



Factors Influencing Consumer's Intention to Buy Counterfeit Products

By Mathumita Mukherjee Basu, Sumit Basu & Jung Kook Lee

Indiana University, United States

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Abstract- There are several factors which influence consumers to buy counterfeit products. Today, any product in any nation is vulnerable to this malady. Counterfeits are packaged and labeled to resemble the original brand-name and generic products. Therefore, fake products often illusion the consumers to thinking that they are buying authentic goods. Counterfeits are a real and looming threat to all manufacturers. Counterfeit policing measures are yet to mature and become omnipresent. With this background information, it is noteworthy to observe how the Theory of Reasoned Action (TRA) could help identify the factors responsible for influencing behavioral intentions of a consumer towards purchasing counterfeit products. The present study reviews existing literature on counterfeit products, identifies potential improvements, and provides further insight into consumer motives behind the purchase of counterfeits. Six primary factors that influence counterfeit purchase have been identified and the TRA has been applied to investigate the impact of these factors on consumer behavioral patterns. The factors are (1) social motivation, (2) personal gratification, (3) perception, (4) value, (5) brand loyalty, and (6) ethics. The 'influence of society' and 'value for money' have been identified as the top two reasons that motivate consumers to buy fake products based on a survey conducted. A mathematical 'covariate interactions' analysis as well as a Chi-square regression analysis corroborated the same finding- identifying the top two factors that most strongly influence a customer's 'Intent to purchase'. A logistic regression analysis was run on the survey results that yielded a mathematical expression which can predict how likely a customer is to buy a counterfeit $p(Y)$. The proposed correlation matches the obtained survey data very well.

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I. INTRODUCTION

Counterfeit products cause significant amount of damage to the free market economy. There are several factors that influence consumers who buy counterfeit products. A meticulous scrutiny of these factors is essential. The federal authorities in U.S have seized 150 websites that used to traffic counterfeit brand merchandises in 2011. In today's tight economy, consumers have no choice but to look for ways to save

money. Often in this pursuit to save, they end up opting for counterfeits. Consumers possibly believe that low priced products and discount stores can meet their status needs (Eastman and Eastman, 2011). Starting from the packaging to its labeling, a counterfeit product resembles its original counterpart almost in every aspect. Counterfeit goods look authentic. The factors that contribute to the purchase of counterfeits are economic advantages, perceptions of personal or hedonic benefits, and past purchase experiences (Nia and Zaichkowsky, 2000; Gentry et al., 2000; Ha and Lennon, 2006). Respondents to a particular study indicated that they found luxury goods to be fun and worth the price paid for, regardless of whether they were an originals or counterfeits. Value, customer satisfaction, and the status of original luxury brand names did not decrease due to the widespread availability of counterfeits (Nia and Zaichkowsky, 2000). The very existence of the brands and the promises made by them are the cause of counterfeits (Bloch, 1993; Cordel et al., 1996). Counterfeits are considered value for money for the reason that they have a fairly small price and are of inferior quality (Bloch et al. 1993; Lichtenstein et al. 1990; Ang et al. 2001; Wang et al. 2005). Purchasing counterfeits means getting the prestige of branded products without paying for them (Cordell et al. 1996; Grossman and Shapiro, 1988) while, compromising on quality. Counterfeit products increasingly penetrate the supply chain and pose a threat to the manufacturers. The presence of counterfeits is a fret for nearly every product, company, supply chain, government and industry; and the problem is aggravating. Potential investments in research and development are at stake from the unfair competition generated by counterfeits (Maldonado and Hume, 2005). Social needs, comprising social recognition and social status, are primarily responsible for the consumption of counterfeits. Counterfeit products have had a widespread impact and become a global phenomenon over the past few years. By 2015, the International Chamber of commerce expects the value of counterfeit goods globally to exceed \$1.7 trillion (Hargreaves, 2012). That's over 2% of the world's total current economic output.

Cost is the most frequently cited motivation for buying counterfeits. Brand success breeds counterfeits (Green and Smith, 2002). The findings were derived from a limited survey conducted among 46 students in

Author α: PineBrook Ct, Columbus, Indiana, USA, Adjunct Faculty, Indiana University-Purdue University of Columbus, Indiana, USA.
e-mail: mmkhrj@gmail.com

Author σ: Freelancer, Ph.D from Purdue University and MBA from University of Chicago (USA). e-mail: basusumit@yahoo.com

Author ρ: Assistant Professor of Marketing, Division of Business, Indiana University Purdue University of Columbus, IN, USA.
e-mail: leejk@iupuc.edu

the North Eastern University. The Theory of Planned Behavior (TPB) was used to explain the intention for purchasing counterfeits (Penz and Stöttinger, 2005). A χ^2 -analysis yielded the top three factors that influence one's intention to buy fake products to be (i) perceived behavioral control, (ii) a smart shopper attitude, and (iii) subjective norm. The authors suggest that their method be applied on different product categories to test its validity.

A potential gap in the reported literature is that every research group mentioned above has proposed a different set of primary factors influencing the purchase of counterfeits. Also, a unified quantitative approach to determine and rank the factors influencing counterfeit purchase intention is yet to be developed. An expression depicting the relationship between the consumer purchase intention (Y) and the factors (X 's) affecting is within the purview of improvement in this field of study. Lastly, the findings of every study depend on the market dynamics where the study was conducted on money influx, social and cultural settings prevalent there. In order to reach a meaningful conclusion, one should simultaneously study and analyze the dynamics of markets that are widely different in characteristic and geographic location. We propose six factors (see Fig. 1) that significantly influence the consumer's intention to buy a fake product. They are (1) social motivation, (2) personal gratification, (3) perception, (4) value, (5) brand loyalty, and (6) ethics. These factors have been critically examined using a standard reasoning theory described below.

The TRA, which is different from the TPB, is a useful tool for understanding consumer misbehavior. In the past Fishbein and Azjen's TRA has proved effective for understanding the intentions behind using contraceptive methods (Doll and Orth, 1993), predicting gambling behavior (Moore and Ohtsuka, 1999), designing persuasive public information campaigns, and studying condom use for HIV prevention (Fishbein et al. 1992). With this background information, it is noteworthy how the TRA could help uncover the behavioral intentions of consumers towards procurement of counterfeit products. The TRA illustrates the motives behind volitional acts such as the purchase of counterfeits. It suggests that an individual's behavioral intention is determined collectively by his/her attitude towards the subjective norms-others' perception of whether he/she should engage in a particular behavior or not (Ajzen and Fishbein, 1973; Fishbein, 1980). In the study presented below, the TRA has been applied on the six factors mentioned above to understand a consumer's attitude and behavioral intention towards counterfeits.

