



# The Web, the Spider and the Fly: A Cautionary Tale for SMEs going online

Shirley Bode and Janice Burn

School of MIS, Edith Cowan University, Churchlands Campus, Perth, W.A., 6018, Ph: (08) 92738198, s.bode@cowan.edu.au, j.burn@cowan.edu.au

## ABSTRACT

*Electronic commerce is often considered too expensive, technologically complicated and unsuitable for the small business environment and is not seen as a core activity for most small enterprises. In spite of these inhibitors, there are a growing number of small organizations developing websites to market their products and an increasing number of enterprises conducting online transactions and selling their products directly to customers via the Internet. In Australia there are more than 1000 website design consultants having a strong impact on the Small and Medium Enterprise (SME) sector, particularly in their efforts to enter the world of online commerce. The majority of SMEs have neither the internal expertise nor financial resources to enable in-house development of electronic commerce and therefore turn to the services of website design consultants to assist them. As this appears to be a necessary strategy, given the operational and financial limitations of SMEs, the efficacy of this option is investigated in this paper. The aims of this paper are firstly, to identify the extent to which SMEs feel their individual business needs are understood by website design consultants. Secondly, to investigate whether SMEs have clear goals and strategies before engaging in electronic commerce. The paper incorporates a case study of two Western Australian online SMEs who contracted website design consultants to produce their sites. The SMEs chosen were established retail businesses and both used the services of different website design consultants. The results of the study indicated that the case SMEs did not have an understanding of the need for business planning or developing an Internet strategy. Instead, both SMEs had entered the world of online retailing in a relatively adhoc manner. It was found that neither SME felt their individual business needs were understood or met by the website design consultant. In fact, the case SMEs themselves appeared unable to articulate their own business needs in order to ensure a successful relationship with the consultants.*

## INTRODUCTION

Electronic Commerce<sup>1</sup> is not seen as a core activity for most small enterprises in Australia and it is quite often considered too expensive, technologically complicated and unsuitable for the small business environment (DIST, 1998, ISBR, 1998; Small Business Index, 1998). It appears that Australian Small and Medium Enterprises (SME)<sup>2</sup> are hesitant in their approach to electronic commerce (Centre for Electronic Commerce, 1996; DIST, 1998), unlike the United States where electronic commerce is growing at an exponential rate (Shern, 1998, USIC, 1999).

In spite of the reluctance of Australian SMEs to enter the online world, there are a growing number of small organisations developing websites to market their products and an increasing number of enterprises conducting online transactions and selling their products directly to customers via the Internet. Therefore, SMEs appear to be slowly overcoming their reluctance to enter the online world. Whilst this is considered a positive step in increasing the presence of SMEs in the online environment, most SMEs lack IS expertise (Kole, 1983, Yap et al., 1992), and turn to the services of website design consultants to assist them in developing an online presence.

In Australia there are more than 1000 website design consultants (DIST, 1998) having a strong impact on the Small and Medium Enterprise sector, particularly in their efforts to enter the world of online commerce.

The question asked by this paper is as follows: To what extent do SMEs feel their individual business needs are understood by website design consultants in order to ensure a successful venture into the world of online electronic commerce?

In an attempt to answer this question, this paper incorporates a case study of two Western Australian online SMEs who contracted website design consultants to produce their sites. The SMEs chosen were established retail businesses rather than start-ups as it was felt that established businesses would already have a general business plan or strategy. Different website design consultants were used in each case.

A review of the literature shows that an important factor in the success of online enterprises is their ability to align business processes with website strategy (Poon and Swatman, 1995 Cragg, 1998, Lawrence and Chau, 1998, Bergeron et al., 1998). Further, several important issues have been identified in the literature regarding SME use of external consultants in the management of Information Systems. These include a clear understanding of the client/consultant role and the importance of SME involve-

ment in the consultation process (Gable, 1989, Gable, 1991 Kole, 1983, Krentzman and Samaras, 1984, Yap et al., 1992)

### SMEs and the Internet

Research shows (ISBR, 1998, Small Business Index, 1998, DIST, 1998, Poon and Swatman, 1997) that most SMEs accessing the Internet tend to use it primarily for communication and information gathering with a small percentage actually using the Internet to conduct electronic transactions.

