

# Chapter 47

## Using DEMATEL–Based ANP Model to Measure the Successful Factors of E–Commerce

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### ABSTRACT

*Factors affecting online businesses are complicated and intertwined. To stimulate online sales, understanding of key influential factors and causal relationships among the factors is important. This paper introduces a hybrid method, called the DANP method, to expose the driving factors that most influence the online businesses. A hierarchy of fourteen criteria in six dimensions is formed to denote the influence levels and weights of factors. The causal graph shows that “Uncertainty” dimension has the highest degree of direct impact on other dimensions; thus, strong efforts should be made to eliminate the influence of this dimension throughout the online shopping process. In addition, the results also show “perceived price” to be the greatest important criterion among all; thus, it should be treated with top priority to boost the online businesses.*

### INTRODUCTION

Online shopping provides many advantages over traditional retails, it has become one of the most effective shopping transaction methods in the era of Internet today. According to Forrester Research, the number of online shoppers in the USA is predicted with a compound annual growth rate of 15%, from 167 million people in 2012 to 192 million people in 2016, and each consumer spending will grow by 44%, from \$1207 in 2012 to \$1738 in 2016. In the UK, the online sales are projected at a compound annual

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growth rate of 11%, from 30.1 billion in 2011 to 51.0 billion in 2016, and the proportion of online shoppers will increase from 75% of the population in 2011 to 85% in 2016. China, especially, is the biggest market and accounts for 80% of Asia Pacific online retail sales. All available reports seem to indicate that the e-business is booming, and the online shopping is taking root as a part of our everyday lives.

Most studies concerning online shopping focused on understanding of the consumer's purchase behaviors via the Internet (Akhter, 2012; Chiou & Ting, 2011; Chiu, Tzeng, & Li, 2013; Kim, Xu, & Gupta, 2012). One recent study identified the key factors leading to a success of e-business, many others explored the influences on online shoppers' evaluations regarding repurchase from an e-store (Kim, Galliers, Shin, Ryoo, & Kim, 2012), customer satisfaction and intentions linked to complaints (Hong & Kim, 2012; Wu, 2012), and website quality (Chiou, Lin, & Perng, 2011; Cebi, 2013). In addition, the technique of multiple regression was commonly used to show the effects of interaction between online shopping motivation and product type (Chiou & Ting, 2011); whereas the structural equation modeling (SEM) approach was also frequently used to test the hypothetical relations between independent and dependent variables (Hong & Kim, 2012; Kim, Galliers, Shin, Ryoo, & Kim, 2012; Wu, 2012). These studies have made important contributions to the understanding of dynamics of e-businesses; however, in real life, the available information used for evaluating online shopping process is usually uncertain, intertwined and complex. Most of previous studies might have ignored the intertwined interactions, interdependence, feedback and different weights among the criteria.

To overcome the above-mentioned problems and to further expose the driving factors that most influence the e-business activities, this paper attempts to propose a hybrid method, called Decision Making Trial and Evaluation Laboratory (DEMATEL)-based Analytic Network Process (ANP) method, or DANP method. The rationale of this hybrid method is to combine the DEMATEL method with the ANP method, in which the DEMATEL can model influential relationships among various factors, and the ANP can resolve problems related to interdependence and feedback among factors (Liu, Tzeng, & Lee, 2012). Thus, the proposed DANP method can explore the most important criteria to help understand online shopper's needs, expectations, and concerns. As such, the Internet vendors can judge what should be improved with top priority, and this knowledge will certainly benefit to their e-businesses and achieve competitive advantages.

The remainder of this paper is organized as follows. A literature review on online shoppers' perceived benefits and perceived risks is undertaken. The brevity of DEMATEL and ANP is highlighted and the proposed DANP method is presented. An example is demonstrated to implement the DANP procedures. The results and business implications are discussed. Finally, conclusions and directions for future research are addressed.

## **LITERATURE REVIEW**

Nowadays, the Internet serves a convenient shopping medium that can offer such benefits as saving time and effort, less transportation and search costs, improved shopping enjoyment, precise price comparison, convenient information acquiring, and subsequent ability to search more frequently and intensely for ordinary buyers (Chiou & Ting, 2011; Fred & Thatcher 2010; Kim, Xu & Gupta, 2012; Lee, Huang & Lee, 2011; Rozenn & Thierry, 2013). Most of these factors have positive effects on online shopping intention and behavior. In practice, however, there are many barriers to the adoption of online shopping. A number of studies have pointed out that the negative factors in the purchase process can be basically

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