

INFORMATION ORIENTATION: A PEOPLE CENTRIC PERFORMANCE MEASURE OF EFFECTIVE INFORMATION USE IN COMPANIES

William J. Kettinger, *Moore School of Business, University of South Carolina, USA*
Donald A. Marchand, *Institute for Management Development (IMD), Switzerland*

Abstract

While many knowledge management scholars have discussed what a company should look like when it has reached an advanced state in using its information, there has been little research empirically validating these ideas or in developing an effectiveness measure to determine whether a company is actually doing a good job in managing its information. Based on a theoretically driven model of information effectiveness consisting of three core information capabilities (IT Practices, Information Management Practices, and Information Behaviors/Values) this research first develops a statistically valid measure of information effectiveness as perceived by senior managers (Information Orientation) and then demonstrates a causal link between higher Information Orientation (IO) and higher business performance. The contributions have scholarly value, as a building block in a theory of knowledge management, and practical value, as a validated measure of information practice effective that is directly tied to improved business performance.

Introduction

There have been many attempts over the last twenty years to describe companies that manage information and knowledge well. Peter Drucker (1988) introduced the notion of the "information-based organization" as an advanced development stage of companies that employ information effectively. Nonaka, Ikujiro and Hirotaka Takeuchi (1995) have written about the "knowledge-creating company" that excels at converting information into usable knowledge for innovation in products and services. Thomas Davenport (1997) has proposed "information ecology" as a metaphor for an effective "business model for information management". While Chun Wei Choo (1998, p.3) offers the concept of the "knowing organization", which he defines as an "organization that is able to integrate sense making, knowledge creation, and decision making effectively". While each of these authors has painted a picture of what a company looks like when it has reached an advanced state in managing and using its information, none of these authors have empirically validated these ideas or have developed an effectiveness measure to determine whether a company is actually doing a good job in managing its information.

Based on the contribution of these authors and others, this research will develop an empirical measure of information management practice that might form the basis for future measure systems. To ensure that we maintain an enterprise-wide performance perspective, we focus on how well senior managers perceive their companies manage information to improve business performance. In essence, we will attempt to validate a measure of the capability of a company to manage information effectively. These information management practices focus on a company's capabilities to effectively manage the use of information in support of coordination and control, tactical problem solving, and strategic decision-making. This paper will first discuss the theoretical underpinnings of our approach, next it will discuss our research and statistical results, and finally it will conclude with managerial implications.

The people-centric view of information use

What is the key to capturing the benefits of the information age? Many companies originally thought the answer was investing in the enabling technologies – computers and networks. The advent of ERP, CRM and the Internet seemed to give information technology even greater importance. Yet a select group of managers sensed that IT was not enough. Often to deaf ears these managers voiced their frustration that IT investments alone do not result in demonstrable competitive advantage. Hefty investments in E-commerce technology only heightened their concern that significant investments in systems and software could be wasted. The dot.com

collapse and the downturn in the world's economy have proven these questioning voices correct and is bringing the payoff of a company's IT investment under closer scrutiny. These managers recognized that there is a human element to effective use of information.

People are continually challenged to interpret events in the business world, and to focus their attention on acquiring the appropriate knowledge – which resides in other people more often than in data warehouses. Effective information use in companies is dependent on the way people sense, represent, and communicate knowledge. Managers are recognizing that what people do with information and how they take part in knowledge gathering and dissemination is as important as the technology they work with.

There is no question that IT plays an important role but it rarely enhances the process of knowledge use. IT may deliver data to the person's desktop but it cannot dictate what they do with it. People institute the information management practices for collecting, organizing, processing and maintaining information. People create a proactive culture in which information is used creatively and shared. Clearly, human performance must be an explicit part of the equation if a company is to have mature information capabilities – a prerequisite for success in the information age.