The findings of the Institute of Small Business Research (ISBR) 1998 Small Business Opinion Survey of Western Australian SMEs indicated that the majority of SMEs surveyed used the Internet for communication purposes and that electronic transactions only formed a small proportion of Internet usage (see figure 1):

The Institute of Small Business Research estimates that 18% of Western Australian online SMEs surveyed conduct electronic transactions and only 9% are capable of receiving orders via their websites. If higher proportions of SMEs are to venture into the online world, the infrastructures of existent online retailers need to be examined in order to identify successful strategies for electronic commerce. Factors examined in this paper are the decision by a SME to contract a website design consultant, and the influence of the design consultant on the SMEs Internet strategy.

### Website Design Consultants and SMEs

The majority of SMEs do not have either the internal expertise or financial resources to enable the in-house development of IS (Gable, 1989, Gable, 1991, Kole, 1983, Yap et al., 1992). Therefore, given the opera-

Figure 1 W.A. SME use of the Internet (ISBR 1998)

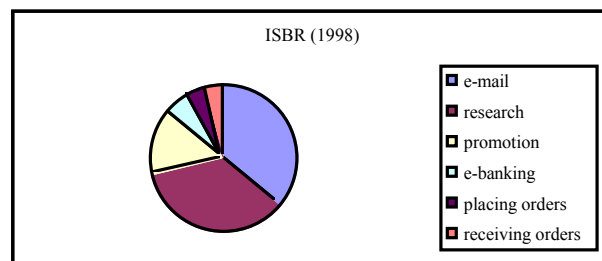


Figure 2 Gable's 12 phase model (Gable, 1989)

<ol style="list-style-type: none"> <li>1. define the problem;</li> <li>2. evaluate internal resources available for the project;</li> <li>3. canvass the market for prospective consulting firms;</li> <li>4. develop a request for proposal (RFP);</li> <li>5. check references;</li> <li>6. evaluate proposals;</li> <li>7. select a firm;</li> <li>8. negotiate the contract;</li> <li>9. announce the selection;</li> <li>10. continuing review and refinement of mutual and individual responsibilities;</li> <li>11. continuing monitoring and control of progress and</li> <li>12. post-engagement evaluation of the service.</li> </ol>
---

tional and financial limitations of SMEs, many SMEs are turning to the services of website design consultants.

Before contracting a website design consultant, SMEs need to consider their business goals, strategies, budget considerations and requirements. Gable, (1989) identified a number of issues that SMEs need to consider when engaging the services of a consultant. These included the amount of time and effort the SME contributes to the project and the maintenance of a clear understanding of the role of the SME and the role of the consultant.

Gable, (1989) developed a twelve phase model of the role of a SME in selecting a consultant (see Figure 2). For the purpose of this paper, it was decided to utilize Gable's 12-phase model of consultant engagement as a framework for analysing SME involvement in selecting a website

Table 1 adapted from Cragg's (1998) Internet strategy model

Goal	SME 1	SME 2
primary		
secondary		
Content	SME 1	SME 2
started with		
major use		
WWW site for		
future plans		

design consultant.

**Internet Strategy and SMEs**

Cragg, (1998) identifies several levels of Internet strategy that are useful for SMEs. This paper incorporates two of Cragg's strategies: the *goals* strategy, which identifies the main goals of the SME and the *content* strategy, which identifies the main uses of the website.

The above models (Gable, 1989, Cragg, 1998) were applied to the two case studies to evaluate the level of SME involvement in the selection of a website design consultant, development of an Internet Strategy and how these elements may have impacted on the success of the SME venture into Internet commerce.

**RESEARCH DESIGN**

As Internet commerce, particularly in Western Australia, is still in an emergent phase it was felt that case studies involving in-depth interviews would be most appropriate.<sup>3</sup> A review of the literature into research methodologies highlighted the usefulness of the case methodology in new and relatively new fields (Benbasat et al., 1987, Eisenhardt, 1989, Yin, 1994).

**Sample**

The case studies were chosen via a deliberate theoretical sampling plan. Initially the researcher scanned the client pages of five Western Australian website design consultants. From this, several online SMEs were identified and their websites assessed based on the following model of website activities. The model was synthesised from Internet usage surveys and interviews conducted by several researchers

Table 2 Website activity model.

Use of Site	SME One Educational products supplier	SME Two Lingerie retailer
<b>Communication</b>	email for client queries	email for client queries
<b>Promotion</b>	site promoted for local, national & international customers.	site promoted for local, national & international customers.
<b>E-transactions</b>	can order products online via email order form – products available in a variety of languages. Pre-payment is a requirement.	can order products via email order form, Prices are not included in catalogue.

