

The Scenario of the Adoption of E-Commerce amongst Malaysian Small and Medium Enterprises in Manufacturing Sector

Rafidah Mohamad Noor, Husnayati Hussin

Department of Information System, Kulliyah of Information and Communication Technology, International Islamic University, Jalan Gombak 53100 Kuala Lumpur.

Tel: 03-2056 5161 Fax: 03-2056 5179

ABSTRACT

The emergence of E-commerce in the midst of bricks and mortar era has transformed the way peoples conducting business transaction. Consequently, the bricks and click approach become dominant. The success stories of a few first movers such as Amazon.com and Dell.com, has motivated a few more especially big companies to join in the battle. However, Small and Medium Enterprises has just started to realize the important of E-commerce in current and future business paradigm. This paper reports a scenario on the adoption of E-commerce among Malaysian Small and Medium Enterprises in manufacturing sector. The analysis is conducted based on 106 responses collected through mailed-questionnaire to randomly selected manufacturing SMEs in Malaysia.

1.0 INTRODUCTION

The interest shown by the researchers and government agencies in SMEs has witnessed significant growth over the years. This is proved by numerous studies on SMEs (D.Jutla et al., 2002; Sondoh and Tanakinjal, 2002; Hashim, 2000; R. Omar and A.Z. Abd. Hamid, 2002; Lee and Runge, 2001; E. Daniel et al., 2002; Kendall et al., 2001) conducted locally and internationally.

Even though operating in small scale, SME's contributions to the economy are increasing throughout the years. The Ministry of International Trade and Industry (MITI) indicates that SME's contributions are amounted to RM4.3 billion or 20% of the GDP in 1991 and expected the SME sector to contribute more in years 2000 and 2020. As the name implied, SME has special needs because of their limited resources in terms of expertise of personnel, financial assistance and knowledge pertaining to E-commerce management (Hashim, 2000).

2.0 LITERATURE REVIEW

In Malaysia, government has pledged to lead the country into the information age. Several technology-related financial grants or assistance schemes are available for local SMEs, and these are made available through various government agencies. Among the government agencies which actively support the development of SMEs in Malaysia are Small and Medium Industries Development Corporation (SMIDEC), Malaysian Technology Development Corporation Sdn. Bhd. (MTDC), Malaysian External Trade Development Corporation (MATRADE), Malaysia Industrial Development Authority (MIDA), Ministry of Entrepreneur and etc.

Major concern of these agencies is in the development of SMEs in manufacturing sector.

Manufacturing sector is one of the most significant sectors which contribute to the growth in Growth Domestic Product (GDP) in Malaysia. Report by Bank Negara (2003) shows that manufacturing sector continued to provide the strongest impetus with growth at 8.2 % compared to 4.0% in 2002. The recovery in global economy has spurs up the exports and strengthening domestic demand led to strong expansion in the manufacturing sector. Department of Statistics of Malaysia enumerates a total of 18,271 of active small and medium enterprises manufacturing sector in Malaysia. It is represent about 89.3% out of 20,455 active manufacturing establishments in Malaysia. This is characterizing an important contribution by SMEs to the whole manufacturing establishments in Malaysia.

The involvement of the big manufacturing companies in E-commerce soon will become the important reason why their smaller counterparts should jump into it as well. With the tremendous growth in E-commerce technology, it may not be too long before these big customers will insist on all suppliers having the facility to supply online. The small suppliers who intend to stay offline will seem to lose in the future business competition. Although E-commerce was proved to be a significant technology in manufacturing sector, the adoption of E-commerce technology in manufacturing SMEs is still low. The low levels of technological capabilities, arising from inadequate capital investment, thereby resulting in an inability to ensure product quality and hence meet market requirements. Typically SMEs hardly invest in R&D, are oriented towards the domestic market and depend mainly on internal sources of funds to finance their business operations. SMEs generally employ labour-intensive modes of production, dependent on their own technology and have yet to automate their production processes. The survey by SMIDEC/NPC shows that the low usage of technology among SMEs, is a major factor constraining enterprise growth and expansion.

The enormous potential of B2B market has opened up the way to the small manufacturing companies in spreading out their business operation. Small players can enter and be successful since the size become of relatively little important when trading in World Wide Web. The emergence of open source

technology also becomes as an added advantage to the SMEs which financial is a constraint to growth.

