

# Increasing Transparency for Consumers Showing Probabilities of Virtual Items in Loot Boxes in Digital Games

Philipp Christian Lohse<sup>1</sup>

<sup>1</sup>Andrássy University Budapest, Hungary

## ABSTRACT

### Keywords:

Freemium, Digital  
Gaming, Survey,  
Transparency, Loot  
Box

**Purpose of the study:** This study is motivated by the increasing public discussions about loot boxes. There are similarities between loot boxes and gambling. Digital games often cross the line between skill-based games and gambling.

**Methodology:** The presented data in this study is based on an online survey from July 2019 in Germany, Hungary, South Africa, Thailand, the United Kingdom, and the United States of America.

**Main Findings:** This paper discusses the public acceptance of a possible loot box regulation. Often, the probabilities of items inside loot boxes are not shown. This paper discusses the acceptance of mandatory showing of loot box probabilities and finds that there is a major agreement to the possible increase of transparency.

**Research limitations:** The presented data only applies to Germany, Hungary, South Africa, Thailand, the UK, and the USA in July 2019. Findings from this study cannot be transferred to other countries. There might be further regional differences in other countries. Further research of consumer preferences for possible regulations can help in determining useful regulations for digital games with loot boxes.

**Novelty/Originality of this study:** Knowledge in this research field is still limited. There are yet adequate studies that explore consumer preferences concerning game design. This applies especially for the field of consumer preferences concerning the showing of probabilities of virtual items inside loot boxes.

## 1. INTRODUCTION

The subject of this paper is the statistical analysis of the transparency of loot boxes in mobile digital games in Germany, Hungary, South Africa, Thailand, the United Kingdom, and the United States of America. Digital games in general had faced frequent disputes in the last few years ([Bauer, 2018](#); [Au, 2019](#); [Wetterau, 2018](#); [Pitscheneder, 2018](#); [D'Anastasio, 2019](#); [Schmieder, 2019](#); [Kleinman, 2019](#); [Lohse, 2019](#)). In the context of this paper, digital games are treated as fully digital goods based on Stelzer's definition. According to Stelzer, digital goods are immaterial ways to satisfy needs that can be developed, distributed, or applied through an information system. Digital goods are products or services that can be represented, transmitted, and processed in the form of binary data ([Dirk, 2000](#)).

The games industry - especially in the field of mobile gaming - has changed significantly in recent years. Paid offers are becoming less common with an increase in free mobile digital games ([Spencer, 2016](#)). According to Spencer, free games generate the highest revenue in respective online portals (App-Store, Play Store, etc.) ([Spencer, 2016](#)). These games can be categorized as freemium games. "Freemium" is a term composed of the words "Free" and "Premium". In a freemium business model, companies provide a substantial portion of their offer for free. In-app purchases make the revenue for additional services. Thus, freemium is a combination of free and paid offers. A freemium revenue model is a form of price differentiation. Game publishing companies no longer try to sell as many copies of the games as possible. Instead, these games maximize user numbers and try to get the users to make in-app purchases. These purchases give players an advantage within the game, or enable them to make cosmetic changes to the game (skins).

The global mobile gaming market, according to the global digital games analytics portal Newzoo, is even bigger than the global gaming market for PC or console games (stationary digital games) ([Wijman, 2019](#)). It is estimated that the global mobile gaming market will achieve a volume of \$68.5 Billions For example, according to Takahashi, the mobile games "Clash of Clans" and "Clash Royal" from publisher Supercell together had generated \$2.3 billion in revenue in 2016 worldwide ([Cowley, 2017](#)).

Newspaper articles have been piling up in recent years, reporting many in-app purchases by minors and adults in a short period of time ([D'Anastasio, 2019](#); Kleinman, 2019). In individual cases, these in-app purchases have led to very high costs. Because of this, criticisms of in-app purchases have increased. In 2019, the World Health Organization (WHO) officially classified video game disorder as a mental health condition ([Rettner, 2019](#)). According to WHO, the gaming disorder occurs

Corresponding Author: Philipp.Lohse@andrassyuni.hu

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when there is a "pattern of persistent or recurrent gaming behavior in which people lose control of their gaming behaviour, give priority to gaming over other interests and activities, and continue gaming despite negative consequences, such as impairments in their family relationships, social lives, work duties or other areas" ([Rettner, 2019](#)).

