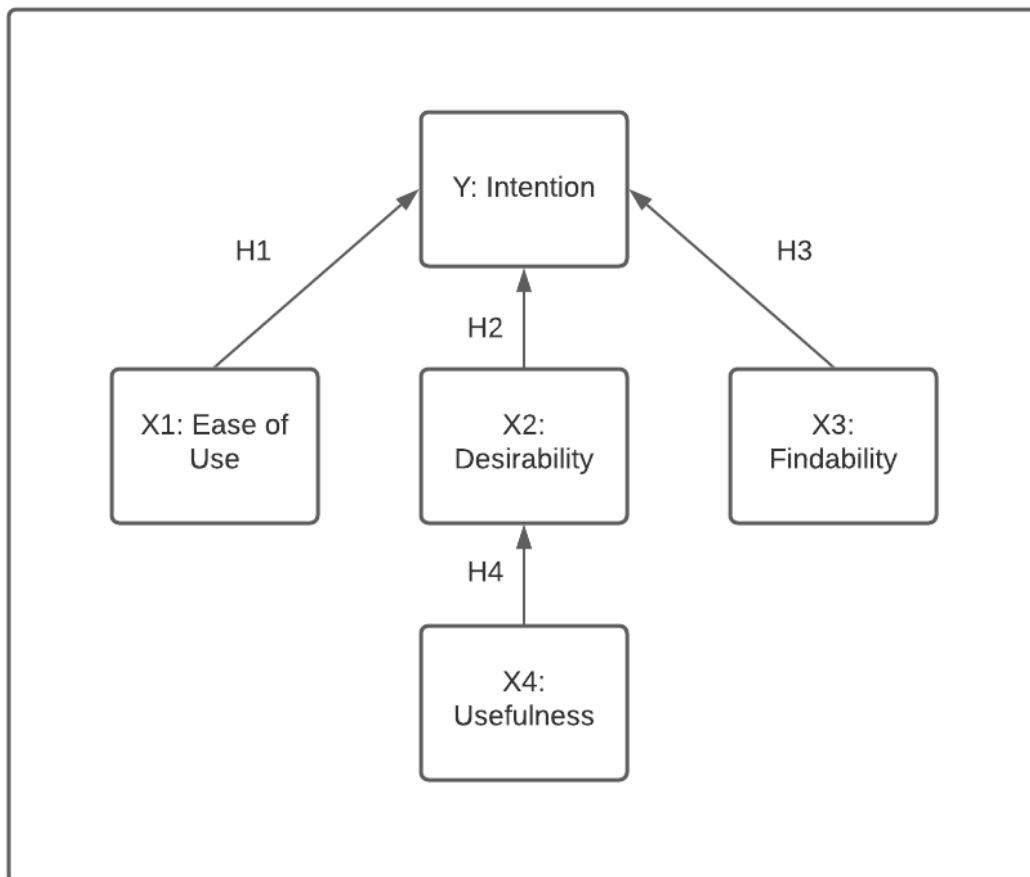

Figure 1: Theoretical Model With Hypotheses

F. *Regression Equations and Meaning:*

Both of the regressions were performed in order to determine the statistical significance between the five variables. These include user intention in buying products, usefulness, ease of use, findability and desirability. The first regression was performed to test the variables of ease of use, desirability, and findability against the user intention in buying products. This regression follows the equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

Represented by this equation are the variables of ease of use (X_1), desirability(X_2), and findability(X_3), Y which denotes the variable of user intention in buying products, and β_n, which denotes the statistical significance of each of the X_n variables in relation to Y.

The second regression was performed to test the variable of usefulness (X_4) against the variable of desirability, to test and show the correlation between these two factors. This regression follows the equation:

$$X_2 = \alpha_0 + \alpha_1 X_4$$

Represented by this equation is the calculation for the significance between the desirability of an application and the usefulness of an application. In the equation, the variables are denoted by X_n. The α_n in the equation denotes the statistical significance of both usefulness and desirability unto each other.

VI. Results and Discussion

In order to obtain results for this study, Qualtrics survey software was utilized, where a brief survey was conducted amongst various individuals. The first part of the survey asked preliminary questions, including gender, age group, does a user have a smartphone, do they currently have e-commerce clothing/fashion apps on their phones, if yes: have you made a

purchase using a mobile app, and how often do you browse merchandise using a mobile app? From these questions, below are the results amongst respondents of the survey.

