

UNIVERSITY OF SOUTHERN QUEENSLAND



**THE ADOPTION OF BUSINESS-TO-BUSINESS SYSTEMS BY
SMALL AND MEDIUM ENTERPRISES IN AMMAN
AND THE PERCEPTIONS OF ITS INFLUENCE ON
PERFORMANCE AND EFFICIENCY**

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CERTIFICATION OF DISSERTATION

I certify that the ideas, experimental work, results, analyses, software and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award, except where otherwise acknowledged.

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Date

DEDICATION

To my dear wife, Ola

Who continues to learn, grow and develop and who has been a source of encouragement and inspiration to me throughout my study, a very special thank you for providing a 'writing space' and for encouraging me through the years of writing. And also for the numerous of ways in which, throughout my study, you have actively supported me in my determination to find and realise my potential and to make this contribution to our world.

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To my lovely daughters; Saba and Hala.

To my brothers and sisters,
Meran, Mohammad, Marwa, Isra, Rawia and Malek.

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ABSTRACT

The aim of this research is to identify the factors that encourage or limit the adoption of Business to Business (B2B) systems in Small-to-Medium Enterprises (SMEs) in the city of Amman, Jordan. The current research referenced in this paper assessed and verified the performance of SMEs as related to improvements in performance and efficiency, as measured by influential factors that related to the B2B system adoption in SMEs in Amman. Within the current research emerged the importance for the adoption of B2B systems for SMEs in Amman for enhancing their performance and efficiency, so that they may become much more useful, effective and productive. The current research was conducted with both qualitative and quantitative approaches to explore both the process of adoption and implementation of B2B systems in SMEs in Amman, and the perceptions of the effect of these changes as measured in terms of performance and efficiency. Within the research, a questionnaire was used as a method of producing quantitative descriptions of some aspects and issues of the study population. The questionnaire focused on the adoption of B2B systems in SMEs in both industrial and services sectors in Amman and the perceptions of SME managers in terms of how their application resulted in changes in of performance and efficiency improvements.

The questionnaire was pre-tested for its validity and reliability, and quantitative statistical of methods such as factor analysis, t-test, analysis of variance and correlations, were employed on the interview and questionnaire itself. In all, 500 SMEs from the AHI (2008) were contacted to participate in this questionnaire, of which 368 SMEs

completed it. This equates to an overall 73.6 percent response rate ($368/500 = 73.6\%$). After screening the data, responses were analysed using Confirmatory Factor Analysis (CFA) and Structural Equation modeling (SEM). The results of factor analysis represented the construct validity of the questionnaire in this research. There were ten factors and 75 items examined by factor analysis in this research. All the factors and items deployed were found to have satisfactory alpha values that were higher than 0.70 percent established for exploratory research. Hence, based on the findings of these tests, it was concluded that the items and factors in this research met the various criteria for evaluating and demonstrating satisfactory social and business studies. As all factors were loaded above 0.50 percent on the factors that they were used to measure, the relationships among factors (First and Second-Order factors) to test the convergent validity through a perfect simple structure and all Eigenvalues are greater than 1.0, thus, it was evident that a simple structure existed in this model. The SEM analysis supports the proposition that the adoption of the B2B systems by enterprises reflects the internal and external organisational factors sufficiently to represent them as a single construct in structural models.

This research has five general findings about the perceptions of SME managers in Amman regarding the adoption of B2B systems and its effects on SMEs' performance and efficiency improvements. The first finding was that B2B systems have a strong positive correlation with SME's performance and efficiency, which suggests that the SMEs' performance and efficiency improved as the extent of the B2B system adoption increased. The second finding was that the internal and external organisational factors' influence on B2B system adoption should be assessed and understood before the

improvement in SMEs' performance and efficiency could be fully realised. The third finding was that the effect of B2B system adoption was fully mediated by improvement in the SMEs' performance and efficiency. The fourth finding was that the four performance factors: namely productivity, sales, profitability and costs; and the three efficiency factors - namely operation efficiency and inventory management and control and Procurement Business Process (PBP), were the most important contributors and measures of the SMEs' performance and efficiency in Amman. The last finding was that a new continuous scale can measure the factors of B2B system adoption, and SME's performance and efficiency improvements.