Many people see a connection between loot boxes and gambling because of the element of chance. Regulations for loot boxes have been discussed by different institutions and in many different parliaments (([Au, 2019](#); [Wetterau, 2018](#))). Some countries have already implemented regulations for loot boxes in their national law.

## 2. LITERATURE REVIEW

There is a public discussion about the excessive usage behavior of mobile digital games ([Bauer, 2018](#); [Au, 2019](#); [Kleinman, 2019](#)). Such discussion is held in many different countries all over the world and is still on-going. The central research question is: is it necessary to increase the transparency of loot boxes in digital games for consumers and what motivates people to demand an increase in transparency ([Abubakar & Obansa, 2020](#); [Aguenane, 2020](#)). This study shows the demand for increased consumer transparency of loot boxes in multiple countries, gives a descriptive overview of the matter, and discusses the results.

Games are no longer just products. They now also include services. People use games over a longer period of time, and game publishers keep updating their games. In 2014, Oscar Clark discussed this phenomenon in his book "Games as a service. How free to play can make better games" ([Clark, 2014](#)). In 2014, Dimitar Draganov published his book "Freemium mobile games - Design & Monetization" ([Draganov, 2014](#)). He discussed on how game designs can keep people interacting with a game over a longer period and how to convert players of a game into paying customers. Tim Fields published his book "Mobile & Social Game Design - Monetization, Methods and Mechanics" in 2014 and discussed the effects of game design on converting players into customers ([Fields, 2014](#)). Field's book focuses on key performance indicators. According to Fields, if there is a low ratio of daily active users relative to monthly active users, then the game has a problem getting players back into the game. In 2015, Fowelin published a general article about how and why game publishing companies use freemium as monetization for their games ([Fowelin, 2015](#)). The research method was qualitative and quantitative. The author sees freemium as a competitive strategy or a marketing tool.

Schwiddessen published a study in 2018 about the classification of loot boxes ([Schwiddessen, 2018](#)). He discussed the element of chance in loot boxes and under which circumstances a loot box can be classified as gambling according to German law. Krainbring and Röhl also published a study about loot box classification in 2018 (Röhl, 2018). In their study, the authors argue that a change in law and jurisdiction in many countries is very likely to happen in the near future. Laustetter published his study about the difference between gambling and skill-based games in 2012. In his study, he discussed different ways to calculate the element of chance in a game ([Laustetter, 2012](#)).

## 3. METHODOLOGY

The research method of this study is empirical. In July 2019, an online survey in social media was carried out promoted with ads in Facebook and Instagram. The survey was done in Germany, Hungary, South Africa, Thailand, the United Kingdom and the United States of America. The presented data in this study are relevant for mobile and stationary digital games. A total of 248 people from Germany, 302 from Hungary, 168 from South Africa, 238 from Thailand, 229 from the United Kingdom and 127 from the United States participated in this survey. The survey was split into two groups for mobile and stationary digital gaming and asked the participants about their usage behaviour of in-app or in-game purchases. The presented data in this study show the survey responses concerning the statement "I would appreciate that probabilities of items in loot boxes are shown" and "Showing loot box probabilities makes me spend less on In-App / In-Game purchases".

For this study, there were questions and statements in the survey. The participants were required to respond to these questions with "Yes", "No", or "Prefer not to say". The participants could respond to the statements with answers from one to seven. One stands for "Do not agree at all" and seven stands for "Completely agree". A pre-test was carried out in June 2019 with seven respondents. During the pre-test, attention was on getting a balanced gender ratio. Four men and three women participated in the pre-test. There is a possible bias for people who do not use social media. Running ads inside games is not possible in many cases. Social media bias is a bias that cannot be avoided. Running ads on social media randomly shows ads to people who have an interest in gaming. Ads have been targeted specifically to each country or region.

## 4. ANALYSIS

A possible regulation of loot boxes that is not yet widely discussed is the mandatory implementation showing probabilities of items inside loot boxes within a digital game. This possible regulation could increase transparency for the consumers. The participants of the survey were asked about their opinion on the statement "I would appreciate that probabilities of items in loot boxes are shown". Figure 1 shows the responses of the survey participants to the statement.