(ISBR, 1998, Poon & Swatman, 1997, Small Business Index, 1998).

The SMEs were chosen based on the following criteria:

- Less than 5 employees (micro-business category);
- Retail business;
- Websites capable of electronic transactions;
- Website designed by an external consultant and
- Business located in Western Australia.

**Background Information**

SME #1 was a supplier of educational products and had been in business for four years. The website was designed and implemented by an external consultant and went "live" in November 1998. Since May 1999 the website has been developed and maintained in-house.

SME #2 was a lingerie retailer and had been in business for two years. The site was designed and implemented by an external consultant and went "live" in May 1999 (a delay of three months from the expected date due to copyright errors). The Owner/Manager intends to undertake a short course in HTML editing and then further develop and maintain the site in-house. Table 3 summarizes the background information of the two SMEs.

**Results and Analysis**

The data was analysed using a matrix as proposed by Miles and Huberman (1994). A matrix is "...the 'crossing' of two lists, set up as rows and columns." (1994, 93). The purpose of this method of analysis is to enable the data to be analysed visually and the data from both cases to be easily compared and contrasted and themes and patterns identified (1994). The data was then further analysed using Gable's 12-phase model for consultant engagement (1989) and Cragg's Internet Strategy (1998).

**Gable's 12-phase model**

Table 4 illustrates how closely the two SME case studies adhered to the guiding principals of Gable's 12-phase model for consultant engagement:

**Consultant Engagement**

Neither of the case SMEs utilized each of the steps in Gable's model (see Table 4). SME #1 completed six steps and partially completed two and SME #2 only completed four of the steps. Neither SME canvassed the market nor did they develop a request for proposal, although interestingly both SMEs stated that in hindsight they would have canvassed the market and asked for full quotations "...in hindsight I would have looked around more and found someone more capable and experienced..." (SME #1). Both SMEs relied on the recommendation of their Internet Service Pro-

Table 3 Background Information of case SMEs

SME	Founded	Staffing	Annual Turnover	Date website started
<b>SME #1 Educational products supplier</b>	1995	2 full-time 2 part-time	\$200,000	November 1998
<b>SME #2 Lingerie retailer</b>	1997	1 full-time 2 part-time	not stated	May 1999

Table 4 SMEs and Gables 12 phase model (1989)

Gable's 12-phase model	SME #1	SME #2
define the problem	→	→
evaluate internal resources available for the project	→	→
canvass the market for prospective consulting firms		
develop a request for proposal (RFP)		
check references	partially	
evaluate proposals		
select a firm	→	→
negotiate the contract	partially	
announce the selection		
continuing review and refinement of mutual and individual responsibilities	→	
continuing monitoring and control of progress	→	
post-engagement evaluation of the service	→	→

vider (ISP), trusting that the ISP would know the market and make an appropriate recommendation.

SME #1 viewed the refereed sites suggested by the consultant, but did not contact either of the sites for a verbal or a written reference. SME #2 did not consider asking for references. Again, both SMEs stated that in hindsight they would have requested either verbal or written references from the consultants' client sites.

Neither SME had a formal written contract with their consultants although SME #1 had negotiated a verbal contract in relation to pricing for the design of their site. A written contract outlining the roles of both parties, requirements for the sites, pricing, timeframes and contract variations would have been useful for both SMEs when engaging a website design consultant and this will be expanded on in the following discussion on pricing, service and consultant experience.

**Pricing and Service**

In the analysis of the data, pricing and service were recurrent themes for both case SMEs and the importance of clarifying the role of consultant and client was very clearly highlighted. In both cases, it appeared that the SMEs passively trusted the consultant to produce results at minimal cost. Gable stated that the "misconceived view of the client role" (1991) is one of the prime reasons for the breakdown of the client/consultant relationship.

Both SMEs felt that they had been overcharged and that they did not receive value for money from their website design consultants. SME #1 had discussed a budget with the consultant and was unaware that changes to the site would incur additional charges "...but that's when the money came into it and it ended up costing for every little tiny change and that's until we got the bill and said 'hey this is much more than what you said', I told him we had a really strict budget and it was just blown right out..."

SME #2 linked pricing and service provision several times throughout the interview "...if I've got to constantly be telling them what to do I think paying \$90 an hour is a bit ludicrous" and "I don't think I got value for money...basically I think they charged me an hourly rate for the work that they did, the fact that they had no ideas of their own should have been taken into account when billing me".

