

# Implications for e-Business Readiness<sup>1</sup> in the KwaZulu-Natal Chemical Industry

**Sharon Husselman**

**Sam Lubbe**

**Rembrandt Klopper**

## Abstract

This study sets out to determine whether forms of electronic communication, configured to deliver e-Business could offer solutions to challenges faced by chemical distributors in South Africa. In 2006 an empirical quantitative study was conducted on a representative sample of chemical companies in the province of KwaZulu-Natal (KZN) on the eastern seaboard of South Africa. The authors conclude that chemical companies would be more likely to support e-Business initiatives if the information that these distributors offer is convenient, reliable and dependable. They recommend informing prospective business (referred to as customers later in the paper) in the chemical distribution sector about the benefits of e-Business service offering order to the levels of e-Readiness of client companies because their levels of e-Readiness were found to impact on the perceived benefits of an online service offering.

## Introduction

As electronic commerce (e-Commerce) enters its third decade and matures as part of e-Business (Wind & Mahajan, 2002), Thayer *et al.* (2004) observe that in the chemical industry all business decisions have

---

<sup>1</sup> This is not a Supply Chain Management study but is only focusing on particular aspects of the readiness of chemical distributors.

become technology driven decisions that require holistic solutions and that focus on customer needs. In general, e-Business is associated with new ways of servicing customers, reducing costs, increasing efficiencies, expanding markets, extending customer bases and improving supply-and value-chain management. This study is therefore designed from a strategic management perspective and explores e-Business as a means for chemical distributors in South Africa to excel in the key result area of e-business readiness.

## **Problem Statement**

Several challenges face South African industrial distributors. The challenge facing them is the difficulty that they face in differentiating themselves from their competitors by explaining and demonstrating their particular value to prospective customers – whether it is through the particular variety of services that they implicitly provide to their customers, or their explicit value in the supply chain. Customers often do not perceive particular benefits provided by a specific distributor and resort to judging the merit of transactions on price alone (Value Added Partners Association, 2001). The situation is especially critical in the commodity trade where the price/cost comparison is the ruling market force (Thomson & Strikland, 2003).

South African chemical distributors are also threatened as a sector by loss of market share and margin erosion due to South Africa's globalization endeavours – the removal of import barriers and tariff reductions – that has seen the emergence of new overseas suppliers and the import of cheaper raw and performance chemicals into South Africa, especially from the Far East. This has increased competitor rivalry. In addition, globalization has also led to the demise of entire chemical-consumption sectors, such as the textile and shoe manufacturing industries, because of their perceived non-competitiveness in the global sphere.

Therefore, South African chemical distributors, reeling under the before mentioned pressures, need to find ways of increasing their value-added component and improving service offerings to customers. At the same time e-Business practices, adopted by overseas chemical distributor counterparts in the US (National Association of Chemical Distributors,

2006) and Europe (The European Association of Chemical Distributors, 2006), could be adopted to help reducing costs, increase efficiencies, expand markets, extend customer bases and improve supply-chain management (Thayer *et al.*, 2004). The adoption of e-Business practices could pose solutions for some of the problems experienced by South African chemical distributors in to alleviate the problems of lack of service differentiation, declining market share and profit margin. The guidelines at the end could be followed to help solve the problem these chemical distributors experience.

## **Background to the Study**

This section reviews literature to contextualise the question as to whether e-Business can provide a solution to the problems experienced by South African chemical distributors. Articles include academic and business accounts, accessed through the following electronic search facilities: Scholar Google (limited to *.edu* and *.PDF* articles), various electronic databases accessible via the University of KwaZulu-Natal's e-Library links, Business Source Premier Resources, Sabinet Consortium's SACat database and IS World's MIS Quarterly article database.

## **Strategic IS Planning**

External pressure encompasses market forces, which are the forces for change in an organization (Jooste & van Schoor, 2003; Ngai & Gunasekaran, 2003) and include 'industry characteristics and competitor rivalry' (Mellville, 2004). Market forces are determinants of required performance levels (selling prices, quality and service levels), and affect the way in which firms manage their business (and decisions made). More specifically and related to this study, market forces determine the way in which IT is adopted and utilized by a firm because they determine the value that can be generated and captured through IT (Melville, 2004). This in turn influences e-Business decision-making.

Rayport and Jaworsky (2001), supported by Biggs (2000), Friedman (2000), Corbitt (2002) and Dunn (2000), recommend an assessment of the financial attractiveness of the opportunity. Such an evaluation would be conducted in terms of the market potential (an indicator of

revenue generation) and profitability. The abovementioned evaluations should be conducted independently as well as in conjunction with each other to arrive at an overall impression of which initiatives to include in the e-Business strategy (Rayport & Jaworsky, 2001).

## **Value Creation through e-Business**

The Internet has unique characteristics that allow firms to create significant value (Chopra *et al.*, 2001; Rayport & Jaworsky, 2001). These unique characteristics include network effects (the economic phenomenon of the value of a product/service rising as a function of how many other users are using the product) and new functionality such as 24/7 (24 hours a day, 7 days a week) access and self service, which enhance customer service levels.

