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# The Probability of Predicting E-Customer's Buying Pattern Based on Personality Type

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**ABSTRACT:** Traditional questionnaires, Customer Relationship Management (CRM), neuroscience, data mining, web mining and web usage mining all came to help marketers to discover the reason WHY customers purchase a product. It has been a controversial marketing topic over the past decades. From buying face-to-face in a retail store to online shopping in Amazon, different fields of science have been involved in this area. Not only marketers have been utilizing marketing and business management science, but also computer science and human computer interaction have been used to predict and analyze the customer's behaviour in order to maximize the purchase. In this paper, psychological aspect of customer's behaviour was introduced that has not been considered in previous research.

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**KEYWORDS:** Marketing, Psychology, Personality Type, Data Mining, Web Mining, Web usage Mining, Computer Science, Human Computer Interaction

## I. INTRODUCTION

Marketing managers have been scrutinizing different techniques to forecast costumer's buying pattern. In this paper, we discuss two of them, traditional and modern techniques.

Questionnaires and analysing costumer's cart can be named as some traditional methods for marketers. Additionally, in the modern era, the necessity of technology is inevitable. We think both traditional and modern marketing techniques can be applied on their relevant business. In other words, it depends on the purpose of the marketers to choose which technique adapts which purpose. For example, distance, frequency, price and product are the main questions in traditional studies. These questions help marketers to guess the customer's behaviour. If we apply a traditional technique on a retail store, the study of customer behaviour usually deals with (I) identification of customers and (II) their buying behaviour patterns. The aim of such studies is to ascertain who buys, where, what, when and how. The buying behaviour of the customers is influenced by the needs and preferences of the consumers for whom the products are purchased. Therefore, practically, every person who enters a store is a potential purchaser and represents a unit in the store's customer traffic (APPLEBAUM).

On the other hand, when it comes to modern businesses, shopping online via computer or mobile (M-shopping), makes the buying process completely different. In most cases the products are the same as the traditional ones but there are some major differences in the way that costumers see, decide, purchase and pay for the product. Moreover, the number of costumers is one of the most important factors in e-business. In the digital market, attracting sufficient online traffic in a business to customer web site is vital to an online business's success (Kwan, Fong, & Wong). Traditional predicting approaches are no longer applicable for e-business situations as the use of the Internet is rapidly spreading as an information gateway all around the world. Furthermore, customer's buying patterns are not constant and are changing along certain periods. Consequently, not only marketing managers have to deal with customer's buying patterns but also need to deal with costumers changing patterns. With the advanced information technologies, firms are now able to collect and store mountains of data describing myriad offerings and diverse customer profiles, from which they seek to derive information about their customer's needs and wants (Jiang & Yu, 2008). Obviously, this rich information can assist marketers to extract buying patterns in e-businesses.

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There are different fields of research to predict costumer's behaviour, such as Neuroscience, Human Computer Interaction (HCI) and mining techniques. The outputs of those techniques are sent to recommendation systems that incorporate data mining techniques to provide recommendations using knowledge learned from the actions and attributes of users. Recommendation systems could be developed to recommend interesting links to products, which could be interesting to users (Tiwari, Richariya, Razdan, & Tomar, 2011).

When it comes to selling a product in face-to-face business, at least there are some minor possibilities for the seller to predict customer's personality type and recommend a proper product. For example, it would be possible for the salesperson to anticipate if the customer is introvert or extrovert. Meanwhile, taking any presumption of online customers is absolutely impossible. In this paper, we discuss the psychological view of customer behaviour to compensate the lack of unpredictability of online customer personality.

Many publications have worked on customer's emotions and feelings. Koufaris (2002) examines how emotional and cognitive responses to visit a Web-based store for the first time can influence revisit intention. The quality of an e-commerce site depends on interrelated factors such as site architecture, network capacity, Web services, and the unpredictability of e-customer behaviour (Kwan, Fong, & Wong).

The other study showed that customer-purchases are mainly based on the cyberspace appearance such as pictures, images, quality information, and video clips of the product, not on the actual experience. Shopping at an online store is like shopping through a paper catalogue ( (Park & Kim, 2003).

Although Irna Azzadina et al. (Azzadina, Nurul Huda, & Morgana Sianipar, 2012) has considered customer's personality type in fashion distribution store in non-online market. The lack of prediction and recommendation based on costumer's personality type in online world is tangible. In this paper, we are about to speak the psychological aspect of customer's behaviour that help marketers to offer a better option.