A survey was designed to elicit responses from target audiences, in the Indian and USA markets, on how critically they perceive each of the six identified factors. The respondents were chosen from the working

class and their age groups varied between 23 to 63 years. The fact that the respondents were chosen from two different nations helps us understand the differences in market dynamics due to differences in economic prosperity/status, geographic location, culture and availability of counterfeits in the local markets. The survey responses included rankings that the respondents assigned to each of the six factors (X 's). Using an interactions plot and a Chi-square regression analysis, the six X 's were then reduced to only the top two X 's that had the strongest influence on the Y variable. Note that Y is a consumer's intent to purchase a fake product. A logistic regression analysis was then performed to formulate an empirical correlation between the Y and the top two X 's i.e. $p(Y) = f(x_1, x_2)$. It should be highlighted that the mathematical expression for $p(Y)$ that has been developed is a novel and unique way of solving this puzzle. Henceforth, one does not need to gather responses on each of the six X 's from a consumer. Instead, the consumer's ranking of the 'societal influence' and 'value for money', on a scale of 100, would be sufficient for the model to predict whether he/she would buy a counterfeit or not. Summarizing, the specific objectives of the present work were to:

- Identify six important factors that influence a consumer to purchase a counterfeit, and analyze how these factors affect a consumer's decision using the TRA.
- Design a survey that leads us to the predominant variables among the six factors (X 's) and that gives us some insight on how people from different backgrounds and geographic locations perceive counterfeit goods.
- Develop a mathematical correlation between the probability (Y) that a consumer will buy a counterfeit product and the primary influencing factors (X 's).

II. CONCEPTUAL OUTLINE

The TRA helps determine a relationship between the consumers' purchasing patterns and the popularity of counterfeits. Six primary factors have been identified that are anticipated to affect a consumer's decision to buy a counterfeit product. Using the TRA, the relationship between a consumer's buying pattern and counterfeits is illustrated in each of the following six propositions. The factors are listed below in Fig.1 and discussed in ensuing paragraphs.

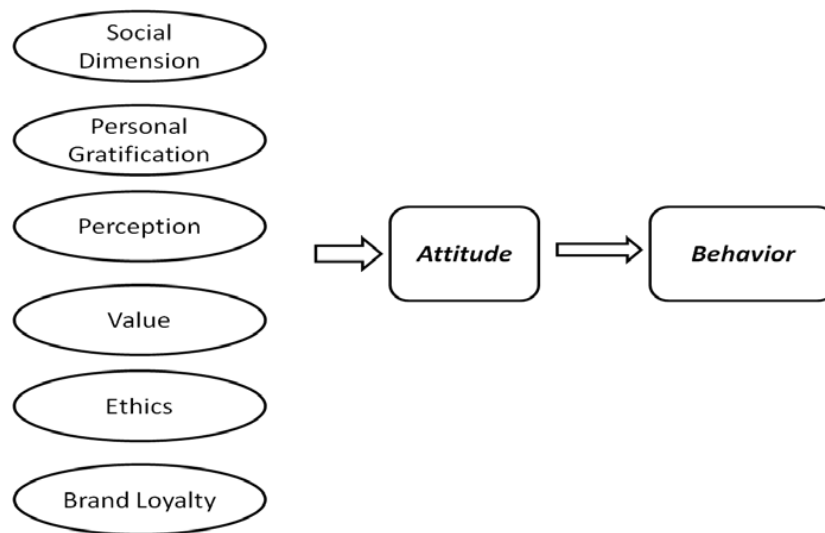


Figure 1 : Six variables affecting consumer attitude towards counterfeits

a) Social Motivation

The term 'social motivation' implies the effect that people have on consumer behavior. The need 'to belong to' is the principal motivation for humans. According to the TRA, a person's voluntary behavior is predicted by his attitude towards that action and how he thinks other people would perceive him if he performed that action. Hence, a need for social recognition (action) is more responsible for driving the purchase of counterfeit products than social influence. One buys branded products to get noticed, to be admired, and to enhance one's social standing. In other words, it is the influence that one's beliefs, regarding a particular product, have on another's behavior leading the other to follow him/her so as to become part of the same league (Haque et al. 2009). The TRA also suggests that a person's intention is a function of two basic determinants- his personal nature and social influence. The consumer's social class determines this pattern of behavior. In cases where both social significance and prominence are important to a consumer and he cannot afford the exorbitant prices of the original product, he is likely to turn to counterfeits as an alternative (Teah and Phau, 2009). The norms followed by a social group and the pressure arising from the instinct to emulate that reference group, can induce a consumer's decision to use original or counterfeits of luxury brands. Consumers are more likely to purchase counterfeits under the influence of their peers (Bearden et al, 1989). One buys branded products to get noticed, to be admired, and to enhance one's social standing. An individual's aspirations to create his/her identity, matching him/her to the standards of others and make an impression on others are one of the fundamental causes of counterfeit consumption (Bloch et al. 1993; Ho and Lennon, 2003; Penz and Stöttinger, 2005). If a consumer feels that a product could be his medium of self-expression then, he

is motivated to consume a counterfeit as it would aid his self-presentation. (Snyder and DeBono, 1985).

Consumption of luxury brands is a social adjustive (self-expression) and value expressive function (self-presentation) or both (Shavitt, 1989). If status is the motivation for a consumer, then he is likely to be less priced and value-conscious than other consumers (Eastman et al. 2011). The reaction of peers to the affluence exhibited from the conspicuous consumption of luxury goods, rather than the worth of the actual product, gives the consumer satisfaction from others' reactions to the wealth displayed rather than from the value of the product itself (Mason, 2001). A reference group's approval also plays a major role in influencing a consumer's attitude towards the purchase of counterfeits (Lee and Yoo 2009). Consumer purchases counterfeits if his friends and relatives act as either inhibitors or contributors and approve of his behavior. Consumers who are motivated by status are more brand-conscious.

Social affluence can be either norm-based (when individuals conform to the expectations of a referent group) or information-based (when individuals accept information from a referent group as evidence of reality). The desire to own luxury branded products to acquire admiration possibly is the reason for motivating individuals to purchase imitations of original products.