Unfortunately up to this point, academia has not provided managers with a framework that gives equal weight to people in managing information. In the absence of a unified theoretical framework, practitioners took it upon themselves to formalize management practice. Two broad disciplines emerged. One discipline, often associated with the knowledge management movement, Information Resources Management (IRM) attempted to improve information usage by formalizing the actual activities associated with information stewardship—namely, the information management discipline. Practitioners associated with this discipline have titles such records manager, corporate librarian, information specialist, data administrators and now web site content managers. The other discipline, associated with the computer science and IS fields, formalized practices associated with information use in automated information exchanges using computer and telecommunication technologies—the IT discipline. Practitioners associated with this discipline have titles such as IT manager, programmers, systems analysts, database manager, network administrator, IS manager.

Unfortunately, improving people's behaviors and values related to effective information use—was never really formalized nor incorporated into these separate management disciplines in a serious way. And, because improving the effectiveness of information use was not a major focus of the human resources, operations, and control disciplines, it has remained a side issue. An integrated theory of effective information use must tie these two separate disciplines together and also incorporate a strong people component. It should incorporate a recognition that organizations consist of relationships among people, and how they choose to contribute their knowledge to achieve organizational purposes. We conceptualize this theory of effective information use as a spiral whereby people's good information usage behaviors and values drive better information management. This, in turn, improves the capability of a company to use IT to support decision-making and problem solving, which reinforces good information usage behaviors and values (see Figure 1). When one of these links is derailed, the recursive aspects of the spiral are disabled and a company is less effective in using information.

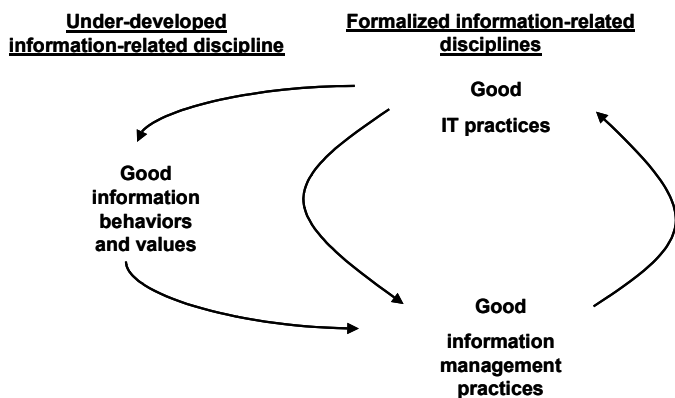


Figure 1: Spiral of effective information use in companies

International research project

These concerns led our team of researchers from IMD in Lausanne Switzerland and the Moore School at the University of South Carolina to conduct a four-year international research study from 1998 through 2001, to confirm, or refute, this new theory of effective information use. This study examined how the interaction of people, information, and technology establishes an orientation towards the use of information within a company, and how this, in turn, affects business performance.

Instrument development: An absence of empirical work in the area, and a need to gather many observations to ensure stable model solutions, suggested the use of survey data collection. All the survey measures were developed from the literature review integrating existing and previously tested constructs and variables in accordance with our theoretical framework. Multiple items were used to measure all proposed constructs. At the draft stage, the questionnaire was reviewed and tested by numerous faculty members and research associates at leading European Business School and at a major research university in the Southeastern USA. The focus of this activity was two-fold: (1) to review the substance of the instruments and ensure content validity, and, (2) to address presentation issues. Pilot testing: the study questionnaire was rigorously pilot-tested with 151 managers attending executive programs at IMD. Of our planned research study sample, one-half of the pilot-testing groups were the CEO, President or Managing Director of their company. A key goal of this pilot testing was to verify that practitioners clearly understood the statements in the questionnaire, and whether there was enough variation in the responses to detect relationships between variables. Final survey instrument: As we wanted to use a full set of parametric statistical techniques to analyze the data, with the intent of producing the most robust and meaningful inferences, we made use of continuous scales (1-7 scale, strongly disagree (1) strongly agree (7) Questions were framed: Our company is extremely good at...). These scales are anchored to produce a judgment on a continuous basis. Based on the multi-phased development process described above, a final survey instrument was honed to measure the conceptual model's constructs and sub-dimensions. Business strategy literature has suggested that multiple measures should be used to measure business performance given the different perceptions of key stakeholders such as employees, customers, shareholders and, particularly, senior managers. Based on the recommendations of Venkatraman (1985), two indicators of business performance—financial performance and market share growth were included in the study. Further suggestions in the more recent strategy research article by Chan et al. (1997) led us to add two additional indicators to the performance measure—improvements in reputation and in product/service innovations—rounding out our overall measure of business performance.

