Adding Value in an Information Function

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ABSTRACT

This paper is the second of three reports on the competitor scanning function in three major multinational firms that had recently moved to set up a formal system for competitor analysis. In the course of the project we interviewed 73 people whose job descriptions included formal responsibility for competitor analysis; 17 people who managed these "scanners"; 63 people whom the scanners identified as their most significant internal clients for competitor information; and 8 Information Technology specialists who were involved in helping the "scanners" develop systems for handling competitor information.

The first paper presented the assessments of the current state of the CI (competitor intelligence) function. To summarize briefly, we found that most scanners and clients agreed that while competitor intelligence was extremely important and growing in importance, the function had not met expectations and needs. There is, however, substantial disagreement on the principal impediments to effective CI use and on where the function should focus its efforts at improvement. Clients put much more stress on the need for CI outputs to address current management problems, to have more value added, and to use more effective analytical techniques. While CI specialists themselves recognize the importance of improving CI outputs, they are more likely to see impediments in factors outside their control, such as management culture and inadequate allocation of resources to the function. Scanners also have higher expectations of the potential contribution of information technology.

Client demands that CI outputs be more useful raised the question of how CI actually is used. Six uses emerged in the course of the interviews: decision-making and planning, which operate at the level of action in the organization; legitimation (providing justification for changes already desired) and inspiration (providing new ideas of how to solve problems), which operate at the level of organizational routines and heuristics; and sensitization (making people aware of the relevance of formidable competitors) and benchmarking, which operate at the level of basic assumptions. The examples of use given in the client interviews were dominated by planning, although one-third of the examples were of uses below the action level.

This paper identifies three dimensions on which value is added to information. The first is data management (acquisition, classification, storage, retrieval, editing, verification, presentation, aggregation, distribution, and assessment); the second is analysis (synthesis, hypothesis, and assumptions testing); the third is implication. Each dimension addresses a different question. Data management asks "What do we know?"; analysis asks "What does it mean?"; and implication asks "How should we respond?" The potential application of information technology is greatest in data management, and least in implication.

INTRODUCTION

Two pieces of information land on a manager's desk one day. One is a message that Competitor X has just approached the chairman of a major event to inquire about sponsorship. The other is that Competitor Y's reported earnings have risen 40% over the previous year. In response to the first item, the manager picks up the phone and makes a preemptive offer on the event sponsorship. The second item he notes with some interest and perhaps with some irritation, because he wants an explanation of the change in performance and a breakdown by product lines. The first piece of information has immediate action implications, without further processing: it is of high value but low value added. The second requires further information and analysis -- value adding --before the action implications, if any, can even begin to be considered.

Managers and competitor scanners alike often carry a model of information dominated by intrinsic value rather than value adding: that is, the assignment of value to pieces of information depending on their intrinsic value in making specific decisions, rather than a model of information processing which focuses on the value that is added to information. The scanner who envisions the ultimate success of his function as unearthing the single piece of information that will produce the multi-million dollar deal and the manager who wants his scanners to hand him the key item of CI that will enable him to make that day's decisions with greater certainty are both carrying a model of CI that may be unsuited to their situation. Certain types of firms -- and certain activities within firms -- depend heavily on timely but low value-added information. Firms whose industries are dominated by discrete transactions -- trading companies[1] and construction firms[2] are prime examples -- have to build information systems to collect and distribute quickly information about an array of aspects of the business environment, including competitor behaviour as well as pending deals and business opportunities. Such information, with almost no "processing," has immediate action implications. For most firms, however, information about competitors and competitive situations requires considerably more "value added" before it can be used.[3]

Defining "value added" for information is a problem that continues to plague those who study information-processing, because "value" is usually defined either in terms of use in specific decisions or in individual, highly subjective terms. For example, one manager told us, "I don't want a data dump. If the information can't be summarized in a page, it's of no use to me." Another in the same company said, "I'd rather be inundated with information and not have time to read it than have it condensed and screened for me by staff people." For the first manager, screening and condensing information adds value; for the second, it reduces it. Is there any way a generic model of "value adding" can be constructed under such circumstances?

The first manager is assimilating CI to the dominant organizational model of information-processing: adding value by standardizing information and using routinized procedures for summarizing it, so that the volume of

information is reduced at each step of information-processing. This is indeed a powerful way of adding value to information, but it is not the only way, as the second manager's comment recognizes. Information may well gain in value by gathering additional interpretation and contextual information as it is transmitted within the organization. However, information processing systems for this kind of information are much less well-developed than the volume-reduction systems; organizational models of information processing tend to be based on the treatment of quantitative data, which is much easier to reduce.

Clearly any effort to develop concepts for information value adding processes must supplement their focus on the "reduction" models by including "amplification" models. In addition, it must also move away from the subjective, individual paradigm of value to a more organizational model. And finally, it must address the issue of whether, even though the intrinsic value of pieces of information may be highly context-specific, it is possible to develop a generic model of how the "pieces" of information are processed in order to add value. Only then can we begin to address usefully the question of how the formal CI function can build its learning curves in adding value to competitor information.

DIMENSIONS OF VALUE ADDING

We began to conduct our study of competitor analysis in three major multinational corporations with an explicit sequential model of an information value adding chain that we hoped to refine and test in the course of our investigation. However, a very different model began to emerge from scanners' descriptions of what they did, from their managers' discussions of changes over time in the CI function, and from client perceptions of what made information more or less valuable. Instead of a "chain" of value adding stages we began to perceive three interrelated but distinct clusters of value adding activities.

To give just one example of the many comments that led us to the three-dimension model, here is the reply of one of the "managers of scanners" to our question about changes over time in the CI function:

> "Some expansion has occurred in the amount of information on competitors, but the main change is the recognition that more information on competitors isn't what they need; it's information that is interpreted and tailored to their needs."

And later in the same interview, in response to a question on what advice he would give someone succeeding him in the position of managing the CI function, he said, "We have to aim more at `so what?' and `what do we do?' rather than just at what are the facts. We no longer need studies that just document that there are competitive problems."

