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Uncertainty Avoidance, Individualism and the Readiness of Business-to-Consumer E-commerce*

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Abstract

This study aims to test whether and to what extent national culture affects the readiness of business-to-consumer (B2C) e-commerce across the world. We regress two sets of data at national level: (1) the ratings of two main dimensions of Hofstede's national culture framework, uncertainty avoidance and individualism, and (2) UNCTAD B2C e-commerce index value. A sample of 83 countries was tested in this study. Several control variables at national level are included in our regression model. We find that these two cultural dimensions have an effect on the readiness of B2C e-commerce in various ways. We find that countries with high individualism score have high index value of B2C e-commerce development. We discuss the implications of these findings for B2C e-commerce developing strategies. We then call for designing relative policies with full consideration on national culture to promote the development of B2C e-commerce. In addition, we identify the limitations of the study and propose recommendations for future research. This study is the first one to use UNCTAD data on B2C e-commerce to explore the relationships between two dimensions of Hofstede's national culture and the readiness of B2C e-commerce and adds to the knowledge of literature in this research field.

Keywords: B2C E-commerce Index, Individualism, Uncertainty Avoidance, National Culture

JEL Classification Code: L81, L89, O12, P33

1. Introduction

The ubiquitous access of the Internet has led to the rapid development of electronic commerce with unprecedented speed in the past two decades across the world (He et al., 2019). Global e-commerce sales grew 13% in 2017, hitting \$29 trillion, according to the latest numbers released by

UNCTAD. The Organization for Economic Co-operation and Development (OECD) defines e-commerce transaction as “the sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders.” According to the nature of transactions, e-commerce can be classified into following types: business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer (C2C) (Yu et al., 2011). B2C e-commerce, or business-to-consumer e-commerce refers to the e-commerce model in which business sells directly to individual shoppers (Bidgoli, 2002). Traditionally, the term was used to refer to any type of process of selling products directly to consumers, including shopping in-store or eating in a restaurant, but is now more commonly used to describe transactions between online retailers and their customers.

Across the world, B2C e-commerce has been growing steadily and has gradually become an ever more important section in the retail industry (Yahia et al., 2018). As an important part of e-commerce, B2C e-commerce increasingly attracts more and more customers because of its convenience and price advantage (Luo et al., 2008). The rapid development of B2C e-commerce has largely

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benefited consumers, such as facilitating their search for product information and improving the quality of their online purchase decisions (Pavlou, 2003; Zhou et al., 2018). It is estimated that 1.45 billion people, one quarter of the world's population aged 15 and older, made online purchases in 2018, with an increase of 9% from the previous year. In the modern world of technology, B2C e-commerce has become a very important option for businesses. Many enterprises have already adopted e-commerce as an effective and necessary trading tool in daily business processes (Keeney, 1999). Especially for small- and medium-sized enterprises (SMEs), many SMEs are under pressures due to the fierce competition from large firms to implement e-commerce (Lai et al., 2020).

Therefore, more countries have realized the importance of e-commerce in their economies and include B2C e-commerce as well as the whole e-commerce industry in their economic developing strategies. However, the development of B2C e-commerce is still very imbalanced across the world. According to the numbers UNTCAD, Luxembourg remains as top one performer in B2C e-commerce with the index value of 97 while Niger is the last one with the index value of 3.

At the national level, there are so many reasons that can explain the imbalance in readiness and development of B2C e-commerce across the world, like GDP per capita, educational level, market factor, etc. (Lim et al., 2004). Are culture and B2C e-commerce related? The study aims to explore the impact of national culture on the readiness and development of B2C e-commerce development at national level across the world. We introduce Hofstede's culture dimensions as potential explanation of imbalanced adoption and development level of B2C e-commerce across the world. In particular, the dimension of individualism is observed in this research. Triandis (2001) considers the individualism dimension as the most significant cultural difference across countries. We hypothesize that countries with higher individualism score are more likely to have high adoption and development level in B2C e-commerce, which is reflected by our dependent variable, B2C e-commerce index in our study.

We used Stata 15.1 to merge data on several levels: B2C e-commerce value index, uncertainty avoidance and individualism scores of national culture, GDP per capita, institutional quality index, political index, market index and GDP. We got emerged data set of 83 economies. Based on this combined data set, the correlation and multi-linear regression are conducted. After controlling for four control variables, the research results show individualism significantly affects B2C e-commerce in a positive way across the world, and uncertainty avoidance also shows positive relationship with B2C e-commerce. Then, robustness check is conducted to verify the findings.

