

**INTERACTIVE WEB-BASED SHOPPING SYSTEM FOR
THE HYPERMARKETS IN SAUDI ARABIA**

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Universiti Utara Malaysia

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**INTERACTIVE WEB-BASED SHOPPING SYSTEM FOR
THE HYPERMARKETS IN SAUDI ARABIA**

**A thesis submitted to college Arts & Sciences in partial
Fulfillment of the requirement for the degree master
(Information Technology)**

University Utara Malaysia

By

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ABSTRACT

Interactive web-based shopping services give the flexibility and the easy to access anytime and anywhere without need to waste the time for the hypermarkets that located in Saudi Arabia. However, Saudi Arabia contain a large number of these hypermarkets, the sell process for these hypermarkets not friendly to attractive the buyer and not appropriate to support them about merchandise information. For that the study proposed to design an Interactive Web-based Shopping System for the hypermarkets in Saudi Arabia that makes it easy and flexible for the customers to make their shopping by online services, otherwise the proposed Web-based shopping system provides the customers with the facility to check the merchandise price and view them via the system.

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LIST OF ABBREVIATIONS

B2B	Business-to-Business
B2C	Business-to-Consumer
IWSS	Interactive Web-based Shopping System
EC	Electronic Commerce
C2B	Consumer-to-Business
C2C	Consumer -to- Consumer
EDI	Electronic Data Interchange
MMO	Massively Multiplayer Online
KACST	King Abdul Aziz City for Science and Technology
STITC	Saudi Telecommunications and Information Technology Commission
SNIC	Saudi Network Information Center
DNS	Domain Name Space
ISP	Internet Serves Provider
MICT	Ministry of Communications and Information Technology
FICCI	Federation of Indian Chambers of Commerce and Industry
ATM	Automatic Teller Machine
SAMA	Saudi Arabian Monetary Authority
SPAN	Saudi Payments Network
EFT	Electronic Funds Transfer
POS	Point of Sale
SARIE	Saudi Arabia Riyal Interbank Expresses
UPU	Universal Postal Union
GPS	Global Positioning System
AVS	Address Verification System
IP-VPN	Internet Protocol Virtual Private Network

STC	Saudi Telecommunication Company
PDA	Personal Digital Assistant
TAM	Technology Acceptance Model
UML	Unified Modeling Language

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Web-based applications are becoming so popular in our daily life in the sense that it would not pass a day without we use them. These applications range from simple to more complex ones, where millions of dollars in revenue are generated. Developing, testing and quality assuring these applications become a challenging task (Abdesselam, 2002). The technology available for implementing machine interactivity in online shopping environments has the potential to provide consumers with unparalleled opportunities to locate and compare product offerings (Haubl & Trifts, 2000).

With the rapid expansion of e-commerce, more and more products are sold on the Web; more and more people are also buying products online. In order to enhance customer satisfaction and shopping experience, it has become a common practice for online merchants to enable their customers to review or to express opinions on the products that they have purchased. With more and more common users becoming comfortable with the Web, an increasing number of people are writing reviews. As a result, the number of reviews that a product receives grows rapidly.

The contents of
the thesis is for
internal user
only

REFERENCES

Abdesselam, R. (2002). Guidelines for Improving the Development of Web-Based Applications Proceedings of the Fourth International Workshop on Web Site Evolution (WSE'02) IEEE page 93-94.

Ahn, T., Ryu, S. and Han, I. (2004). The Impact of the Online and Offline Features on the User Acceptance of Internet Shopping Mall. *Electronic Commerce Research*, 405-420.

Alfuraih, S. I. (2008). E-commerce and E-commerce Fraud in Saudi Arabia: A Case Study. International Conference on Information Security and Assurance. IEEE DOI 10.1109/ISA.45.

Alriyadh Newspaper, 2008. Project links the traditional post with new post. Retrieved on 17 April 2009. From (<http://www.alriyadh.com/2008/03/09/article324289.html>).

Athanassopoulos, A., Gounaris, S. and Stephanopoulos, V. (2001). Behavioral Responses to Customer Satisfaction: an Empirical Study. *European Journal of Marketing*.

Benetti, I., Beneventano,D.,Bergamaschi,S., Corni,A., Guerra,F., and G. Malvezzi. (2001). Si-designer: a tool for intelligent integration of information. International Conference on System Sciences (HICSS2001). Retrieved on 5 March 2009. From (<http://dictionary.zdnet.com/definition/e-commerce.html>).

Bohle, K., (2002). Integration of Electronic Payment Systems into B2C Internet Commerce. Background Paper No. 8. Electronic Payment Systems Observatory (ePSO). European Communities. Retrieved on 18 Mar 2009. From (<http://www.jrc.es>).

Brody, P., Misra, S. and Rao, H. (2001). On risk, Convenience, and Internet Shopping Behavior, *Communications of the ACM*, vol. 43, no. 11, pp.98-105, 20001.

