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## **A Study on the Effects of Product Types and Culture on the Level of Use of BIN Auctions by Sellers**

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### **Abstract**

*Unlike most previous studies on Buy-It-Now (BIN) auctions, this study investigates factors that affect the level of use of BIN auctions by sellers. This study proposes a conceptual model in which product types and culture are two important factors affecting sellers' decisions on the level of use of BIN auctions. The empirical investigation exhibits that sellers of homogeneous products are more likely to use BIN auctions than sellers of heterogeneous and antique-like products do. The result also shows that the level of use of BIN auctions can be explained by the Hofstede's Culture Dimensions. While power distance brings a positive impact, uncertainty avoidance and individualism bring negative impacts on the level of use of BIN auctions by sellers. The results provide valuable insights for sellers and Internet marketplace operators to refine their business strategies and their plans for expanding their businesses to overseas markets.*

**Keywords:** Buy-It-Now (BIN) auction, Product types, Culture, Hofstede's Culture Dimensions

### **1. Introduction**

With the rapid advancement of information and communication technologies (ICT), innovative mechanisms have been developed in the past few years by electronic marketplaces, such as eBay (<http://www.ebay.com>) and Yahoo! auction (<http://auctions.shopping.yahoo.com/>), with an aim to facilitating Internet auctions among market participants. Amongst these new mechanisms, Buy-It-Now (BIN) auction is one of the most successful mechanisms developed.

Compared with ascending auctions, prior studies have shown that BIN auctions generate higher revenue for products with independent private values (IPV) (Budish and Takeyama 2001; Hidvégi et al. forthcoming; Mathews 2004; Reynolds and Wooders 2003; Yoo et al. 2006), i.e. products with high level of homogeneity, and for products with common values (CV) (Hidvégi et al. forthcoming), i.e. products with high level of heterogeneity, when bidders are risk averse. Based on these assumptions, we expect that sellers have strong incentives to use BIN auctions as this auction format can generate more revenue for them.

In the past few years, eBay and Yahoo! auctions have expanded quickly by opening subsidiary websites in overseas markets. With the increase of acceptance of Internet auctions worldwide and the possibility for users from a country to participate, i.e. either to host auctions or to submit bids to auctions, in another country's auction website, we foresee that the impact of culture on the operation of electronic marketplaces will become stronger and stronger. Such impact has been observed in e-commerce in general (Cyr et al. 2005; Pavlou and Chai 2002), which may also exist in electronic marketplace business.

In this study, we aim to investigate the impact of product types and culture on the level of use of BIN auctions by sellers. To sum up, we would like to address the following two research questions:

1. Would the tendency to adopt BIN auctions by sellers differ across product types?
2. Would the tendency to adopt BIN auctions by sellers differ across cultures?

Our research is important as it will provide insight for marketplace operators to develop new incentive schemes and new mechanisms which can fulfill the expectation of sellers from different countries and/or sellers who auction off different types of products. Moreover, sellers who use marketplaces to auction off their products can also gain benefit from our study. They can have a better understanding of their overseas competitors and make necessary adjustments of their business strategies before they participate in overseas markets.

The paper is organized as follows. In the next section, we review prior research work related to BIN auctions. Section 3 focuses on our conceptual model and the development of hypotheses whereas Section 4 is on our data collection and analysis. In Section 5, we conclude our paper with discussions on the contribution and future extensions of this study.

## **2. Literature Review**

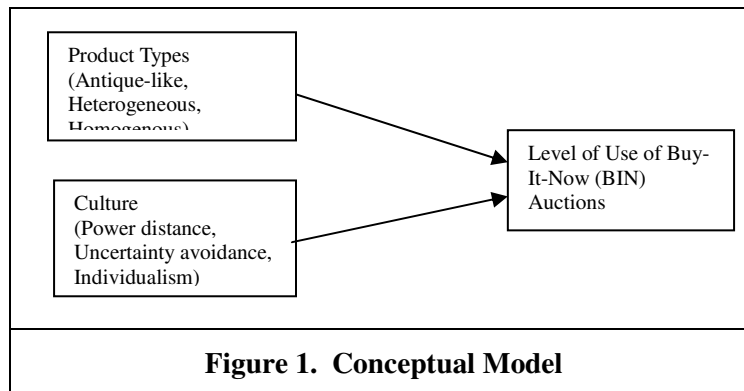
BIN auction is a variation of an English auction which provides bidders an opportunity to win the auction instantly at the outset of the auction when any bidder accepts the BIN price ( $P_{BIN}$ ) posted by the seller, i.e. exercises the BIN option. At present, there are two formats of BIN auction, viz. the eBay (BIN) format and the Yahoo! Buy Price format. The difference between these formats is the duration of the availability of BIN option. For eBay format, the BIN option will no longer effective and the auction will convert

back to an ascending auction when any bid above the reserve price is submitted by one of the bidders. However, for the Yahoo! Buy Price format, the BIN option stays there throughout the bidding competition.