Characteristics of E-commerce, CEO's Commitments to IT, and Organizational Readiness.

3.0 RESEARCH OBJECTIVES AND KEY VARIABLES

This paper reports the scenario of the adoption of E-commerce among Malaysian manufacturing SMEs based on the survey conducted recently. The survey focuses to understand the current situation of the adoption of E-commerce among small manufacturing firms by focusing on three main factors that underlying the adoption process: Perceived

i) CEO's Perception on the Characteristics of E-commerce

Based on Roger's Diffusion of Innovation Model, 5 items under perceived characteristics of innovation are adopted to test the perception of SME towards the adoption of EC technology. The items are (1) Relative Advantage (2) Compatibility (3) Complexity (4) Trialability and (5) Observability. Table 1 shows the definition of the five characteristics of E-commerce.

Table 1: Research Definition of Five Perceived Characteristics of E-commerce

Perceived Characteristics of E-commerce	Definition
Relative Advantage	The benefit perceived by SMEs in adopting E-commerce to conduct business as measured by lower business cost, wider market coverage, increase revenue, increase customer, lower human requirement, and beneficial for the business in the future.
Compatibility	How well SMEs think the new innovation will fit into their existing business process. It is measured by the fit of the companies E-commerce efforts with their suppliers and customers, and the fit with their organizational structure and company's policy.
Complexity	The difficulty perceived by SMEs in adopting E-commerce. The more knowledge/expertise one has and the more secure E-commerce is perceived to be, the less complex it will appear.
Trialability	E-commerce is more trialable if business conversion can be carried out in phases and if grant is provided to cover high start-up costs.
Observability	The ability to see beneficial results of using E-commerce by other businesses. Knowledge of the benefits of E-commerce is likely to be seen and understood if it is observable.

ii) CEO's Commitment to IT

Research conducted by Martin & Matlay (2003) and Mehrtens, Cragg & Mills (2001) have identified the important role of CEO or owner-manager in influencing the adoption of E-commerce in SME. As key personnel, CEO has the authority in decision making and also recognizes the Internet marketing potentials and develops the strategy to adopt it. Thus, the decision whether to adopt or not to adopt will depend on CEO. High commitment from CEO is needed since the process of adoption typically occurs stage by stage. Moreover, the limited resources face by most SMEs does not allow them to incorporate radical innovation, hence only IT savvy manager will be able to allocate the resources on E-commerce adoption as well as dealing with the technical aspects of E-commerce. IT savvy managers usually encourage the use of Internet in the organizations in various business aspects including as a medium of interactions, advertising, selling and buying of product as well as searching for information. Hence, the characteristic of CEO was included as one of the variables to see how strong the role of CEOs in influencing the adoption of E-commerce in manufacturing SMEs.

iii) Organizational Readiness

Organizational readiness refers to the firm's readiness in term of knowledge of the key personnel and facilities to adopt the technology. With adequate Internet knowledge, key personnel given him/her CEO/IT personnel would be able to sponsor or champion the E-commerce adoption. In order to apply the E-commerce technology, a firm must have adequate computer systems within the firms to access and use the Internet without major problems. Study by Mehrtens et. al (2001), Grandon and Pearson (2004) and Iacovou et. al.(1995) emphasis on the organizational readiness as one of the factors that influence the technology adoption.

Technical knowledge and expertise are important aspect in the measurement of a success adoption of E-commerce. The technical knowledge own by the manager or the IT expertise can help to facilitate the process of implementation of E-commerce technology in SME. The more knowledge or expertise one has the less complex E-commerce is perceived to be, thus the faster the process of E-commerce adoption. Other than IT infrastructure and technical knowledge, firm's innovativeness also can be seen as a factor that may influence the adoption of E-commerce in an organization. Study conducted by

Lee and Runge (2001) shows that firm's innovativeness has an effect on the traditional information system adoption and diffusion.

