Is That a Nike? The Purchase of Counterfeit Sporting Goods through the Lens of Planned Behavior

D.O.I: http://dx.doi.org/10.4127/ch.2015.0098

Weisheng Chiu¹, Ho Keat Leng²

¹ Yonsei University, Republic of Korea
² Nanyang Technological University, Singapore

Abstract

The purpose of this study was to examine the consumer behavior related to the purchase of counterfeit sporting goods (CSGs) based on the theory of planned behavior. The results showed that consumers’ attitude, subjective norm, and brand consciousness were predictive of purchase intention, whereas perceived behavioral control had no influence on purchase intention. Moreover, both risk averseness and sport involvement negatively led to consumers’ attitude toward CSGs. The paper ends with a discussion on the theoretical and practical contributions of this study towards the purchase of CSGs.

Key Words: Counterfeit Goods, Theory of Planned Behavior, Risk Averseness, Brand Consciousness, Sports Apparels
Introduction

The global market for counterfeit goods is large. Based on trade statistics, it has been estimated that trade in counterfeit and pirated goods reached USD 250 billion in 2007 (OECD, 2009). However, as it is difficult to obtain accurate statistics on the trade of counterfeit goods, other reports have suggested that the actual figure may be much higher (Chaudhry & Zimmerman, 2012).

Counterfeiting occurs across a wide spectrum of products. These include computer software, music and movies, drugs and medicine, and even military products (Chaudhry & Zimmerman, 2012). Within this broad range of goods, apparels including footwear and headgears, are highly likely to be counterfeited (OECD, 2009). This is due primarily to two factors. First of all, the technology used to manufacture apparels is cheap and widely available. Secondly, given the high demand for branded apparels, there is a ready market for counterfeiters of apparels (Shultz & Saporito, 1996).

In particular, a large percentage of counterfeit apparels are found in the form of athletic clothing and shoes (Chiu, Lee, & Won, 2014). Traditionally, sports apparels are bought to be used during sporting activities. However, through successful marketing by sporting goods companies, there is growing acceptance of sports apparel in daily wear. As such, besides athletes who are buying sports apparel to enhance their performance in sports, other consumers are also buying sports apparels for use outside of sports. This expands the market for sports apparels and makes the product category even more attractive for counterfeiters.

Given the large market for counterfeits and the potential impact it has on commercial organizations, it is not surprising that there exists a large body of literature on counterfeits. A number of these studies have focused on consumer behavior related to the purchase of counterfeit goods and concluded that consumer behavior can differ across product categories (Eisend & Schuchert-Güler, 2006; Penz & Stottinger, 2005; Tom, Garibaldi, Zeng, & Pilcher, 1998; Wee, Tan, & Cheok, 1995).

However, there have been few studies examining the purchase of the category of counterfeit sporting goods (CSGs). As sporting goods are both bought to be used in games and as everyday fashion, it is expected that the consumer behavior in CSGs is different from other product categories. In particular, given that the quality of sporting goods has an effect on the performance of an athlete, it is expected that consumers view the importance of genuine products in sporting goods differently from ordinary fashion wear. This study aims to examine the consumer behavior related to the purchase of CSGs and addresses a gap in the literature on counterfeit purchases in a category that has been studied to a lesser extent.
Literature Review

Counterfeit Purchases

Counterfeits are purchased in two different scenarios. In the first scenario, the consumer believes that the product purchased is genuine but, in fact, is a counterfeit. This is termed deceptive counterfeiting as the consumer is deceived into buying a counterfeit. However, not all counterfeit purchases are made in situations where the consumers are deceived. Consumers are able to use cues such as price, purchase location or other information sources to determine whether a product is a counterfeit (Gentry, Putrevu, & Shultz, 2006). As such, there are consumers who knowingly purchase counterfeit goods (Phau, Teah, & Lee, 2009; Tom, et al., 1998). In this second scenario where the consumer recognizes that the product is not genuine but willingly purchases the counterfeit product, it is considered non-deceptive counterfeiting.

It is important to differentiate the circumstances in the purchase of counterfeits. It is only in non-deceptive purchases that consumers make a conscious decision to purchase counterfeits. As such, determinants of purchase intention of counterfeits can only be established in non-deceptive counterfeiting circumstances (Eisend & Schuchert-Güler, 2006). Consequently, for this study, only non-deceptive counterfeiting will be examined.

