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Some Observations on the Nature of International Information Systems

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and Mexico, which together constitute approximately 69% of Michigan's exports (Figure 2). In 1995, 12.47% of exports from the Grand Rapids Metropolitan Statistical Area went to Hong Kong, Singapore, Korea, and Taiwan, with 20.67% being exported elsewhere in Asia. These Asian exports amounted to approximately \$764 million, up 20% from \$636 million in 1994.

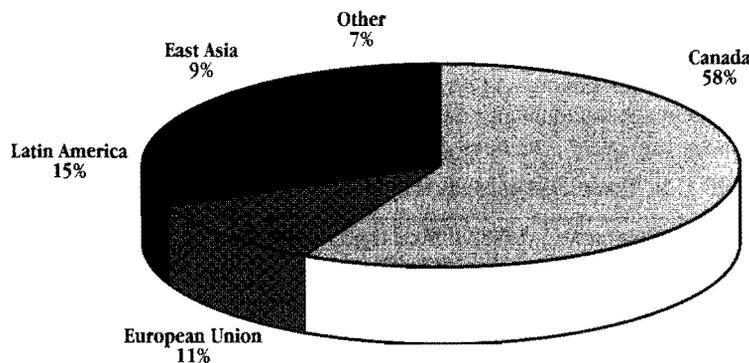
Table 2
Michigan Export Sales to Selected Asian Countries

	1996 Rank*	1996 Sales, Thousands \$	1995-96 % Change	Exports as a % of State's Total
Thailand	18	202,969	45.3	0.53
Taiwan	19	198,752	-32.2	0.52
Singapore	26	110,514	-7.1	0.29
Malaysia	30	69,845	28.1	0.18
Philippines	35	47,737	7.8	0.13
Indonesia	42	36,440	23.9	0.10

Source: International Trade Administration, Department of Commerce.
*Ranking by \$ sales of Michigan's exports market.

The impact on the local economy will be more significant if Japan is severely affected. Japan is Michigan's 3rd largest export market, with approximately \$1.8 billion worth of Michigan products sold there in 1996 – 23.3% more than in 1995. Japan alone was the destination for 14.9% of the Grand Rapids MSA's exports in 1995 (approximately \$343 million), up by 17.22% from 1994.⁶ This underscores the importance that the area plays in the west Michigan economy. About half of Japan's exports go to other Asian economies, and Japanese banks incurred some significant losses during the currency crisis. If, as some analysts are predicting, Japan's economy grows by only 1 to 2% this year, then 1998 may be less than stellar for west Michigan's exporters.

Figure 2
Michigan Export Markets, 1996



Source: International Trade Administration, Department of Commerce. "East Asia" includes: China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand.

⁶"Grand Rapids Metropolitan Data Book," Seidman School of Business, GVSU, 1997.

Some Observations on the Nature of International Information Systems

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The Global Marketplace:

Organizations are now faced with competition and opportunity all around the world. This type of international opportunity/threat has led to increasing concern with the nature of international business. One avenue of study has been to focus on the understanding of networks and interactions that bind countries, organizations, and people in an interdependent global economy. The pursuit of international understanding has led to the study of the impact resultant from Internet, the world wide web, and trans-global communications capability that is pervading all areas of business.

Suddenly, due to this trans-globalization, companies find themselves faced with a new barrier to trade, the need for information technology and expertise in using such technology. Firms participating in the global arena (and who is not?) suddenly realize a need for timely and accurate information. Managers rely on information technology to provide this information reliably, quickly, and accurately.

Assessing IT Quality:

A great deal of academic attention in information systems has focused on the attempt to measure quality of particular systems. Most studies agree

that a real measure of quality is difficult to ascertain. Thus, numerous approaches to quality surrogates have emerged and two of these approaches are widely used as a means of assessment. The most popular approach has been through the gathering of data regarding the satisfaction of managers who are using the system being considered [Doll & Torkzadeh, 1991]. A second approach to the problem of quality was undertaken by Fred Davis (1989) and focused on the use of perception of the users regarding the system being considered. Both of these methods of assessment tend to rely on the assumption that "a good system will be well received".

Assessing International Operations:

Equally important is the assessment of the success of the firms engaged in international practice. One fairly standard measure of a firm's performance in the international marketplace is the measure of export intensity. This measure focuses on the ratio of international sales to total sales of the organization and is called export intensity. This type of measure provides an examination of the firm's ability to penetrate the global marketplace.

Depth and Breadth:

The authors decided to examine the use of the IT quality constructs to assess the effectiveness of IT in the international context. One of the immediate problems was to determine a measurement of how IT was implemented in the organization in the global context. Two approaches to IT examination were used, one involved the measurement of horizontal integration of the information systems [Stück & Schroeder, 1994], the other involved the examination of the vertical integration of the systems being considered. Horizontal integration refers to the usage of systems across departments, work groups, etc. Vertical integration refers to the level of system being used (e.g. telephone vs. teleconferencing). Thus, both depth and breadth of the IT systems being used in the organization could be considered as components facilitating international operations.

Putting It All Together:

Over 2,000 firms were contacted based on the Harris Selectory of Manufacturers 1995. All of these firms were identified as being firms engaged in the business of exporting products. Sales data was collected from the Harris Selectory while firms were asked to anonymously self report other information about their information systems.