Data collection and sample description: While national and cultural differences exist, managers of international companies are challenged to address a common global competitive environment while facing a barrage of new information technologies. To better understand their common perceptions, a representative international sample of senior managers was used in this study. In survey research, targeted respondents assume the role of a key informant, and provide information on an aggregated unit of analysis, by reporting on organizational properties rather than personal attitudes and behaviors (Venkatraman 1989). We followed this approach by selecting senior executives as our key informant concerning the effective use of information within their companies. In focusing on senior managers, we adopted Hambrick and Mason's (1984) upper-echelons perspective that the organization becomes a reflection of its top executives. They argue that top management characteristics and functions have a far greater potential for predicting business performance and strategic choices. *Sampling frame and sampling procedure:* For this study, potential participant companies were randomly selected from a database of over 5000 Partners, Business Associates, and other companies, which had participated in executive program activities at the European Business School over the past five years. The study sample of 376 companies represented multiple industries, with varying company sizes, levels of business performance, and years of existence. Of the companies invited by direct mail, 103 or 27% signed a Corporate Participation Agreement. These companies were then requested to identify one or more senior managers from senior management teams at corporate, division or business unit levels. This produced a total of 1050 senior managers that were to participate in the study. *Sample profile:* Of the total 1009 senior managers in the study sample, Chief Executive Officers (CEOs) represented the highest concentration of responses within an individual management position category. The majority of study responses (58%) came from Chief Executive Officers, Executive and Senior Vice Presidents and General Managers/Directors. The 1009 senior managers represented 26 countries and 25 industry sectors (see Figure 2). They worked for companies that ranged in size from relatively small (500) to very large (+250,000) employees. The study sample included respondents who had held their existing position from less than one year to over 16 years, of which the majority or (58%) has been in their positions from 1-5 years. In addition, their companies employed respondents for less than one year to over 16 years, the majority of which (51%) have been associated with their companies for over 11 years. Of

the total sample of respondents, 94% were male and 6% were female, ranging in age from 35 to over 56. The majority of the respondents (62%) were between the ages of 41 and 55.

Statistical Analysis: To address our major research question— *Is competence in all three Information Capabilities required to achieve higher business performance?* — the study team used two proven psychometric analysis techniques, confirmatory factor analysis (CFA) and structural equation modeling (SEM), to analyze the results of the participant data. These techniques are widely used in social science, strategy, and marketing research. CFA was used to determine that the individual measurable ideas were valid and consistently perceived by senior managers. They were also used to determine whether these validated ideas (constructs) were sub dimensions of larger “higher level” ideas, such as information orientation (IO). In essence, CFA provides us with a mental map of how senior managers think about effective information use in their companies. SEM was applied to validate the causal linkages between collections of validated ideas and other collections of validated ideas, such as the casual link between higher IO and higher business performance. In building and testing covariance models, it is important to formally assess: (1) the congruence of the data’s distributional properties with the distributional assumptions of the technique; and, (2) the identification of estimated models. Checks of these statistics for the variables of this study revealed no serious departures from multivariate normality or excessive kurtosis. To establish the validity and reliability of our pre-specified factors, Confirmatory Factor Analysis (CFA) was used. CFA was also used to test the presence of higher order factors (Jöreskog and Sörbom 1989). Unlike Exploratory Factor Analysis approaches, CFA directly tests the viability of a pre-developed measurement model’s structure (theory) against the observed data. Within this frame, a unique solution can be obtained and statistical metrics can be employed to determine the adequacy of the model in capturing the observed co-variances. Literature review and executive interviews identified dimensions and associated indicators that provided the definitional context for constructs. Checks Cronbach’s alpha values reveal the scale reliabilities are satisfactory. Figures 2 and 3 illustrates the results of CFA and SEM modeling. While no definitive metric exists for assessing the absolute strength of model fit, the Comparative Fit Index (CFI) of 0.90, and the Root Mean Squared Error of Approximation (RMSEA) 0.08 and .09, provide evidence of model fit and factor loadings between the first and second order factor are strong. In addition, highly significant t-values ($t > |2.00|$) can be observed for each indicator, giving evidence of convergent validity (Bollen 1989; Jöreskog and Sörbom 1989). Both models met all these criteria.