The effects of B2B system adoption in SMEs in Amman are fully mediated by SME efficiency improvement. Productivity, costs, PBP and operation efficiency were more affected by B2B system adoption than other factors due to their structured characteristics. This finding is supported in the management literature, which suggests that there are improvement inter-dependencies among SMEs' performance and efficiency outcomes where an improvement in one area leads to improvement in others. The fully mediated relationships between B2B system adoption, SMEs' performance and efficiency improvements concluded that changes in productivity, cost reductions and sales processes were the drivers for improved performance. At the same time, it was concluded that changes in PBP and operation efficiency were the drivers for improved SMEs' efficiency. While the adoption of the B2B system enables improvements in business processes that are otherwise difficult to achieve, such as automation of administrative functions and the global transactions of electronic documents, the evidence in this thesis concluded that SME performance and efficiency improvements

were not improved without changes in the business process that initiate, receive and use the information. For example, while the sharing of valuable information is much easier using IT, it could theoretically occur through a variety of media including fax and digital or paper documents. However, these information media are more costly to operate and transfer than most IT applications such as B2B systems and may suggest why some information was not shared between Trading Partners (TPs) prior to B2B systems.

This research demonstrates that measuring the internal and external organisational factors provided a more parsimonious model with higher statistical power. This means that both internal and external organisational factors that influence B2B system adoption are necessary for explaining the level of variance in SMEs' performance and efficiency as demonstrated in this research. The findings also suggest that the methodological results and contributions derived from measuring the influence of the B2B system adoption on SME performance and efficiency in Amman on a continuous scale appears to capture dimensions of the technology not previously measured in the services and industrial sectors in Amman. Specifically, it measures varying degrees of the B2B system adoption rather than simple presence, i.e. either the technology exists or not. It also explores various dimensions of the activities forming the B2B systems internal and external organisational factors that have not been collectively measured in a single study. This involves measuring SMEs' strategic, SME managers' perceptions, readiness and external pressure by TPs and internally on a continuous scale. This research found that automating the PBP allows timely and accurate estimation of the material needs of the SMEs in Amman. Activities of PBP include placing and confirming order to and from TPs online, as well as checking of order status. As

discussed earlier, these activities can be performed online through TPs' websites and/or through e-mail. In addition, SMEs' and TPs' activities involve the collection and processing of information about potential TPs. This research contributed the following conclusions to the literature and SME managers in Amman:

1. The B2B system adoption in SMEs in Amman has had a positive influence on SMEs' performance and efficiency improvement.
2. The external organisational factors such as readiness and external pressure by TPs were most important factors influencing the adoption of B2B systems.
3. Some of the factors in SMEs' performance improvement, such as productivity and costs, appear to be factors that are more affected by B2B system adoption than other factors.
4. The evidence suggests that some of the factors in SMEs' efficiency improvement, such as PBP and operating efficiency, appear to be more factors that are affected more by B2B system adoption than other factors.
5. The findings suggest that the effect of B2B system adoption on profitability is indirect, mediated by other factors such as productivity, costs and sales.
6. The three control variables: enterprise size, B2B systems' use duration and economic sector in this research have had neutral effects on B2B system adoption in SMEs in Amman.
7. B2B system adoption can remove many of the competitive advantages of larger enterprises in Amman and provide opportunities for SMEs.

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GLOSSARY OF ABBREVIATIONS

| | |
|-------|--|
| ABS | Australian Bureau of Statistics |
| ADSL | Asynchronous Digital Subscriber Line |
| AHI | Amman Handbook Index |
| AIC | Amman Industry Chamber |
| ANOVA | Analysis of Variance |
| B2B | Business-to-Business |
| B2C | Business-to-Consumer |
| C2C | Consumer-to-Consumer |
| CFA | Confirmatory Factor Analysis |
| COC | Chamber of Commerce |
| CT | Contracting Theory |
| DOI | Diffusion of Innovation |
| DOS | Department of Statistics – Jordan |
| DSD | Direct Store Delivery |
| EC | Electronic Commerce |
| EDI | Electronic Data Interchange |
| EFA | Exploratory Factor Analysis |
| EG | Electronic Government |
| EIDF | Export and Imports Development Foundations |
| EJADA | European Jordanian Action for the Development of Enterprises |
| EM | Electronic Marketplace |
| ERP | Enterprise Resource Planning |
| ES | Electronic Signature |
| ETD | Exports and Trade Developments |