Based on the assumption that bidders have their own independent private value (IPV) on the items, Budish and Takeyama (2001) show that Yahoo! Buy Price auctions can generate higher revenue than Dutch and First Price auctions if bidders are risk averse. Reynolds and Wooders (2003) compare the efficiency of eBay BIN auctions and Yahoo! Buy Price auctions with ascending auctions. They show that if bidders are risk averse, both BIN and Buy Price auctions outperform ascending auctions. Moreover, Yahoo! Buy Price auctions outperform BIN auctions. Mathews (2004) shows that eBay BIN auctions are useful when bidders, sellers or both, are impatient. Hidvégi et al. (forthcoming) suggest that when both buyers and sellers are risk averse, suitably selected Buy Prices in Yahoo! Buy Price auctions increase the expected utility for all parties concerned. Yoo et al. (2006) empirically show that Yahoo! Buy Price auctions and eBay BIN auctions outperform ascending auctions. Furthermore, they show that when BIN options are not exercised, both BIN and Buy Price auctions still generate higher revenue compared with ascending auctions. They suggest that the additional information provided by BIN option improve market efficiency when BIN options are not being executed.

### 3. Conceptual Model and Hypotheses

In this section, we present our conceptual model (Figure 1) and the hypotheses developed. In brief, we expect product types and culture affect the level of use of BIN auctions by sellers.



#### 3.1 Product Types

In this study, we measure the level of the use of BIN auctions as the number of BIN auctions listed divided by the total number of auctions listed. Based on the assumptions that both buyers and sellers are risk averse, and bidders have their own IPV on items auctioned (Mathews 2004), we expect both sellers and buyers will benefit from BIN auctions. Hence, the level of use of BIN auctions of products with IPV element, such as homogenous products like digital products, should be high. However, the level of use of BIN auctions of products with CV element (Kagel 1995), such as heterogeneous products, may not be as high as the level of use of BIN auctions of products with IPV element. Our reasons are as follows.

For BIN auctions of products with IPV element, both sellers and bidders know the probability distribution of bidders' valuation. Hence, sellers can use the expected maximum valuation of items as reference points to determine  $P_{BIN}$ . For a risk averse seller, he will post a  $P_{BIN}$  which is less than or equal to the maximum of the expected valuation. This strategy can enhance the probability to sell his product earlier at a relatively high price (Mathews 2004). However, this strategy does not work for BIN auctions of products with high CV element. It is because both sellers and bidders are uncertain about the actual valuation of products with high CV element. Hence, it is difficult for sellers to determine the optimal values of  $P_{BIN}$  to enhance the probability to sell their products. We propose that products like clothing and jewelries are heterogeneous and fall within this category. The uncertainty about the valuation of products is even higher for antique-like products, such as antiques, art and crafts and collectibles. With this expectation, the first hypothesis is as follows.

**Hypothesis 1.** *Sellers of homogeneous products use BIN auctions more than sellers of heterogeneous and antique-like products.*

### 3.2 Culture

With the growth of electronic commerce, sellers are now receiving orders from different parts of the world. To form a better understanding on the interaction between sellers and their overseas customers, information systems researchers have investigated the effect of culture on websites (Cyr et al. 2005; Pavlou and Chai 2002; Straub et al. 1997) and grounded their discussion on Hofstede's Culture Dimensions (Hofstede 2001).

Hofstede's Culture Dimensions (2001) is developed based on a series of studies conducted by Hofstede and other researchers since 1960s. There are altogether five culture dimensions developed by the model. In this study, we use three out of five of these dimensions, viz. power distance (PD), uncertainty avoidance (UA) and individualism (IND). The other two dimensions, i.e. masculinity (MAS) and long-term orientation (LTO) are not included in our model because (i) MAS usually does not have primary effect on multiple regression analysis and we expect that it would not have much influence on our model (Appendix 6 of Hofstede (2001); and (ii) LTO has a strong correlation with PD and IND which creates a multicollinearity problem in our analysis if we include it in our model (see Exhibit 7.2 of Hofstede (2001)). The culture dimension scores of the four countries investigated in this study are tabulated in Table 1.