Therefore, customer's social dimension with the brand product has a positive effect on the attitude toward counterfeit product brand.

b) Personal Gratification

Behavioral beliefs (motivating a person's attitude toward the behavior) influence a person's attitude. The TRA's most conspicuous element is that behavioral intent is the best predictor of actual behavior. If a person believes that buying a merchandise is a means of personal gratification, self-representation and

status, then he is likely to hold an unfavorable attitude toward the behavior of buying a counterfeit. Personal gratification is linked to the need for a sense of accomplishment, appreciation, and a craving to enjoy the finer things in life. The consumers who do not buy counterfeits have been observed to be more confident, more successful, and having a higher perceived status (Bloch et al. 1993). These characteristics are often associated with individuals who seek accomplishment, and a higher standard of living. The term 'status' refers to the relative rank and lifestyle that an individual holds and the lifestyle in a hierarchy. This hierarchy is based on honor, respect, prestige and envy from others and represents the goals of a culture. The term 'status consumption' refers to ostentatious individuals who seek self-satisfaction and simultaneously exhibit their prestige and status to others through tangible evidence (Eastman et al. 1997). The social benefits that a product offers estimate the utility of the product, as there are considerable levels of status consumption in all societies in the world (Eastman et al. 1997).

Hence, personal gratification and pursuit of status has a negative effect on attitude and intention towards the purchase of counterfeit products.

c) Perception

Subjective norm in the TRA gives weight age to perceived expectations of people who are important to a person and whether or not he/she should act in accordance with their expectations. A consumer's perception about counterfeit depends on various factors like social norms, risk, product involvement, price, ethics, brand image, etc. The consumer's perceptions are influenced by the society which, in turn, affects his/her personality and beliefs (Haque et al. 2009). A few studies suggest that purchasing decisions are based on perception (Bian and Moutinho, 2011). A strong intention to purchase counterfeits has a strong correlation with the perceived behavioral control of purchasing counterfeits (Penz and Stöttinger, 2005). An individual's ability, the easy availability of counterfeits and his awareness on counterfeits positively influence the intention to purchase duplicate products (Ajzen 1985, 1991). An individual's perception of social norms decides if he/she should execute the behavior in question (Ajzen and Fishbein, 1975). A recent research proposed that product involvement and product knowledge guide the relationship between the consumer's perception and purchase intention of counterfeit branded products (Hanzaee and Ghafelehbashi, 2012). If the consumer cannot distinguish easily between a counterfeit and branded product due to low product involvement with the branded one, it leads to more favorable perceptions towards counterfeits. However, when people perceive a monetary risk in the consumption of counterfeit products, they are likely to assess these products lowly

(Maldonado and Hume, 2005). Consumers who belong to high income brackets also perceive fake products as substandard (Nia and Zaichowsky, 2000). A brand's image has a definite impact on the customers' perceptions of product and service quality while, a recognized company has a wide effect on consumer perceptions of value and fidelity (Cretu and Brodie, 2005). Consumer perceptions of a brand name, with reference to brand risk and brand differences, are the principal reasons for influencing purchase of new brands among consumers. Prominence, exclusivity, pleasure seeking feature and reputé are identified as vital elements in a valued brand (Vigneron and Johnson, 2004) but the existence of counterfeits pull down the perceived value of a luxury brand (Hieke, 2010).

Therefore, it can be inferred that customer's perception toward brand product itself has a positive effect on the attitude toward counterfeit product brand.

d) Value

Value of a brand product to a person could mean the degree of monetary or material utility he derives from it, in comparison with other products. As per the TRA, a person may participate in a particular behavior if the outcome seems beneficial to him. Therefore, he may engage in buying a counterfeit as it will give him the same value for money as an original product. Value is a lasting belief that rises above definite intentions and circumstances and thus, affects attitude and behavior (Rokeach, 1973). Paying lower prices, while maintaining some constraints in quality, refers to value consciousness (Lichtenstein et al. 1990). Although, buying counterfeits purports compromise in quality but, the fact is that counterfeits provide large cost savings and hence, consumers have high value consciousness for them. Furthermore, studies have shown that a conspicuous price advantage of a counterfeit product over the authentic one motivates consumers to decide on the counterfeit (Bloch et al. 1993; Phau and Dix, 2009). Ang et al. (2001) in their study establish that the more value-conscious a consumer was, the more favorable one's attitude towards piracy was. People with integrity, graciousness and conscientiousness tend to have a negative attitude towards counterfeit purchase (De Matos et al. 2007; Phau and Teah, 2009). But at times, few consumers are willing to trade off their protected values against cheaper prices (Baron, 1999). In sociology, value implies putting together some approaches of behavior in our society (Bronowski, 1959). Regardless of the exceptional quality, consumers are unwilling to pay for the exorbitant prices as counterfeits offer the same utility as the original.

Consequently, customer's value towards the brand product has a positive effect on the attitude toward counterfeit product brand.

e) *Ethics*

Ethics are a system of moral principles which forbids people from performing immoral actions. The TRA purports that one's attitude towards a behavior depends on his beliefs and hence, a group of people who have strong ethical values will restrain themselves from performing any action which is against their principles. The consumers' conceptions of truth and moral values are not absolute but relative to the persons or groups holding them, positively affecting ethical judgments regarding purchase of counterfeit products. The more idealistic a consumer is, the more is he bound to be ethical and therefore, have a negative attitude toward counterfeits. According to Muncy and Vitell (1992), four factors influencing the consumer ethics are: 1) deriving benefits from illegal activity actively, 2) deriving passive benefits, 3) deriving active benefits from questionable actions, and 4) not engaging in harm or foul (Maldonado and Hume, 2005). Law-abiding consumers have a negative approach to counterfeits (Cordell et al. 1996). A consumer with a higher moral character is independent of others' opinions and has a strong self-identity. Hence, he would regard purchase of counterfeits ethically wrong (Penz and Stöttinger, 2005). If a consumer values integrity, he is unlikely to support counterfeits (Ang et al. 2001; Wang et al. 2005). Guilt has a significant negative influence on the purchase intent of counterfeits and a positive influence on the moral judgment for all product types.