Crowston, J. and Rayport, J. (1997). The Coming Battle for Customer Information. *Harvard Business Review*, 75, 1, 53-65.

Choi, S., Stahl, D.O., and Whinston, A.B. (1997). The Economics of Electronic Commerce. Indianapolis. Retrieved no 28 March 2009. From (<http://scholar.google.com/scholar?q=Meanwhile,+ecommerce+can+be+defined+as+a+subset+of+e-businessandhl=enandum=1andie=UTF-8andoi=scholart>).

CIA (2008). World Factbook. Retrieved no 8 April 2009. From (<http://www.airninja.com/worldfacts/countries/SaudiArabia/population.htm>).

CITC (2008). Communication and Information Technology Commission. Retrieved no 8 April 2009. From (http://www.internet.gov.sa/resources/statistics/tbdinternetuserstat/view?set_language=en).

Dennis, C., Patel, T., King, T., and Hilton, J. (2002). Qualitative Studies of Shoppers' Motivations, 9th International Conference on Recent Advances in Retailing and Services Science. Germany: EIRASS, Heidelberg.

Digitsmith (2005). Ecommerce definition and types of ecommerce. Retrieved on 1 April 2009. From (<http://www.digitsmith.com/ecommerce-definition.html>).

DZNet, (2007). E-Commerce. Retrieved no 4 April 2009. From (<http://dictionary.zdnet.com/definition/e-commerce.html>).

EC. Retrieved on Feb 2 2009. From (<http://www.american.edu/carmel/FB9122A/E-comm.htm>)

Economist Intelligence Unit (EIU) (2008). Growth of e-commerce. The Economist Intelligence Unit Ltd. Retrieved on Feb 10 2009. From (<http://www.pyr.com/documents/EIU%20Article.pdf>).

Endo, M., and Yutaka, T. (2006). A proposal of encoded computations for distributed massively multiplayer online services.

European ePayments (2002). Opportunities and threats for FSI's. Statistic retrieved from the ePaynews website at (<http://www.epaynews.com/statistics/purchases.html#29>).

Fabiyyi, Y. L. and Idowu E. O. (2009). State, Nigeria, In Poverty Alleviation and Food Security in Nigeria, p. 68-76.

FICCI, (2003). Federation of Indian Chambers of Commerce and Industry. Business potential for Indian ICT sector in Saudi Arabia

Galletta, D. F., Henry, R., McCoy, S. and Polak, P. (2004). Web Site Delays: How Tolerant Are Users. *Journal of the Association for Information Systems*, 1-28.

Gerald, L. and Spiller, L. (1998). Electronic shopping: The effect of customer in- terraces on traffic and sales. *Communications of the ACM*, 41(7), pages 81-87.

Giancarlo, L. (2000). Types of e-commerce: B2B, B2C, C2C, C2B. Retrieved on 27 March 2009. From (<http://gandalf.it/offline/off26-en.htm>).

Gpayments (2001). Smart Payment Technology. Form filling techniques designed to expedite online payment transactions. Warriewood (Australia). Retrieved on 2 March 2009. From (http://www.gpayments.com/pdfs/GPayments_Smart_Payment_Technology_Whitepaper.pdf).

Gpayments (2002). VISA 3D-Secure vs. MasterCard SPA. A comparison of online authentication standards, Warriewood (Australia).

Haubl, G., Trifts, V. (2000). Consumer Decision Making in Online Shopping Environments: The Effects of Interactive Decision Aids. Faculty of Business, University of Alberta, Edmonton, Alberta, Canada T6G 2R6. Vol. 19, No. 1, pp. 4-21

Hendry and Mike (2002). The Internet Open Trading Protocol: What is it and why is it needed? EPSO-Newsletter, Retrieved on 12 March 2009. From (<http://epso.jrc.es/newsletter>).

Hesterbrink, C. (1999). E-Commerce and ERP: Bring Two Paradigms Together, Price Waterhouse and Cooper.

Hoffman, D.L. and Novak, T. P. (1996). Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations, *Journal of Marketing*, 60, (3), 50-68.

Hui, H. J., Yen, J. and Guan, S. (2008). A Study on the Interface Usability of B2C Hypermarket E-commerce Website. Department of Information Management, Transworld Institute of Technology, Yunlin, Taiwan. IEEE Computer Society.

Junping, W. (2007). Risk Control and Estimation of Online Services Market Segmentation.1 – 5.

Jurca, A. (1999). Online Travel Planning Survey. Technical report DMT-ISR//1; Ecole Polytechnique Federale de Lausanne, Switzerland.

Kerner, S. (2006). Is PHP the Cure for the 'Broken' Web, internetnews.com. Retrieved on 10 Jan 2009. From (www.eit.in/sw/net/sss/php/php.html).

