Hypothesis

Antecedents and Consequences of Digital Shadow Work in Mobile Shopping Apps Context

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Abstract: Shadow work continues to witness a significant uptick in the context of mobile shopping. Therefore, we question whether shadow work perceived by mobile shoppers may become a bigger problem, create fatigue for mobile shoppers, and lead them to discontinue the use of mobile shopping apps. This study examines the relationship between shadow work and the discontinuance of mobile shopping apps. Data from a total of 266 completed surveys were collected by a market research firm. We adopted partial least squares structural equation modeling (PLS-SEM) to assess both the measurement and structural components of the model. The results show that both information overload and system feature overload positively influence individuals’ shadow work. This study explores the concept of shadow work in the context of mobile shopping apps. Specifically, the study developed the relationships between the antecedents and consequences of shadow work in the mobile shopping context. The main contribution of our study is that it introduces an integrative model of shadow work in the mobile shopping context, highlighting the importance of shadow work.

Keywords: shadow work; digitalization of shadow work; self-service technology; discontinuance intention; consumptive labor; mobile shopping

1. Introduction

Although advances in IT promise to make work and life easier, people find themselves being pushed into unpaid work by businesses and organizations and performing tasks that previously used to be performed by employees. In other words, consumers have often been expected by businesses to engage in a variety of activities that exclusively belong in the sphere of paid work (e.g., bagging groceries and using self-service technologies such as self-checkout machines and kiosks) [1]. The range of unpaid work done by consumers has expanded to include creative inputs to products and services [2].

According to Illich [3], such unpaid work that benefits someone else is called “shadow work.” Shadow work was initially defined as “entirely different form of unpaid work which an industrial society demands as a necessary complement to the production of goods and services.” [3] Major cases of shadow work include both household work and child rearing. Specifically, household work includes all the activities that enable a family to survive, such as providing food, water, shelter, and clothing. This includes the stress of forced consumption and all kinds of activities labelled as “household work” [1]. The advent of labor-saving appliances such as washing machines, refrigerators, and vacuum cleaners has reduced the time spent on household work, but the hours spent on shopping and household management have increased [4].

Recent developments in IT have transformed the nature of shadow work. The definition of shadow work was reconceptualized as all unpaid jobs we perform [5]. As a result of the significant proliferation of self-service technologies (SSTs), increasing amounts of shadow work are passed on to consumers, that is, unpaid workers. Consumers reserve travel, do stock trading by themselves, and delete spam emails on behalf of businesses. As
shadow workers, they create value for businesses in exchange for several benefits (saved time, increased autonomy, etc.).

Today, shadow work is dramatically mushrooming in the context of mobile shopping. Due to the proliferation of mobile technologies, over 90% of consumers in Korea use mobile applications (also known as apps) to order groceries [6]. Ordering groceries through mobile shopping seems to be typical household work as well as a kind of necessary unpaid job. Mobile shopping apps enable users to experience increased efficiency of household work as well as reduced time and effort for shopping, resulting in decreased traditional shadow work [7]. However, mobile shoppers perform more digital shadow work whenever they engage in shopping activities. Although most shadow work includes tasks that are not strictly necessary, mobile shoppers perform certain shadow work because of the expected benefits of doing so. While there is no research that directly mentions the concept of shadow work, some research domains cover shadow work, such as the literature regarding self-service technology (SST).

Previous studies regarding SSTs tend to explain the adoption of SSTs by applying well-known IS theories, such as the technology acceptance model, the unified theory of acceptance and use of technology, and innovation diffusion theory [8]. Most studies investigated the factors that influence the adoption of SSTs [9,10]. Recent years have witnessed the negative effects of forcing consumers to use SSTs and passing shadow work onto consumers via the use of SSTs [11]. Thus, mobile shopping providers should pay attention to the negative reactions of customers with regard to SSTs to improve business performance and customer value. Surprisingly, the negative outcomes of SSTs have been noted [12], but little research provides insights into how increased shadow work by SSTs influences the use of SSTs. In addition, findings from prior research on SSTs [13] may not be directly applicable in our study to explore the antecedents and consequences of shadow work in mobile shopping contexts. While there are some concerns related to shadow work in mobile shopping apps, unfortunately, there have been no attempts to employ the concept of shadow work in the mobile shopping context.