Interestingly, neither SME voiced their concerns with the consultants and, as can be seen from the comment of SME #2 above, assumptions regarding billing were made but not explicitly drawn to the consultant's attention to enable any potential rectification.

This lack of feedback from the client to the design consultant confirms Gable's (1991) statement. This is further highlighted in comments made by both SMEs concerning a perceived lack of follow-up service provision. SME #1 "It was me contacting him rather than him coming out at the end and going through it and saying right this is it it's final and saying are you happy? It didn't close up at all." SME #2 "I haven't heard from them since May and it's now July..if it was me, you know, a week or two later I would have phoned and said 'how's it all going'."

**Consultant Experience**

One of the client concerns identified by Gable in his analysis of consultant engagement is that consultants often appear to have minimal relevant experience. He stated that this could be overcome if selection of a consultant were guided by his 12-phase model. The two cases in this study lend support to this statement as they did not adhere strongly to the guidelines of Gable's model and very clearly felt that their consultants lacked essential experience.

For example, SME #2 believed their consultant was technically competent, but lacking in original ideas. "I don't think they have any ideas of their own. I think they are very good technically, but I don't think either artistically or marketing wise that they are particularly well clued up". SME #1 stated "We gave them our catalogue, we thought they'd come up with something wizzbang but they copied exactly what we had done. We could have done that ourselves...they gave us the basis but that was all, there wasn't any extras...we fed them the ideas."

The development and evaluation of a Request for Proposal (RFP),

Table 5 SME Internet strategy adapted from Cragg (1998)

Goal	SME #1	SME #2
<b>primary</b>	To reach an International market	To establish mail order.
<b>secondary</b>	To increase profits	To market site to potential customers
Content	SME #1	SME #2
<b>started with</b>	email, catalogue, order form, promotion	email, catalogue, order form, promotion
<b>major use</b>	promotion	marketing/promotion
<b>WWW site for</b>	product distribution	increase customer base
<b>future plans</b>	electronic shopping cart	To control site internally, to initiate ideas that will increase the profitability of the site

steps 4 and 6 in Gable's model, may have clarified for the SMEs exactly what they were seeking from a website design consultant. In conjunction with the RFP, the preparation of a firm contract (step 8) may have assisted in circumventing these problems.

**Cragg's Internet Strategy**

Table 5 indicates how both SMEs fit within the Internet strategy model adapted from Cragg (1998).

Neither of the SME's had a formal written business plan or Internet strategy as suggested by Cragg (1998). Instead, both SMEs had entered the world of online retailing in a relatively adhoc manner. Both SMEs relied on ideas, memory and hopes for the future success of their sites. SME #1 had ongoing discussions between the partners of the firm to generate ideas and future plans based on their original goals of reaching an International market and increasing overall profits. SME #2 stated that they did not have a written plan "just ideas, obviously I'd like to develop it to other things".

When interviewed, both cases SMEs could verbally identify their primary and secondary goals, but were less clear about content strategy. Both SMEs had future goals for their sites but had not formulated a structure for ensuring their ideas were captured, that plans and timeframes developed, or that future costs were identified.

SME #1 felt that they had achieved their first goal of reaching an International marketplace "We're pleased with the response we're getting from people all over the world". Although they did not feel that they had achieved the second goal of increased profits. "...the fact that we're not getting any follow up is really disheartening, at the moment I wouldn't rate it an economic success." The procedure for ordering is complex, an initial inquiry has to be sent via email, a catalogue is then posted and at this point most queries halt. One of the company's future goals is to incorporate shopping cart technology, an online catalogue and credit card ordering. SME #1 felt this improvement in the websites capabilities would increase actual orders from the site and lead to greater economic success. However, SME #1 also stated that the major use for content strategy was for promotion and they considered this an intangible measure of success.

SME #2 on the other hand felt strongly that they had not achieved their primary goal of establishing mail order, “sales off that have been minimal”. Yet their secondary goal of reaching a wider audience was seen as quite successful “we’ve had about 200 requests for catalogues off the site in two months which is pretty good, people are walking around with our catalogues.” SME #2 also stated that they had achieved the content strategy of marketing/promotion of the website. This was seen by SME #2 as an intangible measure of success and that economic success would follow once the website had been reassessed and redesigned internally.

## CONCLUSION

There are many factors affecting the success of SMEs entering the world of online commerce and this paper focused on two possible factors. Firstly, consultant engagement for web design was investigated using Gable’s 12 phase model for consultant engagement, and secondly Internet strategies were explored, specifically the *goals* strategy, which identifies the main goals of the SME, and the *content* strategy, which identifies the main uses of the website adapted from Cragg’s Internet strategy models.

