

## Understanding the Effect of Culture on E-Book Popularity during COVID-19 Pandemic

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### ABSTRACT

Coronavirus Pandemic has changed the way that people live, interact and communicate with others. Some modifications are transitory, while others seem to be permanent. Seeking for social and human development, many individuals find in educational courses a way to get a better quality of life. During the lockdown periods, reducing human contact, information technology plays an important role to enable the access of books by individuals. Cultural factors at a country level also can expand or decrease the interest in information technologies to access electronic books (e-books). Therefore, considering the lockdown limitations during the COVID-19 pandemic, this paper tests the effect of culture on e-book popularity among different countries. First, we observed a significant increase in the popularity of e-books during the lockdown period, which reinforces the potential that information technology has to generate different values for individuals and firms during lockdown restrictions. Large countries, and countries with better levels of information technology tend to search more for e-books during the lockdown. Moreover, masculinity and power distance are two dimensions of culture that seem to be related to the changes in the interest of e-books during pandemics. These results highlight new questions that can be explored in further research.

**Keywords:** E-Books; Cross-Country Analysis; Technology Adoption.

### 1. INTRODUCTION

COVID-19 represents a “global society shock”, generating unprecedented impacts on the world, affecting capital supply, labor market, supply chain management, home life, peoples’ health, among others (Coombs, 2020; Papadopoulos, Baltas & Balta, 2020; Venkatesh, 2020). It may represent a unique situation across generations (Venkatesh, 2020). Lockdowns over the world and temporarily closure of businesses have required many actions by governments and individuals (Papadopoulos, Baltas & Balta, 2020), and Information and Communication Technologies (ICTs) play a special role in this regard.

ICTs contribute to facilitate the life of people and firms. In normal conditions, individuals have the option to choose an appropriate moment to adopt and start using ICT resources. Many factors can affect the initial adoption and the use of information technology, and they include market pressure, competition, behavioral / individual characteristics, and technology itself (Albertin & Albertin, 2012). In a mandatory context (Venkatesh et al., 2003), ICTs adoption can be affected and modified, which is the case forced by lockdown restrictions to prevent Coronavirus contagion. Therefore, Coronavirus pandemic represents an external event in the market that exerts a pressure in the environment and also affects ICTs use/adoption. A strong movement to digitalization started together with the isolation measures.

COVID-19 has generated a decrease in social activities, to reduce human contact, and an increase in other activities, such as eating at home (Coombs, 2020; Papadopoulos, Baltas & Balta, 2020) and working at home (home office). To deal with COVID-19 restrictions, many small firms use digital technologies that have potential to help the process of value creation (Papadopoulos, Baltas & Balta, 2020). On one hand, the impacts of COVID-19 increased the interest in information technology resources. For example, video conference offers to individuals the opportunity to keep in contact during these times (Coombs, 2020). In this way, the COVID-19 pandemic affected the digital world, generating opportunities to expand technology-based solutions (Sein, 2020; He, Zhang,

& Li, 2021). On the other hand, traditional concerns (such as the digital divide) also remain in regard to the access of information technology (Barnes, 2020).

The resources form ICTs have become ubiquitous around the world (Chu, Luo, & Chen, 2019), recreating dynamics through mobile technologies (Dey, Yen, & Samuel, 2020). Considering the educational area, the popularity of mobile devices, such as smartphones and tablets, affected the perception of print publications (Jin, 2014). Together with technology development, the Internet generates some effects in the education and in the sources that students use to obtain information (Crespo et al., 2011). One innovation recently available to students, and for people in general, is the electronic book, or e-book.

The definition of e-book in this study follows the study of Jin (2014), that an e-book is a book publication in digital form, readable on computers or electronic devices. New individuals interested in e-books are emerging every day (Weinstein, 2010). E-book users also claim for features related to usability and interaction, in order to improve user experience when reading (Crespo et al, 2011).

Considering the lockdown limitations during the COVID-19 pandemic and the many actions to reduce human contact, we aim to test the effect of culture on e-book popularity among different countries. To do so, firstly, we compare the popularity of e-books during a period with lockdown orientations across the world with e-book popularity 12 months before, when there were not lockdown limitations. We developed this analysis with data from 116 countries. Secondly, we tested some potential determinants of the increase in e-book popularity. Since we have a database at a country level, in this second stage of analysis, the cultural dimensions of Hofstede were employed to understand an increase/decrease in e-book popularity.

There are many studies on e-books adoption that consider, for example, the Technology Acceptance Model (Davis, 1989; Jin, 2014). Therefore, this study can expand previous literature by considering an external factor of the environment that can affect the use of e-books. As, ICTs resources have gained popularity across countries, and cultural environments have been an important variable to understand the success/failure of many projects (Chu et al., 2019), we also highlight the role of cultural dimensions of Hofstede to better understand the adoption of e-books across different countries.