As a result, consumer ethics is a decision maker on the attitude towards purchase of counterfeits and ethical judgment will have negative effect toward counterfeit brand product and behavior.

f) *Brand Loyalty*

Brand loyalty can be defined as an action of repeat purchase and deep commitment towards a product by the consumers. Regardless of price or convenience, a consumer with brand loyalty will repurchase the brand products. Hence, as the TRA suggests that one's attitude toward a behavior can lead to an intention to act, brand loyalty is a result of consumer behavior and is affected by a person's preferences. The vital factors influencing brand loyalty are (a) the value that the consumer associates with the brand, (b) his faith in the brand, (c) customer satisfaction, (d) continued purchase of the brand product, and (e) commitment toward the brand. A wide variety of products to choose from- price advantage, positive image of store and brand; the consumer's trust and loyalty determine his attitude towards a brand (Liu and Wang, 2008). According to Sophie Hieke (2010), a brand's value diminishes if the consumer is revealed to a range of counterfeits. Moreover, brand replicas erode the abstract images of the original brand in the consumer's mind and their presence reduces the brand's perceived level of luxury. Brand loyalty or the purchase of genuine brands reduces the overall

consumer perceived risk. The consumer's brand loyalty and his act of purchasing the genuine product is a tool in preventing monetary loss resulting from the purchase of counterfeits (Roselius, 1971).

Therefore, consumer's brand loyalty moderates the relationship between attitudes toward counterfeit brand product and behavior.

III. LIMITATIONS

The study includes a review of existing literature and aims to investigate the six variables namely, social motivation, personal gratification, perception, value, brand loyalty and ethics. A rigorous statistical data analysis was performed on the gathered survey data. However, this study and the reported literature that it refers to are subjective, because they comprise opinions of people. These opinions are influenced by demographical preferences, geographic locations, and environmental conditions that vary across different regions and countries. The conclusion of study is limited to type-of-product studies. The present work is an 'Analysis-led-Concept' study and there prevails immense scope for future research in the area of counterfeits spanning a wide gamut of products.

IV. RESULTS AND DISCUSSION

This paper offers an insight of the primary factors that propel consumers to buy counterfeits. The current study extends the growing body of literature, related to counterfeits, by examining the TRA which is explicitly concerned with consumer behavior. The TRA dictates that attitudes and social norms dictate consumer behavioral intent. The present study demonstrates that a consumer's desire for counterfeit luxury brands hinges on the social motivations (i.e. to express themselves and to fit-in) underlying their brand preferences. The more a person believes that a commodity is a means of self-representation and status, the more is he likely not to buy a counterfeit. The TRA indicates that an individual's perception of social norms establishes if he/she should engage in a specific behavior. Consumers who assume that there is monetary risk involved, those who belong to higher income strata, and those who fear being penalized perceive counterfeits as substandard products. Value-conscious consumers are more likely to purchase counterfeits as it will give them the same value-for-money as the real one. The higher the ideology and integrity quotient in a person, the lesser will he be prone to buy a counterfeit. Consequently, ethics have a negative effect on attitude and behavioral intention towards counterfeits.

a) *Qualitative Assessment of Survey Responses*

A survey was conducted among 100 respondents split between the US and Indian markets. 54 respondents were residents of the USA and belonged to the age group of 25-63 years. Forty six

respondents reside in India and belong to the age group of 23-62 years. The respondents were asked to rank the 6 factors (X 's) on a scale of 1 to 6, and asked several objective questions that were framed to derive a relationship between the intent to purchase counterfeit (Y) and the 6 X 's. From the survey rankings and responses, the following information was derived:

- Many consumers buy branded products not because they are brand loyal but, because branded products signify genuine 'quality'.
- Those who are status conscious are less likely to buy counterfeits.
- Older people (avg. age > 45) feel less guilty while buying counterfeits. In other words, older people are less brand-conscious.
- Most people are price conscious rather than being brand-conscious.
- Everyone wants value for the money they spend.
- 36% of the respondents said that they would consider buying a counterfeit if the price of the fake product is lower by >40% when compared to the original product price.
- Specific to the Indian markets, people do not feel guilty while buying pirated software. However, they are loyal to brands when it comes to other product categories such as apparel, electronic goods, watches and fashion accessories.
- Some consumers buy counterfeits if the original branded product is not easily available in the local market.
- People whose annual earnings are low (<\$25000 per annum) resort to counterfeits more often than others.
- Respondents who said that they were more 'brand conscious' rather than 'price conscious' were not open to buying counterfeits.
- Those who value 'Ethics' and 'Brand loyalty' do not buy counterfeits.

b) Interactions Analysis of X-Covariates

Based on the survey ranking response data, a 'main effects' study of the six factors (X 's) on the purchase intent (Y) was done using a statistical software package called, Minitab. The 'main effects' method analyses the interaction of the Y variable with the individual X 's. The six panels in Fig. 2 show the interaction of each factor with the Y variable independently. The steeper the traces of the X 's in the panels are, the stronger their impact on the ' Y ' variable. A trace that is mostly parallel to the horizontal half-line ($y=0.5$) or remains on any one side of the half-line (i.e. not intersecting it) has hardly any effect on the Y variable. The six discrete levels (0, 20, 40, 60, 80, 100) on the x-axis of Fig. 2 are the scores that we attributed

to each X based on the rankings that the respondents imparted to it- (6, 5, 4, 3, 2, 1). Figure 2 indicates that the factors 'influence of society (X_1)', 'value for money (X_4)' and 'status consciousness (X_2)' seem to have the strongest impact on the purchase intent of counterfeits or branded products, as they have the sharpest slopes and are evenly spaced across the half-line. The factors 'perception towards fake products (X_3)', 'ethics (X_5)' and 'loyalty to brand (X_6)' do not seem to have a strong statistical effect on the Y variable as the their traces are (i) parallel to the half-line in some portions implying a weak correlation with the Y variable, (ii) clustering on any one side of the zero line in some portions, and (iii) saw-toothing near the zero line in some portions yielding a mild slope for the overall trace. The positive slopes of the traces for X_1 and X_4 imply that these two factors influence the Y variable positively. In other words, an increasing 'societal influence or desire to belonging to an elite society and owning luxury goods' or an increasing sense of getting 'value for money (price consciousness)' will strengthen the consumer's intent to buy a counterfeit product. The negative slope of X_2 implies that the 'status consciousness' factor impacts the Y variable negatively. The more status conscious a person is, the less likely he/she is to buy a counterfeit. Also, if the person has ranked 'status consciousness' as one of the top 4 factors that he/she considers while deciding whether to purchase a counterfeit or not, he/she is not likely to buy a fake product as the trace lies below the half-line for $x \geq 40$ (see encircled part in second panel of Fig.2). Similar conclusions could be drawn for the other X 's as well. For example, if a person has ranked 'societal influence' as one of the top two factors that drive him/her while shopping, he/she is certain to buy a counterfeit product (see encircled part in first panel of Fig.2). The traces of X_5 and X_6 , on the other hand, remain mostly below the half-line and indicate that people who value 'ethics' and are 'brand loyal' are less likely to buy counterfeits. The gradual slope of the trace for 'perception towards counterfeits (X_3)' and the fact that it mostly remains below the half-line indicate that this factor does not influence a consumer's decision to buy counterfeit appreciably.