2. Literature Review

Just like the empirical study on national level, the theoretical models on the determinants of e-commerce relative factors on the national level are still in the nascent stage. We identify just a few papers that explore the relationship between culture and e-commerce adoption or online shopping rate, mostly at individual or organizational level.

As for the other key factor, national culture, which serves as the independent variables in our study, several different cultural frameworks have been proposed in the literature (Singh et al., 2005), but Hofstede's (2011) theory on national culture is by far the most used (Ahunov & Van Hove, 2019). The latest version of Hofstede's classification captures national culture in six dimensions – power distance, individualism, uncertainty avoidance, masculinity, indulgence, and long-term orientation, providing ratings for 104 countries (Ahunov & Van Hove, 2019), while the GLOBE project only involves 60 countries. Given the objective of our paper, this was the main reason to employ Hofstede's data on national culture.

Hofstede and Bond (1988) offer a definition of culture as 'the collective programming of the mind that distinguishes the members of one category of people from those of another. Culture is composed of certain values, which shape behavior as well as one's perception of the world.' Adler (1997) argues that culture can affect our values and beliefs, then further affects our attitudes and behavior. Williamson (2000) states that 'informal institutions such as culture change very slowly over time – on the order of centuries or millennia. Empirical studies support this view, showing that the relative country culture ratings are persistent over time even when the economic conditions of a country change.'

Specifically, we propose that the readiness of B2C e-commerce is jointly affected by contextual factors (such as GDP per capita, market index, political index) as well as two major dimensions of Hofstede's national culture: individualism and uncertainty avoidance, which have been widely used in empirical studies to explain a couple of social phenomena (Newman & Nollen, 1996; Barkema & Vermeulen, 1997; Begley & Tan, 2001; Chui et al., 2002; Thomas & Au, 2002; Lim et al., 2004).

Uncertainty avoidance describes the extent to which members of a culture feel threatened by unknown or uncertain situations (Hofstede & Hofstede, 2005). Uncertainty about online shopping is often cited as one of the main reasons people do not conduct online shopping for the following reasons.

Research suggests that uncertainty avoidance plays an important role in technology adoption (Srite & Karahanna, 2006) and resistance (Laukkanen, 2015). Online shopping involves computer, smart phone or other electronic devices, which triggers the emergence of risks (Liu and Wei, 2003). People in culture with high uncertainty avoidance tend to

resist the new technology while people in culture with low uncertainty avoidance are more willing to try and adopt new technology.

Information asymmetry of online shopping inherently brings more uncertainties than shopping in physical stores (Liu & Wei, 2003). While the retailer has full information about the products and service, the consumer is never completely sure whether the product or service will be delivered as it is marketed online because of information asymmetry. Some customers in countries with high uncertainty avoidance also use Internet to seek information about the goods, but still chose to purchase offline (Taylor Nelson Sofres, 2001). This fact suggests, as Minkov and Hofstede (2014) stated, that online sellers might take advantage of the process to make opportunistic profits.

Uncertainty avoidance is often associated with risk tolerance (Frijns et al., 2013). The nature of online transaction using computer or other electronic devices indicates that customers cannot see, smell, touch or try the products directly (Wan et al., 2012). In this circumstance, customers feel risky to shop online. Privacy concerns about the theft of personal information and the possibility that third parties with abusive intentions might be involved in the system hinders online purchases. As these risks lead to a lack of trust in B2C e-commerce (Hajli, 2014) consumers start to display a tendency to refrain from such a risky environment. Thus, people in high uncertainty avoidance tend to avoid the risk and uncertainty and do not adopt e-commerce.

Change often brings uncertainties (Lim et al., 2004). The emergence of online shopping has changed people's shopping habit and lifestyle. Therefore, people in high uncertainty avoidance cultures might be more likely to resist purchasing online than people in cultures with low uncertainty avoidance. Most importantly, people in high uncertainty avoidance cultures have higher needs for structure, like laws and rules, than people in cultures with low uncertainty avoidance (Doney et al., 1998). In a lot of areas across the world, e-commerce is still highly unregulated and lacks a standard legal system to protect online customers (McKnight et al., 2002). People in high uncertainty avoidance cultures desire institutional assurance. We expect that people in countries with lower uncertainty avoidance should accept online shopping more than people in countries with higher uncertainty avoidance. Therefore,