While the respondent himself did not explicitly identify them, his remarks and many others like them imply that there are three activity clusters: getting the information, analyzing it in order to interpret competitor behaviour, and working on what the company could do in response. Although much of the attention of clients and scanners alike

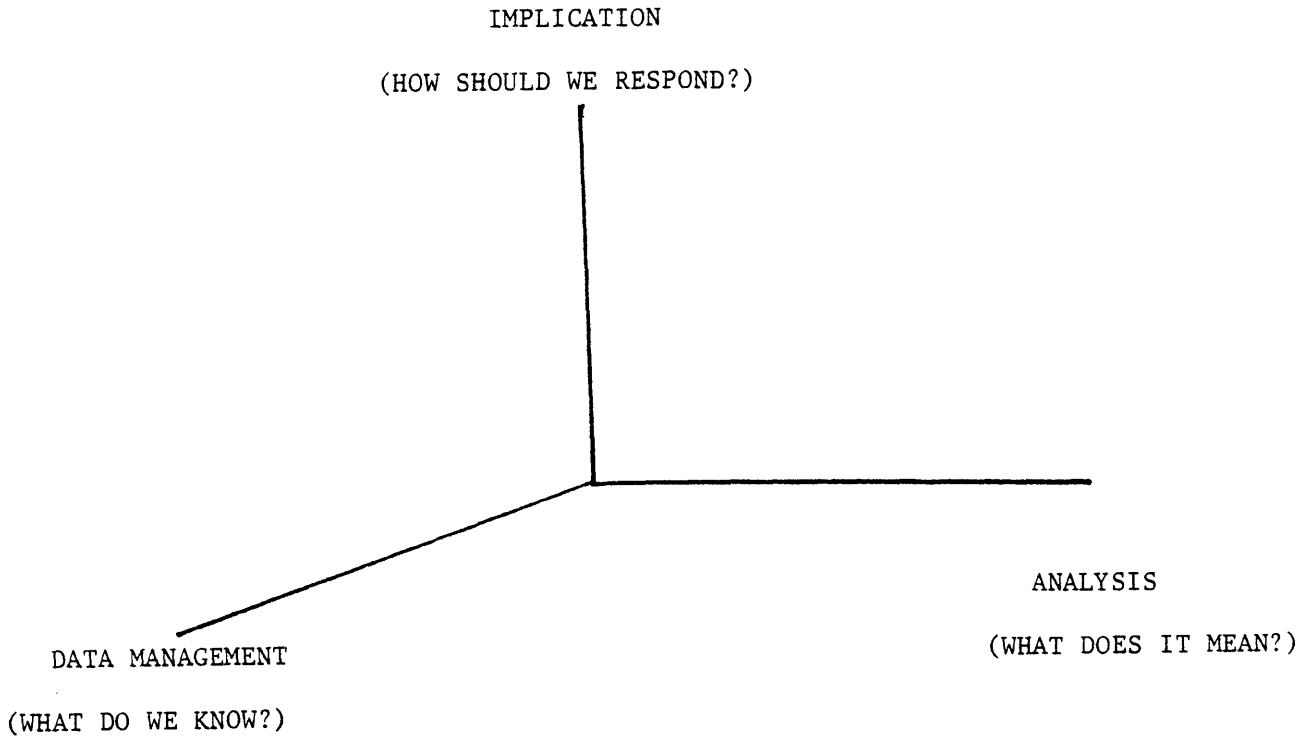
was focused on "getting the information" as a distinct activity, it became clear in the course of our interviews that acquisition is in fact only one of a larger set of activities that involve information handling. Reducing this dimension to "acquisition" is focusing on the tip of an iceberg, with potentially serious costs for understanding how value is added to information.

We have labeled this activity cluster "Data Management" because it goes well beyond acquisition of information to include many aspects of the manipulation of information without any transformation of its basic content. It includes ten processes: acquisition, classification, storage, retrieval, editing, verification and "quality control", presentation (i.e. the choice of format), aggregation (as in the production of newsletters), distribution, and assessment (the collection of information on client reactions to the output of the CI function). The second dimension is "analysis". It involves primarily three processes: synthesis (putting information together so as to assemble a complete picture that is more than the sum of the parts); hypothesis (which involves the development of scenarios and "what if" techniques of analysis); and assumption building and testing (the continuing explication and testing of the underlying assumptions that guide synthesis and hypothesis). The third dimension is the elucidation of the range of possible responses to the competitor behaviour, the range of subsequent competitor responses, and the consideration of future action alternatives; we have labelled this dimension "implication". Each dimension addresses a different question. Data management asks "What do we know?"; analysis asks "What does it mean?"; and implication asks "How should we respond?" (Exhibit 1).[4]

At first glance this model may also seem like a sequential "value added chain": first one gathers information and classifies, stores, retrieves it and so on; next, one analyzes it; then one assesses the implications for one's own behaviour. However, as an ongoing system it is interactive, not sequential. The data management dimension is (or should be) continuously fed by the value added information produced on the analysis dimension. That value added information itself has to be stored, retrieved, disseminated, and so on. And information about competitor responses to company moves that were at least in part the result of value adding on the implication dimension must also be handled by the data management dimension. The activities of the analysis dimension that deal with assumption specification and testing should be continuously informed by the work being done on the implications dimension. The three dimensions should be genuinely interactive, not sequential, although in the early stages of the evolution of the CI function they may be sequential-- and a great deal of value added information may be lost as a result.

The fact that an activity or a dimension adds value to information does not automatically mean that it is "valuable" to the firm. Just as it is possible for a product to be "over-engineered" -- that is, to have more value added than the market or the organization requires -- so it is possible for information to be "over-processed" -- to have value added unnecessarily. But understanding systematically the nature of the activities by which value is added to information is a necessary first step to the judgment of how much value adding is needed for a particular organization or a paricular use. For example, all six uses of CI identified

EXHIBIT 1 : DIMENSIONS OF VALUE ADDING



in our first report -- sensitization, benchmarking, legitimation, inspiration, decision-making, and planning -- usually require some value adding on all three dimensions. But the importance of the value added on each dimension varies according to the primary use of the information.

Decision-making and planning, if they are to be effective, are the two uses which require the most value adding on the implication dimension, since a careful consideration of the range of feasible responses to competitor behaviour is an essential part of both. Clients who expressed uneasiness with the very concept of CI on the grounds that it carried the danger of producing mindless imitation of a competitor were, consciously or not, worried that the organization would make a direct leap from the data management and analysis dimensions to action, without sufficient consideration of the possibility of alternatives to competitor matching. In other words, their concern is that insufficient value will be added on the implications dimension. For both benchmarking and legitimation, while data management processes are obviously a prerequisite, the information requires considerable systematic analysis to provide usable benchmarks or the convincing evidence of the link between a particular structure or process and performance that legitmates a particular organizational decision. And for sensitization and inspiration, often simply getting and distributing the information about a competitor's behaviour, with very little value added on the analysis or implications dimension, is enough.