As shadow work in the digital space is emerging but not fully studied, it is worthwhile to explain the relationship between shadow work and the discontinuance of mobile shopping apps. Therefore, the aim of this study is to broaden our horizons of understanding that the shadow work that mobile shoppers perceive may become a spreading problem, and to examine the relationships among shadow work, fatigue of mobile shoppers, and their discontinuance of using mobile shopping apps. By inferring from the concept of shadow work [5] and reviewing the psychological reactance theory [14], we propose that users’ resistance to SSTs is more associated with the intention to reduce their unpaid work than the values of the SSTs themselves [15]. Furthermore, we have developed a new construct of shadow work and then examined both its antecedents, such as information overload and systems feature overload originating from the characteristics of mobile shopping apps, and their impact on mobile shoppers’ reactions.

The remainder of this paper is organized as follows: the next section provides the theoretical background and presents our proposed hypotheses. We then introduce the research method and results of the data analysis. Finally, the implications of our findings based on these results are presented.

2. Background and Hypotheses

2.1. Shadow Work Due to SSTs

Most unpaid household work, which includes both physical tasks for family and cultural tasks such as child rearing, has been reduced by commodified goods and services [16]. Even if labor time is saved in household work activities as subsistence labor via the use of labor-saving appliances, some of that time is re-allocated to consumption work by IT development and digitalization. For example, SSTs have made it easier for companies to transfer their consumption-related tasks to consumers. This leads to an increase in the time spent on consumption as servant labor [16]. Although shadow work due to SSTs deniably
has benefits, it exposes its users to a new kind of middle-class serfdom in the digital era [5]. In many cases, SSTs users may feel obligated to use SSTs instead of more direct means of buying goods that prevailed in the past. The excessive demand for the use of SSTs is problematic, if underestimated.

SSTs refer to technological interfaces that enable customers to produce a service independent of direct service employee involvement [17]. From the standpoint of companies, SSTs are regarded as a win-win proposition for both companies and consumers, as they increase service efficiency, reduce operational expenses, and increase revenue [18]. According to a meta-analysis of SSTs [9], most studies examined the factors of consumers’ adoption of SSTs, including system characteristics of SSTs, characteristics of consumers, and situational factors [15]. While these studies discovered the positive aspects of adopting SSTs from the standpoint of companies, we attempt to explore key antecedents and consequences of consumers’ perceived shadow work from the SSTs. This enables us to explore the negative aspects of SSTs from the perspective of consumers. The feeling of doing shadow work creates a potential threat to SSTs’ value, leading to consumers’ resistance to SSTs.

Mobile shopping apps are the context in which we can consider the side of SSTs associated with shadow work. As a typical example of SSTs, mobile shopping apps are applications performed in a wireless environment to enable consumers to purchase products and services using mobile devices [19]. These are capable of leading consumers to value services as quicker and more convenient than face-to-face alternatives by reducing both perceived and actual waiting time [17]. However, this shifts the purchasing activities from the employees to the shadow-working consumers. Tasks when using the mobile shopping apps are divided between the consumer and the technology, and delete employees’ efforts [20]. In other words, the imperative to buy products as cheaply as possible with less effort makes consumers take more shadow work through mobile shopping apps. As a consequence, mobile shoppers who transact in self-service environments with mobile shopping apps may perceive that a particular service is less valuable because of the increase in shadow work [5].

Meanwhile, most SSTs are forcing consumers to use SSTs without alternative service options; this forced use of SSTs reduces consumers’ freedom of choice [21]. According to psychological reactance theory [22], limited freedom of choice may lead to negative effects such as anxiety [23], decreased evaluations [21], and switching intention [15]. This may lead to an increase in the discontinuance intention with the service. To present empirical evidence of shadow work [5], we developed measurement items for shadow work and investigated its antecedents and consequences.

2.2. Antecedents of Shadow Work in Mobile Shopping Context

When mobile shopping apps’ provision is much more than what mobile shoppers are comfortable with, they tend to be drawn to shadow work. Overload due to SSTs originates from an imbalance between the excessive demands of SSTs and users’ coping ability [24]. In the context of mobile shopping apps, information overload refers to exposure to information beyond which consumers are capable of dealing with [25], whereas system feature overload reflects a situation in which the features of mobile apps are too complicated for a customer to use easily [24]. When mobile shoppers’ bounded information capacity is challenged, they feel that they are being forced to take up shadow work. As the system features of mobile shopping apps become more complex, mobile shoppers are exposed to more forced shadow work. Based on previous literature suggesting that exposure to overload leads to negative outcomes [26], the following hypotheses are derived:

Hypothesis (H1). Information overload is positively related to shadow work.