H1. *The dimension of uncertainty avoidance is negatively related to the readiness and developing level of B2C e-commerce across the world (higher score of uncertainty avoidance, lower UNCTAD B2C e-commerce index).*

Individualism refers to the relationships of individuals with other people within a culture (Hofstede, 1980). In individualist societies, individuals maintain loose ties

between each other. Individuals tend to only take care of themselves as well as his or her immediate family (Hofstede & Hofstede, 2005). As the opposite of individualism, collectivism indicates individuals are tightly integrated into cohesive in-groups that remain in one's lifetime (Hofstede & Hofstede, 2005).

Doney et al. (1998) argue trust is more likely to form among individuals in collectivist societies through prediction or transference process. People in individual society are more likely to build trust in a calculative way. In a collectivist society, trust is built on the basis of people's prior experiences upon prediction process. Based on this, the current belief comes into being like that the online vendor's behavior is acceptable (Lewicki & Bunker, 1995). Without experience, trust can also be established in collectivist societies through transference among in-groups. During the process, trust is transferred from trustworthy source to the next target (Milliman & Fugate, 1988). Without prior experience with a target such as online vendor, people tend to rely on the recommendations from their family members or peers. In collectivist cultures, members of the in-group, such as peers, and co-workers, are more trustworthy than out-group people (Triandis et al., 1986). In short, collectivists are more likely to form trust based on their prior experiences or opinions and proofs of their group members, which is called 'relational trust' by Rousseau et al. (1998).

Individualism has been widely related with adoption studies of a new innovation or technology, such as B2C e-commerce adoption. Flight et al. (2011) argued that individualism is the most critical cultural factor that can influence innovation adoption. Mourouzidou-Damtsa et al. (2019) think managers of a firm in individualistic societies are willing to try new methods to get more profits and increase shareholders' wealth. An empirical study concludes that individualism has a positive influence on managers' intentions to use the Internet in Jordan (Akour et al., 2006). Zhang et al. (2012) confirmed that individualism has specific moderating effects on E-commerce adoption. Shopping is an activity, which is more individualistic than going to stores and offers more freedom like shopping time. Therefore, the online consumers could very well have a positive attitude towards transactions with online business, because individualists are also more objective than affective (Hofstede, 2001). Individuals in low individualistic culture may be reluctant to shop online because of the lack of social cues on the online shopping environment, which makes the online shopping process difficult to conduct for individual customers.

Prior research reveals that trust is higher in collectivist cultures than individualist cultures (Doney et al., 1988; Huff & Kelley, 2003). Trust is established through calculating the rewards and costs of engaging in an exchange (Buckley & Casson, 1988), like e-commerce transaction. When customers judge that the benefits outweigh the perceived

risk from the other party, they would be more likely to trust the other party. People in individualist cultures are more willing to carefully evaluate the risks of online purchase with the absence of prior experience with online shopping. As for online shopping, they might carefully browse the webpage, check the reliability of Internet vendors, the delivery and refund policy and the qualification and reputation of the third party (Shek et al., 2003). People would adopt online shopping if they think the benefits like price and convenience outweigh perceived risks. In all, people in collectivist cultures are more likely to form trust via either a prediction or transference process (Doney et al., 1998). As a relatively new form of shopping in a lot of areas across the world, the lack of prior experiences makes it difficult to form predictive trust among individual customers. Transference of trust is therefore also difficult because ‘proof sources’ are hardly available (Lim et al., 2004). In individualistic societies individuals demand for getting more information by themselves and people are more likely to collect more information to make sound decisions. Therefore, it is expected that B2C e-commerce is more appealing in individualist cultures than collectivist cultures. Based on the analysis above, we conjecture that in individualistic cultures people prefer to adopt e-commerce. We have the hypothesis in this study as follows:

H2. The dimension of individualism is positively related to the readiness and developing level of B2C e-commerce across the world (higher score of individualism, higher UNCTAD B2C e-commerce index).