The lure of counterfeit goods lies in its lower prices as compared to the genuine product. For consumers who find the genuine products to be beyond their economic reach, counterfeits act as a substitute with their lower prices. Not surprisingly, studies have shown that consumers who buy counterfeit goods tend to earn less income. Consequently, consumers who buy counterfeit goods also tend to be younger and less educated (Ang, Cheng, Lim, & Tambyah, 2001; Bian & Veloutsou, 2007; Swami, Chamorro-Premuzic, & Furnham, 2009; Tom, et al., 1998; Wee, et al., 1995).

Theory of Planned Behavior

Researchers have also studied determinants affecting the purchase of counterfeit goods beyond price-related variables. Among the various theories used to explain the purchase of counterfeit goods, the Theory of Planned Behavior (TPB) has been used in several studies and general support of the theory has been found (Chiu, et al., 2014; De Matos, Ituassu, & Rossi, 2007; Penz & Stottinger, 2005; Phau, et al., 2009).

The TPB was developed as an extension to the earlier Theory of Reasoned Action (TRA). In the original theory, purchase behavior was hypothesized to be
determined by purchase intention which was in turn determined by attitude toward the behavior and subjective norms. However, the TRA was not predictive in situations where people have incomplete volitional control. Subsequently, an additional variable, perceived behavioral control, was added to form the TPB (Ajzen, 1991). In conditions where an individual has complete control, perceived behavioral control should not exert any influence. Conversely, in situations where the behavior is not under complete volitional control, greater perceived behavioral control should be associated with stronger intention-behavior relationships (Armitage & Conner, 2001; Penz & Stottinger, 2005).

The TPB has been used extensively in studies to predict and explain behavior across a broad spectrum of activities. The studies generally found support for the TPB and its earlier form, the TRA. These studies, to a large extent, found that intentions are predictive of actual behavior especially when there is perceived behavioral control. The studies have also found general support that the more favorable the attitude and subjective norm with respect to a behavior, and the greater the perceived behavioral control, the stronger an individual’s intention to perform the behavior under consideration. However, the relative importance of attitude, subjective norm, and perceived behavioral control in predicting intention can vary across behaviors (Ajzen, 1991; Armitage & Conner, 2001).

Hypotheses Development

The TPB is an appropriate theoretical framework for studies involving counterfeits as it allows for the examination and prediction of behaviors that are not under complete volitional control. Consumers do not have complete control in their purchase of counterfeits as this is subject to whether they have access to counterfeits (Lan, Liu, Fang, & Lin, 2012). With higher levels of access to counterfeit goods, consumers will have higher levels of perceived behavioral control. This is positively related to intentions to purchase counterfeit goods (Chiu, et al., 2014; Penz & Stottinger, 2005).

Specific to the purchase of counterfeit goods, there are also a number of studies establishing the relationship between attitude toward the behavior and intention to purchase (Ang, et al., 2001; Chiu, et al., 2014; Phau, et al., 2009; Swami, et al., 2009; Tom, et al., 1998; Wee, et al., 1995). It must be noted that a small number of studies construe attitude as an attitude toward the product category of counterfeit goods instead of an attitude toward the behavior of purchasing counterfeit goods. In this study, attitude is construed as an attitude toward the behavior of purchasing counterfeit goods as it is a better predictor of behavior (Penz & Stottinger, 2005). Hence, it is expected that attitude toward purchasing CSGs predicts purchase intention of CSGs.
The last construct in the TPB is subjective norm. Subjective norm refers to the perceived pressure by others to perform a specific behavior. Through the process of consumer socialization, consumers are susceptible to normative influence through their peers and friends in terms of brand and product choice (Lachance, Beaudoin, & Robitaille, 2003). Studies have found that normative influence is stronger in conspicuous product categories (Lord, Lee, & Choong, 2001). This is because conspicuous product categories allow the choice of brands and other product characteristics to be displayed and judgment on the appropriateness to be made by other people. Consumers who desire to be part of a reference group or to comply with the expectations of members of the group will need to make purchase decisions of conspicuous products within the expectations of the group.