| | |
|-------|---|
| EU | European Union |
| G2B | Government-to-Business |
| G2C | Government-to-Customer (Citizen) |
| GDP | Gross Domestic Products |
| I-EDI | Internet Electronic Data Interchange |
| ICT | Information and Communication Technology |
| INTJ | Information Technology Association in Jordan |
| IOS | Inter-Organizational Systems |
| IP | Internet Provider |
| IS | Information Systems |
| ISP | Internet Service Provider |
| IT | Information Technology |
| I-VAN | Internet Value Added Network |
| JCC | Jordanian Chamber of Commerce |
| JCS | Jordan Computer Society |
| JETL | Jordan Electronic Transactions Law |
| JT | Jordan Telecom |
| JTC | Jordan Telecommunication Company |
| MIT | Ministry of Industry and Trade – Jordan |
| ML | Maximum Likelihood |
| MOICT | Ministry of Information and Communication Technologies |
| NAFES | National Fund for Enterprise Support |
| NIC | National Information Center – Jordan |
| OTE | Organizational, Technological and Environmental Context |
| PBP | Procurement Business Process |
| RA | Relative Advantage |
| RSS | Royal Scientific Society – Jordan |
| SBA | Small Business Administration |
| SBS | Small Business Service |
| SCM | Supply Chain Management |
| SEM | Structural Equation Model |
| SMEs | Small Medium Enterprises |
| TAM | Technology Acceptance Model |
| TCP | Transmission Control Protocol |
| TCT | Transaction Cost Theory |
| TP | Trading Partner |

| | |
|----------|---|
| TPB | Theory of Planned Behavior |
| TRA | Theory of Reasoned Action |
| TRC | Telecommunication Regularity Commission – Jordan |
| UNCITRAL | United Nations Commission and International Trade Law |
| UNIDO | United Nations Industrial Development Organization |
| USAID | United States Agency for International Development |
| VAN | Value Added Network |
| VCT | Value Chain Theory |
| VPS | Virtual Private Server |

PUBLICATIONS

1- Publications from this Research

1. Al-Bakri, A., Cater-Steel, A., & Soar, J. (2010). The Influence of B2B e-Commerce on SME's Performance and Efficiency: A review of the Literature. *International Journal of Liability and Scientific Enquiry (IJLSE)*, vol. 3 no. 3, pp. 213-224.
2. Al-Bakri, A., & Kisswani, N. (2010). Ethics and E-Commerce Systems: Cybercrime and the Need for Information Sharing Security, paper presented at the *International Arab Conference of e-Technology (IACe-T'2010)* 30 - 31 March 2010 Arab Open University – Kuwait www.aou.edu.jo

2- Other Publications

1. Kisswani, N., and Al-Bakri, A. (2010). Regulating the Use of Electronic Signatures Given the Changing Face of Contracts. *Macquarie Journal of Business Law (MqJBL)*, vol. 7, pp 53 – 65.
2. Kisswani, N., and Al-Bakri, A. (2010). Application of Electronic Signature in Business and Its Influence on Electronic Commerce Implementation. *International Journal of Liability and Scientific Enquiry (IJLSE)*, vol. 3, no. 4, pp. 282-290.
3. Kisswani, N., and Al-Bakri, A. (2010). Security, Ethics and Electronic Commerce (EC) Systems; Cybercrime and the Need for Information Sharing Security. *International Journal of Liability and Scientific Enquiry (IJLSE)*, vol. 3, no. 3, pp. 225 -237.

4. Al-Bakri, A. (2010). *I-EDI Adoption by Jordanian SMEs: Drivers, Benefits and Barriers of I-EDI Adoption by SMEs in Jordan*. ISBN: 978-3-639-22666-9. VDM Verlag Dr.Muller Aktiengesellschaft & Co. KG. Germany.