3. Data and Methodology

3.1. Dependent Variable

The United Nations released annually the report on B2C e-commerce index since 2015. The UNCTAD B2C e-commerce index reflects the process involved in an online shopping B2C transaction, which measures an economy’s preparedness to support online shopping. The index consists of four indicators that are highly related to online shopping and for which there is wide country coverage. The extent to which people shop online in a country is highly correlated with the value of the index, with an adjusted R-squared value of 0.8. B2C e-commerce index includes for indicators: Internet users, secure servers, account penetration and postal reliability score. Data was collected from 144 economies on these four indicators. On basis of values of these four indicators, a general e-commerce value index of each economy was calculated, which represents the developing level of B2C e-commerce of each economy. We mainly observe the general index value in this study. The index is

calculated as the average of these four indicators: account ownership (% of population ages 15+), individuals using the Internet (% of population), postal reliability index and number of secure Internet servers (per one million people). In this study, we use 2017 UNCTAD B2C e-commerce index value as the dependent variable, the readiness of B2C e-commerce.

3.2. Independent Variables

Hofstede and his team established six dimensions of national culture, which are independent of each other: individualism, power distance, uncertainty avoidance, masculinity, long-term orientation, and indulgence. According to Hofstede (2001), national cultures are stable over a period of time. In this study, we mainly focus on the two main dimensions of uncertainty avoidance and individualism. Figure 1 and Figure 2 separately show the ratings of uncertainty avoidance and individualism across the world.

3.3. Control Variables

3.3.1. Control for GDP Per Capita

The OECD defines GDP as “an aggregate measure of production equal to the sum of the gross values added of all resident and institutional units engaged in production and services (plus any taxes, and minus any subsidies, on products not included in the value of their outputs)”. Whereas IMF publication states “GDP measures the monetary value of final goods and services—that are bought by the final user—produced in a country in a given period of time (say a quarter or a year).”

Our data are expressed in current US dollars per person (i.e., total GDP divided by the total population of the country). GDP per capita is “the value of all final goods and services produced within a nation in a given year, converted at market exchange rates to current U.S. dollars, divided by the average population for the same year.” GDP per capita is considered as an indicator of standard of living in one country as well as a proxy for economic wellbeing and people’s income in different economies. GDP per capita is highly related with the residents’ consumption capacity. E-commerce emerges as one way of shopping, so the developing level of B2C e-commerce across economies is highly related with GDP per capita. In our baseline model we always include GDP per capita as a control variable to the cultural dimensions in each regression. In our full models, GDP per capita is always included in combination with another additional country-level control variable that varies from one model to the next.