## 2. LITERATURE REVIEW

Hofstede's cultural dimensions have supported many cross-cultural studies in the field of information systems, since it represents a parsimoniously cultural dimension framework (Chu et al., 2019). Hofstede proposed four dimensions of culture: Power Distance, Uncertainty Avoidance, Individualism/Collectivism, and Masculinity/Femininity; the countries covered by the analysis could receive a score for each dimension (Hofstede & Bond, 1984). In more recent work, two other dimensions were included in Hofstede's Framework: Long/Short Term Orientation, and Indulgence/Restraint (Hofstede, 2011).

Extant literature indicates that besides technology factors and personal factors, technology adoption also depends on environmental factors such as culture (Panigrahi et al., 2018). Previous studies point that culture may influence adoption of digital innovations such as e-commerce (Hallikainen & Laukkanen, 2018), e-learning (El-Masri & Tarhin, 2017), mobile systems (Lee et al., 2007; Choi et al., 2014), games (Pyae, 2018), among others.

The studies of Lee et al. (2007) and of Abbasi et al. (2015) indicate that a propensity to individualism have a significant impact on technology adoption. Lee et al. (2007) argue that individualistic people value technologies and services that can be customized according to their needs more than people with collectivist tendencies. Individualism also increases the probability that the individual will perceive technology as useful for self-interests (Abbasi et al., 2015).

In the context of e-commerce, Hallikainen and Laukkanen (2018) point that masculinity positively affects the perception of trustworthiness of online stores. Kaba and Osei-Bryson (2013), state that in masculine societies, technology adoption is more likely to be based on a cost / benefit balance than on feminine cultures. Thus, the relationship between perceived usefulness and technology adoption is stronger for countries with higher levels of masculinity, which means that individuals in these countries tend to adopt technologies if they perceive them as useful (Kaba & Osei-Bryson, 2013).

According to Nistor et al. (2013), members of cultures with higher levels of power distance are less likely to use educational technologies. Assuming that an individual's cultural orientation can influence any belief and

perception regarding IT use, Hwang and Grant (2011) identified that the distance of power has a significant and negative effect on computer self-efficacy, which, in turn, influences the perception of ease-of-use of ERP systems.

Regarding uncertainty avoidance, studies point that it is a cultural factor related to risk perception and, consequently, to resistance to the use of technologies (Hwang & Lee, 2012; Hallikainen & Laukkanen, 2018). Potnis et al. (2018) point that the uncertainty associated with the use of e-books negatively affects the intention to use these electronic resources. Thus, the authors emphasize the relevance of supportive initiatives taken by librarians to mitigate uncertainty related to e-books adoption.

Therefore, we consider the Hofstede's cultural dimensions to improve the understanding of e-books popularity during pandemics. However, due to the absence of data for many countries of the study sample, only the initial four dimensions were considered in the quantitative analysis of this study.

### 3. DATA AND METHODS

The main purpose of this study is to test the effect of culture on e-book popularity among different countries during lockdown periods due the Covid-19 pandemic. To achieve this purpose, we used only public downloadable data. First, we collected data related to e-book popularity using Google Trends (Google, 2020); this variable was called E-Book Index. It represents the search interest for a given term in a given region/time, where a value of 100 indicates the peak of popularity; it ranges from 0 to 100 (Google, 2020).

In this first stage, using Google Trends, we downloaded the E-Book Popularity, by country, in the past 5 years. This information is available to download in weeks. Based on this data, we calculate the average popularity achieved by the term “ebook” in the months of April, 2020 and April, 2019. Therefore, we created two proxies for the dependent variable: i) E-Book Index, that represents the average popularity of e-books in April, 2020, by country; and ii) E-Book Index (Diff), that represents the difference between the average popularity in April, 2020 and the average popularity in April, 2019, by country. This comparative variable enables an analysis related to an increase in E-Book Popularity in relation to the same country and in the same month, but one year before. We collected this information in late July, 2020.

The second stage of data collection involved the variables for culture. To do so, we consulted Hofstede's website (Hofstede, 2020) and filled a spreadsheet with the values for each cultural dimension and country. The study of Hofstede includes six dimensions for culture; however, considering that many countries presented missing values for two of these dimensions (Long Term Orientation and Indulgence), this study considers the other four dimensions in the quantitative analysis: Power Distance; Individualism; Masculinity; and Uncertainty Avoidance.