We took the data gathered from the firms that responded (about 115) and analyzed relationships between their international success (Export Intensity), their levels of integration (Vertical and Horizontal), and the measurements of systems success (Satisfaction, Ease of Use, and Perceived Ease of Use). Thus, these measurements may provide some indication of the importance of the various information technology issues on the ability to compete successfully in the international marketplace.

What We Found:

Table 1 summarizes the relationships we found among the various data items in the study.

Table 1
Relationships

	Export Intensity	Satisfaction	Ease of Use	Usability	Vertical Integration	Horizontal Integration	Systems Integration
Export Intensity	1.00	.1904	.1439	.1307	.1046	.0700	.0748
	0.00	.2158	.2899	.3371	.5965	.6015	.7474
	115	44	56	56	28	58	21
Satisfaction		1.00	.4548	.2568	.3703	.2740	.2068
		0.00	.0001	.0389	.0685	.0374	.3683
		66	65	65	25	58	21
Ease of Use			1.00	.7171	.1971	.0561	.2395
			0.00	.0001	.2964	.6425	.2488
			86	85	30	71	25
Usability				1.00	.2271	.0599	.1610
				0.00	.2275	.6196	.4420
				86	30	71	25
Vertical Integration					1.00	.2406	.4792
					0.00	.1924	.0064
					38	31	31
Horizontal Integration						1.00	.9672
						0.00	.0001
						98	31
Systems Integration							1.00
							0.00
							31

The table illustrates the level of correlation between the two items at the intersection of the column and row. The second number is the statistical significance of the correlation and the third number is the number of complete responses for that item in the study. The **bolded** items were found to be significant.

So What Does It All Mean:

We found no relationships between levels of integration and international success, nor between the IT success items and international success. This is disappointing since we expected that there might be a relationship between the two. The study however did find several interesting relationships between the measurement of system success (Satisfaction, Ease of Use, and Usability) and Integration. Basically, the findings strongly support that increased levels of integration in both a vertical and horizontal direction lead to improved perceptions of the system by the end users (in this case managers) of the international information systems in the organization. This would imply that companies with increased presence in the information technology result in managers better facilitated in the performance of their increasingly global jobs. Particularly important was the idea of manager's satisfaction with the information system. The ease of use and usability measurements did not prove significant but this is not totally surprising. Managers who have been trained in the use of such systems may feel the system is difficult to use even though they are satisfied with the system in general.

Recommendations:

Despite the findings, it is still our belief that technology is an important component of the international marketplace. It is possible that Export Intensity is not the best way to measure success in information technology integration. It may be possible that the importance of integration of information technology to international business efforts may be demonstrated by looking at other measures, such as the number of countries where international business is done, and the type of international operation that is involved (exporting, joint venture, wholly owned subsidiary).

There is an important finding as a result of this study, however. Managers are cognizant of the levels of vertical and horizontal integration of the information systems within their companies, and the degree of integration is related to managerial satisfaction with those systems. This type of system satisfaction is a good, albeit different, measure of success that should be noted. Managers who are satisfied with the systems they use are likely to perform their jobs more effectively, which would tend to improve the performance of the company in general. Thus, the key finding here is that increased levels of vertical and horizontal integration of international information systems improved the satisfaction of the managers who performed international operations within the firm.

West Michigan Firms' International Business Activity in 1996: Results of the Second Annual Survey

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International trade continues to be a principal source of business growth in the 1990s. Below, we will discuss the international business activity of West Michigan manufacturing companies in 1996, obtained from the Second Annual International Survey conducted by Seidman School of Business International Business Program. This survey asked West Michigan firms to tell us about their current international business activity, their commitment to international business, if they plan to increase their international business activity in the future, and in what topic areas of international business firms might seek support, training, or advice.

We mailed the survey to 756 West Michigan manufacturing firms that export located in Kent, Ottawa, Muskegon, and Allegan counties. Each of the 756 firms employ more than 20 people, and 84% employ 200 people or less. Of the 756 questionnaires mailed, 84 were returned, for a response rate of about 12%. The average size of the firms that responded is 151 employees.

Nearly 64% of the respondents reported they had an interest in international sales, but only 46% reported having a person whose main responsibility is looking after international business. Twenty percent said that the person's title is manager, 18% of them said it is a Vice President, and 14% said it is the President who oversees international operations. Over half of the respondents that do business internationally do not have a specific person to oversee these operations.

International sales contribute to the firm's sales growth:

Sixty-five percent of respondents agreed with the statement that international sales contribute to their firm's sales growth. Fifty percent agreed that international sales contribute to the firm's competitiveness, while 50% disagreed with the statement.

International sales account for 11.81 % of total sales:

Average international sales of respondents in 1996 was \$ 3.5 million. Average total sales for these firms was \$ 38.4 million. Therefore, international sales comprise 11.8% of all sales among respondent firms. Respondents predict that their average international sales by the year 2000 will be \$ 7.13 million. The average total sales in 2000 is estimated to be \$ 66.43 million. The ratio of international sales to total sales in 2000 is expected to increase to 17.11%.