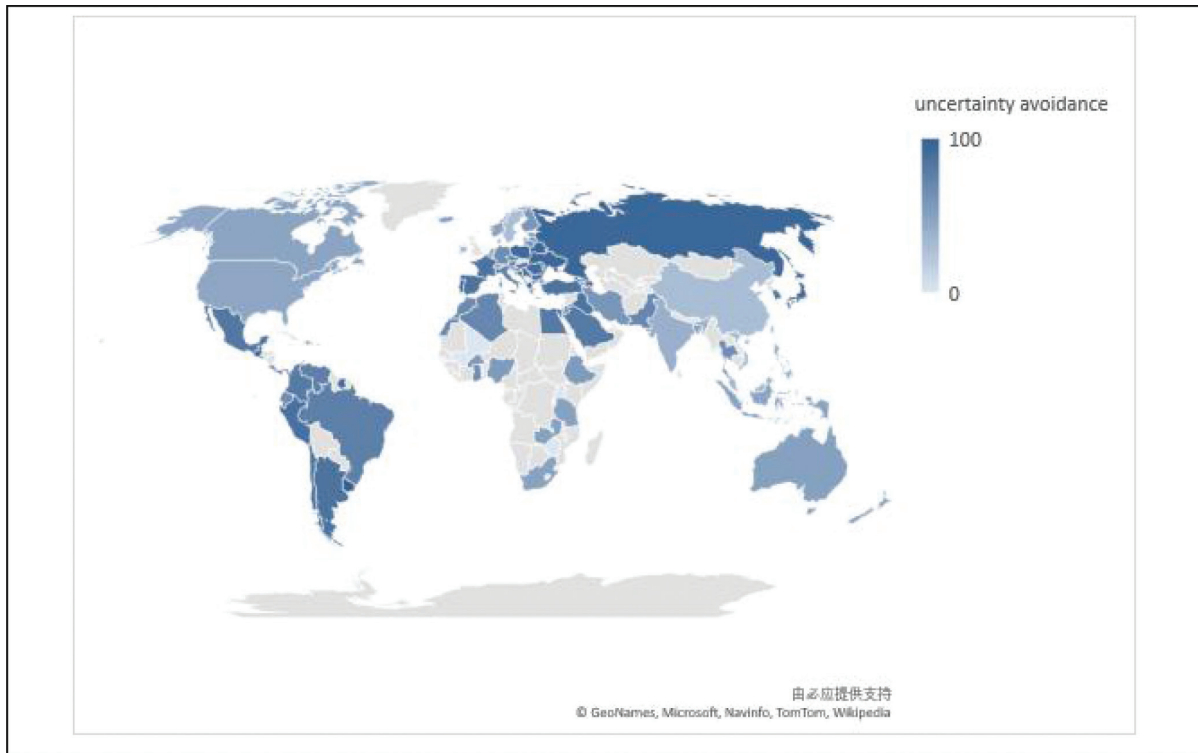


Figure 1: Uncertainty Avoidance World Map

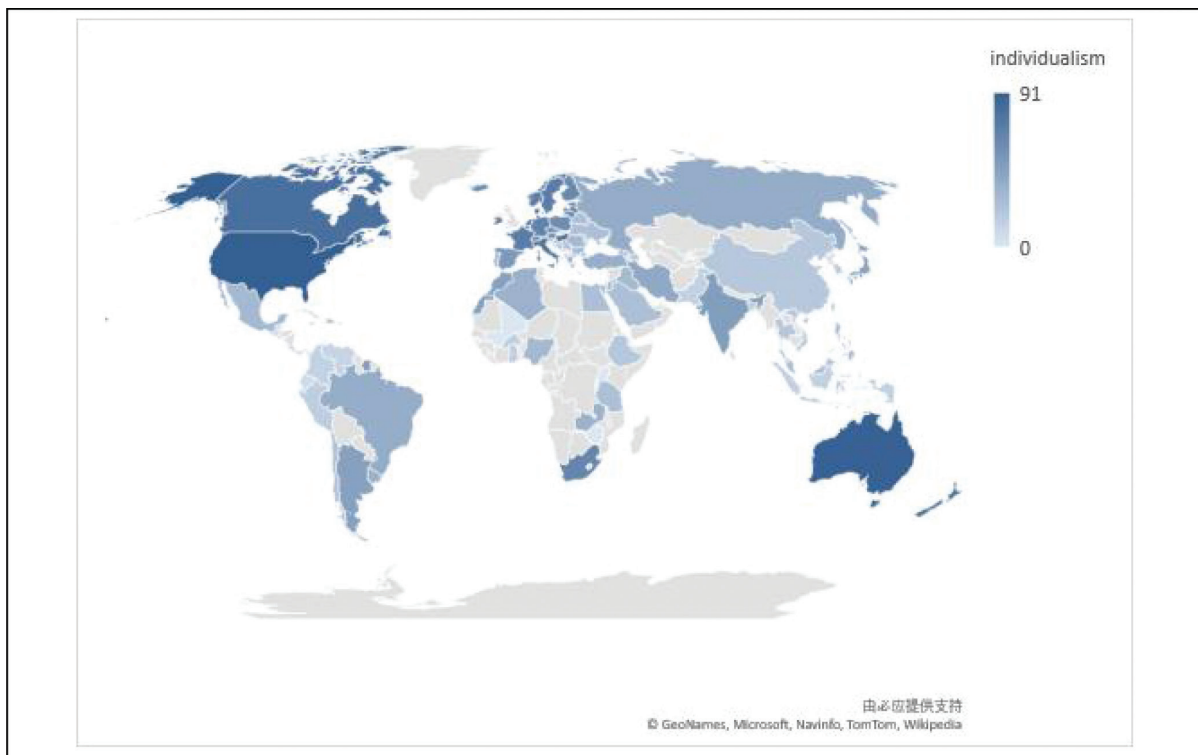


Figure 2: Individualism World Map

3.3.2. Control for Institutional Quality

According to Davis and North (1971, pp. 6-7), the institutional environment is “set of fundamental political, social and legal ground rules that establishes the basis for production, exchange and distribution”. There is a clear link between institutional quality and quality of life (measured according to the UN Human Development Index), institutional quality and income level (measured as GDP per capita), investments, innovation and even environmental quality and institutional quality as one increasingly important part of economy, B2C e-commerce might be influenced by institutional quality in a country.