By adopting e-Business' supply chain management initiatives (IOS), suppliers are able to achieve strategic advantage such as organizational competitiveness (Ngai & Kauffman, 2003; Subramani, 2004). There are various models in IT literature, grounded in strategic management, which explain how e-Business is able to increase the adopting firm's competitiveness. Concurrently, these models can help to clarify the statements expressed by Bharadwaj (2000), Simchi-Levi and Simchi-Levi (2002) and Chopra *et al.* (2001) regarding the value that can be captured from e-Business and the disputed benefits of e-Business to suppliers.

Industry characteristics found to affect the adoption of e-Business and in support of e-Business adoption by chemical distributors, are given below:

- Teo *et al.* (2003) provide empirical evidence that industry pressure (mimetic, coercive and normative types) is a major contributor to firms adopting e-Business.
- Product category is the most important factor in determining suitability for Internet management (Huizingh, 2002).
- The chemical industry is a low growth industry (Glasgow, 2003; Preston, 2000).
- e-Commerce and vendor managed inventory are e-Business initiatives advocated as best practice for the chemical industry by SAP (SAP,2004)

- The impact of IT resources on the e-Business adoption decision is the subject of this section. Mellville (2004) defines IT resources as technological, human and organizational. Organisational IT Resources: Organizational factors such as resources and infrastructure affect the perceived importance of IT resources by the firm (Wade & Hulland, 2004). These factors also affect the performance of IT projects (Wade & Hulland, 2004) by determining the value created through the IT resources (Chopra *et al.*, 2001; Mellville, 2004).

## **Implementation**

There are two approaches to the implementation of an e-Business strategy (following risk assessment) – a ‘phased approach’ (Biggs, 2000; Friedman, 2000; Schultz, 2003; Dunn, 2000) and an ‘all or nothing’ approach (Corbitt, 2002; Rayport & Jaworsky, 2001). The advantages of the phased approach include,

- It is the more popular approach (*cited* by more authors – refer above).
- It is the method recommended from a cost management perspective (Chopra *et al.*, 2001; Biggs, 2000; Barki & Pinsonneault, 2002; Dunn, 2000; Oliva, 2002).
- Implementation efforts can be made even in a down economy (Adner & Levinthal, 2004).
- According to Jooste and van Schoor (2003), it can help overcome South Africa’s unique social and technological constraints, which have lead to a slower than average adoption of e-Commerce activities.
- It ties in with the progressive definition of e-Business given earlier.
- It is premised on the reiterative nature of strategy development (Huizing, 2002).

The phased implementation of e-Business initiatives can occur according to various models, Evolutionary models (Huizingh, 2002; Mu-

fatto & Payaro, 2002), Wave framework model (Oliva, 2002), and Value matrix (Oliva, 2002).

## **Research Questions**

Some aspects of the literature have solved part of e-Business decision relevant to chemical distributors in South Africa. However, the following still needs to be ascertained in order to develop an online strategy:

- Does e-Business govern customers' approach to Internet usage and why?
- Do customers have to be at a certain level of e-readiness to experience the impact of an online strategy?
- What critical success factors affect online transactions and which of these will impact on an e-Business strategy for chemical distributors?

## **Research Methodology**

The empirical part of this study (delineated in this section) is premised on aspects relating to e-Business adoption and strategy development, highlighted in the literature review and could impact the outcome of an e-Business strategy for SA chemical distributors.

## **Data Collection**

The data collection instrument incorporates components of 'Servqual' and 'Webqual', which are existing questionnaire templates developed to measure customers' web site requirements in the context of IS service delivery (Kettinger & Lee, 1995). The questionnaire is divided into four parts. The first part requests respondents' permission to use their responses for research purposes. The second part of the questionnaire (questions 1-6) captures demographic information relating to firms' size and chemical usage sector and respondents' demographic information so that trends in this respect can be identified. The questionnaire can be supplied to any interested party.

Questions 7-11 and 15-26 assess customers' attitude and approach to the Internet to find out to what extent firms deploy the Internet for

e-Business and/or information-seeking activities. Questions 28-36 gauge the benefit respondents derive from Internet usage. This enabled the researchers to make deductions regarding the correct levels of online functionality that should be offered to SA chemical customers (users). A pilot study was conducted to identify possible ambiguity and misunderstandings regarding questions posed as well as to assess time taken to complete the questionnaire. The questionnaire was refined accordingly. The researchers found 177 chemical companies in KZN. The researchers managed to approach 145 companies to fill in questionnaires. This sample selection technique led to the researchers collecting 100 completed questionnaires.

## **Discussion of findings**

The purpose of the data analysis is to ascertain the overall perceptions of respondents towards the subject matter. The results analysis reveals those factors that may encourage customers to transact online and overcome reservations towards developing an online strategy.

### ***Gender, Age and ethnic Contribution***

Females were in the minority constituting 32%, males constituted 68%. The reason for this result is related to the researchers targeting senior members of staff to complete the questionnaire and these senior company positions were held predominantly by males. The majority of respondents were in the age groups 26-35 years (27%) and 36-45 (28%). Many of the respondents (23%) were 46-55years, and 56-65years (15%). Only 7 % were between 0 – 25 years. The majority of respondents (92%) who participated in this study were either white or Indian. This indicates that the latter two ethnic groups are far more involved with administrative aspects of their companies' business, and in general hold more senior positions at their respective companies than African and Coloured ethnic groups (5%).