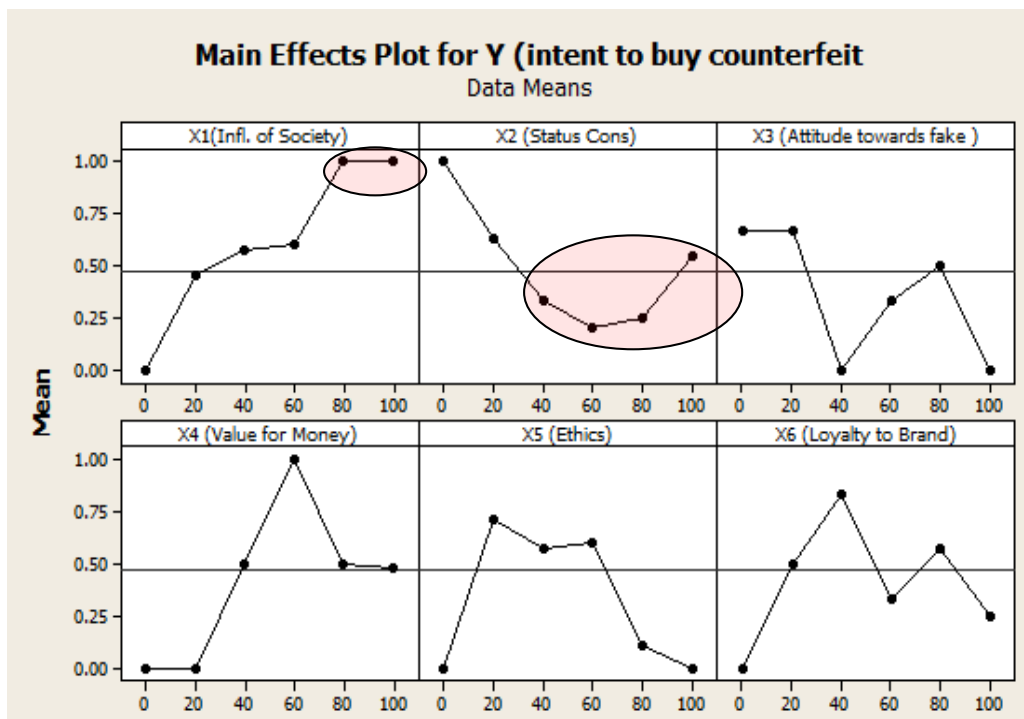


Fig. 2 : Effect of Xs on the purchase intent of counterfeits (Y)

c) Trends observed in the Survey Responses

The raw responses to the survey questions are presented in Figs. 3(a)-3(f) and in Fig.4. In the survey, 38% of the respondents said that they are led to buying branded products under the influence of society and media (see Fig.3a). This is a sizeable fraction implying that 'Social Motivation (X_1)' could be one of the factors that appreciably impacts the intent to buy a counterfeit (Y). The trace in the first panel of Fig.2 corroborates this fact.

48% of the respondents (see Fig. 3c) said that they would be keen to consider buying counterfeits- 'Perception (X_3)'. Typically based on this large fraction, one would assume that X_3 should have a strong impact on the intent to buy counterfeits (Y). However, please note that there existed an equivalent fraction of respondents (52%) who were not open to buying counterfeits. Since, adequate separation does not exist between the 'Yes' and 'No' responses in Fig. 3c, X_3 does not impact the consumer's decision to buy a counterfeit in any one direction and therefore, X_3 does not influence Y significantly. In other words, if we find the 'Yes' and 'No' histogram bars in any figure to be of approximately similar height, then that parameter (X) will not have a strong influence on the Y. Furthermore, the 'Yes' histogram bar has to be taller than the 'No' counterpart in order to have an appreciable impact on the Y variable. By that logic, we could conclude that 'Perception towards counterfeits (X_3)', 'Ethics (X_5)' and 'Brand Loyalty (X_6)' do not have a determining influence on the intent to purchasing a fake product (Y) as shown in Figs. 3c, 3e and 3f.

Among the duo of 'Social motivation (X_1)' and 'Status consciousness (X_2)', it is difficult to decide which one has a greater impact on the Y variable as both show similar trends and magnitudes in Figs. 3a and 3b. However, when comparing the slopes of the traces in the first two panels of Fig. 2, it is easy to identify that X_1 has a greater effect on the Y variable than X_2 . Therefore, for data analysis purposes, the influence of X_2 on the Y variable has been neglected.

A whopping 84% of the respondents said that they were 'price conscious' and not 'brand conscious' (see Fig. 3d) implying that they want value for their spent money (X_4). Those who said that they were 'brand conscious' were not inclined to buying counterfeits. Some of the 'price conscious' people, on the other hand, were open to buying counterfeits while, some were not. In either case, X_4 has a dominant influence on the intent to purchase a fake product (Y) as is also shown in Fig. 2.

68% of the respondents have said that they were not brand loyal (Fig. 3f). This implies that 'brand loyalty' does not play a major role in influencing a consumer's decision to buy a counterfeit product.

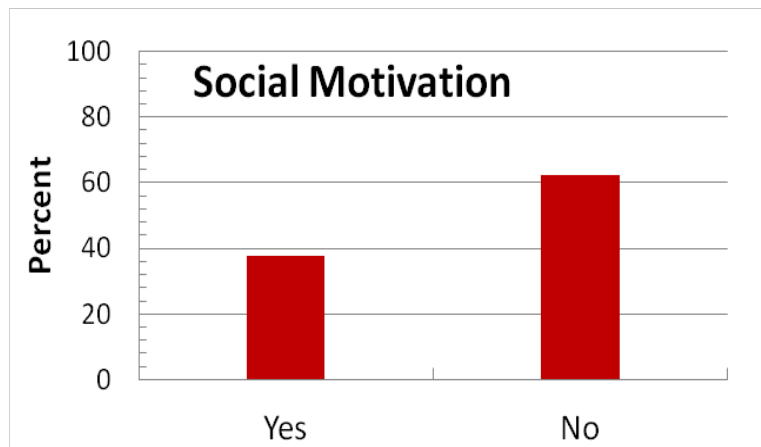


Fig. 3a : 38% of the respondents buy branded products because of societal influence