In our analysis of the assessments of the reasons why competitor analysis in these three companies had not yet met the expectations that its internal "clients" held for it, we found that data management issues loom larger for scanners than for clients, and implications issues for clients than for scanners. However, the greatest gap between the two groups is on the crucial middle dimension of Analysis, where the clients are much more inclined to perceive major inadequacies than the scanners themselves (28% of the clients vs. 12% of the scanners mentioned this as a problem area).

The following sections take one of the three value adding dimensions and discuss the processes involved and some of the patterns common across the three firms.

DATA MANAGEMENT

The motive for formalizing the Data Management dimension of the CI function was expressed by one client when he said, "We need a better understanding of what we know. We have a fairly good informal system, but we need to formalize and publish what we know." Data Management involves the activities that are most routinized and most disliked by scanners themselves. One of our questions to scanners was "What do you like most and least about your job?" The most frequent responses on the least liked aspect concerned data management: "reading all those journals, photocopying, and filing;" "the mechanics of number crunching;" "passing on information in multiple copies in set formats that haven't changed in years;" "getting people to put in information;" "when information is too detailed and complex to categorize for the data base" -- these are just some of the responses. Each of the ten data management processes--acquisition, classification, storage, retrieval, editing, verification,

presentation, aggregation, distribution, and assessment -- adds value to the information, and most are essential for all information. But each activity requires a slightly different set of skills, it requires time, and the value that it adds is all too often invisible both to clients and to the scanners themselves.[5]

The following section examines the current practices and problems in the three companies on each of the data management processes. With very few exceptions, CI specialists in all three companies are responsible for the full range of value adding processes in data management. As a result, they complain, they have too little time left for analyzing the data. One of the key issues is improving the performance of the CI function is to discover ways to reduce the time allocated to Data Management by CI analysts without reducing the level of value added--indeed, if possible to raise the level of value added.

1. ACQUISITION

Bringing information across the boundaries of the firm and collecting it in the CI function adds value to that information, just as "procurement" is an important element of adding value in a processing industry. But how that information is acquired and from what sources are complicated issues.[6]

A longstanding category of analysis in environmental scanning in general is the distinction between surveillance (routinized reference to a basic set of sources) and search (a focused hunt for specific information). While most of our respondents immediately recognized the validity of these two modes, they had difficulty estimating how their time was divided between the two, because of the great amount of variation between times when they were focused on specific projects and times when they had more slack for surveillance. Scanners whose activities were driven primarily by client demand for information tended to believe they spent more time in search rather than surveillance; those who produced newsletters spent more of their time in surveillance. But even those whose activities were primarily search-focused felt that acquisition was one of the most tedious parts of their job. As one respondent told us, in response to our question about what he liked least about his job, "Reading all the material is what I like least. Just getting the information takes half my time; my productivity would be increased if the collection of the information could be farmed out...Any well-trained secretary can gather information; interpreting it is what requires the skill."

Discussions of surveillance and search in the general literature on environmental scanning refer primarily to external sources. But an important reason for setting up the CI function is to tap systematically the organization's own internal sources of competitor information as well as the external sources. Most scanners spend at least some of their time identifying and cultivating key people within their own organizations who pick up important and timely information about competitors.

Table 1 summarizes the answers given in the interviews to the question, "What are your major sources of information about competitors?"

TABLE 1: ACQUISITION: SOURCES OF CI
(based on 53 scanner interviews[7])

	Number of scanners	%
INTERNAL	49	92.5
Personal contacts	25	47.2
(other CI people)	(15)	(28.3)
Internal reports/data	25	47.2
Overseas subsidiaries	13	24.5
Own data base	3	5.7
EXTERNAL	45	84.9
Publications/documents	38	71.7
Consultants/contract services	16	30.2
Informal personal contacts	13	24.5
Online databases	9	17.0
Trade shows	7	13.2

It shows that scanners are indeed using both internal and external sources. Over 90% of the scanners cited at least one source of internal information as important to them, while nearly 85% mentioned at least one external source. On the other hand, the single most commonly cited source was external publications and documents, a fact which may explain the perception of many clients that the CI function is better at getting external than internal information. The second most frequently mentioned external source was the external consultant or contract service: over 30% of the scanners report currently using such services to collect external information (clearly using an outside service to collect internal information is beyond the bounds of feasibility or desirability).

Personal contacts are important as sources both externally and internally, but they are more important internally -- again providing an indication that the CI function is indeed tapping into internal sources. However, it is important to note the salience of "other CI people" among the internal personal sources. Fifteen of the scanners mentioned other CI people as important elements of their internal information network, and this is worthy of note because it suggests strongly the importance of the formal CI network in moving information across SBUs, functions, geographic units, and levels (none of the individuals mentioned in this context were people in the same CI unit). We should note that 12 of the 15 scanners were in the company that has developed the most extensive formal parallel CI systems.

It is also interesting to note that although we may have entered the "age of IT," for the scanners we interviewed, personal contacts are still a more important external source (cited by 25%) than online data bases (17%), despite the increasingly aggressive marketing efforts of data base companies and consultants. Only three scanners mentioned their own data base as a major source. One had created a personal text data base of trade press clippings that were put on line by an outside firm which used an optical scanner. The other two cited pre-existing market share or marketing data bases that contained competitor information. (Note: several other scanners pointed out that they contributed material to a data base, but they did not mention these data bases as sources of useful information for their own work.)

Table 1 aggregates the data from all three companies, and therefore does not capture an important dimension of variation across the three firms. The balance between internal and external sources in any company is strongly influenced by the richness of the external information environment. Industries vary considerably in the extent to which an external information market has developed to provide detailed competitor information. Take, for example, the automobile industry and the photographic materials industry. The automobile industry has an extensive trade press and receives considerable attention in the general business press. Moreover, a number of firms that specialize in providing industry and firm-level information actively market their services to the major auto firms. In contrast, the photographic materials industry receives comparatively little attention in the general business press, and while consumer-oriented trade publications have proliferated, they contain relatively little information on competing firms, as opposed to competing products. Among the major factors which determine the richness of the external information environment are the following: the number of competitors, the scale of the industry, and the level of overlap across

other industries (which determine the size of the potential market for external information suppliers); and the level of regulation (which influences the amount of public sector information available).