### ***The Size of the Firm***

This study used number of staff employed as an indicator of the size of the firm. Chemical firms employing more than 101 staff made up 28% of the sample, firms with 1-20 staff members contributed 27%, firms employing 21-50 staff members made up 24% of the sample and firms

employing 51-100 made up 19% of the sample. Two of the respondents (2%) did not want to answer this question, presumably for strategic reasons. The majority of the respondents who participated in the study worked for companies involved in chemical manufacturing (including manufacturers of chemical raw as well as performance chemicals).

## **What Descriptive Frequency Statistics Reveal about e-Business in the Target chemical Distributors**

This section reports the results of statistical central tendency statistical tests to establish common general trends among the companies studied, and correlation tests to establish significant relationships between factors studied.

### ***Staff with Internet Access***

Fifty percent of the respondents work for companies where the majority of staff has Internet access. Only one respondent, works for a company where there is no access to the Internet. The majority of respondents (77%) perceive the Internet to be important for business; while the vast majority of chemical companies (87%) use the Internet extensively for banking. The results reveal that many chemical companies use the Internet for receiving orders (74%).

Many chemical companies use the Internet for occasionally placing orders (65%). The majority of chemical companies in the sample in KZN (92%) use the Internet to search for information. This may suggest that many companies in the chemical industry in KZN are information intensive. More than half of the sample of chemical companies (59%) uses the Internet for accessing news. Most of the respondents (85%) are concerned about the security of information transmitted via the Web and 86% are concerned about the privacy of information transmitted via the Web.

### ***Central Tendency Statistics***

<b>Study Variables</b>	<b>Description</b>	<b>Questions</b>
V1	Companies' use of the Internet for transacting online	9,10,11
V2	Companies' use of the Internet for searching for	12,13,14



	information online	
V3	Perceived importance of the Internet for business.	7,8
V4	Personal use of the Internet for transacting online	15,16,17,18,26
V5	Personal use of the Internet for searching for information	19,20,21,22,23,24,25
V6	Perceived importance of the Internet	27
V7	Internet's convenience rating	28,29,30
V8	Internet's reliability rating	31,32,33,41,42
V9	Internet's quality of information rating	34,35,36
V10	Security and reliability concerns rating	38,39,37

**Table 1:** *Explaining the legend for Vn used below*

The results for the variables V1, V2, V3 are: The V1 variable, with mean value 2.00, reveals that companies use the Internet ‘occasionally’ for transacting online; The V2 variable, with mean value 2.00, reveals that companies use the Internet ‘occasionally’ for searching for information; and The V3 variable, with mean value 2.00, reveals an articulated average perception that the Internet is ‘Important’ to companies for businesses.

The median results are the same as those indicated for the mean. The mode results are also the same as those indicated for the mean. The variables V1, V2, V3 have a standard deviation ranging from 0.911 to 1.028. This indicates a variation in respondents’ perceptions regarding their companies’ use and deployment of the Internet. The standard deviation with regard to the sample’s perceived importance of the Internet in business (V3) is greater than 1 and this result cannot be extrapolated to the population.

The variables V4 and V5 relate to respondents’ use of the Internet in their personal capacity. The V4 and V5 variables both have mean values of 3.00; this reveals that respondents in their personal capacities use the Internet ‘very seldom’ for transacting (purchasing and selling) online as well as searching for information. The mean value for V4 is influenced by the particularly low participation in online auctions (87% of respondents never participate) and personal selling of goods over the Internet (77% of respondents never do so). The mean value for V5 is influenced by the particularly low usage of the Internet for searching for financial

advice - 62% of respondents never use the Internet for seeking such advice.

The variable V4 has a median value of 3.00 and mode value of 3 (standard deviation 0.688), which corresponds to respondents' 'very seldom' use of the Internet for transacting online. V5 has a median value of 2.00, mode of 2 and standard deviation of 0.745, which corresponds to respondents' use of the Internet 'occasionally' for searching for information. This value is higher than the mean value for V5 because this indicator negates the (negative) influence of the question, concerning usage of the Internet for searching for financial advice, on the results. These standard deviations are less than 1 which means that the sample's responses to personal use of the Internet can be extrapolated to the population.

Variables V6, V7, V8, V9, and V10 relate to respondents' attitude and approach to the Internet. The mean for the variable V6 is 2.00. This rating corresponds with the Internet occupying an 'important' role in respondents' lives. The mean for variable V7 is 2.00. This value reveals that respondents are in agreement that the Internet is a source of convenience and easy to use. V8 has a mean value of 3.00, revealing that respondents disagree that the Internet is safe and reliable to use for online transactions. V9 has a mean value of 2.00, revealing that respondents are in agreement that the Internet provides quality information. V10 has a mean value of 2.00, confirming that respondents do have concerns regarding the security and privacy of their personal information when it comes to online transacting. The V8 variable has a median value of 2.00, which corresponds with most respondents (53%) agreeing that the Internet is safe and reliable to use for transacting online.

The standard deviations in the variables concerning respondents' attitude and approach to the Internet are as follows - V6 (0.841), V7 (0.750), V8 (0.772), V9 (0.537). These standard deviations indicate variance in respondents' responses regarding the Internet's convenience, reliability, utility and safety. These standard deviations are less than 1, which means that the sample's perceptions of the Internet can be extrapolated to other organisations.