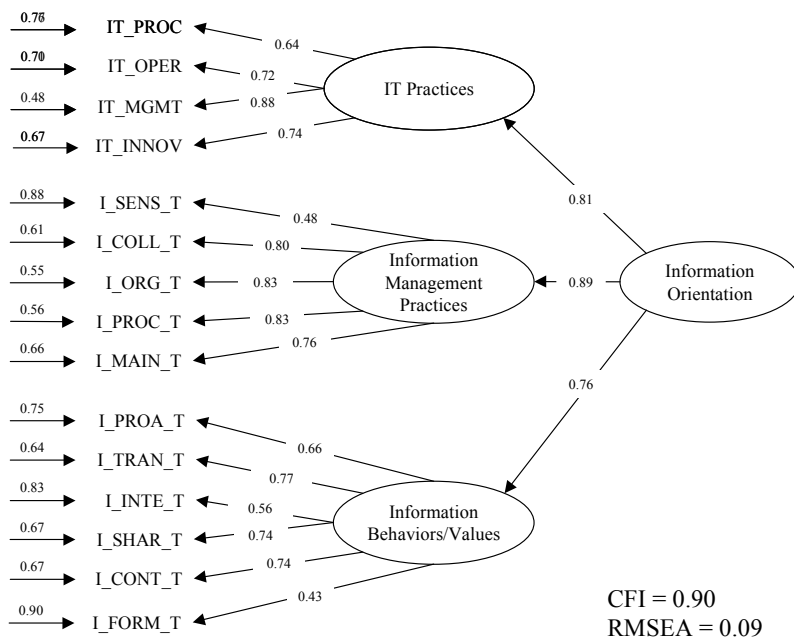


Figure 2: Confirmatory Factor Model of Information Orientation

Figure 3 demonstrates that IT practices, information management practices, and information behaviors and values together, through a shared and more comprehensive indicator (information orientation), predict higher business performance than any one or subset of these capabilities.

In sum, our findings discovered a new and comprehensive measure of effective information use that predicts business performance. We call this new metric “Information Orientation” or IO. Information Orientation measures the extent to which senior managers perceive that their organizations possess the capabilities associated with effective information use to improve business performance. IO does this by determining the degree to which a company possesses competence across three vital Information Capabilities (IC) (see Figure 4):

Information Technology Practices (ITP) – the capabilities of a company to effectively manage information technology (IT) applications and infrastructure to support operations, business processes, innovation, and managerial decision-making.

Information Management Practices (IMP) – the capabilities of a company to manage information effectively over the life cycle of information use including sensing, collecting, organizing, processing, and maintaining information.

Information Behaviors and Values (IBV) – the capabilities of a company to instill and promote behaviors and values in its people for effective use of information. These include integrity, formality, control, transparency, sharing and proactive ness.