Prior to consultant engagement, a SME needs to have a clear idea of their Internet goals and the strategies required for achieving those goals as suggested by Cragg (1998). However, neither of the case SMEs appeared aware of this concept. Although both cases SMEs could identify their primary, secondary and content goals verbally, both relied on ideas, memory and hopes for the future success of their online venture. Neither SME had allocated an ongoing budget for future maintenance and development of the sites nor had they clearly articulated or formalized future aims, identified time-frames or developed clear strategies for achieving any of these objectives.

The analysis of the interview data showed that Gable’s 12 phase model for consultant engagement is a worthwhile tool for evaluating SME involvement in engaging external consultants to design their website. One aspect of this model that is particularly useful is its potential for clarifying the mutual roles and obligations of the client/consultant relationship. The model could be used in order to guide negotiations and relations between the client and the website design consultant to achieve a more successful outcome.

The question asked by this paper was: To what extent do SMEs feel their individual business needs are understood by website design consultants in order to ensure a successful venture into the world of online electronic commerce.

The data from the two case studies indicates that neither case SME felt that their individual business needs were understood or met by the website design consultants. In fact, the case SMEs themselves appeared unable to articulate their own business needs. Therefore, further research in this area would be valuable in order to clarify the issue, namely are online SMEs, in general, able to define and articulate their business needs to ensure a successful relationship with website design consultants. Ongoing research for this project will include an Australia-wide cross-case analysis of SMEs and website design consultants with the following anticipated outcomes:

1. Guidelines will be developed to enhance negotiations between website design consultants and Australian SMEs to achieve a more effective outcome;
2. A set of critical development factors will be designed, in relation to Internet strategy and consultant engagement, that may be used by Australian SMEs and consultants to facilitate the implementation of the online organization

## ENDNOTES

- 1 The definitions of electronic commerce range from the very simple and straightforward concept found in the Yellow Pages Small Business Index as “the use of the Internet to buy and sell products” (1998, p.1). To the far more complex definition offered by the Monash Centre for Electronic Commerce: “as the process of conducting all forms of business activity between entities using appropriate electronic methodologies and procedures in order to achieve the organisation’s objectives” (1996, p.1).
- 2 There is no definitive model of a small or medium enterprise in Australia. The Yellow Pages Small Business Index defines a small business as having up to 19 full-time employees and a medium business as having between 20 and 200 employees, these figures do not include agri-

cultural businesses (Small Business Index, 1998). The Small Business Development Corporation (SBDC) of Western Australia definition of small business is less than 5 employees in a micro-business, less than 20 employees in the non-manufacturing sector and less than 100 employees in the manufacturing sector. For the purpose of this paper, two small enterprises were chosen for case analysis in the micro and small business category.

- 3 “Case research is best utilized when the goals of the researcher and the nature of the research topic influence the selection of a strategy. Case research is particularly appropriate for certain types of problems: those in which research and theory are at their early, formative stages”. (Benbasat et al., 1987 p360)