## **Correlations**

The Pearson product correlation coefficient r-value for V2<sup>2</sup> is 0.315 indicating some correlation. These results confirm that there is a positive relationship between companies' use of the Internet for online transacting and searching for information. The Pearson product correlation coefficient r-value 0.409 indicates medium correlation. These results confirm that there is a relationship between companies' use of the Internet for online transacting and Internet adoption.

The Pearson product correlation coefficient r-value 0.454 confirms that there is a positive relationship between companies' use of the Internet for searching for information and the Internet adoption. From the above it can be concluded that chemical companies using the Internet, deploy it for online transactions almost as much as information searching. Testing variable V4 with variable V5 shows a correlation of 0.501 revealing that there is not a difference in use (frequency) of the Internet for exploratory and transactional purposes by respondents.

The variable V1 with variable V4 shows that there is a correlation between company and personal use of the Internet for conducting online transactions. The statistics show that the correlation is 0.343, which indicates a positive correlation. The variable V2 with variable V5 shows that there is a correlation between company and personal use of the Internet for exploratory purposes (e.g. searching for information). The statistics show that the correlation is 0.524. The variable V3 has a significant correlation with variables V4 and V5. The Pearson product correlation coefficient r-value for V4 is 0.319 and for V5, 0.399, indicating a relationship in both instances.

The variable V6 correlation with variables V1, V2, V3, shows that there is a correlation between respondents' perception of the Internet's importance and their companies' use and deployment of the Internet for business. The correlation is 0.501 with regard to V1 – indicating strong positive correlation, 0.446 with regard to V2 – indicating medium positive correlation and 0.514 with regard to V3 – indicating strong positive correlation. Variable V7 with variables V1, V2 and V3, shows that there is a correlation between respondents' perception of the Internet's con-

---

<sup>2</sup> For an explanation of the legend of the *Vn*, please consult Table 1.

venience and their respective companies' use and deployment of the Internet for business. The correlation is 0.385 with regard to V1, 0,280 with regard to V2 and 0.455 with regard to V3.

Variable V8 with variables V1, V2 and V3 shows that there is a correlation between respondents' perception of the safety and reliability of the Internet and their companies' use and deployment of the Internet for business. The correlation is 0.484 with regard to V1, 0,320 with regard to V2 and 0.398 with regard to V3.

The correlation of variable V9 with variables V1 and V3 shows that there is a correlation between respondents perceiving the Internet to be a good source of information and their respective companies' use and deployment of the Internet for e-Business. The statistics show that that the correlation is 0.261 with regard to V1 and 0.327 with regard to V3. The results also show that the correlation between respondents perceiving the Internet to be a good source of information and their respective companies' use of the Internet for exploratory purposes (e.g. searching for information) is 0.175 meaning that the two variables are independent of each other.

From the above correlation results, it can be concluded that important contributors to companies' deployment of the Internet in business (V3) in descending order are perceived importance, perceived convenience, perceived safety and reliability and perceived quality of information. The contributors to companies' use of the Internet for transacting online (V1) in descending order are perceived importance, perceived safety and reliability, perceived convenience and the perceived quality of information obtained. Whilst the most important contributors' to the use of the Internet for searching for information (V2) in descending order are perceived importance, perceived safety and reliability and perceived convenience.

The variable V6 is tested with variable V4 and V5. The statistics show that that the correlation is 0.541 with regard to V4 and 0.597 with regard to V5. The correlation of variable V7, with variables V4 and V5 shows that the correlation is 0.534 for V4 and 0.434 for V5. The correlation of variable V8, with variable V4 and V5 shows that there is a correlation between respondents' perception of the safety and reliability of the Internet and their personal deployment of the Internet for online

transactions and searching for information. The correlation is 0.484 with regard to V4 and 0.438 with regard to V5.

The correlation of variable V9, with variables V4 and V5 has a significant correlation. The Pearson product correlation coefficient value is 0.322 for V4 and V9. The Pearson product correlation coefficient value is 0.262 for V5 and V9. The dependency is greater for online transactions than for online information searching.

	V1	V2	V4	V5
V10 Pearson	.103	.144	.215*	.238*
Correlation	.310	.153	.033	.017
Sig.(2-tailed)	100	100	80	100

\* Correlation is significant at the 0.05 level (2-tailed)

**Table 2:** *Relationship between Internet usage and security and privacy concerns*

The correlation of variable V10, with variables V1 and V2 shows no correlation and therefore no relationship between concerns over privacy and security issues and companies' deployment and use of the Internet neither for exploratory purposes nor for transactional purposes. When the variable V10 is tested with variables V4 and V5, it has a correlation. The correlation is 0.215 for V4 and 0.17 for V5, indicating a small correlation in both instances. These results indicate that there is a small relationship between respondents' concerns over those issues and their personal use of the Internet.

### ***T- Test***

The T-test is used to determine the statistical significance between a sample distribution mean and a parameter (Cooper & Schindler, 2003), and is applied to the gender dispersion.

	F	T	df	Sig. (2-tailed)

V1 Equal variances assumed	.531	-.676	98	.501
Equal variances not assumed		-.637	52.769	.527
V2 Equal variances assumed	.436	1.642	98	.104
Equal variances not assumed		1.604	57.454	.114
V3 Equal variances assumed	3.000	.867	98	.388
Equal variances not assumed		.776	47.268	.441

**Table 3:** Comparison of gender-related responses regarding company Internet usage

In the above T-test results, the p significance values are above 0.05 for V1 (0.501), V2 (0.104), V3 (0.388) revealing that there is no significant difference between male and female perceptions regarding their companies' adoption and deployment of the Internet.