In an information-rich external environment, clients are likely to feel that they are generally well-informed about their competitors from their own reading, and that they do not need the CI function to pick up general external information for them. Instead they expect the CI function to draw in the more detailed and focused competitor information that resides within the firm. In an information-lean environment, by contrast, managers can rely much less on their own "surveillance" of external published material to keep them abreast of their competitors' strategic behaviour, and they are more likely to value external information that is sought out and provided to them by the CI function. We do not have independent measures of the richness of the external and internal information flows for our three companies, but our observations strongly suggested that the motor vehicle industry and the petroleum industry sustained much richer external information markets than the photographic materials industry. We found when we tabulated the distribution of responses across the companies that our expectations about the effect of the external information markets on acquisition patterns were borne out. In information-rich environments, scanners relied more heavily on internal information; in relatively information-lean environments, the resort to external information was much greater.

The density of internal information flows -- in other words, the corporation's internal information environment -- also influences the pattern of sources, especially the balance within the internal sources between documents and personal contacts. The denser the internal informal information flows within a corporation, the greater we would expect to find the reliance on internal personal contacts rather than internal documents. In Table 1, the balance between the two is identical: 47% of the scanners mentioned each source. However, this balance conceals an interesting difference across the three companies.

In the absence of any "hard" measures of internal information density we tried to place each of the three companies on the continuum between "rich" and "lean" on the basis of our own experience of several weeks duration. When we looked at the distribution across the three companies in the number of respondents who cited internal personal contacts and internal reports and data collections as important sources, we found that the company we located closest to the centre of the continuum had the most balanced distribution; the company we had characterized as having a "lean" informal information environment was strongly biased toward internal documents, and the company that prided itself on its "rich" informal information network had the greatest reliance on personal sources.

The current role of IT in acquisition is somewhat less than we expected, particularly in the acquisition of external information through online data bases. When we asked some of those scanners who were not using online data bases what was preventing them from doing so, they indicated that the major impediments were inadequate information about the quality and relevance of the data bases for their work; a lack of

training in using such systems; the feeling that most external data bases contained information that was too general for their needs (this was especially common among SBU CI people); and the high cost. Several indicated that having a corporate "centre of expertise" that could provide up-to-date information and training and shared access to key external data bases would be extremely useful, but none of the three companies currently provided such services, at least in the perception of the scanners.

The use of IT in external information acquisition may well be greater than Table 1 indicates, although it may be indirect: the external consultants and services may be making use of external online data bases to produce their "product". Such services may be able to provide the benefits of such services at lower costs, because they can reap the advantages of scale and scope in a way that its client firms cannot. Why then is there not more extensive contracting out of the acquisition of external information? One "manager of scanners" gave some convincing reasons for keeping at least part of the process in-house. His company has decided to contract out external acquisition for a certain set of competitors while keeping it in-house for a very small number of key "corporate" competitors (that is, firms which compete across the dominant businesses and most major product lines). There are two benefits from this system. The first is that the level of understanding of those core competitors is so much higher within the firm than it is outside, even in a specialized contractor, that more value is added by keeping the process inside. Second, having in-house acquisition enables him to benchmark the external contractors and assess their costs (and the quality and scope of the product), and having the external contractors provides a benchmark for the internal process. In SBUs, however, where a single individual may have the sole responsibility for the entire CI value adding process, there may be little choice but to contract out all of this process. The external contractor can feasibly undertake both external surveillance and search, and indeed they may have some advantages in search, because they can approach the competitors' suppliers and customers and even in some cases the competitor itself for information.

We came across only one example of an apparently successful application of IT to the routinized collection of internal information, and that was in one SBU where the competitor scanner had created a "news hotline" using a voice-messaging system, where the sales people in the field could call a dedicated number and leave a message about any competitor behaviour they thought was of potential use to other sales people, primarily technical product information and pricing data, outside as well as inside the home country. As the scanner described it, he received between 10 and 15 calls a day, often concerning the same trend. If he received no disconfirming reports within the next twenty-four hours, he put out a "news broadcast" over the voice messaging system, summarizing the news received. It is worth noting that IT is <u>not</u> used to store this information; the scanner takes notes and puts them in a file. It is important to note several key factors behind the apparent success of this system: the contributors are not required to add value to their information by classification, storage, or editing; contribution is on a voluntary basis; and the contributors quickly receive value-added information back (that is, information which has been subject to some of

the Data Management processes and in most cases to some analysis). It is important to note that the incentive to contribute is not recogition or reward, but value added information.

2. CLASSIFICATION, STORAGE, AND RETRIEVAL

These are three distinct processes in terms of the activites and the skill levels involved, but all three are integrally linked to the storage mode. Classification is the generation and assignment of categories for the information, and it remains a necessary condition for effective storage and retrieval largely owing to the fact that very little CI is currently stored in an electronic form that would allow searching and retrieval through the use of key words. Despite several efforts within the companies we have examined to set up a central CI data base, none is as yet functioning; CI is still primarily stored in hard copy or on word processors that lack extensive keyword search capacities. The role of IT in classification is inextricably linked to the use of IT in storage: as its use in storage rises, the value added in classification will decrease.

Currently the dominant mode of storage is the filing cabinet, and this creates serious problems on all three value adding processes. Scanners complained of the "bulging file cabinet" and its associated inefficiencies: the problem of running out of storage space; the problem of deciding which file was appropriate for a complex document (classification); the problem of retrieving information speedily when one's only guide was a certainty that "I knew I'd seen that information in an article only a week or so ago, but I couldn't remember where I'd put it." Most CI specialists have no formal training as information handlers, and so they devise their own idiosyncratic methods of classification. Often their best guide to finding information in their files is their own memory of where they put it or of when they filed it. As a result, even though classification, filing, and retrieval are tedious and low-skill tasks, they are reluctant to hand them over to clerical staff, fearing -- rightly-- that to do so would lower rather than raise their ability to make efficient use of the information they are storing. However, when another individual takes over the position, the stored information is virtually unusable, given the impenetrability of the classification system.