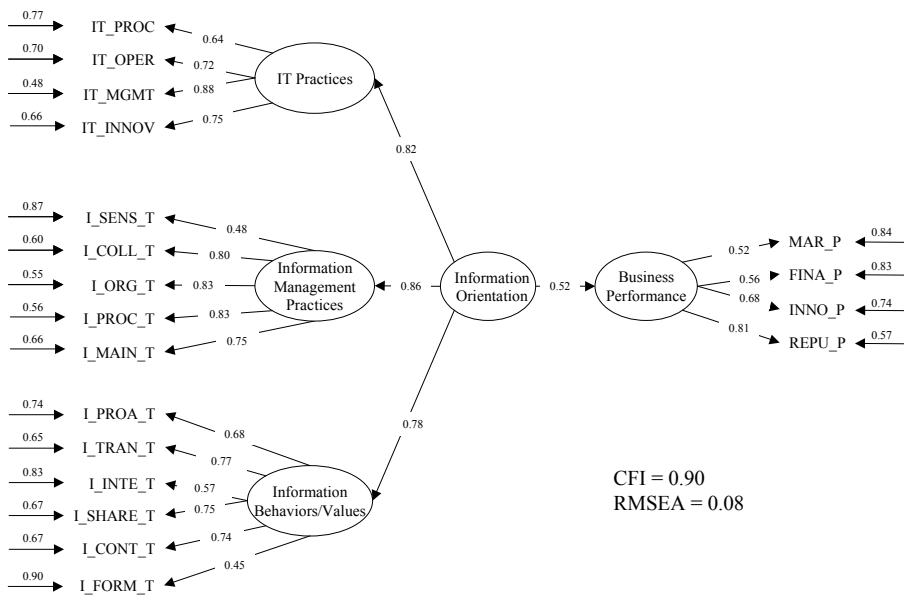


Figure 3: Structural Equation Model of IO Predicting Business Performance

Practically, our results indicate that an organization must score high on all three information capabilities to realize superior business performance. In other words, each of the capabilities alone is necessary but not sufficient for higher business performance. The dimensions within each information capability (see Figure 4) influence an orientation toward information use that is measured as the interaction of the three distinct information capabilities. Being high on this orientation, i.e., IO, predicts higher business performance.



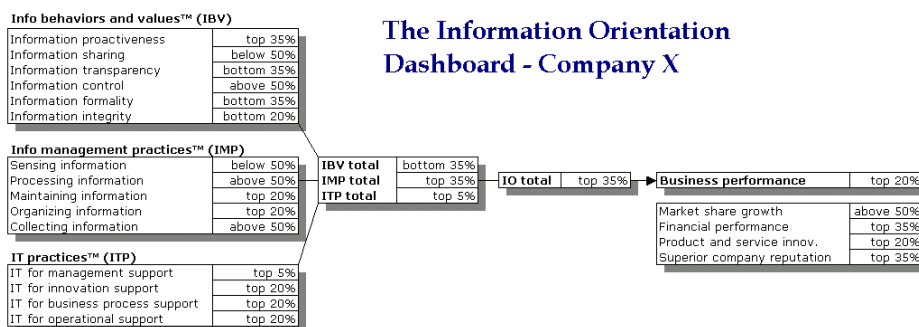
Figure 4: Key study finding - senior managers' mental model of effective information use

The Information Orientation Dashboard – the IO Diagnostic tool

We developed the Information Orientation Dashboard (IO Dashboard™ in Figure 5) as a diagnostic benchmarking tool that senior managers can use to evaluate each dimension of IO in their companies. The IO Dashboard gives percentage rankings of each capability relative to our benchmark of global senior management teams. In a simple picture it shows companies exactly which information capabilities they need to improve to achieve higher IO. Managers can identify areas of strengths and areas in need of improvement. The IO Dashboard is also a powerful management tool for internal or external benchmarking. This diagnostic tool can be used for intra-industry and cross-industry benchmarking. Managers that need a more effective measure of global IO can use the Dashboard as a diagnostic tool in their company for comparing the information capabilities of multiple business units and divisions worldwide.

To read the IO Dashboard, first look at Figure 5. Note that our benchmark of business entities have been categorized in percentiles, based on their scores relative to the average sample scores across all the measures of the IO Diagnostic. At the far left of the Dashboard are the dimensions. To their right are the information capabilities to which they belong. The total IO score for a business unit/company follows. To the right of the IO total score is the corresponding company's (Overall) benchmarked Business Performance total score. Finally, at the far right of the Dashboard are the items that make up the scores for business performance.