	F	T	df	Sig. (2-tailed)
V4 Equal variances assumed	.180	.608	98	.544
Equal variances not assumed		.629	66.257	.531
V5 Equal variances assumed	.615	1.636	98	.105
Equal variances not assumed		1.580	55.856	.120

**Table 4:** Comparison of gender-related responses regarding personal Internet usage

In the above T-test results, the p significance values are above 0.05 for V4 (0.544) and V5 (0.105) indicating that statistically, there is no significance difference between male and female personal use of the Internet for online transactions and searching for information.

	F	T	Df	Sig. (2-tailed)
V6 Equal variances assumed	1.235	1.805	98	.074
Equal variances not assumed		1.721	54.185	0.91
V7 Equal variances assumed	.464	1.249	98	.214
Equal variances not assumed		1.224	57.799	.226
V8 Equal variances assumed	.115	.177	98	.860
Equal variances not assumed		.169	54.444	.866
V9 Equal variances assumed	.124	.493	98	.623
Equal variances not assumed		.494	60.934	.623
V10 Equal variances assumed	7.582	.387	98	.700
Equal variances not assumed		.328	42.470	.745

**Table 5:** Comparison of gender-related responses regarding attitude to the Internet

In the above T-test results, the p significance values are above 0.05 for V6 (0.074) and V7 (0.214), V8 (0.860), V9 (0.623), V10 (0.700) indicating that statistically there is no significant difference between male and female attitudes and approaches to the Internet.

**ANOVA**

	<b>Sum of squares</b>	<b>df</b>	<b>Mean square</b>	<b>F</b>	<b>Sig.</b>
V1 Between Groups	6.660	4	1.665	2.094	0.88
Within Groups	75.530	95	.795		
V2 Between Groups	4.853	4	1.213	1.472	.217
Within Groups	78.307	95	.824		
V3 Between Groups	1.904	4	.476	.440	.779
Within Groups	102.656	95	1.081		
	104.560	99			

**Table 6:** Comparison of age group related responses to company use of the Internet

The ANOVA test results reveal there is no statistically significant difference in perceptions of different age groups respondents towards the variables V1, V2 and V3 because these variables have p significance values 0.088, 0.217 and 0.779, which is more than 0.05.

	<b>Sum of squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
V4 Between Groups	4.136	4	1.034	2.297	.065
Within Groups	42.774	95	.450		
V5 Between Groups	1.453	4	.363	.645	.632
Within Groups	53.507	95	.563		
	54.960	99			

**Table 7:** Comparison of age group related responses to personal use of the Internet

The ANOVA test results reveal no statistically significant difference in perceptions of different age group respondents towards the variables V4 and V5 because these variables have *p* significance values 0.065 and 0.632 respectively which is more than 0.05. The ANOVA test results reveal there is no statistically significant difference in perceptions of different age-group respondents towards the variables V6, V7, V8 and V9 because these variables have *p* significance values 0.623, 0.552, 0.328 and 0.361, which is more than 0.05. There is however a statistically significant difference in the perceptions of different age-group respondents towards the variable V10, which questions the privacy and security, concerns of respondents.

	<b>Sum of squares</b>	<b>Df</b>	<b>Mean square</b>	<b>F</b>	<b>Sig.</b>
V6 Between Groups	1.885	4	.471	.657	.623
Within Groups	68.115	95	.717		
V7 Between Groups	1.734	4	.434	.763	.552
Within Groups	53.975	95	.568		
V8 Between Groups	2.771	4	.693	1.171	.328
Within Groups	56.189	95	.591		
V9 Between Groups	1.262	4	.316	1.100	.361
Within Groups	27.248	95	.287		
V10 Between Groups	4.955	4	1.239	3.305	0.14
Within Groups	35.605	95	.375		
	40.560	99			

*Table 8: Comparison of age group related responses to attitude to the Internet*

### **Chi-Square Test**

Chi-square tests are used to analyses variances in nominal measures (Cooper & Schindler, 2003) and applied to test classification-related variances in responses to questions in this study. The above Chi-square (χ<sup>2</sup>) test result indicates a *p* value 0.588, which is above 0.05. This result reveals there is no statistically significant relationship between gender



classification and the relevant question. These two variables are independent each other.

	Value	df	Asymp.Sig. (2-sided)
Pearson Chi-Square	2.822	4	.588
Likelihood Ratio	3.458	4	.484
Linear-by-linear Association	.158	1	.691
N of valid cases	100		

**Table 9:** *Relationship between gender classifications*

	Value	df	Asymp.Sig. (2-sided)
Pearson Chi-Square	13.361	16	.646
Likelihood Ratio	11.604	16	.771
Linear-by-linear Association	2.660	1	.103
N of valid cases	100		

**Table 10:** *Relationship between age-group classification and that a web site conveys a sense of community*

The above Chi-square ( $\chi^2$ ) test result indicates a p value 0.646, which is above 0.05, this result reveals there is no statistically significance relationship between age-group classification and that a web site conveys a sense of community. These two variables are independent of each other.