The situation is complicated by the fact that the more analysis a CI output contains, the more difficult it is to classify the information neatly and parsimoniously for subsequent retrieval. This is one of the factors behind complaints[8] that the CI function's outputs are not sufficiently cumulative. The most difficult classification, storage, and retrieval tasks are often those associated with the analytical outputs of the CI function itself. These documents often have limited circulation, and yet the information and analysis might be of inestimable use to another analyst working on a slightly different aspect of the same competitor(s). Yet because the documents are "stand-alone" productions, whose analysis is rarely added to the "filing cabinet", CI analysts not involved in its production may not even be aware that it exists. One of the companies is trying to remedy this by creating an annotated bibliography of CI outputs. This effort at classification is laudable, but the problem of retrieval has yet to be addressed: even when a CI specialist finds a reference to a potentially useful document, there is no central storage

repository that would make its retrieval speedy and effortless. The CI person must obtain it from whoever is listed as its producer -- which may well be someone who no longer has CI responsibility, or who is away from their desk for the critical time period. As this example shows, a solution to a problem on one Data Management process may be excellent in itself, but if related problems on other processes are ignored, the solution may well fail to make any difference, despite the expenditure of considerable time and effort.

Classification systems that separate out "hard" and "soft" information may simplify problems of storage and retrieval through the creation of at least two distinct kinds of files or data bases: quantitative "key indicators" files and descriptive, explanatory text files. However, this can raise the level of resistence of SBUs and subunits to sharing CI with other units. One "manager of scanners" gave us an excellent example of this. In one important product area, the SBU had collected information that showed that while the company's own sales had stayed virtually flat over a certain period of time, the principal competitor's had risen considerably. However, that period was a one of transition to a new production process that entailed unforeseen quality problems, and in the eyes of the SBU the fact that the company had prevented its sales from falling represented a triumph of marketing. When the sales figures were taken out of that report and separated from this context, however, they were used to show the superiority of the competitor's marketing. Developing CI classification and storage systems that do not require the uncoupling of quantitative and contextual descriptive information is probably an essential condition for the more open sharing of CI across units and for the accurate analysis of information. It can also save time at later stages of the value adding, when the context usually has to be added back in.

Understandably all three companies have experimented with the possibility of creating a central on-line competitor data base that would include all important information about major competitors and be widely accessible throughout the corporation, thus simultaneously solving the problems of classification (such classification as would be necessary would be standardized throughout the company, and the capacity of an on-line system for keyword search would lower the value added contribution of classification anyway), storage capacity, and retrieval, and would make it possible for more value adding processes to be carried on outside the formal CI function. None of these efforts has as yet produced an operating central on-line data base, an issue to which we shall return later in the paper.

Where internally created text data bases exist, there is all too often inadequate clerical support to put the information into the machine, and especially in SBUs, scanners spend much of their time creating their own text storage on word processing systems. The keyword search capacity of these systems is also all too often inadequate: it is oriented to editing and spelling-checks, rather than content searches. The use of optical scanners to store text is surprisingly infrequent: we came across only one example of this, which was contracted out to a firm that specialized in the creation of such text data bases.

3. EDITING AND VERIFICATION/QUALITY CONTROL

Both these processes involve managing the stored data. Editing is primarily the task of weeding out information that is outdated or no longer relevant and either placing it in "dead storage" or discarding it altogether. Verification/quality control is the process of checking to make sure that the stored information is accurate. Again, both these processes are fairly routine and because the value they add is often invisible to scanners and clients alike these tasks tend to get neglected under the pressure of time. One of the reasons for the "bulging file cabinet" problem is that its keeper never has the time to sit down and weed out information that has been made obsolete or to cross-check various sources to ensure that the information stored is the most accurate available.

Editing involves far less specialized knowledge that verification and quality control, and can be undertaken by someone with very little specialized training once the basic principles are established and an appropriate repository for "dead storage" set up so that information is not completely lost should an error of judgment be made. Editing is facilitated if a system whereby information that is used is "tagged" in some way so that unused material can be readily identified. Editing adds value to information processing because it reduces search and retrieval time and thereby increases the efficiency of "processing". It is analogous to the practice of "keeping a clean work space" so important in Japanese approaches to Quality Control and productivity enhancement, and it tends to be ignored in Western organizations for much the same reasons as it is resisted in Western factories: it is seen as a "waste of time" and an uninteresting housekeeping task.

Verification and quality control are far more demanding, both for external and internal information. One scanner responded to a question about how he made judgments on the quality of the external information he received by saying, "The critical capability is derived from reading a lot of stuff on the same topic." Checking the validity of internally derived information is an even more demanding task. The formal CI system is caught in the dilemma that it is expected to make use of internal information, and yet managers often believe internal information is biased. For example, as one manager of the CI function said to us, "The primary source of information on competitor pricing is our sales people, but they are always wanting to lower prices and they will pass along any information that seems to justify that." Because of the important role of CI in legitimation, internal information sources are strongly suspected of bias, even when the information they provide is highly valued as more immediate and up-to-date than most external information. The extra effort needed to verify internal information often means that even while it is collected it is not used.

4. AGGREGATION AND PRESENTATION/FORMATTING

Aggregation is the putting together of pieces of information in terms of physically putting them side by side. It should be clearly distinguished from synthesis, one of the analytical processes that makes the whole greater than the sum of the parts by adding a level of interpretation of

the emergent pattern as a whole. Aggregation is one of the value adding processes in the production of a newsletter, for example (the others are retrieval and dissemination). A newsletter may or may not involve the process of presentation/formatting, which involves the use of graphics, tables, and other methods of summarizing information or presenting it vividly to enhance its impact.

In the absence of a shared on-line system, aggregation is an important value adding process in sharing information across levels or functions. Newsletters and similar aggregations often are more highly valued outside the unit for which they are ostensibly produced. CI specialists often cited the newsletters of other CI units as important internal sources of information. They have the advantage of providing relatively low valued added information in a form that is easy to classify and incorporate into files.