Figure 5: The Information Orientation Dashboard - Company X



Carrying out the IO assessment periodically permits an evaluation of the journey the company is taking toward achieving more effective information use. With these periodic IO measures, managers can ask the following questions. Which actions to improve information capabilities have worked? Which ones have not? Which dimensions of information capabilities does the company need to work harder on? Did the level of IO to business performance improve or decline? Moreover, the IO of multiple business units can be assessed on a corporate-wide level. Knowing the relative information capabilities of the business units, corporate and business unit managers can develop a portfolio approach to improving information capabilities and IO levels to raise the business performance of a group or global company. Managers can learn about best practices in managing information capabilities from high-performing business units and transfer them to lower performing business units.

Applying the IO measure

The new IO metric has several important characteristics:

- Information Orientation is not limited to the IT department or other information management support functions; IO is an organization-wide metric.
- Information Orientation applies universally across international borders. No statistically significant differences exist between the senior manager responses in North America and Western Europe. These findings strongly suggest that the model is applicable to companies operating globally.
- Managers can use Information Orientation as a key performance indicator over time. With it, they can assess how effectively their actions have improved information behaviors and values, information management practices, and IT practices.

Conclusion

All business organizations depend on effective information use by their people to succeed. Whether the company is a start-up looking for unprecedented new opportunities or an established business seeking superior performance in established markets, both require excellent information capabilities. We believe we have made good strides towards discovering how effective information use and business performance are linked through the interaction between people, IT and information. Companies incorporating a people-centric, rather than merely techno-centric, view of information use and which are good at all three information capabilities should improve their business performance. Moreover, if IO is measured periodically, a company can more systematically plot its course to higher performance. Leading your company on a journey to achieve high IO and attain superior business performance takes hard work, persistence and personal commitment. Knowing this, our intent is not to promote a new management fad or offer a silver bullet solution, rather to offer a useful tool that helps develop the right mind-set about effective information use in their business.

Note: This research was partially sponsored by IMD Switzerland and Andersen Consulting. For further information on the research and managerial implications see Marchand, Kettinger and Rollins (2001).

References

- Bollen, K.A. (1989). Structural Equations with Latent Variables. New York: John Wiley & Sons.
- Chan, Y., Huff, S., Barclay, D. and Copeland, D. G. (1997). "Business Strategic Orientation, Information Systems Strategic Orientation, and Strategic Alignment," Information Systems Research 8(2): 125-150.
- Choo, Chun Wei. (1998). The Knowing Organization: How Organizations Use Information to Construct Meaning, Create Knowledge, and Make Decisions. New York: Oxford University Press.
- Davenport, T.H. (1997). Information Ecology: Mastering the Information and Knowledge Environment. New York: Oxford University Press.
- Drucker, P.F. (1988). "The Coming of the New Organization," Harvard Business Review 66(1): 45-53.
- Hambrick, D.C. and Mason, P.A. (1984). "Upper Echelon: The Organization as a Reflection of its Top Managers," Academy of Management Review 9 (2): 191-206.
- Jöreskog, K.G., and Sörbom, D. (1989). LISREL 7: A Guide to the Program and Applications. Chicago, Illinois: SPSS, Inc.
- Nonaka, I. and Takeuchi, I. (1995). The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation. New York: Oxford University Press.
- Marchand, D.A, Kettinger, W.J. and Rollins J. (2001). Information Orientation: The Link to Business Performance. Oxford University Press 2001.
- Venkatraman, N. and Walker, G. (1989). "Strategic Consistency: Theory and Analysis," Unpublished Working Paper, Sloan School of Management, MIT, Cambridge.
- Venkatraman, N. (1985). Strategic Orientation of Business Enterprises: The Construct and its Measurement. Ph.D. Dissertation, University of Pittsburgh, Pittsburgh, PA.