4.0 METHODOLOGY

The survey questionnaires were sent to CEO or senior executives of 700 manufacturing SMEs located in the West Coast of the Peninsular Malaysia. A list of manufacturing records are collected from several directories such as Small and Medium Industries Development Corporation (SMIDEC), Malaysia External Trade Development Corporation (MATRADE), Unit Pembangunan Ekonomi Negeri Selangor (UPENS), Perbadanan Usahawan Nasional Berhad (PUNB), MARA, SMI Business Directory, Federation of Malaysian's Manufacturers (FMM), and Kuala Lumpur Malay Chamber of Commerce. The questionnaires were mailed out during the fourth week of April 2004. The initiatives have been made to increase the response rate by providing cover letter and personalized address. The cover letter highlights the importance of the study as well as the benefits of participating in the survey. In addition, a stamped reply envelope was provided with each questionnaire to facilitate the mailing process.

From 700 questionnaires distributed, 76 were returned after duration of two months which yield about 11.46% response rate after excluded 37 unattended questionnaires. In order to increase the number of responses, 250 follow-up questionnaires

were sent to SMEs. A total of 48 questionnaires were received out of 250 follow up. Final checking on the responses discovers that only 106 responses were useful for further analysis. Among the reasons for exclusion were responses from non-manufacturing sector, responses by other than company's decision maker, and incomplete questionnaires.

5.0 RESULTS

For the first stage of analyzing the data from the survey, descriptive analysis has been employed to study the scenario of the adoption of E-commerce among manufacturing SMEs. The SMEs will be analyzed in term of CEO's perception on the characteristics of E-commerce, CEO's commitments to IT, and company's profile and organizational readiness.

i) CEO's Perception on the Characteristics of E-commerce

The way CEOs perceived E-commerce also important in influencing the decision to adopt that technology in their business operation. Items used to measure perceived characteristics of E-commerce were measured on 6-points Likert scale which ranging from Strongly Disagree (1), Disagree (2), Somewhat Disagree (3), Somewhat Agree (4), Agree (5) and Strongly Agree (6). Table 2 shows the breakdown of the CEO's perceptions derived based on the five characteristics of E-commerce.

Table 2: Perceived Characteristics of E-commerce

Perceived Characteristics of E-commerce	Mean	Std. Deviation
Cross international boundaries	4.84	1.21
Will consider EC if can reach the intended customer base	4.80	1.08
Will consider EC if most of suppliers and customers use it	4.75	1.28
Concern about the security of payment	4.71	1.44
Virus might affect the Internet transaction	4.52	1.21
Important for the business in the future	4.29	1.30
Has a short payback period	4.25	1.42
Prefer conversion process in phases	4.19	1.27
Information involved is not private	4.16	1.54
Results by others help in decision making	4.10	1.32
Aware of the government's grant/subsidies	4.04	1.43
Will consider EC if results of the trials by others can be observed	4.01	1.36
Lower business cost	3.86	1.28
Increase revenue	3.85	1.25
Lower human requirement	3.84	1.23
Unsure returns in term of profit	3.65	1.43
Has the technical knowledge	3.59	1.40
Change company policy (reverse, mean = 3.67)	3.33	1.52
Change company structure (reverse, mean = 3.75)	3.25	1.47

Observation on the perceived characteristics of E-commerce revealed that most of the SMEs believe that E-commerce will help their business to expand across international boundaries. This was proved by the highest mean score, 4.84 obtained by item 'Cross international boundaries' on the 6-points Likert scale. They also believe that E-commerce will 'increase

their number of customer' with the mean score 4.80. The two lowest score obtained by item 'change company policy' with mean score of 3.33 and standard deviation 1.52, and item 'change company organizational structure' with mean score 3.25 and standard deviation 1.47. Since these two items have reverse score, lower score on the scale indicate the

higher score for the questions measured. The overall score ranging from 3.59 to 4.84 shows that most of the scores were on the scale of 'somewhat agree' to 'agree'.

ii) CEO's Commitments to IT

Majority of the CEOs use Internet between 1 to 3 hours a day which represent 46.3% of the whole sample. About 25% of the CEOs use Internet more than 3 hours a day. This group represent group of Internet savvy CEOs. About 29 % of the CEOs rarely use Internet with about 4% almost never use Internet. The latter group represents Internet passive CEOs, which either do not have or have little of the Internet knowledge or they have knowledge but perceived Internet as less beneficial to their businesses. This finding prove that majority of the CEOs are Internet aware.