Country/Score	PD	UA	IND
France	68	86	71
Germany	35	65	67
Taiwan	58	69	17
United States	40	46	91

Source: Extracted from Appendix 5 of Hofstede (2001)

IS researchers have applied the Hofstede's Culture Dimensions to investigate global IS research problems. Straub et al. (1997) conducted a three-country study on Technology

Acceptance Model (TAM) using their self-developed Computer-based Media Support Index (CMSI), which is the average of UA, PD, MAS and (100 – IDV). Pavlou and Chai (2002) apply the Hofstede's Culture Dimensions to the Theory of Planned Behavior (TPB) and show the culture effect on the adoption of electronic commerce in China and US. Cyr et al. (2005) study the trust, loyalty and user satisfaction on websites from Canada, US, Germany and Japan. They observe high similarities of responses from Western countries. Bagchi et al. (2004) study the IT product adoption over a ten-year period in 31 countries and suggest that the Hofstede's Culture Dimensions can be applied to IT product adoption studies.

We develop three hypotheses to describe the effects of PD, UA and IND on the level of use of BIN auctions by sellers. First, as the choice of using BIN auctions is determined by sellers, we expect sellers from countries where the less powerful members of institutions and organizations (i.e., high PD) accept and respect power imbalance are more willing to use BIN auctions compared to sellers from countries where the less power members do not accept power imbalance (i.e., low PD). With this, our Hypothesis 2 is as follows.

**Hypothesis 2.** *The level of use of BIN auctions by sellers is positively associated with PD.*

Next, we expect UA has an impact on a seller's decision on whether he should use BIN auctions or not. Compared with the outcome of an English auction, the outcome of a BIN auction is less straightforward. The use of a BIN auction may result in higher ambiguity and uncertainty to the outcome of the bidding competition. Therefore, sellers from countries where members of them feel less threatened by uncertainty (i.e., low UA) are more willing to use BIN auctions compared to sellers from countries where members of them feel more threatened by uncertainty (i.e., high UA). Hence, we have Hypothesis 3 as follows.

**Hypothesis 3.** *The level of use of BIN auctions by sellers is negatively associated with UA.*

Lastly, we expect IND also has an impact on a seller's decision on whether he should use BIN auctions or not. As shown by Bagchi et al. (2004), people from countries with high IND usually adopt technologies more readily than people from countries with low IND. Therefore, sellers from countries with low IND have limited access to the Internet due to the low technology adoption rate. This makes sellers from countries with low IND more time impatient. As suggested by Mathews (2004), impatient sellers are more willing to accept BIN auctions. Therefore, we expect the lower the IND, the higher the level of use of BIN auctions by sellers. Based on this reason, we develop our last hypothesis as follows.

**Hypothesis 4.** *The level of use of BIN auctions by sellers is negatively associated with IND.*

#### **4. Data Collection and Analysis**

#### 4.1 Data Collection

To test our hypotheses, we collected auction data from the eBay flagship website in US and three subsidiary websites in France (<http://www.ebay.fr/>), Germany (<http://www.ebay.de/>) and Taiwan (<http://www.tw.ebay.com/>) in January 2006. eBay family has been selected as the subject of this study because it is the market leader in the Internet marketplace sector. Plus, all these websites have the same content design (and the only difference is the languages used). Hence, we can assume that the human-computer interactions (HCI) for these websites are the same.

Each week, we randomly selected a day to collect our data. We recorded the total number of auctions and the number of BIN auctions listed in each category of goods on each website by copying the webpage into an MS Word file. We collected four weeks' data from these websites. A total of 418 data points were collected.

#### 4.2 Data Analysis

Our Hypothesis 1 predicts that sellers of homogeneous products are more willing to use BIN auctions compared with sellers of heterogeneous products and anti-like products. We classify the categories of items auctioned into four product categories, i.e., antique-like products, heterogeneous products, homogeneous products, and "Others" which are tabulated in Table 2. Aside from this, product categories that we put under "Others" are products which we have difficulty to determine whether they should be treated as homogeneous, heterogeneous or antique-like products.