## II. MARKETING

One of the purposes of marketing is extending the sale to its utmost level. Hence, marketers have been trying to reach this point by predicting customer's needs and wants. For this purpose, analysing customer's way of buying is important. To clarify, the pattern a potential customer uses to purchase any products can help firms and companies for further shopping.

In addition, each customer has a unique pattern of buying and gathering all customers' purchase information to analyse their activities to reach this pattern would be valuable. Collecting customer's information seemed to have been available, but still how to analyse these data effectively is of interest to marketers and researchers (Jiang & Yu, 2008). Similar to any other marketing, increasing income by predicting customer's needs is also online marketing target. Meeting this objective requires knowledge of how e-customer's movements change from awareness of products to the exploration of options and further to purchase commitment (Kwan, Fong, & Wong).

What people do and what they do not, from daily activities to buying behaviour, is exactly related to their characteristics. Each customer's purchase behaviour pattern can indicate the personality of that particular costumer. By knowing the people's personality, their lifestyle patterns can be explained; behaviours and consumption choices can be predicted. Furthermore, Barkhi and Wallace (2007) stated that customer's personality type is one of the factors that influenced the process of decision making. The result showed that customer's personality profile relates to assessment of marketing and it impacts the purchasing decisions (Azzadina, Nurul Huda, & Morgana Sianipar, 2012).

Marketers are actually trying to satisfy the customer's exact needs by persuading them to buy their offering and would like to maintain in contact after purchasing products at the expense of the customer's privacy. Customers experience a heightened sense of engagement when they process information that fits their requirements (Vashishtaa & Balaji, 2012). Records of what was sold, when it was sold, and at what price it was sold in a store or group of stores are a generalized history of customer's buying behaviour pattern. The more complete and accurate the records are as well as covering sufficient period of time, the more valuable the data could be (APPLEBAUM).

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Moreover, the emergence of scientific techniques like neuroimaging technologies enables marketers to assess the underlying consciousness of the customers. The challenge, however, is to hit the right buy button of the brain to deliver what the customer exactly requires. The functioning of the human brain has been the central focus of psychology and neuroscience researchers (Vashishtaa & Balaji, 2012).

## III. COMPUTER SCIENCE AND HUMAN SCIENCE INTERACTION

The nascence of e-commerce would change everything in business about customer management and marketing. Researchers recently have investigated the human aspect of computing, with attempts to explore the meaning and effects of computer interface design and its interactive use. The technologies that support knowledge management in e-business are data warehousing, data mining, the Internet, and document management systems (Kwan, Fong, & Wong). So, using data mining tools has become more demandable.

The term 'data mining' is used to describe the process of analysing a company's internal data for customer profiling and targeting. In e- commerce application, the end goal of data mining is to improve processes that contribute to deliver value to the end customer (Jiang & Yu, 2008). Mining is an umbrella term which includes disparate areas of study. In this paper, in order to present how different areas try to predict customer behaviour pattern, we are going to briefly review Data Mining (DM), Web Mining (WB) and Web Usage Mining (WUM).

### 3-1: Data mining

The term "data mining" refers to a broad spectrum of mathematical modelling techniques and software tools that are used to find patterns in databases to build models (Tiwari, Richariya, Razdan, & Tomar, 2011).

Data mining techniques have been adopted to predict customer behaviour, as well as searching through a database without any specific pre-determined hypothesis to obtain implicit, previously unknown, and potentially useful information from very large databases. Data mining brings various techniques together to discover patterns to construct models from databases. Data mining is a stage in Knowledge Discovery in Databases (KDD), involving the application of (Chen, Chiu, & Chang, 2005). The various mechanisms of data mining are abstractions, aggregations, summarizations, and characterizations of data (Jiang & Yu, 2008).

Database marketing is an approach to generate integrated and accessible customer information to help marketers target their customers (Hsieh & Chu, 2009)

As a result, the gathered information can be ascertained to support better decision-making in marketing (Chen, Chiu, & Chang, 2005) Thus, data mining is very useful in market segmentation, customer profiling, risk analysis, and other applications (Hsieh & Chu, 2009).