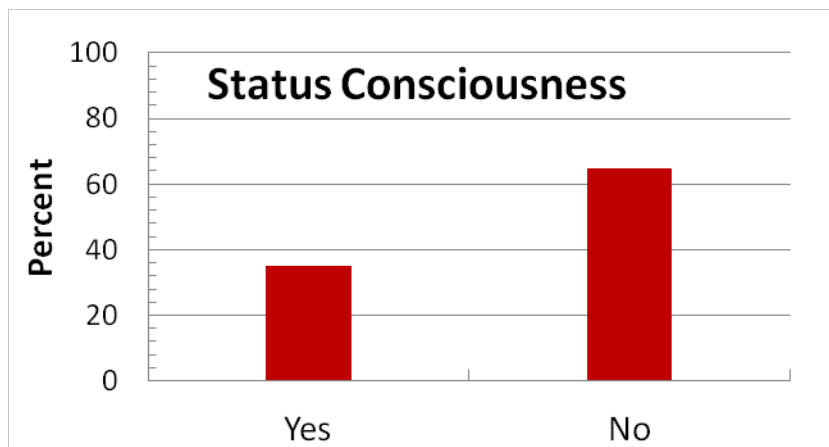


Fig. 3b : Only 35% of the respondents said that the branded products define their public image (i.e. status consciousness)

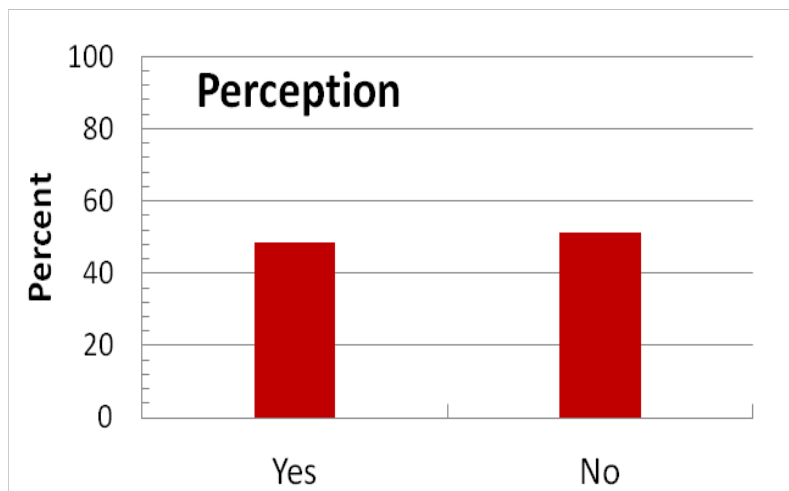


Fig. 3c : 48% of the respondents said that they are open to buying counterfeits- 'Perception'

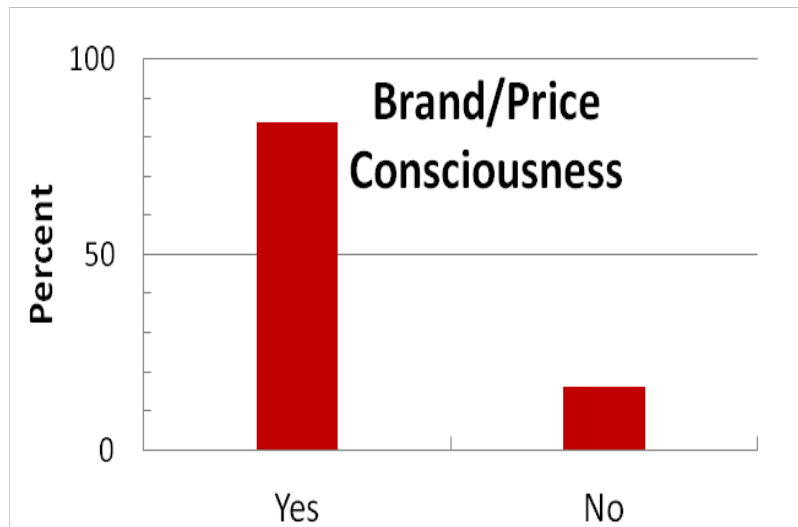


Fig. 3d : 84% of the respondents said that they were price conscious (i.e. Value for money)

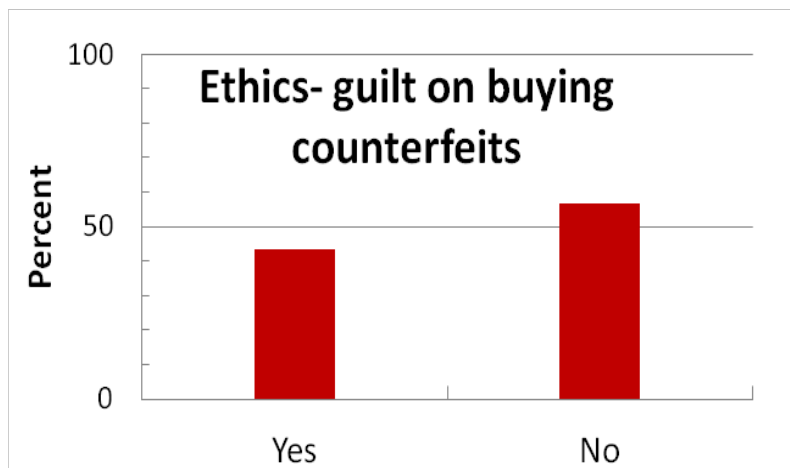


Fig. 3e : 43% of the respondents said that they feel guilty upon buying a counterfeit

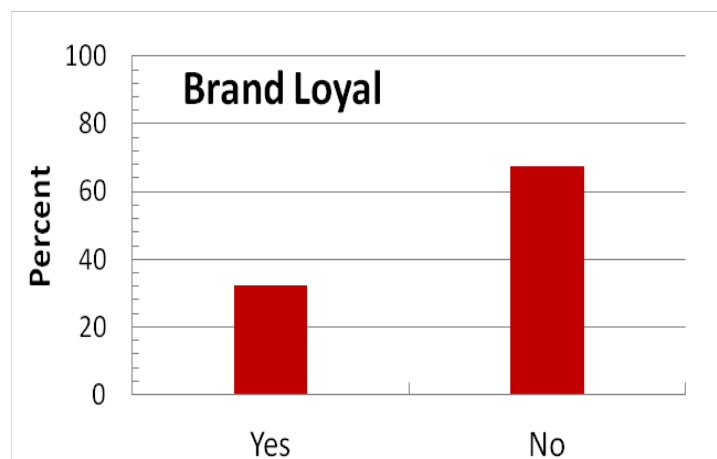


Fig. 3f : Only 32% of the respondents said that they were brand loyal

Figure 4 shows histograms of the raw survey data for all the 6 independent factors (X's). The survey responses were also classified according to the geographical location of the respondents. The green-

colored bars in Fig.4 represent voices from the Indian market while, the red-colored bars represent voices from the American market. The blue-colored bars represent the gross or combined voices of both markets. The

x-axis of the plot represents net scores obtained by the six factors (X 's) based on the rankings attributed to them by the respondents. The following facts can be derived from this plot:

- 'Value for money' is a clear winner and strongly influences the consumer's intent to buy a branded/counterfeit product. Those who want good returns on their invested money and are price-conscious typically tend to buy counterfeits. Respondents from India were more price-conscious than those from USA implying that there is greater

likelihood that consumers will buy counterfeits in India than in the USA.