Presentation/formatting involved a different kind of aggregation than the text aggregation referred to above. It involves aggregating quantitative data and putting them into standardized summarizing formats such as bar graphs and pie charts. It also involves the techniques of presenting and organizing qualitative information to make it eye-catching and quickly comprehensible, techniques that include the use of "headlines", executive summaries, and many of the techniques developed by newspapers and magazines to increase the visual appeal of information. The value added by presentation and formatting in the CI function seems to be growing, with the proliferation of desktops with "user-friendly" graphics software and desktop publishing programmes. When such presentation techniques are used irregularly, the CI specialist can experience some difficulties in having to re-learn the system: in one unit, where several months pass between the formatting of data for reports, scanners mentioned this as one of the factors that reduced the time they had for analysis. Effective presentation and formatting can greatly enhance the impact of data; they can also, if not used carefully, induce misleading interpretations.[9] The growing use of statistical graphics packages by people whose statistical training is negligible (or considerable, but rusted by disuse) is evoking warnings from statistical experts in a number of corporate contexts, not just in CI.

5. DISSEMINATION

Dissemination involves three key questions: what form should the CI outputs take, how should they be delivered, and to whom should they go? Dissemination is, next to acquisition, the Data Management process that is the focus of the most sustained concern. There are basically two types of CI outputs: regular (provided at set intervals) and irregular (or "as requested"). These can be delivered in three ways: in "hard copy" (or written form), orally, or electronically. The kinds of CI outputs we encountered in the three firms are mapped onto these variables in Exhibit 2.

The CI specialists throughout each company have considerable latitude in deciding on the frequency of outputs and the most effective mode of delivery. Scanners in general expressed a strong preference for oral presentations, either in tandem with written reports or instead of them.

EXHIBIT 2: DISSEMINATION

DELIVERY MODE	FREQUENCY	
	REGULAR	"AS NEEDED"
WRITTEN	Newsletters Annual competitor profiles Quarterly Reports Planning cycle support documents	Strategic profiles of competitors Briefing notes Special project reports
ORAL	Annual review of competitors	Briefings Informal handoff Responses to queries
ELECTRONIC	News Broadcasts	"News flashes" Responses to electronic mail

EXHIBIT 3: DISSEMINATION IN DIFFERENT INFORMATION ENVIRONMENTS

	INTERNAL INFORMATION ENVIRONMENT	
	DENSE	THIN
EXTERNAL	As needed - Oral/written	As needed - Written/electronic
RICH INFORMATION ENVIRONMENT		
LEAN	Regular - Oral/written	Regular - Written/electronic

Many scanners often feel more comfortable giving inte ations of the significance of the "data" orally rather than in writin part because they are then able to modify their interpretations b on additional information given by their hearers and in part ause if their interpretations turn out to be less than completely accurate, they are less likely to be cited later as evidence of incompetence. Moreover, because oral presentations are interactive, they can serve to collect information as well as to disseminate it. Because they require the sustained attention of those attending, they are more visible to the client community than written documents. Finally, the opportunity for the scanners to interact with the clients is both personally gratifying and helpful in building learning curves in the function because it helps clarify what the clients want.

Of the three modes of dissemination, the electronic was the least frequently mentioned. The principal example of electronic dissemination of regular outputs was the "news broadcast" mentioned above. The voice messaging system was also mentioned by other CI people in the same company as a way of disseminating "news flashes": urgent items of information about a competitor. Voice-messaging systems that allow one message to be distributed to a pre-defined list of recipients are well suited to such transmissions. Whether this mode is preferred to an on-line mode such as electronic mail seems to be largely a function of internal Information Systems culture. Since many managers find voice-messaging a more congenial technology than an on-line electronic mail system, it may prove to be a more effective dissemination mode, at least for the next few years. In at least one company, it seemed to be a frequently-used method of communicating within the CI community internationally.

The use of electronic dissemination seems to be increasing; however, it is not replacing either written or oral modes so much as it is adding a new mode for information that might otherwise not be passed on, or might not be passed on in so rapid a fashion. For most outputs, the clients themselves expressed a strong preference for hard copy or oral presentations rather than electronically delivered outputs. The reason many of them gave was the superior portability of hard copy outputs and the fact that what they wanted from the CI function was value added CI -- analysis -- that did not lend itself easily to electronic form.

In general, the richer the external information market, the greater the need for the CI function to target its activities on specific managerial issues and problems and to produce "as needed" outputs rather than regular and routinized outputs. And the denser the internal information networks, the more effective are oral as opposed to written outputs: oral modes of dissemination add value to the information because it gets shared, discussed, and debated. Combining these hypotheses, we can begin to suggest what kinds of outputs might be most effective in which environments (Exhibit 3).

There remains the issue of "to whom". Scanners themselves tend to prefer the widest possible distribution, in part because that is a way of enhancing the visibility of the function and thereby potentially increasing the function's ability to draw in CI from various parts of the company. Several scanners (in all three companies) mentioned that they felt considerable frustration with the reluctance of senior management to

encourage wide circulation of CI outputs, especially those that contained analysis and interpretation or internally-derived CI. The higher the level of value-added in the CI outputs, the greater the resistence to broad circulation tends to become. This adds dissemination to the list of processes (the others are classification, storage, and retrieval) that are more difficult for high value-added CI.

6. ASSESSMENT

This is an aspect of information value adding that certainly exists in at least two of the three companies, but on a fairly irregular basis: it consists of the collection and analysis of data on the evaluation and use of CI outputs, and the conducting of "post mortem" analyses of special CI projects. The distribution of evaluation sheets after major presentations and the inclusion of an evaluation sheet with major CI documents are the least intrusive measurement instruments, although their subsequent processing and analysis may take considerable time. And since time is one of the extremely scarce resources in the CI function, the assessment process tends to be one of the most neglected in the Data Management dimension. Yet it is extremely important in contributing to learning curves in the function, if -- and only if -- some use is made of the information so collected: that is, if it is used not simply as a signal to the clients that their opinions are valued.

ANALYSIS

Each of the three dimensions of CI is necessary and important, but if one dimension had to be singled out as critical to the success of the formal CI function, it would be analysis. Yet in many companies, well beyond the three in this particular study, the focus of the formal function is on Data Management, especially acquisition. The approach often seems to be that described by one disgruntled client as "They're trying to pull in everything from everywhere, hoping someone will use it some day."