Antique-like (N = 84)	Heterogeneous (N = 52)	Homogeneous (N = 104)	Others (N = 178)
<ul style="list-style-type: none"> <li>✧ Antiques, Art &amp; Crafts</li> <li>✧ Collectibles</li> </ul>	<ul style="list-style-type: none"> <li>✧ Clothing &amp; Jewelry</li> </ul>	<ul style="list-style-type: none"> <li>✧ Computers</li> <li>✧ Consumer &amp; Personal Electronics</li> <li>✧ Entertainment</li> </ul>	<ul style="list-style-type: none"> <li>✧ Books</li> <li>✧ Health &amp; Beauty</li> <li>✧ Toys</li> <li>✧ Video Games</li> </ul>

To examine the effect of product types and culture on the level of use of BIN auctions by sellers, we use multiple regression technique with the following variables:-

- ✧ **Level of use of BIN auctions:** It is the dependent variable which is the number of BIN auctions listed divided by the total number of auctions listed.
- ✧ **Antique-like Product (Antique):** This is a dummy variable for coding antique-like products (1 = antique-like products, 0 = otherwise).
- ✧ **Heterogeneous Product (Heterogeneous):** This is a dummy variable for coding heterogeneous products (1 = heterogeneous products, 0 = otherwise).
- ✧ **Power Distance (PD):** It is the PD Index developed by Hofstede (2001).
- ✧ **Uncertainty Avoidance (UA):** It is the UA Index developed by Hofstede (2001)
- ✧ **Individualism (IND):** It is the IND Index developed by Hofstede (2001).

The regression results are summarized in Table 3. The diagnostic checks confirmed that all the assumptions of multiple regression hold. Also, all coefficients are statistically

significant with the expected signs.

We notice from the coefficients of the regression equation that the level of use of BIN auctions by sellers decreases from homogenous products, heterogeneous products, to antique-like products. This reflects that the level of use of BIN auctions decreases across product types when the heterogeneity of the product products increases. Therefore, Hypothesis 1 is supported.

Concerning the culture dimensions, we also notice that the coefficient of PD is positive and the coefficients of UA and IND are negative. These results are consistent with our Hypotheses 2 and 4 and thus, these hypotheses are also supported.

	Coefficient	<i>t</i> -statistics
Intercept	1.104	24.1
Antique	-0.2821	-17.7
Heterogeneous	-0.1820	-10.1
PD	0.006045	7.27
UA	-0.008611	-11.3
IND	-0.004886	-16.02
R-sq (adj)	0.751	

Note: All *t*-statistics are significant at  $p < 0.01$ .

## 5. Discussion

In this study, we examine whether the level use of BIN auctions by sellers is dependent on product types and culture. Our result shows that the level of use of BIN auctions by sellers is depended on product types and thus, our Hypothesis 1 is supported. This leads us to a new question. If we agree that the prediction of the analytical result is extendable from IPV auctions to CV auctions as suggested by Hidvégi et al. (forthcoming), the marketplace operators should find ways to encourage sellers of heterogeneous products and antique-like products to use BIN auctions. This can generate more revenue for sellers, as well as for marketplace operators whose profits are linked with final auction prices. We propose that marketplace operators should consider providing incentives to attract more sellers of heterogeneous products and antique-like products to use BIN auctions.

Our result on the impact of culture supports our Hypotheses 2 to 4. This result is also useful for marketplace operators and sellers. For marketplace operators, we suggest them to take note on the culture dimension indexes and develop corresponding business strategies when they enter into new markets. For example, if a marketplace operator wants to enter into a country with high UA and IND indexes and low PD index, it should put more efforts to educate the sellers in the market on the benefits of using BIN auctions. This can boost up the level of use of BIN auctions by sellers and enhance the profit of the marketplace operator concerned as mentioned above. Sellers can use these culture dimension indexes to predict the behaviors of their competitors in the new overseas



markets. For example, if a seller wants to enter into a new market with high PD index and low UA and IND indexes, he can expect his competitors have a higher tendency to use BIN auctions, and he can adjust his strategies accordingly to better adapt the new business environment.

This study also has some limitations. First, we study the level of use of BIN auctions by sellers and only know that it is product and culture dependent. However, the current study cannot predict whether the product or the culture effect on the level of use of BIN auctions also exists on bidders' side. Based on our observations, we predict that the behaviors of bidders are very likely to be product and culture dependent. Hence, we propose that further research should be conducted to examine the use of BIN auctions on the bidders' side. Second, we studied the effect of product types in a relatively broad sense with products at different stages of product life cycle and at different price levels. For example, we anticipate that even though sellers of digital cameras like to use BIN auctions, they may have different levels of use of BIN auctions for low resolution digital cameras and for sophisticated high resolution digital cameras. Hence, we suggest that more detailed analyses should be conducted. To conclude, we propose that future studies on BIN auctions should be focused on the effect of product types and culture by bidders. More analytical and empirical studies should be conducted to extend our understanding of this new format of auction. Further study on these issues on Buy Price auctions is also recommended. Well designed laboratory experiments will probably help us to probe into this issue.

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