Hypothesis (H2). System feature overload is positively related to shadow work.
2.3. Connecting Shadow Work with Fatigue and Discontinuance Intention

According to Lambert’s argument [5], mobile shoppers may feel fatigued when they feel enforced to perform shadow work, such as managing their passwords, updating mobile apps, responding to all the recommendations, and writing reviews after using mobile shopping apps. In this respect, shadow work could be a key trigger for explaining why mobile shoppers feel fatigue when using shopping apps.

Furthermore, when mobile shoppers are forced to perform shadow work, psychological reactance may influence discontinuance intention [15]. It is possible that mobile shoppers directly discontinue mobile shopping apps because they are motivated to restore the freedom to not spend enough time and effort to purchase groceries via mobile shopping apps. Previous studies have also suggested that mobile shoppers who are exhausted from using mobile shopping apps develop an intention to discontinue stressful behavior [13]. Thus, we propose that:

Hypothesis (H3). Shadow work is positively related to fatigue.

Hypothesis (H4). Shadow work is positively related to discontinuance intention.

Hypothesis (H5). Fatigue is positively related to discontinuance intention.

All hypotheses are shown in Figure 1.

![Figure 1. Research model.](image)

3. Method
3.1. Sampling

The main focus of our study is to explore the antecedents of shadow work and its consequences in the context of mobile shopping. In this study, we considered consumers of mobile grocery shopping apps as our main target sample. Among all kinds of household work, shopping for goods is an example of outstanding traditional shadow work which is transformed digitally. A mobile shopping app that requires no interpersonal contact between the buyer and seller is an example of an outstanding shadow work creator. A total of 300 respondents were collected by a market research firm. A total of 266 survey respondents were retained for data analysis after removing 34 invalid data points. Table 1 summarizes the sample profiles of respondents. As shown in Table 1, the ratio of female respondents was appreciably higher than that of males (82.7% and 17.3%, respectively). Furthermore, around 68% of the respondents spent an hour to two hours on mobile shopping apps each day.
Table 1. Demographic characteristics of the respondents.

| Variable                  | Category     | Frequency | Percentage (%) |
|---------------------------|--------------|-----------|----------------|
| Gender                    | Women        | 220       | 82.7           |
|                           | Men          | 46        | 17.3           |
| Age                       | 20–29        | 42        | 15.8           |
|                           | 30–39        | 40        | 15.1           |
|                           | 40–49        | 94        | 35.3           |
|                           | 50–59        | 90        | 33.8           |
| Marital Status            | Single       | 86        | 32.3           |
|                           | Married      | 180       | 67.7           |
| Education Level           | Below High School | 37   | 13.9 |
|                           | University (enrolled) | 16  | 6.0 |
|                           | University (graduated) | 181 | 68.0 |
|                           | Graduate School | 32   | 12.0 |
| Average time spent daily on mobile shopping apps | Below 1 h | 51 | 19.2 |
|                           | 1–2          | 181       | 68.0           |
|                           | Above 2 h    | 34        | 12.8           |

3.2. Measurement

In this paper, we employ questionnaire data to measure the five key concepts of information overload, system feature overload, shadow work, fatigue, and discontinuance intention. Except for shadow work, the focal constructs are measured by modifying validated and previously used multi-item scales. The items for shadow work were developed in this study. Information overload was assessed using four items adapted from Karr-Wisniewski and Lu [24] and Gao et al. [27]. Items for system feature overload were adapted from Karr-Wisniewski and Lu [24]. Items for fatigue were adapted from the exhaustion scale of Maier et al. [28]. Items for discontinuance intention were adapted from Gao et al. [27] and Maier et al. [29]. All items were assessed using a seven-point Likert scale ranging from 1, strongly disagree, to 7, strongly agree. Table 2 lists the variables drawn from the questionnaire used to operationalize the key constructs.