Analysis uses the information supplied by the Data Management processes and continually feeds value-added information back into the Data Management system. The basic processes in Analysis are synthesis, hypothesis, and assumptions specification and testing. Synthesis puts different items of information together to form an emergent "map" that is greater than the sum of the parts. For example, the analysts may combine data on a competitor's pricing behaviour on several related product lines, its stated corporate goals, patenting behaviour and new product development, and produce an interpretation of the competitor's behaviour that suggests strongly that it is moving towards the market in a new product area. Hypothesis is the construction of "what if?" scenarios and "If...then" analyses: for example, if Competitor X is planning to enter this product area, these are the indicators we would expect to see; or, Competitor X has just done this, and here are the likely effects on its subsequent competitive behaviour in these product lines. Both synthesis and hypothesis are only as good as the assumptions on which they are built, and therefore an important part of the value adding process in Analysis is the explication and

testing of those assumptions. Indeed, the frequently heard statement that, "Analysis is only as good as the data on which it is based" is less accurate that the statement that "Analysis is only as good as the assumptions on which it is based." If the data are wrong but the assumptions right, exposing the errors in the data means that the analysis can quickly be corrected. If the data are right and the assumptions wrong, correction is much more time-consuming and difficult.

An important part of this process is drawing out and refining the underlying assumptions about what drives competitor behaviour that are held by the clients of the function. Managers and planners are continuously, of necessity, making their own assumptions about what drives competitors' behaviour, some of which are well-founded and some of which may lead to inappropriate competitive responses. The CI function, by laying bare its own assumptions in the course of presenting its competitor analyses, can help elicit, refine and improve the working assumptions of its clients -- and of its own analysts.

Clients, as we observed in our first working paper, want more analysis from the CI function. And the scanners themselves not only have a strong stake in meeting those expectations; many of them also find analysis the dimension of CI which is most personally rewarding. Over a third of the scanners replied to our question "What do you like most about your job?" with some mention of the analysis dimension, such as: "When the bits and pieces come together and you pass it off to people who can really use it, that's great;" "the challenge of analyzing a company: its's like a puzzle -- you start with nothing and piece it together;" "getting a data dump two inches thick and making inferences and analyses." If clients want more analysis, and many scanners thoroughly enjoy analyzing, why is more analysis not done?

Scanners provided us with three sets of impediments to expanding the analysis dimension. The first was simply lack of time, which occurred for two reasons: Data Management tasks simply ate up most of the time, and clients, unrealistic about how long it takes to produce a good analysis, set deadlines that could only be met with a very slight enhancement of a "data dump". The second impediment was the lack of an established discipline that provided well-tested assumptions and analytical techniques for doing competitor analysis. In contrast to economic analysis or political risk analysis, undergirded by the fields of economics and political science respectively, competitor analysis is a complex, interdisciplinary field that is only beginning to develop as an academic and commercial specialty. It is not possible to enhance the CI function by bringing in someone with a Ph.D. in competitor analysis. Third, the corporate culture often makes it much more costly for individuals to make incorrect predictions or to put forth analyses whose assumptions get discredited than for them to make no attempt at analysis. However, for the CI function as a whole, in the long run, the costs of providing no analyses are much higher than the costs of making incorrect analyses from which the function can learn. In other words, the reward and incentive structures for individuals run counter to the long-run interests of the function. As one CI person who indicated analysis as what he most liked about his job put it, "I'd rather make 25

predictions and have 20 of them right than 3 and have them all right. But I'm not sure that attitude is shared in my company, and they make it very embarrassing for you if you're wrong." Or as another scanner in a technical function put it, "In the technical community, credibility is based on always being right."

One of the key problems for the Analysis dimension is therefore unrealistic expectations on the part of the client community -- and all too frequently on the part of the scanners themselves. As one manager put it, "Business is a poker game, and it sure helps to see the other guy's hand." If clients expect the CI function to provide the "crystal ball" that lets them see into the future in a way that eliminates uncertainty about the competitive environment, then they will be sorely disappointed and the function will have a relatively short life span. Predicting the behaviour of competitors is even more difficult than predicting the behaviour of one's own company.

Another problem was suggested by an MIS expert in one of the companies, who said, "The top management in the company made it clear that they believed not enough systematic analysis of competitors was being done around here, but as the message passed down the line it was translated into "have competitor information to satisfy the planning requirements." Many managers and even CI specialists tend to believe that the important part of CI is getting the data, which can then "speak for themselves." In other words, the complexity and the importance of value adding on the analysis dimension can be seriously underestimated.

The outputs of the analysis dimension can be either regular or on an ad hoc basis. Analysis can be directed to producing regular profiles of competitors that may be either general or issue-specific: for example, an annual general strategic review of key competitors, or regular profiles of how competitors are responding to certain key environmental or internal changes, such as fluctuating exchange rates or changing commodity prices. In industries where the external information markets are lean, where there are significant new entrants or potential new entrants, or where key competitors are undergoing major internal reorganizations and shifts in strategy, general profiles may be important, although how often they should be updated remains an open question. In industries with rich external information markets, few new entrants, and stable competitors, issue-targeted analyses are more highly valued.

The CI function is also asked to produce intermittent client-requested "as needed" analyses. These will have real value, as many scanners pointed out to us, to the extent that the clients specify their needs: as one scanner said, "Good analysis depends on the question." The more clearly the clients can specify what they hope to do with the analysis, the more clearly analysts can focus on picking and testing the critical assumptions and building the most useful syntheses and hypotheses.

We found relatively few examples of the use of IT on the Analysis dimension. There were two systems currently in use that had been designed by the analysts and put on-line. One was primarily useful for synthesis: it showed the distribution of a certain type of competitor assets in a way that allowed the analyst to assess quickly the impact of

any competitor asset acquisition or divestment on the competitor's overall position vis-a-vis his own company. Another was primarily used for hypothesis: it showed the major competitors' manufacturing costs and those of the analyst's own company in a way that allowed the analyst to play out "what if" scenarios on changes in the costs of materials or labour (although to date it had been received with some scepticism by the client community, who had doubts about the accuracy of the profile of the competitors' costs).

IMPLICATION

In our interviews, problems on the Implication dimension received more mention from both clients and scanners than any other dimension. To that extent there is a significant agreement between the two groups. However, in the client interviews we encountered an interesting paradox. Clients complained that CI specialists too often dumped data about competitors on them without telling them what it meant for their business. On the other hand, some clients -- sometimes even the same clients -- complained that analysts too often slanted the data towards a particular course of action, and in the words of one manager, "I don't want some analyst telling me how to run my business."

