E-Marketplace: A Generic Electronic Catalogue Framework for SMEs

Yin Leng Tan & Linda A Macaulay

School of Informatics, University of Manchester, PO Box 88, Sackville Street, Manchester M60 1QD, yin.tan@manchester.ac.uk

ABSTRACT

Statistics show that over 95% of businesses in the UK are small and medium-sized enterprises (SMEs), whilst in Europe, over 90% of SMEs are micro enterprises, employing fewer than 10 persons [6]. The Internet and World Wide Web have been with us for over a decade, and electronic business is neither a new topic nor a new concept. However, studies reveal that the SME take-up rates of Internet Communication Technologies (ICT) and e-business are still very low. The purpose of this study is therefore to propose an e-business framework and additionally, to design a generic e-catalogue framework that would enable a sizable number of small businesses (heterogeneous in nature) to participate in e-business. The structure of this e-catalogue contains five levels - domain, resource, catalogue, product category and product, and it is designed to support both commercial (B2B) and domestic (B2C) markets.

INTRODUCTION

This paper is structured as follows:

- looks at the background of this study and the barriers to SME e-business take-up.
- outlines the project aims.
- discusses the research methods used in this study.
- presents the e-business framework from a conceptual viewpoint.
- gives an overview of the generic e-catalogue framework and data design.
- draws current outcomes and outlines future plans.

BACKGROUND

According to the Department of Trade and Industry's Small Business Service SME statistics [15], there were an estimated 4.3 million business enterprises in the UK at the beginning of 2004, and nearly all of these enterprises (99.3%) were small (0-49 employees). SMEs altogether accounted for more than half of the UK employment (58.5%) and have an estimated 51.3% annual turnover in the UK. The latest market research survey commissioned by Ofcom [12] reveals that 68% of UK SMEs are now connected to the Internet. However, a number of studies [5, 19 and 20] show that SME take-up rates on ICT and e-business are still very low. Lack of the necessary ICT skills and e-business strategy, high costs of investment, unawareness of the potential of ICT to enhance their business operations, and issues of security and privacy are considered the main barriers to SME e-adoption [4, 5, 19, 20 and 22]. However, there are three other fundamental issues that Dixon et al. [4] have highlighted: (1) the heterogeneous nature of SMEs, so a single solution is unlikely to be applicable to all SMEs, (2) the lack of research on the real impact of ICT on SMEs, and (3) the role of property and infrastructure in the ICT-SME relationship. Of these, points (1) and (2) are the two main issues addressed in this study.

PROJECT AIMS

The aims of this study are (1) to propose a conceptual e-business framework that would enable a substantial number of SMEs to take part in e-business, (2) to design a generic e-catalogue framework to support and evaluate this e-business framework. The frameworks proposed could then be utilised or deployed by other parties to assist SMEs in e-business adoption. In this study, we use the 6000 SMEs in Tameside and the Tameside Business Portal[1] as a case study.

RESEARCH METHODS

The e-business framework proposed is based on findings from the following sources: current literature in this domain, the analysis of industry sectors, company sizes, IT survey and needs of the Tameside SMEs, and review of the Tameside Business portal. The literature review topics cover e-businesses, e-marketplaces and Web portals. Issues of SMEs and e-business have also been investigated. In this, the IBM stages and states of e-business [18] and the DTI e-business adoption states [11] have been adopted as models as they highlight the transformational aspects of e-business technology. To further evaluate the proposed e-business framework, and to provide the motivation for the practical work, a generic e-catalogue framework for SMEs to participate in the e-marketplace is being developed. The design of the e-catalogue framework is carried out based upon review of a number of Tameside SME websites, as well as findings from the current literature in this area. Microsoft® SQL Server and XML technology are being utilised, and the UNSPSC® [21] (United Nations Standard Products and Services Code) classification schema is also being adopted in this practical work.

THE E-BUSINESS FRAMEWORK

The e-business framework proposed is illustrated as Figure 1; it is designed to meet the following criteria: (1) to support a substantial number of SMEs (2) to support SMEs that are heterogeneous in nature (3) to support both B2B and B2C markets. As shown in Figure 1, the e-business framework comprises an e-catalogue (C), e-auction (Z), B2C (X) and B2B (Y) applications. The framework utilises both the Web portal and e-marketplace models [2, 13 and 16]. The intersection of elements X, Y, and Z ($X \cap Y \cap Z$) is the e-catalogue C. This catalogue is the core of the e-business framework and the accomplishment of the framework's objectives depends upon its underlying architecture and data design. Intersections of Y and $X \to Y \cap X$, intersection of Y and $Z \to Y \cap Z$, and intersection of X and $Z \to X \cap Z$ are the shared/common business activities. These might include for example, the business documents, and order processes that the two e-business solutions have in common. It can thus be proposed that the conceptual view of SME e-business framework is sme_eF:

$$sme_eF = P_{portal} \cup E_{e\text{-}marketplaces} \{X, Y, Z\}, \text{ and in which}$$
$$C_{catalogue} = X \cap Y \cap Z$$