Table 2. Constructs and Source.

| Constructs                  | Questionnaire                                                                 | Source          |
|-----------------------------|-------------------------------------------------------------------------------|-----------------|
| Information overload (4 items) | I am often distracted by the excessive amount of information available to me in the mobile shopping apps.  
I find that I am overwhelmed by the amount of information I have to process on a daily basis in the mobile shopping apps.  
There is too much information about my shopping in the mobile shopping apps so I find it a burden to handle.  
I find that only a small part of the information in the mobile shopping apps is relevant to my needs.  | [24,27]         |
| System feature overload (4 items) | I am often distracted by features that are included in the mobile shopping apps I use for my shopping but are not necessary to perform my shopping.  
I am often less productive because of poor user interface design in the mobile shopping apps I use to support my shopping.  
The mobile shopping apps are often more complex than the tasks I have to complete shopping.  
The mobile shopping apps tend to try to be too helpful which makes performing my shopping even harder.  | [24]            |
| Shadow work (4 items)       | I feel that my time and effort devoted to mobile shopping seems to be useless.  
I feel that the mobile shopping seems to pass on something that I don’t have to do to me.  
I feel that doing mobile shopping seems to be meaningless.  
I feel that doing mobile shopping seems to be unnecessary job for me.  | Developed       |
| Fatigue (4 items)           | I feel drained from activities that require me to use the mobile shopping apps.  
I feel tired from my activities of using the mobile shopping apps.  
Using the mobile shopping apps is a strain for me.  
I feel burnout from my activities with the mobile shopping apps.  | [28]            |
| Discontinuance intention (3 items) | I intend to stop using mobile shopping apps in the next three months.  
I predict that I would reduce my mobile shopping apps use in the next three months.  
I plan to stop or reduce my mobile shopping apps use in the next three months.  | [27,29,30]      |
4. Results

We employed partial least squares structural equation modeling (PLS-SEM) to assess both the measurement and structural components of the model using SmartPLS 3 software [31]. PLS-SEM is suitable for research with small samples when the research model has complex relationships with many constructs and indicators [32,33]. The PLS-SEM approach is also preferred when the research aims to explore theoretical extensions of established theories [33]. This study has adapted the definition and measurement of shadow work that has never been studied in the IS field and is concerned with testing causal relationships of constructs from a prediction perspective. Thus, PLS-SEM was employed for the data analysis [33].

4.1. Measurement Model

We assessed the measurement model using all reflectively measured first-order constructs by examining convergent and discriminant validity. As shown in Table 3, all individual items were loaded above the recommended level. The factor loadings ranged from 0.717 to 0.928. For construct validity, composite reliability (CR) should be greater than 0.7, and the average variance extracted (AVE) should exceed 0.5 [34]. As can be seen in Table 3, the composite reliability of all constructs ranged from 0.906 to 0.934, and the AVE ranged from 0.706 to 0.784. Thus, the reliability of all constructs was significantly higher than the recommended threshold.

Table 3. Reliability.

| Constructs                  | Factor Loading | Cronbach’s α | Composite Reliability | AVE  |
|-----------------------------|----------------|--------------|-----------------------|------|
| Information overload (4 items) | 0.913 0.911 0.870 0.717 | 0.877 | 0.916 | 0.734 |
| System feature overload (4 items) | 0.762 0.876 0.882 0.836 | 0.861 | 0.906 | 0.706 |
| Shadow work (4 items)        | 0.855 0.880 0.911 0.875  | 0.904 | 0.933 | 0.776 |
| Fatigue (4 items)            | 0.870 0.931 0.817 0.909 | 0.905 | 0.934 | 0.779 |
| Discontinuance intention (3 items) | 0.900 0.928 0.826 | 0.861 | 0.916 | 0.784 |

To assess discriminant validity, the square root of AVE should be greater than the inter-construct correlations (i.e., the average variance shared by the construct and its indicators should be larger than the variance shared by the construct and other constructs) [33]. As shown in Table 4, from the inter-construct correlations (off-diagonal elements) and the square root of the AVE (diagonal elements), all constructs share more variance with their indicators compared to those of other constructs. Collectively, our results show that the measures of all constructs are reliable and exhibit sufficient convergent and discriminant validity.
Table 4. Inter-construct correlations.

|                      | Information Overload | System Feature Overload | Shadow Work | Fatigue | Discontinuance Intention |
|----------------------|----------------------|-------------------------|-------------|---------|--------------------------|
| Information overload | 0.857                |                         |             |         |                          |
| System feature overload | 0.559               | 0.840                   |             |         |                          |
| Shadow work          | 0.581                | 0.530                   | 0.881       |         |                          |
| Fatigue              | 0.599                | 0.547                   | 0.614       | 0.883   |                          |
| Discontinuance intention | 0.521               | 0.521                   | 0.631       | 0.520   | 0.886                    |

Note: Figures along the diagonal in bold are values of the square root of the AVE.