Finally, we included some control variables in the quantitative model based on open data from The World Bank (2020). These control variables are related to country size (Population) and technology access (Mobile Cellular Subscriptions per 100 people). The variable Population (code: SP.POP.TOTL) represents the count for all residents in the country and refers to the estimative for 2019. For that countries with missing value in this variable, we considered the population of 2018 or 2017 (the most recent available). Regarding the technology variable, Mobile Cellular Subscriptions per 100 people (code: IT.CEL.SETS.P2) represents “subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology” (The World Bank, 2019). The most recent information on Mobile Cellular Subscriptions refers to 2018; for those countries with missing value in 2018, we considered the value of 2017 in this variable.

We employed the multivariate regression analysis to test the hypotheses. To avoid concerns with outliers and to eliminate the effect of scales, we calculated the natural logarithm of the variable Population. In both models, we also considered robust standard errors in order to avoid eventual concerns related to heteroscedasticity. All tables for the multivariate regressions report the Variance Inflation Factor statistics, which enables the evaluation of multicollinearity issues between the independent variables.

### 4. RESULTS

After consulting three large different sources of data, we elaborated the Table 1, that summarizes the descriptive statistics of the variables. On average, the E-book Index was 39.3 on April, 2020, ranging from 0.0 (the minimum) to 87.3 (the maximum value). It is important to note that the variable E-book Index (Diff) was 8.9 on average. This result indicates that, on average, the popularity of E-books increased by 22% in comparison to the same period, one year before. The descriptive statistics also indicates that a half of the countries in the sample (p50) have more than one mobile cellular subscription per person.

**Table 1:** Descriptive statistics of the variables

Variables	N	mean	sd	min	p10	p25	p50	p75	p90	max
E-book Index	116	39.3	20.9	0.0	13.0	23.3	36.8	51.5	73.3	87.3
E-book Index (Diff)	116	8.9	16.2	-59.5	-8.0	0.1	6.8	18.4	29.3	50.5
Power Distance	116	66.7	20.7	11.0	35.0	55.5	70.0	80.5	92.0	100.0
Individualism	116	37.3	21.3	6.0	15.0	20.0	30.0	52.0	71.0	91.0
Masculinity	116	47.1	17.7	5.0	20.0	40.0	46.5	58.0	68.0	100.0
Uncertainty Avoidance	116	66.5	21.6	8.0	38.0	50.0	68.0	86.0	93.0	100.0
Mobile Cellular Subsc.	116	117.6	31.5	37.2	87.6	98.4	118.5	133.6	147.2	270.0
Population (LN)	116	16.5	1.6	12.8	14.5	15.4	16.3	17.6	18.5	21.1

Notes: E-book Index = represents the average popularity of e-books in April, 2020, by country; E-Book Index (Diff) = represents the difference between the average e-book popularity in April, 2020 and the average e-book popularity in April, 2019, by country; Power Distance, Individualism, Masculinity, and Uncertainty Avoidance = represent the four cultural dimensions of Hofstede; Mobile Cellular Subsc. = Mobile cellular subscriptions per 100 people; Population (LN) = represents the natural logarithm of the count for all residents in the country.

After observing the descriptive statistics, we employed a t-test to evaluate the increase in E-book index. The result indicated that the difference between the indexes (8.9) was statistically significant at 0.01 ( $t = 5.9496$ ;  $d.f. = 115$ ). Such result is consistent with the consideration that the lockdown restrictions have increased the popularity of e-books among the countries of the sample. This result also suggests that Covid-19 affected the voluntariness to adopt some kinds of technologies, since a mandatory context (Venkatesh et al., 2003) can affect ICTs adoption. In the case of this study, we suggest that Covid-19 forced users to find alternative tools in relation to traditional books, and e-books gained attention during the lockdown periods.

Appendix A indicates that two dimensions of culture presented a significant relationship with e-book popularity: Power Distance, with a negative effect, and Masculinity, with a positive effect. This first model (Appendix A) explains 36.22% of the variability in e-book popularity on April, 2020. Regarding the increase in e-book popularity (E-Book Index Difference), the second model (Table 2) explains 21.69% of its variability. In this second stage of analysis, the same cultural dimensions were statistically significant, as well as the control variables (when compared to the results available in Appendix A).

**Table 2:** Results for the multivariate regression analysis (dependent variable: E-Book Index Difference)

Variables	Coef.	Rob. Std. Err.	t	P>t
Power Distance	-0.169	0.084	-2.020	0.046
Individualism	0.072	0.079	0.910	0.363
Masculinity	0.129	0.062	2.100	0.038
Uncertainty Avoidance	0.042	0.069	0.600	0.549
Population (LN)	3.194	0.781	4.090	0.000
Mobile Cellular Subsc.	0.127	0.050	2.540	0.012
Constant	-58.981	17.948	-3.290	0.001
Adj. R2	21.69%			
N	116			

Notes: Mean VIF = 1.36; Maximum VIF = 1.92. Power Distance, Individualism, Masculinity, and Uncertainty Avoidance = represent the four cultural dimensions of Hofstede; Mobile Cellular Subsc. = Mobile cellular subscriptions per 100 people; Population (LN) = represents the natural logarithm of the count for all residents in the country.