3.3.3. Control for Political Conditions

Political conditions might affect the economic development. Stable political conditions will bring good governance. Good governance simply is the implementation of trustworthy and responsible development control reciprocal with the principles of efficient markets (Rojikinnor et al., 2020). Therefore, the development of B2C e-commerce will also be affected by political conditions in different country. An unstable political climate can't guarantee the basic conditions of adoption and development of B2C e-commerce.

3.3.4. Control for Market Index

The development and the scale of e-commerce also depends on the market capacity in one country or region as well as the whole world. E-commerce is online market and gradually becomes more and more part of the whole market. Therefore, we included the market index in this study as one of control variables.

4. Results and Discussion

4.1. Descriptive Statistics

Table 1 shows the general descriptive statistics of all variables in this study; we can see among 83 economies, the mean B2C e-commerce index value is 64.26, with the highest 96.5 and lowest 24.01, indicating the development of B2C e-commerce across the world is very imbalanced. As for the dimension of national culture, individualism, the mean score is 41.77, with the highest 91.00 and the lowest 8. The difference in national culture might affect the adoption and development of B2C e-commerce across the economies.

Table 1: Descriptive Statistics

Variables	Obs	Mean	Std.Dev.	Min	Max
B2C Index Value	83	63.988	24.023	14	96.5
Uncertainty Avoidance	83	65.036	21.595	8	100
Individualism	83	41.181	21.891	8	90
GDP Per Capita	83	21452.4	22841.9	338.484	104000
Political Index	83	.612	.243	.113	.991
Institutional Index	83	.615	.231	.105	.966
Market Index	83	.613	.244	.071	.994
CPI	83	52.036	19.604	18	89

Table 2: Correlation Analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) B2C Index Value	1.000							
(2) Uncertainty Avoidance	-0.054	1.000						
(3) Individualism	0.675	-0.178	1.000					
(4) GDP Per Capita	0.789	-0.247	0.608	1.000				
(5) Political Index	0.826	-0.079	0.765	0.770	1.000			
(6) Institutional Index	0.864	-0.148	0.709	0.777	0.948	1.000		
(7) Market Index	0.801	-0.207	0.560	0.692	0.776	0.936	1.000	
(8) CPI	0.879	-0.246	0.677	0.869	0.901	0.934	0.857	1.000

4.2. Correlation

Table 2 shows that the correlation value between B2C e-commerce index value and individualism score is 0.685, which means these two variables are highly correlated. That means the economy with high individualism score will have high index value in B2C e-commerce. More testing will be given in the following parts.

Although the positive and significant correlation between national culture and B2C e-commerce index value is heartening, its usefulness is limited. E-commerce should also be determined by other factors, like GDP and other financial, economic and even political factors. So, in order to better understand the relationship between these two variables, we estimate a regression of the general form by adding other control variables to see to what degree individualism can explain B2C e-commerce readiness in different economies.

We attempt to explain the cross-country B2C e-commerce index value variation based on variations in individualism and a set of other control variables. We construct our research on three catalogues of data: B2C e-commerce value index as our independent variable, individualism score as our independent variable and a set of control variables, including GDP, uncertainty avoidance, institutional quality, political index and market index. GDP is ‘a measure of aggregate business activity as described by the value at final point of sale of all goods and services produced in the domestic economy during a year by both domestic and foreign-owned enterprises’ (Hirschey & Pappas, 1993: 299–300). The development level of some economy is demonstrated by its GDP, which also effect the development of its economic factors, including e-commerce, so we use log GDP index in this study as the most important control variable.

4.3. Multiple Linear Regression Results

We examine the relation between individualism and B2C e-commerce value index by using a multi linear regression model, several control variables were included, like GDP, political index, institutional quality index and market index. Now we provide multi-linear regression results (obtained from Stata 15.1.). The model we use is adapted and developed from the seminal paper of Kwok and Tadesse (2006), which directly linked national culture and financial factors. The equation is as follows:

$$\begin{aligned}
 Y^i \text{B2CIndex value} = & \beta^0 + \beta^1 \text{Individualism} \\
 & + \beta^2 \text{Uncertainty avoidance} \\
 & + \beta^3 \text{Institutional quality index} \\
 & + \beta^4 \text{Political index} \\
 & + \beta^5 \text{Market index} \\
 & + \beta^6 \text{GDP per capita} + \epsilon_i
 \end{aligned}$$

We examine the relationship between national culture and B2C e-commerce value index by using a multi-linear regression model. Table 3 shows R-square of the model is 0.826, which means the model can explain 82.6% in variance. The results show that national cultures characterized by high individualism are more likely to have higher B2C e-commerce value index, which indicates higher adoption and developing level of B2C e-commerce. The table shows the individualism score increases one point; the B2C e-commerce index value will increase 0.213 point. P-value is 0.012 and the 95% conf. interval is from 0.049 to 0.378. It shows there is a positive relation between individualism and B2C e-commerce development, which means generally the economy with higher individualism score in individualism tends to have higher B2C e-commerce index.