	Value	Df	Asymp.Sig. (2-sided)
Pearson Chi-Square	107.042	16	.000
Likelihood Ratio	19.161	16	.260
Linear-by-linear Association	2.076	1	.150
N of valid cases	100		

**Table 11:** *Relationship between ethnic group and that a web site conveys a sense of community*

The above Chi-square ( $\chi^2$ ) test result indicates a p value of 0.000, which is below 0.05. This result reveals there is a statistically significant relationship between ethnic-group classifications and that a web site con-

veys a sense of community. These two variables are dependent on each other.

	Value	df	Asymp.Sig. (2-sided)
Pearson Chi-Square	20.992	16	.179
Likelihood Ratio	22.365	16	.132
Linear-by-linear Association	.223	1	.636
N of valid cases	100		

*Table 12: Relationship between firm size and that a web site conveys a sense of community*

The above Chi-square ( $\chi^2$ ) test result indicates a p value of 0.179, which is above 0.05. This result reveals there is no statistically significant relationship between sizes of firm and that a web site conveys a sense of community. These two variables are therefore independent of each other.

	Value	Df	Asymp.Sig. (2-sided)
Pearson Chi-Square	27.865	28	.472
Likelihood Ratio	27.419	28	.496
Linear-by-linear Association	15.266	1	.000
N of valid cases	100		

*Table 13: Relationship between industry sector and that a web site conveys a sense of community*

The above Chi-square ( $\chi^2$ ) test result indicates p value is 0.472, which is above 0.05. This result reveals there is no statistically significant relationship between industry sector and that a web site conveys a sense of community. These two variables are independent of each other.

### ***Cronbach Alpha Test***

The Cronbach Alpha test is applied to the research results to test the internal consistency and reliability of the measurement tool used for the empirical study (Cooper & Schindler, 2003). Reliability analysis of the questionnaire's continuous variables reveals a Cronbach alpha value of 0.8682. This value is above 0.7 and therefore indicates that this study's

research instrument's (questionnaire) continuous variables have internal consistency and reliability.

## **Conclusions**

South Africa's globalization endeavours and the advancement of Web technology has resulted in increased exposure and access to overseas sources of chemical supply and made sourcing of chemicals and chemical products, easier than before. It is with this in mind that the study reviewed literature (Huizingh, 2002; Chopra *et al.*, 2001, Jooste & van Schoor, 2003; Friedman, 2000; Schultz, 2003) to ascertain whether e-Business could add value to chemical distributors and what the issues surrounding e-Business adoption were, so that an online strategy could be developed for chemical distributors in KZN.

## **Research Questions**

*Does e-Business govern customers' approach to Internet usage and why?*

The empirical findings prove that the Internet is important for business to most chemical companies in KZN. In order to answer the abovementioned question, the empirical study needed to ascertain whether the Internet is deployed by those companies more for exploratory purposes, such as searching for information, accessing news and advertising, or more for conducting e-Business.

The central tendency results reveal equal deployment (occasionally) of the Internet for exploratory purposes (information seeking) as for conducting e-Business. This finding was confirmed by the correlation statistics. These tests also found a relationship between Internet deployment and its use for transactional purposes (e-Business). The type and magnitude of the relationship was found to be the same (marginally different) with regard to both applications, confirming that e-Business partly governs customers' approach to the Internet.

Correlation test results indicate that companies participate in e-Business mostly from a convenience and an ease of use perspective. This

finding supports the previously discussed value-adding benefits of e-Business- time saving and convenience - proposed by Huizingh (2002), Chopra *et al.* (2001), Jooste & van Schoor (2003), Friedman (2000) and Schultz (2003).

*Do customers have to be at a certain level of e-readiness to experience the impact of an online strategy?*

Comparing central tendency results for respondents' personal use of the Internet for transactional purposes with that of their respective companies reveals that respondents' personal use of the Internet is more conservative towards transactional as well as exploratory purposes, compared to that of their respective companies. It was found that, on average, respondents use the Internet 'very seldom' for conducting online transactions, such as making electronic payments, purchasing goods online, making online reservations and participating in online auctions. Personal use of the Internet is more for the 'occasional' searching for information and services (online directory) and browsing news sites.

However, statistical analysis found that respondents' personal use of the Internet for conducting online transactions does have a statistical correlation with companies' deployment and use of the Internet for e-Business. It was also found that the greater respondents' use of the Internet for online transactions, the more positive are their perceptions and approach to the Internet for that purpose. This supports the claims by Dai and Kauffman (2003), Kurupparachi *et al.* (2002), Mellville (2004), Moolman *et al.* (2003) and Barua (2004) that customer e-readiness is a 'critical' factor in e-Business adoption decision because it has an impact on the success of an online strategy.

*What critical success factors affect online transactions and which of these will impact on an e-Business strategy for chemical distributors?*

Despite most companies (+- 85%) being concerned about the security of their information (refer data discussion) and about the privacy of their personal information, when it comes to online transactions, the majority of companies (60%) still have no reservations to conducting business online. There is no statistical significant relationship between companies' deployment of the Internet for e-Business and concerns over security and privacy of information transmitted via the Web.

Correlation finds a dependency between aspects relating to perceived reliability of the Internet and respondents' use of the Internet for online transactions. It can be concluded that order fulfilment attributes and capabilities of the Internet are an important determinant of whether respondents are likely to transact online or not. Based on those findings, it can be concluded that the most critical success factors for an online strategy for chemical distributors in KZN, ranked in descending order are reliability in terms of order fulfilment, convenience, ease of use and quality of information provided.