Table 1: Gender and Age Group Breakdown of Survey Respondents

Variables	Sample Size	Categories	Percent
Gender	19	Male (gender =1)	34.54%
	35	Female (gender =2)	63.6%
	1*	**Other (gender =3)**	**1.0%**
Age Group	40	18 to 24 (age group =1)	72.72%
	6	25 to 34 (age group =2)	10.9%
	2	35 to 44 (age group =3)	3.63%
	6	45 to 54 (age group =4)	10.9%
	1	55 to 65 (age group =5)	1.0%
	0	65 and over (age group =6)	0.0%

*This response denoted "other", but had text that stated, "male but there are only two genders :)", so for the purposes of this study, this counts as a male response.

The table above provides a summary of the demographics of the survey respondents who completed the survey in its entirety. The demographics presented include the genders and ages of survey participants. This information was asked for by the respondent to have the chance to examine any possible correlations. Correlations to consider include gender impacting how users feel about the user experience, user interface, and design of mobile e-commerce applications. One more correlation to look for is age having an impact on how users feel about mobile e-commerce applications.

The following discusses the next preliminary questions asked to respondents. They were first asked whether they owned a smartphone. A limitation that was not encountered but could

have been in analyzing these results is if a participant did not own a smartphone, as they would

not be viable participants in this study. If they do not have a smartphone, they cannot have

experience using smartphone apps since they would not own one. It is important to note this

limitation and note that results indicated all participants actually own a smartphone. So, this

limitation was avoided with this group of respondents.

The survey participants were also asked questions surrounding whether they have any

e-commerce or fashion apps on their smartphone, have made a purchase using an e-commerce or

fashion app, and the frequency at which they browse for products and merchandise using

e-commerce smartphone apps, respectively. These questions were asked to evaluate users and

their intentions in using e-commerce and fashion smartphone apps. This adds to the feedback

gauged from the survey, as if they do not have relevant experience with e-commerce fashion

apps, their feedback would not be valuable concerning this study. The frequency of participants

browsing merchandise using e-commerce apps is fundamental to note. This can be an indicator

of the value of responses from users of these apps, since the more frequently they may use these

apps, the more likely they are to contribute valuable insight to this study.

The second part of the survey investigates users and their insights concerning their

intention in buying products and the four outlined user experience criteria. From each of these

categories, the prompts each received a response between 1 and 5 on the defined Likert scale,

which is shown in Appendix 1. In each section of the survey, denoted is the number of the

prompt at hand, as well as the amount of responses for 1, 2, 3, 4 and 5 on the Likert Scale. The

following graphs display responses to each survey question, with answers given on the Likert

Scale.

Table 2: Survey Responses Across All Variables

Variable	Prompt	Average Response Value	Standard Deviation
User Intention (INT)	Overall	3.158	0.621
	1	3.127	1.171
	2	3.091	1.206
	3	3.255	1.205
Usefulness (USF)	Overall	4.105	0.676
	1	4.382	0.757
	2	4.091	1.059
	3	3.946	0.970
	4	4.000	0.981
Ease of Use (EOU)	Overall	4.091	0.684
	1	3.927	1.068
	2	3.927	1.078
	3	4.146	1.066
	4	4.146	1.041
	5	4.309	1.171

Table 2: Continued

Findability (FND)	Overall	4.236	0.634
	1	4.673	0.747
	2	4.218	0.896
	3	4.291	0.875
	4	3.764	1.261
Desirability (DES)	Overall	3.687	0.775
	1	3.818	1.001
	2	3.891	0.975
	3	3.800	0.951
	4	3.582	1.243
	5	3.346	1.220

The above information displays the survey results to answer the question concerning the user experience and how it affects the user interface and design of e-commerce applications in the fashion industry. The five graphs above show where the five variables that are to be compared in the study were derived from. Each of these prompts was given an average response value, which then underwent a regression analysis.