In [2, 3, 8, 13, 14, 16 and 17], e-marketplace models and structure have been presented. The structure of the e-marketplace can be grouped into four typical dimensions; industry focus, ownership structure, type of product, and type of transaction (see Figure 1). Based on the findings,

*Figure 1. Conceptual view of the SME e-business Framework*
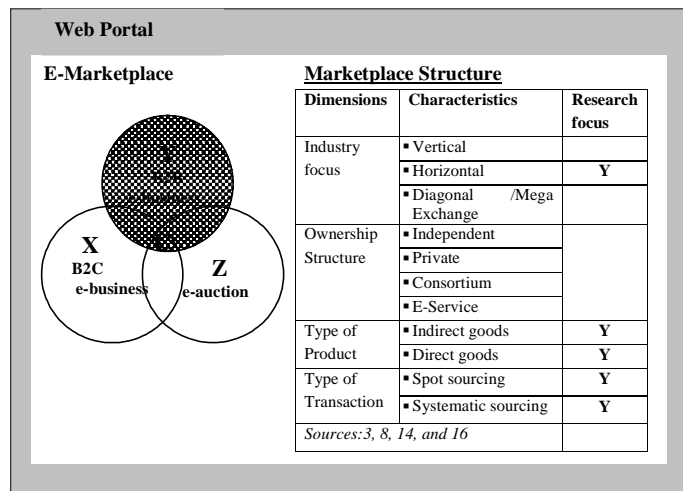
horizontal markets that enable spot and systematic sourcing of both indirect goods (operating inputs) and direct goods (manufacturing inputs) that do not have complicated product attributes are main focus of this study.

THE E-CATALOGUE FRAMEWORK AND DATA DESIGN

To realise the study objectives, the framework of the generic e-catalogue (as shown in Figure 2) is proposed. This is accomplished based upon the analysis of a number of SME websites, and findings from the current literature [1, 7, 9, 10 and 23]. The proposed e-catalogue framework can be set out into a number of levels:

- *Domain-level.* The domain-level holds the information concerning the domain that a particular business belongs to (e.g. Home and Garden, Sport and Equipment).
- Resource-level. The resource-level contains the firm's virtual store information such as store contact information.
- *Catalogue-level.* To support different e-business solutions and to enable diversified SMEs to engage in a multi-vendors catalogue

Figure 2. The generic e-catalogue framework
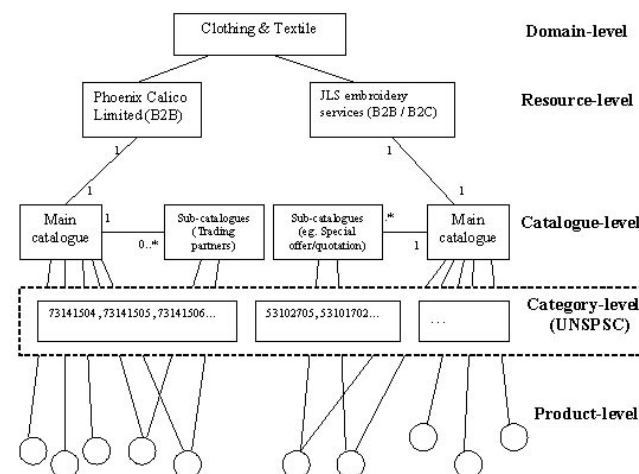
environment, the catalogue-level is introduced. Each SME can have a maximum of one virtual store. Each store has one main catalogue, and under the main catalogue, one can have zero to many (0 - *) sub-catalogues. For B2C firms, a sub-catalogue can be their special offers or a winter sale catalogue, whilst for B2B firms, a sub-catalogue could be a catalogue or product quotation (eg. pre-trade business activities) for a specific buyer. Each SME maintains its own collection of catalogues. The catalogue-level contains catalogue information such as catalogue name, status and valid date.

- *Product Category-level.* Products that have common features will be grouped within the same product category, and not limited to one category. UNSPSC version 7.0901 is being adopted at this level.
- *Product-level.* The product-level stores detailed information of a specific item. It includes common product information that applies to all items such as item name and description, and product attributes that belong to the same product family such as size and colours.

OUTCOMES AND FUTURE PLANS

The data design of the e-catalogue is complete and the testing and evaluation phase is in-progress. Initially, this study will sample around 50 SMEs from different business sectors, and each with 5-10 product items. To assist the task, XML technology and Microsoft® SQL Server are being utilised. To date, 6 SMEs' websites have already been sampled. The results so far show that (1) the proposed frameworks are able to meet the three criteria established in section 5, (2) the classifying of product items according to the UNSPSC schema could be a challenging and laborious task which may require field expertise and familiarity of the product field, (3) revision of the data design at the catalogue's product-level, particularly product attributes that belong to the same product family, might be needed as the testing progresses. Further cycles of testing will need to be performed, the results of which can finally be used to revise the proposed frameworks.

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ENDNOTE

[1] A European Regional Development Project – The portal (www.tamesidebusiness.co.uk) is being developed in the School of Informatics at the University of Manchester for Tameside Metropolitan Borough Council.

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