As a fashion product, sports apparel purchases are conspicuous and as such, they are more likely to be susceptible to normative influences (Chew & Leng, 2014; Zhou & Wong, 2008). In particular, brand names play an important role in affecting consumer choice for sports apparels (Dickson & Pollack, 2000). They not only reflect the choice of the individual consumer but more importantly, visibly indicates membership and shared beliefs of the group (Bae, 2011; Chae, Black, & Heitmeyer, 2006; Dickson & Pollack, 2000).

Specific to the purchase of counterfeit goods, subjective norms have a positive influence on consumer’s intentions (Ang, et al., 2001; Chiu, et al., 2014; De Matos, et al., 2007; Penz & Stottinger, 2005; Phau, et al., 2009; Tom, et al., 1998). When relatives and friends accept the practice of purchasing counterfeit goods, the consumer is more likely to purchase counterfeit goods. However, rejection by relatives and friends may inhibit a consumer from purchasing counterfeit goods, especially when such product usage is visible.

Subjective norm has been found to be weaker in predicting purchase intention when compared to perceived behavioral control and attitude towards the behavior. This is especially so when subjective norm is measured by a single item (Armitage & Conner, 2001). Others have suggested that with improved quality in counterfeit goods, it may be difficult to determine whether a product is genuine. In such cases, if relatives and friends are not able to distinguish the counterfeits, the influence of subjective norms on the purchase of counterfeits may be reduced (Gentry, et al., 2006; Penz & Stottinger, 2005).

In sum, it is expected that the TPB can be used to examine the purchase of CSGs. The hypotheses are as follows.

H1a: Attitude toward purchasing CSGs will have a positive influence on purchase intention of CSGs.

H1b: Subjective norms toward purchasing CSGs will have a positive influence on purchase intention of CSGs.
H1c: Perceived behavioral control toward purchasing CSGs will have a positive influence on purchase intention of CSGs.

A review of the literature also suggests that besides the variables in the TPB, brand consciousness may have a negative influence on the purchase intention of CSGs. Branded goods can enhance a person's self-image. Consumers who are brand conscious are more likely to perceive that using branded goods can convey their ideal self-image, associate themselves with a higher social class level and gain acceptance from target groups (Bian & Moutinho, 2011; Wee, et al., 1995). This is especially so in the case of branded sports apparel (Dickson & Pollack, 2000).

Consequently, consumers who are high in brand consciousness are less likely to purchase counterfeit goods (Gentry, et al., 2006). In particular, when the counterfeit is of low quality and easily recognized as non-genuine, it is less likely to be acceptable to consumers who are high in brand consciousness. However, there has been mixed results as a recent study did not find brand consciousness affecting the purchase of counterfeit luxury goods (Phau, et al., 2009). Whether brand consciousness affects the purchase intention of CSGs remains to be tested.

H2: Brand consciousness will have a negative influence on purchase intention of CSGs.

The literature suggests that there may be antecedents to the attitude toward purchasing counterfeit goods. The purchase of counterfeit goods carries some risk. Consumers who are averse to risk may be more concerned as to whether counterfeits goods will perform as expected, are safe or will affect them adversely in how others perceive them. They are thus more likely to have a more negative attitude toward purchasing CSGs as compared to consumers who are less averse to risk (Ang, et al., 2001; Chiu, et al., 2014; Tom, et al., 1998). However, it remains inconclusive as to whether risk averseness affects the attitude toward the purchase of counterfeit goods as some studies have not found support for this (De Matos, et al., 2007).

In addition, consumers differ in their level of sports involvement. Gwinner and Swanson (2003) define sport involvement as the love of and bond with sports. It is the cognitive affiliation towards sports. Consumers who are high in sport involvement are more likely to purchase high quality sports products as they place value on sport performance. As such, they are more likely to have a negative attitude toward CSGs when compared to consumers who are less involved in sports (Bian & Moutinho, 2011; Chew & Leng, 2014). Consequently, the above discussion suggests consumers’ risk averseness and level of sports involvement are negatively related toward the attitude of purchasing CSGs.
H3a: Risk averseness is negatively related to the attitude toward the purchase of CSGs.

H3b: Sport involvement is negatively related to the attitude toward the purchase of CSGs.