## **Managerial Guidelines**

This study proposes guidelines for Internet deployment for business by chemical distributors. These guidelines are based on the above recommendations, and proposed applications of the Internet by Kruger (2003) and Hitt *et al.* (2003). The aim is to offer customers convenience, improved reliability and trusted information and to minimize the requirements for order-fulfilment.

1. Streamline day-to-day interactions with customers.
  - Provide customers with point-of-sale information.
2. Chemical distributors can offer their customers an additional communication means (channel) to contact their company and make their company representatives more accessible to customers, increasing points of contact.
  - Increase value-added services.
  - Promote products and boost sales. Chemical distributors can use the Internet to offer customers product promotions. Aged and/or surplus stock can be advertised online. Product catalogue can be made available online.
  - Improve after-sales service offering to customers.
  - Real time service offering - not recommended. Currently chemical distributors in SA would not benefit from a real time service offering to customers (e.g. enabling customers to track own or-

ders, access delivery's status and access real-time stock availability information).

Chemical distributors would first need to have the correct measures in place to ensure that orders received are processed and executed timeously to ensure order-fulfilment. In addition chemical distributors would first need to provide their customers with training to increase their e-Readiness levels and confidence in the Internet's order-fulfilment and trusted service capabilities.

## **Limitations of the Study**

The information that formed the basis of the literature review was obtained from European and the US sources - on the basis of the availability of information. This study does not incorporate the views of the Chinese and other Eastern countries. The research was a 'cross-sectional' study that captured information about the present situation in the SA chemical industry and did not take into consideration future plans and projections. This could lead to the omission of vital information. This study will be limited to the 'initiation' phase of planning (Bendre *et al.*, 2004; Kuruppuarachi *et al.*, 2002; Hackbarth & Kettinger, 2000), in line with the exploratory and motivational objectives of the study. This refinement leads to the inclusion of issues only relating to the adoption of the e-Business decision (Ngai & Gunasekaran, 2003) and project scope definition and value assessment (Kuruppuarachi *et al.*, 2002).

The demographic description of the sample population indicated that only a small proportion (24%) of the respondents, who participated in the study, had involvement in their companies' purchasing activities accord. This outcome is the reason why, a significant proportion of respondents were 'not sure' whether their companies place orders online. The researchers observed inconsistency in the way respondents' interpreted question 8 of the questionnaire. This could have impacted on the accuracy of the research results and statistical analyses.

Inconsistencies were noted in the interpretation of the proportion of staff with Internet access. Certain respondents were unsure whether 'staff' included or excluded the company's factory/warehouse staff. The

ambiguity of the question could have diluted the response to the proportion of companies deploying the Internet in business and impacted on the variable V3 (and statistical findings).

## **Conclusion**

South Africa's globalization endeavours and the advancement of Web technology has meant that South African chemical distributors have had to explore different means of adding value to their business. This study set out to investigate whether e-Business could offer solutions to challenges faced by chemical distributors in South Africa. The literature reports that e-Business does offer benefits of increased efficiency, reduced transaction costs, increased information access and transparency, as well as business expansion and increased profitability. E-Business can also assist distributors in managing the interoperable and complex supply chain relationships that characterize the chemical industry, through available supply chain management initiatives.

Ultimately, the potential for e-Business to add value, hence the e-Business adoption decision, was found to be dependent on customer perceived value and the size of the Internet user base that could be achieved. The empirical study investigated chemical customers' deployment and perception of the Internet for business in order to answer the research questions. The research findings confirm that the Internet is a priority in business and that all companies (98%) have Internet access. The study found that customers use the Internet as frequently for transactional (e-Business) as for exploratory purposes.

Certain e-Business initiatives are supported extensively by most chemical customers in KZN (e.g. online banking), whilst other online initiatives are utilized by fewer customers and less frequently (e.g. online ordering). Chemical customers admitted to lack of confidence in order-fulfilment capabilities of the Internet and this was the reason proposed by the study for customers' extensive support of online banking and not online ordering. In terms of implementation, the conclusion of the literature review was that a phased approach to e-Business implementation would be the best for SA chemical distributors because it would help overcome existing social and technological constraints. The empirical study confirmed that this would be the right approach. It concluded

that customers have to be at a certain level of e-readiness (personal use of the Internet for online transactions) to realize value from an online service offering, and found that the Internet is currently being used 'very seldom' for online transactions by customers in their personal capacities. However, statistical evaluation revealed that training, especially of younger age groups, would be effective in improving customers' e-readiness. Customer training is therefore recommended as part of e-Business strategy implementation.

## References

- Adner, R & D Levinthal 2004. Real Options and Real Tradeoffs. *Academy of Management Review* 29.1: 120 – 126.
- Barua, A 2004. An Empirical Investigation of Net-enabled Business Value. *MIS Quarterly* 28.4: 585-620.
- Barki, H & A Pinsonneault 2002. Explaining ERP Implementation Effort and Benefits with Organization Integration', accessed online at URL on 25/09/2005 at URL: <http://gresi.hec.ca/SHAPS/cp/gescah/formajout/ajout/test/uploaded/cashier0201.pdf>.
- Bharadwaj, A 2000. A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation. *MIS Quarterly* 24,1: 169-196.
- Chopra, S, D Dougan & G Taylor 2001. B2B e-Commerce Opportunities. *Supply Chain Management Review* 5,3: 50, 1.
- Cooper, D & P Schindler 2003. *Business Research Methods*. Eighth Edition. New York: McGraw-Hill/Irwin.
- Corbitt, T 2002. Getting e-Business off the Ground. *Management Services* 46: 11.
- Dai, Q & R Kauffman 2006. To Be or Not To B2B: Evaluating Managerial Choices for e Procurement Channel Adoption, *Information Technology and Management* 7,2, April: 109-130.
- Dunn, R 2000. Developing an E-commerce Strategy. *Plant Engineering* 54,11: 8.