Given that all constructs were measured using the same self-reported method, common method bias (CMB) was a concern in our study. To check the effects of CMB, we performed statistical remedies, as suggested by Podsakoff et al. [35]. This study conducted Harman's single-factor test to assess the potentially detrimental effects of CMB on our results [36]. An exploratory factor analysis (EFA) was performed with all the first-order constructs included. The results showed that unrotated principal components factor analysis explained 70% of the total variance and a single factor explained less than 47% of the variation in the data, far below the recommended 50% threshold [36]. This analysis suggests that CMB is not a serious concern in this study.

4.2. Path Analysis

Structural model analysis was performed by using the PLS bootstrapping technique [33]. Before assessing the structural model, we assessed the VIF value and explained the variance ($R^2$) value. When the VIF values are close to 3 and lower [33], collinearity does not bias the regression. The VIF of all constructs ranged from 1.00 to 1.60. Figure 2 summarizes the path coefficients and explained variances in the model. The $R^2$ value in Figure 2 indicates that the structural model of this study explained 39.8% of the variance in shadow work, 37.7% of the variance in fatigue, and 42.7% of the variance in discontinuance intention.

As shown in Figure 2, the results of our study show that information overload significantly influences shadow work (H1, $\beta = 0.414$, $p < 0.001$) and system feature overload affects shadow work positively (H2, $\beta = 0.298$, $p < 0.001$). The results indicate that both information overload and system features overload increase their shadow work when using mobile shopping apps.

This study also found that shadow work was a significant predictor of fatigue (H3, $\beta = 0.614$, $p < 0.001$) and discontinuance intention (H4, $\beta = 0.500$, $p < 0.001$). Our results indicate that shadow work could be an important predictor of individuals' discontinuance
models of IT use. In addition, we found that fatigue had a significant positive influence on discontinuance intention (H5, $\beta = 0.213$, $p < 0.01$).

5. Discussion

As shown in Table 5, this study demonstrated that our five hypotheses were supported. The results show that both information overload and system feature overload are positively related to individuals’ shadow work. Prior research has suggested that either information overload or system feature overload may cause negative psychological reactions in individuals [24,37,38]. This finding suggests that when handling too much information from mobile shopping applications or when there are too many functions with complex user interfaces, users may perceive a kind of shadow work. In line with the above, we suggest that both information overload and system feature overload could be key predictors of shadow work as a negative psychological reaction. Next, we found that shadow work positively influences both fatigue and discontinuance intention, and also found that fatigue positively influences discontinuance. These findings indicate that users’ discontinuance can be explained by shadow work. Shadow work and fatigue collectively explain more than 42% of the variance in discontinuance intention. Based on our results, shadow work could be a theoretical basis for understanding and predicting individuals’ discontinuance behavior in mobile shopping apps.

| Hypothesis                              | Path Coefficient | t-Value | p-Value | Outcome     |
|-----------------------------------------|------------------|---------|---------|-------------|
| H1 Information overload $\rightarrow$ Shadow work | 0.414            | 6.402   | 0.000   | Supported   |
| H2 System feature overload $\rightarrow$ Shadow work | 0.298            | 4.555   | 0.000   | Supported   |
| H3 Shadow work $\rightarrow$ Fatigue      | 0.614            | 13.579  | 0.000   | Supported   |
| H4 Shadow work $\rightarrow$ Discontinuance intention | 0.500            | 6.786   | 0.000   | Supported   |
| H5 Fatigue $\rightarrow$ Discontinuance intention | 0.213            | 2.828   | 0.005   | Supported   |

6. Conclusions and Implications

6.1. Conclusions

SSTs play an increasingly important role in mobile shopping, which has led to an excessive demand for shadow work by consumers. To sustain greater customer experience in mobile shopping apps, mobile shopping providers have to understand the negative effects of shadow work and seek sustainable approaches to reduce it.