The conceptual model is summarized in Figure 1 below.

![Conceptual model and hypotheses](image)

**Fig. 1. Conceptual model and hypotheses**

**Methodology**

**Participants and procedures**

The survey was administered to 102 students studying in sports-related programs from a tertiary institution in Singapore. Five of the responses were invalid and taken out of the analysis. The number of valid responses used in the analysis was 97 responses. The mean age of the respondents was 21.4 years of age with 41 respondents (42.3%) of the female gender.
Instrument

The survey instrument consists of seven measures adapted from earlier studies. These are a 3-item purchase intention scale (Dodds, Monroe, & Grewal, 1991); a 5-item attitude toward CSGs scale (Huang, Lee, & Ho, 2004); a 4-item subjective norm scale (Yoon, 2011); a 4-item behavioral control scale (Yoon, 2011); a 4-item brand consciousness scale (Sprotles & Kendall, 1986); a 3-item sport involvement scale (Gwinner & Swanson, 2003); and a 4-item risk averseness scale (Burton, Lichtenstein, Netemeyer, & Garretson, 1998). All scale items were evaluated with a 5-point Likert scale ranging from (1) strongly disagree to (5) strongly agree.

In this study, the Cronbach alpha coefficients for six of the seven scales showed good levels of internal consistency. The Cronbach alpha coefficients for purchase intention, attitude towards CSGs, subjective norm, perceived behavioral control, risk averseness and brand consciousness were 0.84, 0.76, 0.75, 0.82, 0.76 and 0.82 respectively. The Cronbach alpha coefficient for sport involvement is 0.59. This is below the generally acceptable level of 0.70. The scale had been used in other studies and was reported to have good internal consistency with Cronbach alpha coefficient of 0.87 (Gwinner & Swanson, 2003). Given the small number of items for the sport involvement scale, the mean inter-item correlation for the items may be more appropriate as a measure of reliability (Pallant, 2010). In this case, the mean inter-item correlation for the sport involvement scale is 0.36 which is within an acceptable range (Briggs & Cheek, 1986). As such, the sport involvement scale is deemed to be of sufficient reliability for this study.

Results

Respondents reported a low level of agreement that they intended to purchase CSGs ($M = 2.58$, $SD = 0.93$). They did not have a favorable attitude towards the purchase of CSGs ($M = 2.40$, $SD = 0.76$), were more likely to be affected by subjective norms in the purchase of CSGs ($M = 3.53$, $SD = 0.77$) and reported having control in their decisions to purchase CSGs ($M = 3.54$, $SD = 0.88$).
Table 1. Descriptive statistics of constructs

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase Intention</td>
<td>2.58</td>
<td>0.94</td>
</tr>
<tr>
<td>Attitude</td>
<td>2.40</td>
<td>0.76</td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>3.53</td>
<td>0.77</td>
</tr>
<tr>
<td>Behavioral Control</td>
<td>3.54</td>
<td>0.88</td>
</tr>
<tr>
<td>Sport Involvement</td>
<td>4.06</td>
<td>0.61</td>
</tr>
<tr>
<td>Risk Averseness</td>
<td>3.12</td>
<td>0.82</td>
</tr>
<tr>
<td>Brand Consciousness</td>
<td>3.07</td>
<td>0.72</td>
</tr>
</tbody>
</table>

Multiple regression analysis was used to assess the ability of attitude towards purchasing CSGs, subjective norm, perceived behavioral control and brand consciousness to predict intention to purchase CSGs. Preliminary analysis was conducted to ensure no violation of the assumptions of multicollinearity. Tolerance and Variance Inflation Factor (VIF) for variables were more than 0.10 and less than 10 respectively (Pallant, 2010).

The total variance explained by the model was 44.3%, $F(4, 92) = 20.06, p < 0.01$. The analysis showed that attitude towards CSGs ($\beta = 0.56, p < 0.01$) and subjective norms ($\beta = 0.14, p < 0.10$) predict purchase intention but not behavioral control ($\beta = 0.11, p = 0.19$), partially supporting Hypothesis 1. In addition, brand consciousness predicts purchase intention ($\beta = -0.18, p < 0.05$), supporting Hypothesis 2.