- Friedman, D 2000. Plan an e Commerce Strategy. *Supply House Times* 43,2: 45.
- Glasgow, C 2003. Business to Technology Strategy Model Chemical Industry. *Chemical Market Reporter* 27.
- Hackbarth, G & W Kettinger 2000. Building an e-Business Strategy. *Information Systems Management* 17.3: 1- 16.
- Hitt, M, R Ireland & R Hoskisson 2003. *Strategic Management: Competitiveness and Globalisation*. Ohio: South-Western College Publishing.
- Huizingh, E 2002. Towards Successful e-Business Strategies: A Hierarchy of Three Management Models. *Journal of Marketing Management* 18: 721-747.
- Jooste, M & C van Schoor 2003. A Framework for the Implementation of e-Procurement. *South African Journal of Industrial Engineering* 14,2, pp. 1-22.
- Kettinger, W, C Lee & C Choong 1997. Pragmatic Perspectives on the Measurement of Information Systems Service Quality. *MIS Quarterly* 21,2: 223-240.
- Kruger, T 2003. *The e Business Handbook*. Cape Town: Trialogue.
- Melville, N, K Kraemer G Kenneth & V Gurbaxani 2004. Information Technology and Organisational Performance: An Integrative Model of IT Business Value. *MIS Quarterly* 28,2: 282-322.
- Moolman, H, A Averweg & G Petkov 2003. Impact of Portal Technologies on EIS Implementation in Organizations in KZN. *SA Journal of Information Management* 5,4, accessed online on 25/09/2005 at URL: <http://www.sajim.co.za>.
- Mufatto, M & A Payaro 2002. Integration of Web-based Procurement and Fulfilment: A Comparison of Case Studies', accessed online on 25/09/2005 at URL: <http://www.payaro.it/materials/payaro-Webbased%20Procurement%20and%20Fulfillment.pdf>.
- National Association of Chemical Distributors (NACD) 2006, accessed online at URL <http://www.nacd.com>, on 27/05/06.
- Ngai, E & A Gunasekaran 2003. Information Systems in Supply Chain Integration and Management', accessed online on 25/09/2005 at URL: <http://web.njit.edu/~bieber/CIS677F04/gunasekaran04.pdf>
- Oliva, R 2002. Charting the Online Journey. *Marketing Management* 11,5: 46-48.

- Preston, R 2000. Endless opportunities lead to endless expectations. *Internet Week* 829: 8.
- Rayport, J & B Jaworsky 2001. e-Commerce, Mc Graw-Hill, New York
- SAP (2004), accessed online on 25/09/05 at 9.40am at URL:  
[http://help.sap.com/bp\\_chemv1500/Chem\\_US/index.htm](http://help.sap.com/bp_chemv1500/Chem_US/index.htm).
- Schultz, Y 2003. How to Cook up a Quick e-Business Strategy. *Computing Canada* 29,10: 24.
- Simchi-Levi, D and E Simchi-Levi 2002. The effect of e-Business on Supply Chain Strategy, accessed online on 25/09/05 on at URL:  
[http://supplychain.mit.edu/innovation/docs/ecommm\\_final.pdf](http://supplychain.mit.edu/innovation/docs/ecommm_final.pdf).
- Subramani, M 2004. How do Suppliers Benefit from IT Use in Supply Chain Relationships? *MIS Quarterly* 28,1: 45-73.
- Teo, H, K Wei & I Benbasat 2003. Predicting Intention to Adopt Inter-Organisational Linkages: An Institutional Perspective. *MIS Quarterly* 27,1: 19-49.
- Thayer, A, C Houston & E Houston 2001. Reaching Out to e-Customers, Chemical and Engineering news, accessed online on 27 /05/06 at URL: <http://pubs.acs.org/cen/e-business/7931bus1.html>.
- Thayer, A, C Houston & E Houston 2004. e-Business for Chemicals: Companies Begin Exploring Electronic Opportunities, Chemical & Engineering news, accessed online on 27/05/06 at URL: <http://pubs.acs.org/cen/coverstory/7829bus1.html>.
- The European Association of Chemical Distributors (FECC), accessed online on 27/05/06 at URL <http://www.fecc.org>.
- Wade, M & J Hulland 2004. Resource-Based View of IS Research. *IS Quarterly* 28,1: 107-142.
- Wind, Y & V Mahajan 2002. *Convergence Marketing: Strategies for Reaching the New Hybrid Consumer*. NJ: Prentice Hall.

S Husselman  
Marketing  
Protea Chemicals  
South Africa

Sam Lubbe  
School of Computing  
UNISA  
South Africa

Rembrandt Klopper

*Implications for e-Business Readiness ...*

School of Information Systems & Technology  
University of KwaZulu-Natal  
South Africa