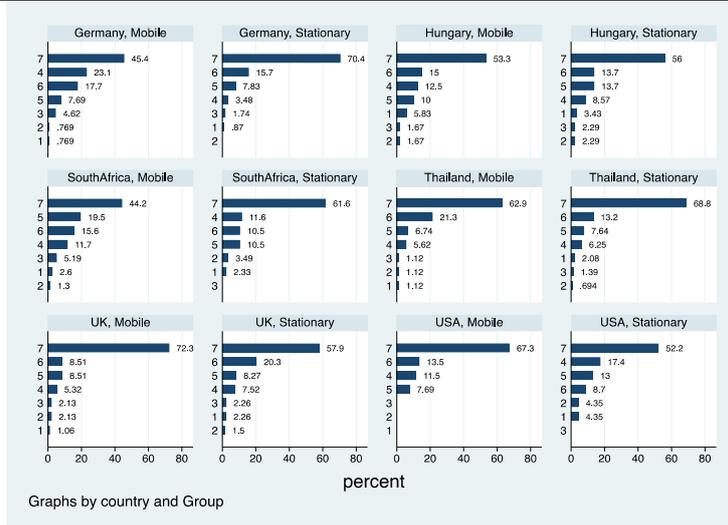


Figure 1: Survey responses in relative numbers to the statement “I would appreciate that probabilities of items in loot boxes are shown” (own figure).

The majority of participants in both groups for all the countries agreed to the statement i.e. that they would appreciate the showing of probabilities of items in loot boxes. There are minor variations. To get further information about the determinants that drive the motivation to increase consumer transparency, a regression analysis was carried out. The dependent variable is equal to one if the survey participants responded to the statement “I would appreciate that probabilities of items in loot boxes are shown” with a five or higher. Otherwise, it is equal to zero. The independent variable “sex” is equal to 1 if the participant is male and 0, if the participant is female. The variable “underage” in this regression is a dummy variable, which is equal to one if the survey participant is 17 years old or younger and zero otherwise. The independent dummy variable “Mobile” is equal to one, if the survey participant plays mobile games and zero otherwise. Other relevant statements for this regression analysis are “I would appreciate it if all virtual items that are in a loot box are available at least once in a while in the game shop for a fixed price”, “Showing loot box probabilities would make me spend less on in-app purchases”, “I would welcome age restrictions for games with loot boxes”, “I would appreciate showing my payment history in the game”, “I want to have a good ranking in the leaderboards”, “I’m proud of my game progress” and “I like to play for several hours at a time”. A positive response (five, six or seven) to a statement was coded to a one. The variables are zero otherwise. Based on these statements, the dummy variables of “Lootboxcontentshop”, “ProbLBless”, “ProAgerestriction”, “Showingpaymenthistory”, “GoodRanking”, “ProudoProgress” and “Severalhours” were generated. “Accsharepassive” is equal to one if other people play the participants’ game accounts too and zero if no one else plays their game account. “Accshareactive” is a dummy variable which has the value of one if the respective survey participant plays the game account of another player and is equal to zero if he does not. Table 1 shows the results of the linear regressions for the six countries in this study and the overall average. A linear regression was chosen because it results in higher values of R<sup>2</sup> compared to a Logit or Probit model.

TABLE 1  
 Regression results

	(1) All	(2) Germany	(3) Hungary	(4) South Africa	(5) Thailand	(6) UK	(7) USA
Sex	0.156*** (0.027)	0.183*** (0.052)	0.111** (0.050)		0.181*** (0.065)		0.293*** (0.070)
underage	0.041** (0.021)	0.130** (0.062)					0.202*** (0.063)
Lootboxconten~p	0.091*** (0.021)	0.102** (0.049)		0.141** (0.065)			
ProbLBless	0.137*** (0.020)	0.137*** (0.049)	0.210*** (0.045)	0.196*** (0.058)	0.074** (0.037)		0.107** (0.053)
ProAgerestriction	0.154*** (0.021)	0.177*** (0.050)	0.106** (0.045)	0.191*** (0.058)	0.202*** (0.038)	0.162*** (0.042)	0.194*** (0.059)
ShowingPaymen~y	0.113*** (0.021)	0.121** (0.051)	0.138*** (0.043)	0.113** (0.057)			
GoodRanking	0.043** (0.020)		0.122*** (0.043)				