Therefore, in this study, we investigated the effect of shadow work in the context of mobile shopping apps. Specifically, we developed survey items for shadow work and then developed a model consisting of antecedents and consequences of shadow work in a mobile shopping context. This study explored two types of overload: information overload and system feature overload. We also considered fatigue and discontinuance intention as consequences of shadow work. Based on findings from relevant studies, we presented five research hypotheses, then this study discovered empirical evidence that information overload and system feature overload could be antecedents of an individual’s shadow work, which predicted either the fatigue or discontinuance intention of mobile shopping apps by testing the proposed hypotheses. More importantly, our results provided empirical evidence that both information and system feature overload affect shadow work.

In addition, shadow work directly or indirectly affects both fatigue and discontinuance.

To recap, this study extended the relevant literature regarding discontinuance in the mobile shopping context by examining the effect of shadow work. While previous research focused on why mobile shoppers discontinue to use their mobile shopping apps, there has been no previous research on the role that shadow work played in the mobile shopping context. Furthermore, there has been no empirical work demonstrating that shoppers’ discontinuance could be predicted by shadow work. Thus, this study represented a significant theoretical gap in the mobile shopping app context. By doing this, our research
introduced a new research direction into mobile shopping research. We hope that many researchers adopt and extend our shadow-work-based model to further improve our understanding of shadow work issues. In particular, future research needs to excavate new factors related to shadow work and continuously prove them for deeper understanding of mobile shoppers’ behavior. In short, based on our findings, we suggest that our shadow-work-based model is capable of explaining discontinuance of mobile shopping apps and contributes to the existing body of knowledge on discontinuance as well as contributes to the mobile consumer behavior literature by introducing and testing a shadow-work-based model.

6.2. Theoretical Implications

Previous research on SSTs has mainly examined the adoption of SSTs. So far, very little has been done regarding the reasons why mobile shoppers discontinue using SSTs. Moreover, while previous studies focused on the functional value, emotional value, and social value of SSTs [15], few studies have addressed the negative effects of shadow work due to SSTs. The main contribution of this research is that we present and test a shadow-work-based model in a mobile shopping context. While most of the constructs in our model, except for shadow work, are not new concepts, the combination of these constructs into a cohesive model is the main contribution of this study. Moreover, by conducting empirical tests, this study proposed that the role of shadow work might be a predictor for explaining individuals’ discontinuance of mobile apps. Specifically, our results indicate that information and system feature overload have direct impacts on shadow work, which may lead to consumers’ fatigue and discontinuance intention. Furthermore, we developed measurement items for the shadow work construct based on the relevant literature. By developing and testing the items, this study offers validated survey items to relevant researchers who are interested in utilizing shadow work in mobile shopping contexts. Lastly, prior empirical studies on individuals’ discontinuance behavior toward the usage of mobile shopping apps have largely focused on exploring possible drivers that lead to discontinuance. Unlike previous work, we attempt to supplement the theoretical understanding of how shadow work may lead to discontinuance. Thus, this study could contribute to relevant literature, together with the previous work, to explain individuals’ discontinuance behavior.

6.3. Practical Implications

This study has implications for individuals and mobile shopping providers. First, for individual consumers, this study found that shadow work may lead to negative psychological and behavioral consequences. Thus, consumers should consider and pay attention to the drawbacks of shadow work, which may lead to fatigue and discontinuance. In addition, to avoid the shadow work caused by information and system feature overload, users should prevent themselves from engaging with too much irrelevant information as well as functions with complex designs. Next, for mobile shopping providers, this study offered strategic insights to relevant practitioners who are interested in the negative reactions of individuals, including shadow work and fatigue. Based on our findings, they can develop appropriate strategies for improving the information quality and esthetic interface designs. For example, mobile shopping providers can develop one-click shopping and payment features that help mobile shoppers make transactions with less shadow work. In addition, chat-bots could mitigate mobile shoppers’ shadow work by providing personalized recommendations to make them feel taken care of. In addition, from the management of mobile service quality, shadow work could be an important mobile service quality factor in the service design process. Thus, by considering the importance of recognizing the shadow work, mobile shopping app developers should embed functions that enable mobile shoppers to find and purchase products quickly. As a result, this will moderate the negative effects of shadow work and foster retention with specific mobile shopping apps.
6.4. Limitations and Future Research

While this study has meaningful implications for research and practice, our study has some limitations. First, our study collected cross-sectional data to test the model and our sample consisted of only 266 respondents. Even though our sample size is sufficient for testing our proposed research model, future research needs to conduct a longitudinal study with a larger sample to validate and generalize the relationships among constructs.