Table 3: Multiple Linear Regression Result

B2C Index Value	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Uncertainty Avoidance	0.137	0.056	2.46	0.016	0.026	0.248	**
Individualism	0.213	0.082	2.59	0.012	0.049	0.378	**
GDP Per Capita	0.000	0.000	2.91	0.005	0.000	0.000	***
Political Index	23.146	26.473	0.87	0.385	-29.580	75.871	
Institutional Quality	-28.079	49.095	-0.57	0.569	-125.861	69.703	
Market Index	64.869	26.079	2.49	0.015	12.928	116.809	**
Constant	4.745	5.178	0.92	0.362	-5.568	15.058	
Mean dependent var	63.988		SD dependent var		24.020		
R-squared	0.826		Number of obs		83.000		
F-test	60.023		Prob > F		0.000		
Akaike crit. (AIC)	631.235		Bayesian crit. (BIC)		648.167		

Note: ***, ** and * indicates *** p<0.01, ** p<0.05, * p<0.1.

As for uncertainty avoidance, contrary to the expectation, the results show positive relationship with B2C e-commerce. In our regression model, the p-value of uncertainty avoidance is 0.016, smaller than 0.05, and the 95% conf. interval is from 0.026 to 0.248, which means the result is statistically significant. According to the correlation matrix, the relationship between uncertainty avoidance and B2C e-commerce shows a slightly negative relationship with the correlation value of -0.054.

5. Robustness Check

In this part, in order to guarantee the robustness of the research, we add another control variable CPI into the model to see the change in results. The Consumer Price Index (CPI) is a measure used to examine the weighted average of prices on consumer goods and services, like transportation, food, clothes and medical care. Changes in the CPI are often used to assess price changes, which are associated with the cost of living. People turn to online shopping for many reasons, among which price is a very important factor. CPI index might be part of the reason explaining the different developing levels of e-commerce across the world. Four main reasons for the growing popularity of online shopping can be identified, namely, convenience, more choice, lower prices, and the ability to compare prices. The adoption by firms can be explained by their emphasis on low-cost trading, the convenience of on-line shopping and the availability of a large pool of price-sensitive consumers (Dinlersoz & Pereira, 2007). So, in this study, CPI index serves as one of the control variables for robustness check.

The robustness check results (Table 4) show the individualism coefficient is 0.216, quite close to 0.213. We can say there is no obvious difference on this respect. P-value of individualism is 0.011, a little lower than 0.012 that we got previously. That means by adding more control variables, the regression result is more efficient, which demonstrates the research result is robust. Individualism plays a very important role in the adoption and development of B2C e-commerce across the world.

As for uncertainty avoidance, the results are still robust to show there's a positive link between uncertainty avoidance and B2C e-commerce. During the process of robustness check, P-value is basically the same. The coefficient always demonstrates a positive relationship between uncertainty avoidance and B2C e-commerce, which is contrary to the results in previous similar study and also reject our hypothesis on this dimension in which the relationship is assumed negative.

6. Implications and Conclusion

This study may be the first to document a positive relationship between individualism and B2C e-commerce development across different economies. Why do economies differ in the diffusion and development in B2C e-commerce? Besides factors like economic development, we conjecture that the development of B2C e-commerce may be affected by its national culture. Specially, we hypothesize that countries with stronger individualism are more likely to have better development in B2C E-commerce. We then call for designing relative policies with full consideration on national culture to promote the development of B2C e-commerce.