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Mobile	-0.156*** (0.053)							
ProudoProgress	-0.131** (0.065)		0.143** (0.063)					
Severalhours	-0.101* (0.056)		0.067* (0.039)		-0.148*** (0.053)			
Accshareactive					-0.244*** (0.068)			
Accsharepassive							0.217** (0.098)	
_cons	0.383*** (0.032)	0.619*** (0.100)	0.412*** (0.060)	0.417*** (0.067)	0.397*** (0.089)	0.818*** (0.031)	0.466*** (0.093)	
Obs.	1098	217	286	162	222	222	106	
R-squared	0.210	0.327	0.203	0.227	0.208	0.116	0.308	

Standard errors are in parenthesis  
 \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Males from Germany, Hungary, Thailand, the USA and the overall average are more likely than the women to appreciate the display of the probabilities of items inside the loot boxes. Underaged people from Germany, the USA and the overall average are more likely to appreciate the display of the probabilities of items inside the loot boxes. Survey participants from Germany, South Africa and the overall average who agree that the content of loot boxes should be available in the respective game shop at least once in a while for a fixed price, are more likely to have a positive attitude towards the display of the probabilities of items inside the loot boxes. People from Germany, Hungary, South Africa, Thailand, the USA and the overall average who agree to the statement that showing loot box probabilities would make them spend less on In-App purchases, are more likely to appreciate the display of the probabilities of items in the loot boxes. People from all regions who welcome age restrictions for games with loot boxes are more likely to appreciate the display of the probabilities of items in the loot boxes. Germans, Hungarians, South Africans and the overall average who welcome the display of a payment history are more likely to appreciate the display of the probabilities of items in the loot boxes. Survey participants from Hungary and the overall average who agree to the statement about good ranking in game leaderboards are more likely to appreciate the display of the probabilities of items in the loot boxes. The mobile gaming group from Germany is less likely to appreciate the display of the probabilities of items in the loot boxes. The group has no statistical significance in other areas for this statement. People from Germany who are proud of their game progress are less likely to appreciate the display of the probabilities of items in the loot boxes, while those from Thailand are more likely to appreciate the display of the probabilities of items in the loot boxes. Survey participants from Germany who like to play several hours at a time are less likely to appreciate the display of the probabilities of items in the loot boxes, while those from Thailand are more likely to appreciate the display of the probabilities of items in the loot boxes. British survey participants who also play the game account of another player are less likely to appreciate the display of the probabilities of items inside the loot boxes. American gamers who let other people play their game account are more likely to appreciate the display of the probabilities of items inside the loot boxes.

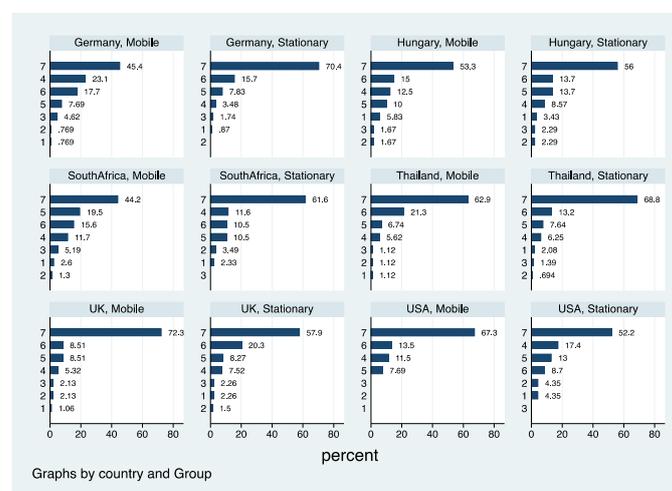


Figure 2: Survey responses in relative numbers to the statement “Showing loot box probabilities makes me spend less on In-App / In-Game purchases” (own figure)

Relevant statements for this regression analysis are “I would appreciate it, if all virtual items that are in a loot box are available at least once in a while in the game shop for a fixed price”, “I would appreciate that probabilities of items in loot