Second, the perception of shadow work might vary from individual to individual. To overcome this shortcoming, future research should consider moderating variables (e.g., personality traits) or control variables (e.g., self-efficacy, subjective norm) to design a research model. Third, we did not consider other factors relevant to shadow work in the current model since we tend to test a concise model for understanding shadow work. Thus, future studies need to identify additional factors to explain the role of shadow work more abundantly. Finally, our empirical data were collected using South Korean users, who are highly capable of using mobile shopping apps. While mobile app shopping is still under development in a lot of regions or countries, it may be questioned whether our findings are consistent with other countries. Therefore, future studies should be conducted in more countries in order to generalize the results of this study.

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References
1. Norene, P.; Ann, D. Unpaid work, capital and coercion. Work Org. Labour Glob. 2012, 6, 27–47. [CrossRef]
2. Kleemann, F.; Voß, G.G.; Rieder, K. Un(der)paid Innovators: The Commercial Utilization of Consumer Work through Crowdsourcing. Sci. Technol. Innov. Stud. 2008, 4, 5–26.
3. Illich, I. Shadow Work; Marion Boyars: London, UK, 1981.
4. Coltrane, S.; Shih, K.Y. Gender and the Division of Labor. In Handbook of Gender Research in Psychology: Gender Research in Social and Applied Psychology; Chrisler, J.C., McCreary, D.R., Eds.; Springer: New York, NY, USA, 2010; Volume 2, pp. 401–422.
5. Lambert, C. Shadow Work: The Unpaid, Unseen Jobs That Fill Your Day; Counterpoint Press: Berkeley, CA, USA, 2015.
6. Open Survey. Mobile Shopping Trends 2020 in South Korea; Open Survey: Prague, Czech Republic, 2020.
7. McLean, G.; Osei-Frimpong, K.; Al-Nabhani, K.; Marriott, H. Examining consumer attitudes towards retailers’ m-commerce mobile applications—An initial adoption vs. continuous use perspective. J. Bus. Res. 2020, 106, 139–157. [CrossRef]
8. Van Droogenbroeck, E.; Van Hove, L. Adoption and Usage of E-Grocery Shopping: A Context-Specific UTAUT2 Model. Sustainability 2021, 13, 4144. [CrossRef]
9. Curran, J.M.; Meuter, M.L. Self-service technology adoption: Comparing three technologies. J. Serv. Market. 2005, 19, 103–113. [CrossRef]
10. Weijters, B.; Rangarajan, D.; Falk, T.; Schillewaert, N. Determinants and Outcomes of Customers’ Use of Self-Service Technology in a Retail Setting. J. Serv. Res. 2007, 10, 3–21. [CrossRef]
11. White, A.; Breazeale, M.; Collier, J.E. The Effects of Perceived Fairness on Customer Responses to Retailer SST Push Policies. J. Retail. 2012, 88, 250–261. [CrossRef]
12. Blut, M.; Wang, C.; Schofer, K. Factors Influencing the Acceptance of Self-Service Technologies: A Meta-Analysis. J. Serv. Res. 2016, 19, 396–416. [CrossRef]
13. Chen, J.V.; Tran, A.; Nguyen, T. Understanding the discontinuance behavior of mobile shoppers as a consequence of technostress: An application of the stress-coping theory. Comput. Hum. Behav. 2019, 95, 83–93. [CrossRef]
14. Brehm, S.S.; Brehm, J.W. Psychological Reactance: A Theory of Freedom and Control; Academic Press: New York, NY, USA, 2013.
15. Feng, W.; Tu, R.; Lu, T.; Zhou, Z. Understanding forced adoption of self-service technology: The impacts of users’ psychological reactance. Behav. Inf. Technol. 2019, 38, 820–832. [CrossRef]
16. Huws, U. The Hassle of Housework: Digitalisation and the Commodification of Domestic Labour. *Fem. Rev.* 2019, 123, 8–23. [CrossRef]

17. Meuter, M.L.; Ostrom, A.L.; Roundtree, R.I.; Bitner, M.J. Self-Service Technologies: Understanding Customer Satisfaction with Technology-Based Service Encounters. *J. Mark.* 2000, 64, 50–64. [CrossRef]