A. *Correlation of Variables*

The results obtained in this study lead to the conclusion that there is a statistically significant correlation when it comes to Hypothesis 2 and Hypothesis 4. This means that these hypotheses have been proven to be accurate. This is shown through a breakdown of the survey results. When the survey was completed, this data was analyzed using Multiple Regression (MR) in the context of the original research question. There were two regressions performed on the five variables. The variable user intention in buying products (INT) is being tested with the four dependent variables, usefulness (USF), ease of use (EOU), findability (FND), and desirability (DES). First, it is important to see the correlation between all of the variables being tested. From the correlation matrix shown below in Table 2, it is clear that there are various factors that have a dependence on each other due to their high correlation coefficients. For instance, since desirability and usefulness have a high correlation coefficient, it is obvious that one depends upon the other in the minds of the user. While we do not know yet which one affects the other, there is clearly a correlation of variables present. Other variable pairs which are correlated according to Table 2 include user intention and desirability, user intention and findability, and user intention and usefulness.

Table 3: Correlation Matrix

	User Intention (INT)	Ease of Use (EOU)	Usefulness (USF)	Findability (FND)	Desirability (DES)
User Intention (INT)	1.000	.070	.239	.186	.255
Ease of Use (EOU)	.070	1.000	.351	.193	.232
Usefulness (USF)	.239	.351	1.000	.271	.514

Table 3: Continued

Findability (FND)	.186	.193	.271	1.000	.110
Desirability (DES)	.255	.232	.514	.110	1.000

B. *Hypotheses and Testing*

　　To determine whether the proposed hypotheses can be proven or disproven, testing must be conducted. This was done in the form of various regressions. From the regressions performed, hypothesis testing is conducted using various pieces of data. Data points kept in mind under each test include the dependency the hypothesis is testing, sample mean, significance, standard deviation, standard error, and T-statistics. All of these factors, which show the estimation of the parameters of the model, are pertinent in determining the validity of the hypothesis. The p-value is used to determine the statistical significance of the dependency scenario at hand, and the T-statistics are used to decide whether to accept or reject the null hypotheses. This can all be seen in Table 3, which is shown below.

Table 4: Hypothesis Testing Results

Hypotheses	Dependency	Sample Mean	Significance (p)	Standard Deviation	Standard Error	T Statistics
H1	EOU → INT	4.0909	0.610	0.68402	0.124	0.513
H2	***DES → INT**	**3.6873**	**0.060**	**0.77553**	**0.401**	**1.923**
H3	FND → INT	4.2364	0.174	0.63359	0.132	1.377
H4	*****USF → DES**	**4.1045**	**0.000357**	**0.67647**	**0.135**	**4.358**
Statistical significance: ***$p < 0.01$ ($t > 2.57$), **$p < 0.05$ ($t > 1.96$), *$p < 0.1$ ($t > 1.64$)						

From the table shown above, table 4, we learn that:

There is one hypothesis (H2) that can be deemed statistically significant on a 90 percent

confidence interval. Hypothesis H2 has a significance level of 0.060, which is less than

0.1. Keeping in mind the T-Statistic of 1.923, this means that the null hypothesis here can

be accepted. Through this hypothesis, it was found that if users desire a specific

application, then they are more likely to intend to use it to purchase a product.

There is one Hypothesis (H4) that can be deemed statistically significant on a 99 percent

confidence interval. In Hypothesis H4, the significance, which was determined to be

0.000357, is less than the p-value of 0.01. Keeping in mind the T-Statistic of 4.358, this

means that the null hypothesis here can be accepted. Through this hypothesis, it was

found that the variable of usability is significant when coupled with desirability. This

shows that when users see an application is usable, they are then likely to desire this

application.

There are two hypotheses (H1 and H3) that cannot be deemed statistically significant. In

Hypothesis H1, there is a significance level of 0.610, and in Hypothesis H3, there is a

significance level of 0.174. In both of these instances, these values are both greater than

0.1, making them statistically insignificant in this study.

VII. Conclusion

E-commerce is the method by which a majority of products are purchased due to its

convenience. Thinking about e-commerce, considerations must be made due to the evolving

technologies that surround this concept. Many consumers have smartphones, so now, mobile

applications have become the primary means by which consumers interact with e-commerce. With this, research in the user experience and its impact on the user interface and design of a mobile e-commerce application situated in the fashion industry should be done.