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boxes are shown”, “I once felt like other players tried to push me to do an In-App / In-Game purchase”, “I keep on playing, even though the game does not give me as much pleasure as it did in the beginning” and “I lose interest in a game when I need a lot of time to learn it”. A positive response (five, six or seven) to a statement has been coded to a one. The variables are zero otherwise. Based on these statements, the dummy variables “Lootboxcontentshop”, “ShowingLBprob”, “Pushedbyplayer”, “Keepplaying” and “Losinginterest” were generated. Table 2 shows the results of the linear regressions for the six countries in this study and the overall average. A linear regression was chosen because it results in higher values of R<sup>2</sup> compared to a Logit or Probit model.

**TABLE 2**  
**Regression results**

	(1) All	(2) Germany	(3) Hungary	(4) South_Africa	(5) Thailand	(6) UK	(7) USA
Lootboxconten~p	0.070** (0.029)	0.166** (0.065)					
ShowingLBprob	0.320*** (0.038)	0.289*** (0.081)	0.444*** (0.070)	0.349*** (0.092)	0.298*** (0.107)	0.261*** (0.098)	0.313** (0.123)
Pushedbyplayer	0.081*** (0.030)	0.175** (0.078)		0.186** (0.074)			
Keepplaying	0.077*** (0.027)				0.180*** (0.064)	0.136** (0.065)	0.177** (0.086)
Losinginterest	0.070** (0.031)			0.173** (0.081)			
_cons	0.117*** (0.038)	0.057 (0.075)	0.127** (0.063)	0.197** (0.086)	0.163 (0.103)	0.270*** (0.101)	0.098 (0.118)
Obs.	1266	238	295	162	233	225	127
R-squared	0.090	0.123	0.119	0.155	0.074	0.046	0.087

Standard errors are in parenthesis  
\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Survey participants from Germany and the overall average who agree that the content of loot boxes should be available in the respective game shop at least once in a while for a fixed price, are more likely to have a positive attitude towards the statement “Showing loot box probabilities makes me spend less on In-App / In-Game purchases”. People from all areas who appreciate the display of the probabilities of items in the loot boxes are more likely to spend less on In-App or In-Game purchases, when the probabilities of the loot boxes are shown. Germans, South Africans and the overall average who once felt pressured by another player to make an In-App or In-Game purchase are more likely to agree to spend less on In-App purchases, when the probabilities of the loot boxes are shown. Survey participants from Thailand, the UK, the USA and the overall average who keep playing even though the game does not give them as much pleasure as it did in the beginning, are more likely to spend less on In-App purchases, if the probabilities of the loot boxes are shown. Participants from South Africa and the overall average who lose interest in a game when they need a lot of time to learn it, are more likely to spend less on In-App or In-Game purchases when the probabilities of the loot boxes are shown.

## 5. DISCUSSION

The survey participants demonstrated a high demand for an increase of transparency. The presented data in this study shows a high agreement that the probabilities of the items inside the loot boxes should be shown. These participants also say that showing the loot box probabilities would lead to a decrease of spending on loot boxes. This explains why game publishing companies do not voluntarily show the probabilities of items inside the loot boxes in their digital games.

## 6. CONCLUSION

The lack of transparency is a problem for consumers. Showing the probabilities of the items inside the loot boxes is a way to increase transparency for consumers, but it is not mandatory by law in many countries. Making it mandatory by law for game publishing companies to show the probabilities of items inside the loot boxes is a way to increase consumer satisfaction. Game publishing companies are not interested in showing these probabilities because it would lead to a decrease in revenue (see Figure 2).

There are no major differences between the preferences of players of mobile or stationary digital games. In-App purchases became popular in mobile digital games with the freemium monetization model. Today, In-Game purchases have become popular in stationary digital games too.

## 7. LIMITATION AND FUTURE RECOMMENDATIONS

This study gives an overview of consumer preferences based on a survey. Until today, the consumer preferences of people from other countries remain unknown. The presented data only applies for Germany, Hungary, South Africa, Thailand, the

UK and the USA in July 2019. Findings from this study cannot be transferred to other countries. There might be further regional differences in other countries. Future studies can fill this research gap. Further research on consumer preferences for possible regulations can help find useful regulations for digital games with loot boxes.

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