### 3-2: Web Mining

Web mining is the application of data mining technology, which is to extract appealing and potentially useful patterns and hidden information from web documents and web activities correlated to the WWW (Yadav, Feeroz, & Yadav, 2012) (Tiwari, Richariya, Razdan, & Tomar, 2011) In the context of web mining, clustering could be used to cluster similar click-streams to determine customer's behaviours (Jiang & Yu, 2008). In e-commerce, the current challenge is to determine how to design responsive Web site Infrastructure that provides a sustainable competitive advantage through a better understanding of target customers (Kwan, Fong, & Wong)

### 3-3: Web Usage Mining

Web usage mining has become very critical for effective web site management, creating adaptive web sites, business and support services, personalization and network traffic flow analysis (Tiwari, Richariya, Razdan, & Tomar, 2011).
Web usage mining attempts to discover buying patterns from the secondary data obtained from the interactions of the users with the web. (Tiwari, Richariya, Razdan, & Tomar, 2011)It is the application of data mining techniques to use logs of large web data repositories in order to produce the results that can be used. Usage analysis includes straightforward statistics, such as page access frequency, as well as more sophisticated forms of analysis, such as

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finding the common traversal paths through a web site (Cooley, Mobasher, & Srivastava, 1999). It is important to articulate the possible routes that e-customers can travel on a Web site when designing an Internet marketing plan (Kwan, Fong, & Wong). Graph mining is an example of this analysis that is a technique used to extract characteristic patterns from a variety of graph structured data (Yada, Motoda, Washio, & Miyawaki, 2004) that can assist researchers to navigate those traversal paths in order to predict next probable customer's behaviour. Using a graph makes it possible to express in extreme detail purchasing information concerning the composition of products as to when and where multiple products were purchased at one time (Yadav, Feeroz, & Yadav, 2012).

## IV. PSYCHOLOGY

The analysis of human behaviour enables the understanding of on-line experiences: from the initial entry to the homepage and the exploration of related Web pages to the final decision to submit or abandon a shopping cart. For instance, when an e-customer spends much time looking at item descriptions, a preference for the item is indicated. When a customer leaves a page instantly, a lack of preference for the item is indicated (Kwan, Fong, & Wong).

Over 78% of e-commerce research has been focused on applications, implementation and technical issues, and only 9% has touched the topic of e-customers, with very few studies directly addressing the issue of e-customer preferences and their effects on Web site acceptability (Kwan, Fong, & Wong).

Now the question is, how the importance of characteristics and personality types can be denied in a relationship between the business and customers, and just rely on mining the activities of a user in a web site that many things can interfere the users decision-making?

It is not sufficient to study buying behaviour a pattern without knowing what personality type is involved.

All people have an innate preference that determines their behaviour in all situations (Azzadina, Nurul Huda, & Morgana Sianipar, 2012). We believe that the shopping process and decision making can be considered as one of those situations. Each customer has unique buying habits (APPLEBAUM) and each has unique personality type too. Buying behaviour patterns represent the design of behaviour of a large number of customers (APPLEBAUM). We believe that customers in the same personality type group have the same buying behaviour pattern.
Knowing the customer's personality type, allows to thoroughly understanding who the customers are. By understanding the customer's personality type one can follow the customer preferences and make proper suggestions based on the customer personality group type.
In e-business, the duty of recommender systems, as one of the best-known examples of web mining, is to discover association rules, or item-to-item correlations. The purpose of association rule mining is to dig for rational relationships between items by finding items frequently appeared together in the transaction database. If item B appeared frequently when item A appeared, then an association rule is denoted as A→B (if A, then B) (Tiwari, Richariya, Razdan, & Tomar, 2011).

In this paper, we anticipate applying psychological aspect of buying pattern on recommender systems can be practicable. If after a same personality type, for example "m", the same buying pattern, for example "n", appeared frequently, thus it is expected that predicting buying pattern "n" based on personality type "m" is probable.

## V. CONCLUSIONS AND FUTURE RESEARCH

Different customers provide different personality types. Moreover, different personality types provide different buying patterns. In this paper, we presented a hypothesis that customer's personality type might influence buying behaviour and the probability that customer's characteristics can also justify the buying behaviour. If marketers know their customer's personality type, thus marketers are able to understand customers buying pattern as well. Therefore, a successful trade would be possible.

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Based on what is presented in this paper, this work can be extended by recognizing people's personality type and categorizing them into finite groups. Making a connection between customer's personality type and their buying behaviour would be the next goal for research.

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