Multiple regression analysis was also used to assess risk averseness and sport involvement in predicting attitude toward purchasing CSGs. The total variance explained by the model 2.8%, $F(2, 94) = 2.38, p < 0.10$. The analysis showed that both risk averseness ($\beta = -0.17, p < 0.10$) and sport involvement ($\beta = -0.18, p < 0.10$) predict attitude towards purchasing CSGs, supporting both Hypothesis 3a and Hypothesis 3b.
Table 2. Summary of the multiple regression analyses

<table>
<thead>
<tr>
<th>DV</th>
<th>IV</th>
<th>Standardised β</th>
<th>Adjusted R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase Intention</td>
<td>Attitude</td>
<td>0.56***</td>
<td>0.443***</td>
</tr>
<tr>
<td></td>
<td>Subjective Norm</td>
<td>0.14*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Behavioral Control</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brand Consciousness</td>
<td>-0.18**</td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>Sport Involvement</td>
<td>-0.18*</td>
<td>0.028*</td>
</tr>
<tr>
<td></td>
<td>Risk Averseness</td>
<td>-0.17*</td>
<td></td>
</tr>
</tbody>
</table>

*p < .10, **p < .05, ***p < .01.

Discussion

In this study, it was found that attitude toward purchasing CSGs and subjective norms are predictive of intention to purchase CSGs, but not perceived behavioral control. This finding differs from a recent study in Taiwan which found that attitude toward purchasing counterfeit goods, subjective norms, and perceived behavioral control all significantly predict the intention to purchase CSGs (Chiu, et al., 2014). It has been noted that although extensive studies showed general support for the TPB, the relative importance of attitude, subjective norm and perceived behavioral control in predicting intention can vary across behaviors and situations. In situations where attitudes or subjective norms are powerful, perceived behavioral control may be less predictive of intentions (Ajzen, 1991; Armitage & Conner, 2001). In this study, attitude towards CSGs had a high beta value and as such, is powerful in predicting intention to purchase CSGs. This may have led to perceived behavioral control to be less predictive in this study.

With respect to brand consciousness, as suggested by (Gentry, et al., 2006), it is not surprising that brand consciousness negatively leads to purchase intention of CSGs. In the case of branded sporting goods, most of the sports brands are well-known and therefore easily recognized by consumers. Consumers with higher brand consciousness are thus less likely to purchase CSGs. This is especially so given that sports apparels are conspicuous goods and brands are important in the decision to purchase sports apparels (Dickson & Pollack, 2000).

In this study, the construct risk averseness was used. While this construct was significant in predicting attitude, the overall model has a low explained variance of less than 3%. Risk averseness is a personality variable and describes a person’s
general propensity to take the risk. Given that the purchase of counterfeit sporting
good is a specific behavior that may be riskier than general behavior, it has been
argued that the construct perceived risk should be used instead.

Perceived risk is defined in terms of the consumers’ perception of uncertainty
and adverse consequences in buying a product. In earlier studies, it has been
found to be predictive of attitudes toward counterfeit goods (De Matos, et al.,
2007). In buying a counterfeit product, consumers face functional risk where the
product does not perform as expected, financial risk where money is lost in pur-
chasing a product that does not work and social risk when the counterfeit product
causes embarrassment for the consumer (Wee, et al., 1995). Hence, using per-
ceived risk in future studies may be more illuminative.

More importantly, sport involvement is significant in predicting attitude towards
purchasing CSGs. Sport involvement denotes the consumer’s cognitive affiliation
toward sports. While the predictive power is relatively weak toward consumers’
attitude, this finding concurs with the evidence found in earlier studies (Bian &
Moutinho, 2011; Chew & Leng, 2014; Chiu, et al., 2014). Consumers who are high-
ly involved in sports may be more reliant on the quality of sporting goods for better
performance, and as such are more likely to have a negative perception toward
CSGs.

Implications

This paper makes several theoretical and practical contributions to the field.
First of all, the findings in this paper enhance our understanding of the consumer
behavior of CSGs. The purchase of counterfeit goods has received much attention
in the literature but few studies have been conducted specific to CSGs. Given the
expanding market of sports apparels, it is important to address this issue which
has received little attention in the literature.