Krulwich, B. (1996). The Bargain Finder agent: Comparison price shopping on the Internet. In Agents, Bots, and other Internet Beasties, SAMS.NET publishing, pages 257-263.

Kushmerich, R., Devaraj, S. and Mahmood, A. (2004). "Understanding Determinants of Online Consumer Satisfaction: A Decision Process Perspective," Journal of Management Information Systems, 115-135.

Kwok, S., Yang, C., and Tam, K. (2004). Intellectual property protection for electronic Commerce applications. Electronic commerce research, 5(1). Retrieved on 10 Feb 2009. From (<http://www.csulb.edu/web/journals/jecr/issues/20041/Paper1.pdf>).

Labovitz, C., Abuja, A., and Jahanian, F. (1999). Experimental Study of Internet Stability and Backbone Failures, In Proceedings of the Twenty-Ninth Annual International Symposium on Fault-Tolerant Computing.

Laudon, K. C. and Laudon, J. P. (2000). Management Information Systems: Prentice Hall PTR Upper Saddle River, NJ, USA.

Lee, K. and Jae, Y. H. (2008). A Survey on Internet Payment Systems. Retrieved on Jan 26 2009. From (<http://ai.kaist.ac.kr/~jkim/cs591-2007/%B9%DF%C7%A5%C0%DA%B7%E1+%BA%B8%B0%ED%BC%AD/Report-Fox-A%20Survey%20on%20Internet%20Payment%20Systems%20%5BFINAL%20REPORT%5D.pdf>).

Neiland, E. and Christophe, B. (2004). Socio-Economic Impacts Of Different Fisheries Management Strategies At The Local Level, In Poverty and Small-Scale Fisheries in West Africa, editors: p. 171-185.

Ni, D., and Wang, J. (1999). System scaling for large-scale Internet-based online services. 180 – 185.

Nijaz, (2000), Dynamic web-based application development. New York: Prentice Hall.

MCIT, (2003). Information and telecommunication technology in Saudi Arabia. Ministry of Communications and Information Technology. Retrieved on Jan 15 2009, from (http://www.itu.int/dms_pub/itus/md/03/wsisc3/c/S03-WSISPC3-C-0025!!MSWE.doc).

Poynder, R. (1998). Online engineering information. IEEE vol. 8, Issue:6 289-294.

Price Water House Coopers (2005). Global Retail and Consumer Study from Beijing to Budapest.

Sait, S. M., Al-Tawil K. M., Ali S. and Ali H. (2002). Use and effect of internet in Saudi Arabia. Retrieved on Feb 15 2009. From <http://faculty.kfupm.edu.sa/COE/sadiq/richfiles/rich/doc/USE%20AND%20EFFECT%20OF%20INTERNET%20IN%20SAUDI%20ARABIA.doc>

Sami, I. (2006). B2C to C2C e-commerce. Retrieved on 23 Feb 2009. From ([http://www.groundswell.fi/sim/academic/\(sim\)%20From%20B2C%20to%20C2C%20e-commerce.pdf](http://www.groundswell.fi/sim/academic/(sim)%20From%20B2C%20to%20C2C%20e-commerce.pdf)).

Saudi Post, 2008. Retrieved on Feb 5 2009. From (<http://www.sp.gov.sa>).

Schmitt, S. (2006). Engaging a Rich Web Experience. Greenwich: Manning Publications Co.

Shih, H. (2004). An Empirical Study on Predicting User Acceptance of E-Shopping on the Web. Information and Management, 41, 351-368.

UPU (2007). Universal Postal Union. E-shopping for everyone everywhere, A White Paper Retrieved on Jan 14 2009. From (http://www.upu.int/e-commerce/en/2007-12-11_presentation-08_e-shopping_for_everyone_anywhere_en.pdf).

Vaishnavi, V. and Kuechler, B. (2006). Design research in information system. From (<http://www.Isworld.Org/Researchdesign/Drisisworld.htm>).

Whitten, J. L., Bentley, L. D., and Dittman, K. C. (2001). System Analysis and Design Methods (5th Ed.) Mc-Graw Hill: Boston.

Wiki, (2009). Wikipedia, retrieved on Jan 19 2009. From (<http://en.wikipedia.org/wiki/Hypermarket>).

Wisdoms and Todd (2006). An Empirical Study on Predicting User Acceptance of E-Shopping on the Web. *Information and Management*, 41, 351-368.

Wunnava, S. (1995). Advances in Internet and interconnectivity of networks, retrieved on Jan 11 (2009). From (<http://ieeexplore.ieee.org/Xplore/login.jsp?url=/iel3/3891/11317/00513046.pdf?temp=x>).

Yuan, K. (2002). The Coming Battle for Customer Information. *Harvard Business Review*, 75, 1, 53-65.