In order to measure current level of E-commerce knowledge among the CEOs, a list of applications typically being used by the companies utilizing E-commerce had been included. This test was

conducted on the CEO's E-commerce knowledge scores to evaluate whether their knowledge on E-commerce are below average 2.5, the midpoint score on the 4-points Likert scale marked as 1-Not Familiar, 2-Familiar but No Knowledge, 3-Familiar with Good Knowledge, and 4-Familiar with Extensive Knowledge. With alpha set at .05, the sample mean for all E-commerce applications were significantly different from 2.5, $t(105) = -2.88, -4.15, -6.20, -6.42, -6.89, -9.01, -10.51, p < .01$. The negative sign on the mean differences shows that the score for each application were below specified midpoint. The highest mean 2.23 ($SD = .98$) obtained by E-Procurement has the smallest effect $d = .28$ on 95% confidence interval with the mean ranged from 2.04 to 2.42. The lowest mean 1.64 ($SD = .84$) obtained by E-tailing has the largest effect size $d = 1.02$ on 95% confidence interval with the mean ranged from 1.48 to 1.80. The results support the conclusion that CEO's in general are not knowledgeable on the E-commerce applications. Table 3 shows the result of one sample T-Test run on CEO's knowledge on E-commerce applications.

Table 3: One Sample T-test on CEO's Knowledge on E-commerce Applications

E-commerce Applications	Test Value = 2.5						
	t	df	Sig. (2-tailed)	Mean	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
E-Procurement	-2.88	105	.005	2.23	-.27	-.46	-.08
Enterprise Resource Planning	-4.15	105	.000	2.14	-.36	-.53	-.19
Customer Relationship Management	-6.20	105	.000	1.97	-.53	-.70	-.36
Supply Chain Management	-6.42	105	.000	1.92	-.58	-.75	-.40
Electronic Data Interchange	-6.89	105	.000	1.92	-.58	-.75	-.42
E-Auction	-9.01	105	.000	1.75	-.75	-.92	-.59
E-Tailing	-10.51	105	.000	1.64	-.86	-1.02	-.70

Level of education is another predictor in assessing the CEOs characteristics which affecting the adoption of E-commerce in SMEs. Therefore, questions which

asking their level of education was included. Table 4 presents the cross tabulation of CEO's level of education against training.

Table 4: Numbers of CEOs Who Attend E-commerce Training According to Level of Education

Level of Education	Attend training		Total
	Yes	No	
Secondary School	4 (36%)	7 (64%)	11(10.4%)
College/Polytechnic/Institute	12(52%)	11(48%)	23(21.7%)
University	41(57%)	31(43%)	72(67.9%)
Total	57(53.8%)	49 (46.2%)	106(100.0%)

Majority of the CEOs are university graduates which carry about 68% of the whole sample. CEOs who graduated from college/polytechnic or institute are about 22% while only about 10% of the CEOs are high school graduates. There is a pattern that can be seen from this result where the percentage of attend training is increasing with the increasing in level of education and the percentage of not attend training is decreasing with the increasing in level of education. This result implies that the higher education CEOs

have, the most likely they will attend training and vice versa. This is not surprising as most institutions of higher education provide IT education and better IT facilities which enhance the level of IT appreciation among the university graduates. However in general, there is not much different between the percentage of CEOs who attend training (53.8%) and the CEOs who do not attend training (46.2%). This result implies that the training appreciation among the SMEs is still low.

iii) Company’s Profile and Organizational Readiness

From the observation on the sample, about 43% companies are below 10 years of age with about 32% age between 6-10 years. The companies’ age between 11 to 20 years, comprise about 41% of the sample and 16% of the companies are more than 20 years of age. This anticipates about 57% of the companies are more than 10 years in operation. Generally it shows

that the sample includes almost balance numbers of mature companies and young companies.

Another important predictor in the studies of technology adoption is company size. Number of employee is the most widely use determinant of the company’s size in organizational study. Table 5 shows a breakdown of the sample based on the number of full time employees.

Table 5: Number of Full Time Employees

Number of Full time Employees	Frequency	Percent (%)
Less than 50	52	49.1
50-99	29	27.4
100-149	19	17.9
150 and above	6	5.7
Total	106	100.0

Slightly about half of the sample companies (49.1%) comprise of less than 50 employees. About 45.3% of the sample has the employees in the range of 50 – 150. Only a tiny proportion (5.7%) of the sample has more than 150 employees. Majority of the companies in the sample has less than 100 employees (76.5%) which show that the sample is skewed towards smaller companies.

companies earned below RM 25 million turnovers as SMEs.