With that in mind, the study conducted here surveyed people who use mobile e-commerce applications and gauged their insights concerning five variables: user intention in buying products, usability, ease of use, desirability, and findability. Two regressions were performed using the five variables outlined above. The first, which was a multiple regression, compared ease of use, findability, and desirability to the user intention to purchase a product. The second regression performed compared usability to desirability. After performing these analyses, it can be concluded that Hypotheses 2 and 4 are statistically significant, therefore they can be confirmed based on the samples we collected. Hypothesis 2 outlines that the more the users think a mobile application is useful, the more the users will find the application to be desirable. Hypothesis 4 outlines that the more the users think that an app is desirable, the more likely the users would intend to buy products using these apps, which are in the mobile e-commerce fashion space.

There were various limitations encountered in this study. One includes the fact that there was a limited data set. With only 55 completed survey responses, the analysis was not as significant as once hoped. So, to expand upon this study, more participants must be recruited to complete the survey, in order to obtain more data. This would provide better statistical insight into these variables. With this superior insight, regression studies, as well as other relevant statistical analyses can be performed to find more insights concerning the data. Also, future work in this study can include making modifications to the variables of the user experience that were tested already in the survey, as well as adding new ones including accessibility, credibility, and

value. Additionally, increasing the parameters at which the data is tested for, including testing

variables of the user experience with controls including gender and age could provide new

insight into this study. Also, taking this question and moving it into a different niche industry

under the umbrella of e-commerce, which includes food delivery apps, property rental apps,

ridesharing apps, and entertainment streaming service apps, has the potential to shed a new light

on the user experience, user interface and design when it comes to e-commerce.

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IX. Appendix

Appendix 1: Likert Scale

Scale Level	Meaning
1	Disagree
2	Somewhat Disagree
3	Neutral
4	Somewhat Agree
5	Agree

Appendix 2: Statement Given to Survey Subjects Before User Intention in Buying Clothing and

User Experience Criteria Survey Blocks

For the purposes of this survey, you are an e-commerce customer, meaning that you are

shopping using the internet. You may be browsing or purchasing fashion merchandise,

depending on certain factors. Fashion merchandise is considered clothing (shirts, pants, skirts,

dresses, socks etc.) and accessories (hats, purses, belts, shoes etc.). You are using your cell

phone or mobile device (Apple, Android etc.). On your device, you shop on e-commerce

platforms using mobile apps, which you have previously downloaded on your device.

Appendix 3: User Intention in Buying Clothing Products Survey Questions

Question	Prompt
1	I log onto an e-commerce mobile application with the intention of making a purchase directly from the app.
2	I log onto an e-commerce mobile application with the intention of browsing fashion items to later go to a brick and mortar location to make a purchase
3	I log onto an e-commerce mobile application with the intention of browsing, navigating away and purchasing an item from a similar mobile application at a lower cost or better quality.

Appendix 4: User Experience Criteria Survey Questions

Criteria	Question Number	Prompt
Usefulness	1	I find e-commerce mobile applications useful to me with the intention of browsing online for merchandise
	2	I find e-commerce mobile applications useful to me with the intention of browsing online for fashion merchandise including clothing or accessories
	3	I find e-commerce mobile applications useful to me with the intention of making a purchase
	4	The e-commerce mobile applications I visit are useful to me in deciding whether I will make another purchase or visit multiple times.
Ease of Use	1	The e-commerce mobile applications I use make it simple to understand where key features are,
	2	The e-commerce mobile applications I use make it simple to understand where things I am looking for are located.
	3	It is simple for me to use an e-commerce mobile application to browse through products.
	4	The e-commerce mobile application I use make it simple for me as the user to checkout when making a purchase.

	5	The payment methods available to me on an e-commerce mobile application make it easier to complete a purchase.
Findability	1	I am able to download the mobile application by searching on the app store.
	2	I am able to find the products I am looking for using a search bar.
	3	I am able to find the products I am looking for using categories or types of products through a menu or filters.
	4	I am able to find the products I am looking for using the bottom tabs menu provided in the user interface.
Desirability	1	1. The images I see on clothing products and accessories make me want to shop on this mobile app more or again.
	2	Based on the imagery and text on fashion e-commerce mobile applications, I would like to return to the app at some point in the future.
	3	E-commerce mobile applications are generally pleasing to my eye.
	4	The way fashion e-commerce mobile applications look is a reason I may or may not make a purchase or return.
	5	The color scheme of a mobile application impacts whether I make a purchase, browse, or return for another visit.