18. Kimes, S.E.; Collier, S.E. How Customers View Self-service Technologies. *MIT Sloan Manag. Rev.* 2015, 57, 25–26.

19. Chopdar, P.K.; Korfiatis, N.; Sivakumar, V.J.; Lytras, M.D. Mobile shopping apps adoption and perceived risks: A cross-country perspective utilizing the Unified Theory of Acceptance and Use of Technology. *Comput. Hum. Behav.* 2018, 86, 109–128. [CrossRef]

20. Buell, R.W.; Norton, M.I. The Labor Illusion: How Operational Transparency Increases Perceived Value. *Manag. Sci.* 2011, 57, 1564–1579. [CrossRef]

21. Reinders, M.J.; Dabholkar, P.A.; Frambach, R.T. Consequences of Forcing Consumers to Use Technology-Based Self-Service. *J. Serv. Res.* 2008, 11, 107–123. [CrossRef]

22. Clee, M.A.; Wicklund, R.A. Consumer Behavior and Psychological Reactance. *J. Consum. Res.* 1980, 6, 389–405. [CrossRef]

23. Liu, S. The impact of forced use on customer adoption of self-service technologies. *Comput. Hum. Behav.* 2012, 28, 1194–1201. [CrossRef]

24. Karr-Wisniewski, P.; Lu, Y. When more is too much: Operationalizing technology overload and exploring its impact on knowledge worker productivity. *Comput. Hum. Behav.* 2010, 26, 1061–1072. [CrossRef]

25. Farhoomand, A.F.; Drury, D.H. Managerial information overload. *Commun. ACM* 2002, 45, 127–131. [CrossRef]

26. Moore, J.E. One Road to Turnover: An Examination of Work Exhaustion in Technology Professionals. *MIS Q.* 2000, 24, 141–168. [CrossRef]

27. Gao, W.; Liu, Z.; Guo, Q.; Li, X. The dark side of ubiquitous connectivity in smartphone-based SNS: An integrated model from information perspective. *Comput. Hum. Behav.* 2018, 84, 185–193. [CrossRef]

28. Maier, C.; Laumer, S.; Eckhardt, A.; Weitzel, T. Giving too much social support: Social overload on social networking sites. *Eur. J. Inf. Syst.* 2015, 24, 447–464. [CrossRef]

29. Maier, C.; Laumer, S.; Weinert, C.; Weitzel, T. The effects of technostress and switching stress on discontinued use of social networking services: A study of Facebook use: Effects of technostress and switching stress. *Inf. Syst. J.* 2015, 25, 275–308. [CrossRef]

30. Cao, X.; Sun, J. Exploring the effect of overload on the discontinuous intention of social media users: An S-O-R perspective. *Comput. Hum. Behav.* 2018, 81, 10–18. [CrossRef]

31. Ringle, C.M.; Sarstedt, M.; Straub, D.W. A Critical Look at the Use of PLS-SEM in MIS Quarterly. *MIS Q.* 2012, 36, iiv–8. [CrossRef]

32. Henseler, J.; Ringle, C.M.; Sinkovics, R.R. The Use of Partial Least Squares Path Modeling in International Marketing. *Adv. Int. Mark.* 2009, 20, 277–319.

33. Hair, J.F.; Risher, J.J.; Sarstedt, M.; Ringle, C.M. When to use and how to report the results of PLS-SEM. *Eur. Bus. Rev.* 2019, 31, 2–24. [CrossRef]

34. Gefen, D.; Straub, D.W.; Boudreau, M.-C. Structural equation modelling and regression: Guidelines for research practice. *Commun. Assoc. Inf. Syst.* 2000, 4, 1–79. [CrossRef]

35. Podsakoff, P.M.; MacKenzie, S.B.; Jeong-Yeon, L.; Podsakoff, N.P. Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *J. Appl. Psychol.* 2003, 88, 879. [CrossRef]

36. Podsakoff, P.M.; Organ, D.W. Self-Reports in Organizational Research: Problems and Prospects. *J. Manag.* 1986, 12, 531. [CrossRef]

37. Luqman, A.; Cao, X.; Ali, A.; Masood, A.; Yu, L. Empirical investigation of Facebook discontinues usage intentions based on SOR paradigm. *Comput. Hum. Behav.* 2017, 70, 544–555. [CrossRef]

38. Swar, B.; Hameed, T.; Reychav, I. Information overload, psychological ill-being, and behavioral intention to continue online healthcare information search. *Comput. Hum. Behav.* 2017, 70, 416–425. [CrossRef]