Secondly, the findings from this study suggest that there are differences be-
tween countries when it comes to consumer behavior in the purchase of CSGs. While perceived behavioral control is predictive of intention in some countries, it is
not applicable in other countries. The findings from this study also suggest that at-
titude towards counterfeits may explain the differences between countries. Theory
development in this area will need to take this into consideration.

Thirdly, this study has found that brand consciousness, risk averseness and
sport involvement influences the intention to purchase CSGs. In particular, the
relationship between sport involvement and attitudes towards CSGs need to be
examined further as it is an area that has been studied to a lesser extent in the
literature on counterfeits.

Lastly, the findings also suggest practical solutions for managers of sport
brands. Commercial organizations should emphasize the relationship between consumers and the sports brand. Consumers who are more involved in sports and who are more risk averse are less likely to have a favorable attitude towards the purchase of CSGs and consequently, are more likely to purchase the genuine products. Marketing managers will need to emphasize the quality of their products and demonstrate how counterfeits cannot compare to the genuine products. In addition, managers can focus their communications on how socially desirable a genuine product is compared to a counterfeit. This can inhibit consumers from purchasing CSGs especially when counterfeits can be easily identified.

**Limitation and future research**

One of the limitations of this study was that respondents were selected from the undergraduate population and as such were relatively younger than the general population. Studies have shown that demographic differences exist in the intention to purchase counterfeit goods and as such, future studies should examine if demographic differences occur in the intention to purchase CSGs as well (Bian & Veloutsou, 2007; Swami, et al., 2009; Tom, et al., 1998; Wee, et al., 1995).

**Conclusions**

To conclude, the present study examines the consumers’ purchase intention of CSGs using the TPB and other psychological variables (i.e., brand consciousness, risk averseness, and sport involvement). We identify that attitude toward purchasing CSGs, subjective norms, and brand consciousness predict consumers’ purchase intention of CSGs. Among these determinants, attitude toward purchasing CSGs plays the most significant role in influencing purchase intention of CSGs. Moreover, risk awareness and sport involvement negatively lead to consumers’ attitude toward purchasing CSGs. It suggests that sport involvement is a critical factor influencing consumer attitude toward purchasing CSGs. Finally, understanding the purchase of CSGs through the lens of the TPB would provide critical implications for future research and practice.

**References**


Appendix 1 – Survey Instrument

Purchase Intention Scale
1. I will purchase counterfeit sporting goods.
2. I will never consider buying counterfeit sporting goods.
3. The probability that I will consider buying counterfeit sporting goods is...

Attitude toward Counterfeit Goods
1. Generally speaking, buying counterfeit sporting goods is a better choice.
2. Considering the price, I prefer counterfeit sporting goods.
3. I enjoy shopping for counterfeit sporting goods.
4. Buying counterfeit sporting goods generally benefits the consumer.
5. There is nothing wrong with purchasing counterfeit sporting goods.

Subjective Norm
1. If I purchase counterfeit sporting goods, most of the people who are important to me will disapprove.
2. People who are important to me will look down on me if I purchase counterfeit sporting goods.
3. My family members will think it is okay to purchase counterfeit sporting goods.
4. My friends believe that buying counterfeit sporting goods is wrong.

Perceived Behavioral Control
1. It is easy to purchase counterfeit sporting goods.
2. I know where to purchase counterfeit sporting goods.
3. I can find counterfeit sporting goods if I wanted to.
4. Buying counterfeit sporting goods is entirely within my control.

Sport Involvement
1. Sport is very important to me.
2. I think about sports all of the time.
3. I watch sporting events whenever I can.

Risk Averseness
1. I don’t like to take risks.
2. Compared to most people I know, I like to “live life on the edge”.
3. I have no desire to take unnecessary chances on things.
4. Compared to most people I know, I like to gamble on things.
Brand Consciousness
1. Well-known brands are best for me.
2. I usually choose more expensive brands.
3. I prefer buying the best-selling brands.
4. The most advertised brands are usually better choices.

Address for correspondence:

Weisheng Chiu
Researcher
Yonsei University, Republic of Korea
weishengchiu@gmail.com

Ho Keat Leng
Assistant Professor
Nanyang Technological University, Singapore
hokeat.leng@nie.edu.sg