- The above fact is corroborated by the difference in heights of the green and red bars corresponding to the 'Attitude towards fake products' category. A much greater fraction of Indian voices, when comparing to American market voices, said that they were open to purchasing counterfeits if the price of the counterfeit product was significantly lower ($>40\%$) than the original branded product.

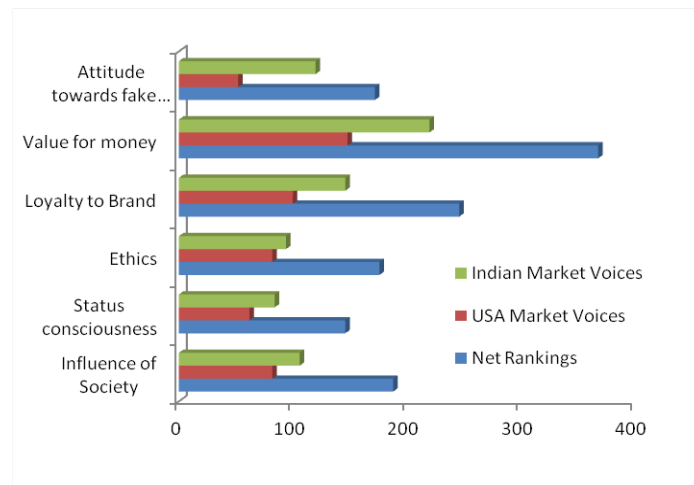


Fig. 4 : Gross rankings of the six factors by the respondents. A batch-to-batch variation between the USA and Indian markets has also been shown

d) *Chi-Square Regression Analysis to identify the two most-impactful X 's*

A Chi-square regression test was performed, using Minitab, in parallel to identify which of the 6 factors (X 's) have a strong influence on the Y variable. A Chi-square is a statistical test commonly used to compare observed data with data we would expect to obtain according to a specific hypothesis. In other words, the test is any statistical hypothesis test in which the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true, or any in which this is *asymptotically* true, meaning that the sampling distribution (if the null hypothesis is true) can be made to approximate a chi-squared distribution as closely as desired by making the sample size large enough. In other words, chi-square is a non-normal

distribution and a sum of squared normal variables. A typical χ^2 random variable with ' n ' degrees of freedom is defined as follows:

$$f(x) = \frac{x^{\frac{n}{2}-1} e^{-\frac{x}{2}}}{2^{\frac{n}{2}} \Gamma(\frac{n}{2})}, \quad x > 0, n > 0 \quad (1)$$

A chi-square distribution approaches symmetry and resembles a normal distribution only for relatively large degrees of freedom ($n \geq 30$). The null hypothesis (H_0) for chi-square states that there exists no relation between X and Y . If the p-value turns out to be less than 0.05, the hypothesis is rejected implying that there does exist a relation between X and Y . The following results were obtained from the chi-square 'goodness of fit' test for the Y variable versus the individual X 's:

Table 1 : Minitab results for Chi-Square 'goodness of fit' for the survey ranking data

Influencing Factor	p-value	Chi-Sq	Deg. of Freedom
Influence of Society (X_1)	0.022	13.16	5
Status consciousness (X_2)	0.151	8.1	5
Attitude towards fake products (X_3)	0.004	17.26	5
Value for money (X_4)	0	82.6	5
Ethics (X_5)	0.003	18.21	5
Loyalty to Brand (X_6)	0.21	7.16	5

It can be seen that the p-value was less than 5% for X_1 , X_3 , X_4 and X_5 implying that the null hypothesis is not true for these factors and there 'does' exist a relationship between Y and these X 's. However, based on results of the 'main effects' plot, we found that the influence of X_3 and X_5 on Y is weak when compared to the influence of X_1 and X_4 . Therefore, if we had to identify two primary X 's that impact Y the most for simplification sake, they would be X_1 and X_4 and we would leave out X_3 and X_5 .

e) *Mathematical expression to predict consumer's intent to buy counterfeits using (X_1 , X_4) rankings*

Finally, we have attempted to model the consumer attitude towards counterfeits (Y) using the importance/ranking that the consumer attributes to the influencing factors (X 's) in his/her mind. In this modeling endeavor of predicting the probability ($p(Y)$) that a consumer would purchase a counterfeit or not, we have used the survey response data- $p(Y)$ and only the two primary X 's that impact the consumer behavior most strongly, viz. X_1 and X_4 , as identified in the discussion above. In summary, our pursuit was for a mathematical function that correlates $p(Y)$, X_1 and X_4 as described in Eqn. (2) below.

$$p(Y) = f(X_1, X_4) \quad (2)$$

A 'binary logistic regression analysis' is typically employed in cases where the output (Y) is a discrete variable and the inputs (X 's) are continuous or discrete with 2 or more levels. The null hypothesis for the analysis was that there existed no relationship between the X 's and Y . The binary logistic regression tries to fit the probability of Y 's occurrence based on Eq. (1) where, β_i are empirically fitted constants.

$$p(Y) = \frac{1}{1 + \exp(\beta_0 + \beta_1 \cdot X_1 + \beta_2 \cdot X_4)} \quad (3)$$

The two primary X 's that influence the Y variable, as deciphered through the 'Main Effects' plot and the Chi-square analyses were identified as the 'Value for Money' and 'Influence of Society'. The intention to buy a

counterfeit was determined from the responses to the survey. The objective of this model was to propose an empirical correlation that predicts if a consumer would buy a counterfeit or not based on the rank (on a scale of 1 to 100) that the consumer assigns to 'Price consciousness' and 'Societal influence/motivation'. The values for $p(Y)$, X_1 and X_4 were derived from the survey responses. The logistic regression analysis then determined the most appropriate values of the constants β_0 , β_1 and β_2 that minimized the error between the (i) survey response values of $p(Y)$ and (ii) model-fitted values of $p(Y)$ according to Eqn. (3).