Table 4: Multiple Linear Regression Results for Robustness Check

B2C Index Value	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Uncertainty Avoidance	0.145	0.059	2.46	0.016	0.028	0.263	**
Individualism	0.216	0.083	2.60	0.011	0.050	0.382	**
GDP Per Capita	0.000	0.000	2.19	0.032	0.000	0.000	***
Political Index	16.667	30.425	0.55	0.585	-43.942	77.276	
Institutional Quality	-22.987	50.700	-0.45	0.652	-123.986	78.013	
Market Index	60.967	27.681	2.20	0.031	5.825	116.110	**
CPI	0.088	0.199	0.44	0.662	-0.310	0.485	
Constant	3.250	6.219	0.52	0.603	-9.139	15.638	
Mean dependent var	63.988		SD dependent var	24.023			
R-squared	0.826		Number of obs	83.000			
F-test	50.930		Prob > F	0.000			
Akaike crit. (AIC)	633.022		Bayesian crit. (BIC)	652.373			

Note: ***, ** and * indicates *** p<0.01, ** p<0.05, * p<0.1.

Using data on B2C e-commerce development value index across 83 economies from the United Nations and national culture scores, after controlling several variables, like GDP and institutional quality index, we have found that the individualism variable is statistically significant, indicating that economies that have high individualism score tend to have higher B2C e-commerce value index.

As for uncertainty avoidance, the results do not show consistent results in the analysis, but there are still some information for further research, which deserves attention. In our regression model, the results demonstrate a positive relationship between uncertainty avoidance and B2C e-commerce, which is contrary to the results in previous study and also reject our hypothesis on this dimension in which the relationship is assumed negative. Even though the results in this dimension are not consistent in each step and contrary to the previous results in literature and rejection of our hypothesis, there might be a possibility there is a positive relationship between uncertainty avoidance and B2C e-commerce because our study covers twice as many countries as previous similar studies. The added countries with available data might be more developing countries than developed countries. In some countries, there might be the possibility of online shopping is more secure than offline store shopping, because of the e-commerce platform returning policies and protection on online shopping on it. People in countries where online shopping is more convenient and secure than offline shopping tend to shop online. Since our study is based on worldwide evidence with huge differences in different countries, contrary results on this dimension might deserve detailed analysis in the future.

This study contributes a couple of significant theoretical implications. The most important contribution is the further development of a conceptual research model between national culture and the readiness of E2C e-commerce on the national level, which provides a better understanding of factors on national culture that affect the readiness and developing level of E2C e-commerce as well as shopping rate as share of the whole population. Our study is one of the few that combine the readiness and adoption of some relatively new economic industry theories and cultural theories at the country level (macro level) within different cultural contexts across the world, exhibiting relatively unique group cultural characteristics. To our knowledge, few studies have measured national culture and B2C e-commerce index at the national level supported by the evidence across the world. It also adds to the few studies that take into account a set of control variables in the multi-linear regression model and highlight their important role in the similar research model to help explore the relationship between independent variables and dependent variables.

This study also has several practical implications on macro and micro levels. The results provide practical implications for governments on different levels to take

into account the link between culture and e-commerce development. Besides, the dominant e-commerce platform, like Taobao in China, can be built on individual level or some company. A large part of the e-business operated on e-commerce platforms like Amazon belongs to individuals or small e-business. E-commerce's readiness and development depends on individual's efforts and entrepreneurship. Government should encourage individuals to start their own e-business especially at the very beginning. When expanding cross-border e-commerce, besides economic and other phenomena at national levels, government, platform or e-business should take into account cultural traits of the target countries. According to our research, the countries with high individualism score tend to adopt and develop well on e-commerce, while countries with low individualism score do not embrace e-commerce because of their cultural characteristics. For customers, people in the countries with high individualism score tend to shop online, because they are more independent on purchase decision and good with acceptance of Internet technology. Generally speaking, people in countries with high individualism score tend to shop online.

This study might be the first one to find a link between the readiness of B2C e-commerce and national culture. Using cross-economy data from 83 countries, we document that, besides economic factors, B2C e-commerce development is positively related to individualism, one of six dimensions of Hofstede's national cultures. As for uncertainty avoidance, the analysis does not show consistent results with even findings contrary to our expectation, which brings information for thinking; it needs more testing in the future by collecting data from more countries. This study has its share of limitations. Firstly, the measurement of the cultural variables is not that precise. Secondly, the effective sample has only 83 countries. This study focuses on two dimensions of national culture, uncertainty avoidance and individualism. In future, we will continue to look into other dimensions' relationships with B2C e-commerce development and the relationships between culture and e-commerce factor on different aspects. Beside cultural factors and other macro national factors, there might be other factors that impact the development of B2C e-commerce, like educational levels and the brand of e-commerce site (Pham, 2020). Future study could also focus on the impact of other factors on B2C e-commerce.

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