Countries where individuals are willing to accept an unequal amount of authority among inhabitants (Hofstede & Bond, 1984) tend to present lower levels for e-book popularity during pandemics. This result is consistent with previous research (Nister et al., 2013; Hwang & Grant, 2011). Education is an essential ingredient to achieve development and equivalent rights, so the disparity in e-books popularity suggests the existence of barriers in these countries to achieve a better level of development.

Moreover, countries more oriented to values related to success and money (Hofstede & Bond, 1984) tend to value e-books more than their counterparts, since the effect of masculinity dimension was positive and significant. This result is also in line with other studies (Kaba & Osei-Bryson, 2013; Hallikainen & Laukkanen, 2018) and allows an advancement in the field, since we are addressing an increase in e-book popularity during pandemics.

The individualism and the uncertainty avoidance dimensions did not affect e-book popularity according to the quantitative analysis. This result complements previous research (Lee et al., 2007; Hwang & Lee, 2012; Abbasi et al., 2015; Hallikainen & Laukkanen, 2018; Potnis et al., 2018) that highlights a relationship between ICTs and such dimensions-related culture.

Additionally, the results from Table 2 (and Appendix A) indicate that e-books popularity seems to be higher in large countries, and in countries that have more cellular subscriptions. In other words, countries where individuals have large index for cellular subscriptions also tend to present a higher popularity for e-books. This figure is equivalent when we consider the increase in e-book popularity during pandemics. Moreover, these results suggest that the diffusion of mobile devices can contribute to the adoption of e-books.

## 5. CONCLUSION

Considering the factors related to ICTs use (Albertin & Albertin, 2012), the Coronavirus pandemic can be viewed as an external event that affected the businesses and individual environments, generating an indirect incentive to adopt new technological resources. Even indirectly, some technological resources gained value with this new environment. A strong movement to digitalization started. In the case of e-books, both individuals and publishers perceived an extra-value in electronic books during the period. For individuals, this value may be related with flexibility to access and read books without the need of going to a physical library. For publishers, the new scenario probably increased the sales and the interest in buying and sharing e-books. These arguments are consistent with our results, since the popularity of e-books increased during the lockdown restrictions.

As commented in the introduction of this study, interaction and usability (Crespo et al., 2011) are important features related to e-books usage. Observing that e-books popularity increased during the lockdown period, a new research avenue could explore the role of usability and interaction to keep new e-book customers, especially for first time users. The isolation measures changed the relationship that individuals have with information technology. However, after these measures, will the popularity of e-books decrease around the world? Two concurrent hypotheses can guide new studies: e-books will continue popular among individuals, since the interaction between individuals and ICTs was changed; and the hypothesis that people will prefer to consult physical books as soon as it is possible again.

Moreover, the results of this study suggest other questions to be considered in further research. For example: is e-book popularity during isolation periods related to some kind of solidarity by book publishers? Will this solidarity be reverted in a change of habit? An equivalent behavior was also observed in the electronic commerce? Will this effect be similar in the future, for other products and services? Further research can address these topics and expand the result of this study.

The main results of this study indicate that electronic books gained popularity during the lockdown period. Mobile device developers and companies that market e-books (Jin, 2014) can consider the results of this study to design strategies to expand the use of electronic books and contribute to their access when the world faces difficult situations, such as the pandemics.

Since the cultural dimension presented an effect in e-book popularity, future research can also study the effects of acculturation and the global consume culture (Kizgin et al., 2020) on the use of electronic books.

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**Appendix A:**

Results for the multivariate regression analysis (dependent variable: E-Book Index 2020)

<b>Variables</b>	<b>Coef.</b>	<b>Rob. Std. Err.</b>	<b>t</b>	<b>P&gt;t</b>
Power Distance	-0.241	0.109	-2.210	0.029
Individualism	0.093	0.100	0.930	0.356
Masculinity	0.177	0.073	2.420	0.017
Uncertainty Avoidance	0.159	0.088	1.820	0.072
Population (LN)	5.888	1.115	5.280	0.000
Mobile Cellular Subsc.	0.192	0.045	4.240	0.000
Constant	-86.612	22.305	-3.880	0.000
Adj. R2	36.22%			
N	116			

Notes: Mean VIF = 1.36; Maximum VIF = 1.92. Power Distance, Individualism, Masculinity, and Uncertainty Avoidance = represent the four cultural dimensions of Hofstede; Mobile Cellular Subsc. = Mobile cellular subscriptions per 100 people; Population (LN) = represents the natural logarithm of the count for all residents in the country.