The logistic regression fit on the survey responses, performed using Minitab, yielded the following values for the constants β_0 , β_1 and β_2 : -2.614, 0.044 and 0.0106 respectively. The results of the analysis are shown below in Fig. 5. Note that the p-value of 0.007 from the analysis is less than 0.05 implying that the null hypothesis of no relation existing between the Y and (X_1 , X_4) should be rejected. Instead, the p-value suggests that there 'does exist' a relation between the Y and X 's. The model match to the survey data of $p(Y)$ is shown in Fig.6a. On a first glance, there does not seem to be a good match between the 'hollow diamonds' (actual survey response data for $p(Y)$) and the red dots (regression model results for $p(Y)$ using the above-mentioned values of β_i). However, upon rounding off the model-predicted values for $p(Y)$ according to Eqn. (4), the model results matched to the survey data very well as shown in Fig. 6b.

The empirically fitted constants, β_i , were also obtained via another route using the global optimization toolbox of Matlab. The 'Optimtool' command on the command prompt pulls up the optimizer toolbox in Matlab. The unconstrained 'fminsearch' function was used to fit the β_i constants to Eqn.(3). The matlab optimizer yielded the following values for β_0 , β_1 and β_2 : 42.45, -2.493 and 0.831 respectively. The model results fitted very well to the survey data as shown in Fig.7. One could use either set of β_i 's, determined using Minitab or Matlab, and Eqn.(3) to predict the consumer's intent to buy a counterfeit.

Logistic Regression Table

Predictor	Coef	SE Coef	Z	P	Odds Ratio	95% CI	
Constant	-2.61462	1.49850	-1.74	0.081			
X1(Infl. of Society)	0.0440633	0.0162914	2.70	0.007	1.05	1.01	1.08
X4 (Value for Money)	0.0106426	0.0150440	0.71	0.479	1.01	0.98	1.04

Log-Likelihood = -21.267

Test that all slopes are zero: G = 10.040, DF = 2, P-Value = 0.007

Fig. 5 : Minitab results of the binary logistic regression fit. Note that 'degrees of freedom' =2 and p-value < 5%

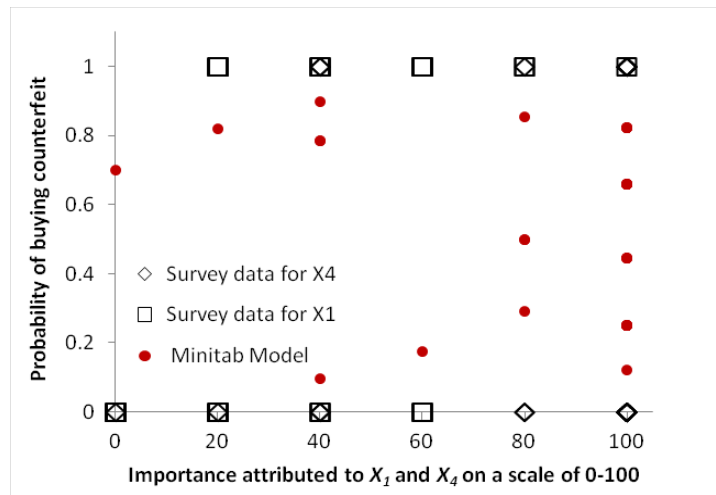


Fig. 6a : Minitab results of the logistic regression fit. On a first glance, there does not seem to be an exact match

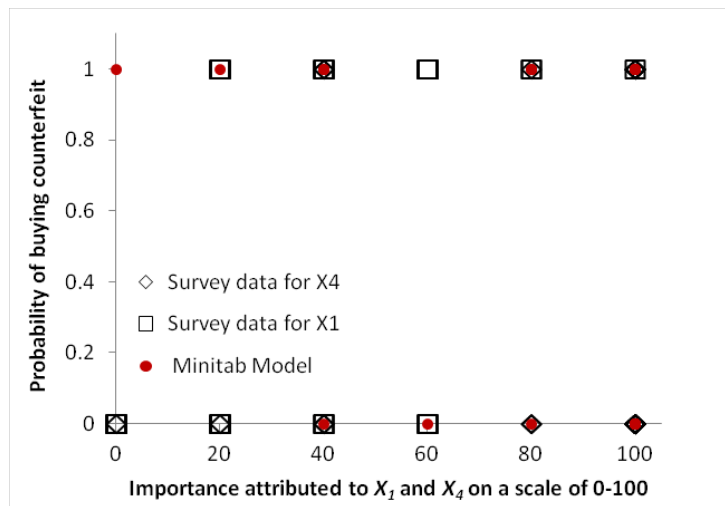


Fig. 6b : Minitab results of the logistic regression fit after rounding off the model-predicted $p(Y)$

$$p(Y) = \begin{cases} 1, & \text{if } p(Y) \geq 0.5 \\ 0, & \text{if } p(Y) < 0.5 \end{cases} \quad (4)$$



Fig. 7 : Empirical fit results of the same logistic regression using the Matlab global optimizer toolbox

V. SUMMARY AND CONCLUSIONS

Six factors that define a consumer's intention to purchase counterfeits have been discussed, based on the TRA, in the present work.

- a) A survey was conducted among consumers to determine which of the six factors predominantly motivate people to buy counterfeits.
- b) Many consumers said that they buy branded products not because they are brand loyal but, because branded products signify genuine 'quality'.
- c) The survey respondents were evenly distributed between the Indian and American markets. Based on the results we had, it was found that respondents from India were more price-conscious and more open to purchasing counterfeits.
- d) The 'influence of society (X_1)' and 'Value for money (X_4)' were identified as the two primary factors that influence a consumer's decision to buy counterfeits.
- e) A logistic regression modeling approach has been used to develop a mathematical correlation that predicts the probability of a consumer buying a counterfeit or not based on the rank he/she assigns to X_1 and X_4 on a scale of 1 to 100.

This investigation contributes to existing literature by studying the impact of each of the six important factors on consumer behavior which has been tested through a survey. The theory of reasoned action, which is a well-established model, has been used as a skeleton/framework to analyze the consumer's behavioral intention towards counterfeit products. The study attempts to throw insight into the significant indicators of consumer attitude towards fake products. Brand preferences and purchase of duplicate products vary from market-to-market based on economic status and availability of counterfeits. Hence, popular products such as mobile phones, apparel and computers should be investigated that are widely used in all walks of life and strata of society in such endeavors.

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