Financial performance is measured by asking about the company’s turnover for the previous year. About 46% of the companies have below than RM1 million annual turnovers and about 30% has turnover in the range of RM 1 million to RM 5 million. Only about 25% earned over RM 5 million in the previous annual turnover. Overall results shows that about 75% of the sample companies earned below RM 5 million compared to only 25% earned over RM 5 million. Generally, manufacturing SMEs in this samples earned small turnover compare to the definition of SMEs in Malaysia which indicate that

The responses received indicated that about 95% of the SMEs have the Internet connection in their organization. This is not surprising as Internet almost becomes a necessity in all aspects of life nowadays. To further assess the organizational readiness, the respondents were given a set of Internet activities which is related to E-commerce activities. Four choices were given; seek information, E-mail, buy products, and sell products. The result indicated that the Internet was used mainly for email (94%) and seeks information (97%). About 41% of the respondents use Internet to buy products and 35% use Internet to sell products. This implies that the Internet usage among SMEs is still rudimentary where the only basic Internet applications are used. Table 6 presents the general Internet activities routinely used in SMEs.

Table 6: Internet Activities

Internet Activities	Count	Pct of Cases (%)
Seek Information	95	94.1
Email	98	97
Buy products	42	41.6
Sell products	35	34.7
Multiple responses		

In order to assess the organizational readiness in term of facilities, equipments, and technologies, a question was included asking whether the SMEs have utilized certain IT applications ranging from simple applications to more automated applications. Majority of the SMEs use basic IT applications such as Accounting-based system (86.7%) and Office Support System (81%). Only about 40%-50% of the

SMEs from samples use more automated systems such as database systems for specific purposes, specialized systems (MRP, CAD/CAM), and Local Area Network (LAN). This result implies that majority of the SMEs still operating using basic applications rather than advance applications. Table 7 shows the breakdown of the IT application typically being used in SMEs.

Table 7: Information Technology Applications in SMEs

Information Technology Applications	Count	Pct of Cases (%)
Accounting-based application	91	86.7
Office Support System such as word processing and spreadsheet	85	81
Other database systems such as marketing	50	47.6
Specialized systems (MRP, CAD/CAM)	41	39
Local Area Network (LAN)	50	47.6
Multiple responses		

Firm's innovativeness is measured by including a question asking SMEs to rate their firm innovativeness on 6-points Likert scale. Table 8 shows the breakdown of the firm's innovativeness.

Table 8: Firm Innovativeness Rating

Innovativeness Rating	Frequency	Valid Percent
Very not innovative	2	1.9
Not Innovative	5	4.8
Somewhat Not Innovative	29	27.9
Somewhat Innovative	38	36.5
Innovative	22	21.2
Very Innovative	8	7.7

The result shows that about 65% of the respondents perceived their company as 'somewhat innovative' to 'very innovative'. Only about 35% perceived their company's as 'somewhat not innovative' to 'very not innovative'. A readily innovative firm will seek for more alternatives in order to remain competitive in the markets. Hence, the emergence of E-commerce could be seen as an alternative strategy for a company struggling for markets growth. It is most likely that an innovative firm will adopt E-commerce technology as one of their business strategies.

Having a company's website is assumed to be the basic steps in venturing into more advance E-commerce applications. From 106 responses received, 67% of them already have websites, while

the remaining 33% do not have websites. High percentage of website ownership requires a justification on the reasons of having the website. A question was included asking user to select the reasons for having a website. Result shows that the highest score is 94% for the reason of 'provide information to customers'. Only about 13% of the respondents perceived that 'Pressure from competitor' as a reason for them to have a website. Generally, the result shows that the main purpose of having a website is to attract customer to their business. The result also proves that competitors do not play an important role in influencing SMEs to have a website. Table 9 presents the scores for reasons of having website.

Table 9: Reason for Having Website

Reasons for having website	Count	Pct of Cases
Gain competitive advantage	44	61.1
Explore new model of business	31	43.1
Pressure from competitors	9	12.5
Provide information to customers	68	94.4
Advertisement	53	73.6

6.0 CONCLUSION

The data from the survey was analyzed descriptively in order to see the scenario and the perceptions of SMEs in E-commerce adoption. Three factors were included in this study; Perceived Characteristics of E-commerce, CEO's Commitments to IT, and Organizational Readiness.