## REFERENCES

- Benbasat, I., Goldstein, D. K. and Mead, M. (1987) The case research strategy in studies of information systems. *MIS Quarterly*, 360-386.
- Bergeron, F., Raymond, L., Gladu, M. and Leclerc, C. (1998) The contribution of information technology to the performance of smes: alignment of critical dimensions. In: *Proceedings of the 6th European Conference on Information Systems*, Vol. I (Ed, Baets, W. R. J.) Euro-Arab Management School, France, 173-187.
- Centre for Electronic Commerce. (1996) *Advice on electronic commerce programs for small to medium-sized enterprises (smes)*. Melbourne., Monash University.
- Cragg, P. B. (1998) Clarifying internet strategy in small firms. In: *Proceedings of the 9th Australian Conference on Information System.*, Vol. I (Eds, Edmundson, B. and Wilson, D.) School of Information systems, NSW, 98-107.
- DIST (1998) *Stats. electronic commerce in Australia.* Canberra, Department of Industry, Science and Tourism.
- Eisenhardt, K. M. (1989) Building theories from case study research. *Academy of Management Review*, 14, 532-550.
- Gable, G. G. (1989) Consultant engagement for first time computerization: problems and issues. In: *Proceedings of the 3rd Pan Pacific Computer Conference*, Vol. II (Eds, Liwei, C., Bingcong, C. and Qiangnan, S.) Pergamon Press, Bled Yugoslavia, pp. 1430-1457.
- Gable, G. G. (1991) Consultant engagement for computer system selection: a pro-active client role in small businesses. *Information and Management*, 20, 83-93.
- ISBR (1998) *Small business opinion survey*. Perth, Institute for Small Business Research.
- Kole, M. A. (1983) Going outside for mis implementation. *Information and Management*, 6, 261-268.
- Krentzman, H. C. and Samaras, J. N. (1984) Can small businesses use consultants? In: D.E. Gumpert (ed) *Growing concerns in building and managing the smaller business*. New York, John Wiley. p.243-262.
- Lawrence, K. L. and Chau, S. T. (1998) Capable but inactive: the Tasmanian electronic commerce experience. In: *Proceedings of the 9th Australian Conference on Information Systems*, Vol. I (Eds, Edmundson, B. and Wilson, D.) NSW, UNSW, pp. 350-359.
- Miles, M. B. and Huberman, A.M. (1994) *Qualitative data analysis: an expanded sourcebook*, California, Sage.
- Poon, S. and Swatman, P.M.C. (1995) *The internet for small business: opportunities, implementation and government policies*. Melbourne, Centre for Information Systems Research.
- Swinburne University, Melbourne.
- Poon, S. and Swatman, P. M. C. (1997) Small business use of the internet: findings from Australian case studies. *International Marketing Review*, 14, 4/5.
- Shern, S. (1998) *Internet shopping: and ernst & young special report*. USA, Ernst & Young.
- Small Business Index. . (1998) *Small business index: a survey of e-commerce in australian small and medium businesses*. Melbourne, Yellow Pages.
- USIC (1999) *State of the internet: USICs report on use & threats in 1999*. United States Internet Council, [http://www.usic.org/usc\\_state\\_of\\_net99.htm](http://www.usic.org/usc_state_of_net99.htm). [site accessed 25/05/1999].
- Yap, C., Soh, C. and Raman, K. (1992) Information systems success factors in small business. *OMEGA: The International Journal of Management Science*, 20, 597-609.
- Yin, R. K. (1994) *Case study research design and methods*, California, Sage.

0 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/proceeding-paper/web-spider-fly/31551](http://www.igi-global.com/proceeding-paper/web-spider-fly/31551)

## Related Content

---

### Survey on Privacy Preserving Association Rule Data Mining

Geeta S. Navale and Suresh N. Mali (2017). *International Journal of Rough Sets and Data Analysis* (pp. 63-80).

[www.irma-international.org/article/survey-on-privacy-preserving-association-rule-data-mining/178163](http://www.irma-international.org/article/survey-on-privacy-preserving-association-rule-data-mining/178163)

### Health Wearables Turn to Fashion

Lambert Spaanenburg (2018). *Encyclopedia of Information Science and Technology, Fourth Edition* (pp. 6114-6123).

[www.irma-international.org/chapter/health-wearables-turn-to-fashion/184310](http://www.irma-international.org/chapter/health-wearables-turn-to-fashion/184310)

### Lessons Learnt when Holistically Approaching Project Management

Maria Alexandra Rentroia-Bonito (2015). *Encyclopedia of Information Science and Technology, Third Edition* (pp. 5104-5113).

[www.irma-international.org/chapter/lessons-learnt-when-holistically-approaching-project-management/112959](http://www.irma-international.org/chapter/lessons-learnt-when-holistically-approaching-project-management/112959)

### A Review of Advances in Supply Chain Intelligence

Nenad Stefanovic and Danijela Milosevic (2018). *Encyclopedia of Information Science and Technology, Fourth Edition* (pp. 5538-5549).

[www.irma-international.org/chapter/a-review-of-advances-in-supply-chain-intelligence/184255](http://www.irma-international.org/chapter/a-review-of-advances-in-supply-chain-intelligence/184255)

### A Study of Sub-Pattern Approach in 2D Shape Recognition Using the PCA and Ridgelet PCA

Muzameel Ahmed and V.N. Manjunath Aradhya (2016). *International Journal of Rough Sets and Data Analysis* (pp. 10-31).

[www.irma-international.org/article/a-study-of-sub-pattern-approach-in-2d-shape-recognition-using-the-pca-and-ridgelet-pca/150462](http://www.irma-international.org/article/a-study-of-sub-pattern-approach-in-2d-shape-recognition-using-the-pca-and-ridgelet-pca/150462)