Perceived characteristic of E-commerce was studied by creating items which associated to the five items from Roger's model. Although the adoption of E-commerce is still low among the SMEs, the study shows that SMEs are optimistic towards E-

commerce. High score on items related to relative advantage shows that SMEs are motivated to use E-commerce by looking at how beneficial the technology to them. Beside that, complexity factor such as security and privacy issues also influence the adoption of E-commerce among manufacturing SMEs.

CEO's characteristic was studied in term of their pattern of Internet usage and the level of their E-commerce knowledge. Majority used Internet between 1 to more than 3 hours per day which mean they somehow appreciate the benefits of online activities. The fact that most CEOs do not have

adequate E-commerce knowledge proves that more training is needed to enhance their E-commerce knowledge.

In term of organizational readiness, financial factor might become a constraint for the adoption of E-commerce among manufacturing SMEs since about 75% of the companies earned below than RM5 million turnover per year. SMEs are left behind the technology growth and still using rudimentary Internet activities such as email and information seeking. Although about 65% of the SMEs perceived themselves as somewhat innovative, majority of them only use basic IT application such as accounting-based application and office supports system. Website was used basically to provide information to customer and advertisement.

Therefore more need to be done to encourage SMEs to involve with E-commerce activities. The availability of government grants such as RosettaNet grant should be a good start for SMEs to participate in conducting business online.

REFERENCES

- J. D. Kendall, L. L. Tung, K. H. Chua, C. Hong, Dennis Ng, S. M. Tan (2001) Receptivity of Singapore's SMEs to Electronic Commerce Adoption, *Journal of Strategic Information Management*, 10 (2001) 223-242.
- J.W. Lee, J. Runge (2001) Adoption of Information Technology in Small Business: Testing Drivers of Adoption for Entrepreneur, *Journal of Computer Information System*, Fall (2001) 44-57.
- D. Jutla, P. Bodorik, J. Dhaliwal (2002) Supporting E-business Readiness of Small and Medium-sized Enterprises: Approaches and Metrics, *Emerald Vol. 12, Number 2*, (2002) 139-164.
- S. L. Sondoh Jr., G. H. Tanakinjal (2002) Supporting Readiness of Small and Medium Industries in Malaysia, *E-business National Conferences for Small and Medium Industries (SMIs)* 21-22 October 2002.
- C.K. Riemenschneider, V.R. Mc Kinney (Winter 2001-2002) Assessing Belief Differences in Small Business Adopters and Non-Adopters of Web-based E-commerce, *Journal of Computer Information System*, Winter (2001-2002) 101-107.
- C.K. Riemenschneider, P.P. Mykytyn Jr.(2000), What Small Business Executives Have Learned About Managing Information Technology, *Journal of Information and Management*, Vol. 37 (2000), 257-269.
- M.K. Hashim (2000), SMEs in Malaysia: Past, Present and Future, *Malaysian Management Review* (June, 2000) Vol. 35, 22-30.
- R.Omar, A. Z. Abd. Hamid (2002) Metamorphosis of Small and Medium Enterprises in Malaysia: A Synthesis of Brick and Click, *E-business National Conferences for Small and Medium Industries (SMIs)*, 21-22 October 2002.
- P. Ratnasingam (2001) Electronic Commerce Adoption in Australia and New Zealand, *Malaysian Journal of Computer Sciences*, Vol. 14(1) June 2001, 1-8.
- J. Mehtens, P.B. Cragg, A.M. Mills (2001) A Model of Internet Adoption by SMEs, *Information & Management* 39 (2001) 165-176.
- E.E Grandon, J.M Pearson (2004), Electronic Commerce Adoption: an Empirical Study of Small and Medium US businesses, *Information & Management* (2004) Article in Press, 1-20.
- Rogers E. M. (1995) *Diffusion of Innovations*, 4th ed. New York: Free Press.
- Barrow C. (1998) *The Essence of Small Business*, 2nd ed. Europe: Prentice Hall.
- Turban E., King D., J. Lee, Warkentin M., H.M. Chung (2002) *Electronic Commerce: A Managerial Perspective*, 2nd ed. Upper Saddle River, New Jersey: Prentice Hall.