Value adding on the implication dimension should resolve this paradox. This dimension centres on the explication of the range of possible responses to competitor behaviour and the probable outcomes of those responses. Because competitor behaviour is only a part of the estimation of those outcomes, albeit an important part, the implication dimension must involve expertise from outside the CI function, especially from the managers and planners who are the function's clients. As one client put it, "CI is at best two of the three pieces of the puzzle...To build credible potential strategic options, you have to bring in people who really know the business and the market." In other words, on this dimension the data and the analysis from the other dimensions of CI are combined with data, analysis, and expertise on one's own company and with data and analysis about other elements of the environment, and the company's range of possible competitive responses considered and their potential consequences assessed. Of course one element of those potential consequences is the likely competitor response, and this means that the value adding process on the implication dimension must interact with the hypothesis processes of the analysis dimension. On the implication dimension much of the value is added by combining the data and analysis provided by the CI specialists with the experience and expertise of other information analysts, planners, and managers. In the absence of value adding on this dimension, much of the data and analysis provided on the other two dimensions will remain unused in two areas of potential application, decision-making and planning, where the value added on the implication dimension is critically important to its use.

The critical question here is the extent to which CI specialists should be involved in adding value on the implication dimension, or whether their value adding should be restricted to the data management and analysis dimensions, with the value added information being handed over to planners and managers who will then use it for the implication dimension. In the three companies, there was considerable range even within each company on the level of involvement of CI specialists on the

implications dimension. As one might expect, there was much less involvement of CI specialists in the implication dimension at the corporate level than at the SBU level. However, clearly the clients expect value adding on the implication dimension from the CI function. It is equally obvious that effective value adding on the implication dimension cannot come solely out of the efforts of the CI function; the users must actively be involved in the process. They can do so alone, or with the involvement of the CI specialist, but they cannot expect the formal CI function to do it alone. The failure to recognize this constitutes one of the major impediments to the more effective use of CI in the large-scale corporation.

There are of course other impediments. One is the locus of responsibility for providing material on one's own company that is comparable to the data and analysis provided by the CI function for the competitors. Some CI groups have clearly assumed this responsibility, largely at their own initiative. Others have not had the resources or the incentives to do so, and yet no other group has been given a clear mandate to supply it to them for inclusion in the information processing on the implication dimension. (There is of course the additional complication that adding one's own company data to CI formal outputs tends to increase the incentives for management to restrict circulation.) A second impediment is the credibility of the CI specialist. Managers do not enjoy discussing the implications of whatever decisions they might make with subordinates who do not, in their view, understand the business. A third and related factor is time: when managers and planners are under time pressure -- which is the usual state of affairs--they are reluctant to spend any of this scarce resource educating the CI specialist. Finally, if management culture strongly emphasizes the individual manager's mastery of decision-making and action, it can seriously mitigate against a genuinely interactive process on the implication dimension.

What are the arguments for involving the CI specialists in the implication dimension? Probably the strongest argument is that clearly both clients and scanners expect that this should be part of the CI function's tasks. Without the involvement of the CI specialists, the competitor information may well get lost in the welter of other, more familiar types of information that are involved. Another reason is that it helps build learning curves in the function: to the extent that CI specialists are involved on the implication dimension, they can build their skills in this kind of value adding. A third is that it builds individual learning curves as well as group learning curves, and in companies which use the CI position as a development assignment for high-potential personnel, the implication dimension is perhaps the most important aspect of the skills acquired in the function. Moreover, the implication and the analysis dimension should be interactive, because the range of likely competitor responses to one's own behaviour should often be part of the implication process. Finally, to the extent that CI is incorporated into the in decision-making and planning processes, it should improve the quality of decisions and plans -- to the extent that CI has major relevance to decision-making and planning in that aspect of the company's activities. This may well be an important caveat: despite the recent popularity of "competitive strategy" paradigms which

assume a constant relevance of CI in virtually all lines of business, and the insistence of virtually all the clients that CI was vitally important in their business, more systematic assessment of "What would we do differently if we knew that?" might reveal areas where CI is of fairly low relevance to company behaviour -- and therefore indicate where an investment in the formal CI function might not result in any significant improvement in decision-making and planning quality.

GENERIC VALUE ADDING ISSUES

Each process in the three value adding dimensions involves some process-specific issues, but three basic issues are common to all the processes. The first is: how specific are the skills to CI, and how much do they have in common with other information management functions? To the extent that the skills are nonspecific, that process may be housed elsewhere than the CI function, or may share resources with another related function. The second is: what is the potential role of Information Technology in that particular process? By taking the examination of the IT role from the general level of "What is the role of IT in the CI function?" to its role in each process, it may be possible to target the allocation of IT resources more effectively. And the third common issue is: how feasible is it for the organization to contract out that process? To the extent that the firm can "buy" rather than "make" it can stretch its own staff resources at a time when growing demands are being made on the CI function even though the corporate climate is strongly against "adding headcount". Exhibit 4 summarizes our answers to each of these questions.

The specialization of CI skills on the Analysis dimension clearly indicates that little sharing of resources on that dimension are possible. It is the Data Management dimension that offers the best opportunities for sharing resources and expertise with other staff functions that require similar information management skills. The clerical tasks of storing, retrieving, aggregating, and formatting could clearly be performed in large part by information technicians shared with other groups. Classification, editing, and dissemination are somewhat more specialized, but with training by CI scanners information technicians could be trained to share these tasks. Internal acquisition, verification/QC, and assessment will probably inevitably continue to be the preserve of the CI specialist.

The feasibility of contracting out a value adding process is greatest for the acquisition of external information -- hardly a startling insight, since all three firms are already contracting out some activity on this process. It might also be possible to contract out presentation/formatting, but the resulting saving of time and effort is so small as so make the effort of administering the contract greater than the saving. It might also be possible to contract out aggregation, to the extent that internally derived information is included in the activity the firm would want to ensure that there are tight controls on contractor confidentiality. It is obvious why storage, retrieval, verification/QC, dissemination, and assessment must be kept in-house. Classification may be a more ambiguous process, but to the extent that it is based on

EXHIBIT 4: VALUE ADDING PROCESSES IN DATA MANAGEMENT DIMENSION

(Coding: ***=high; **=medium; *=low; -=none)

	Level of CI Specificity	Role of IT	"Buy" Feasibility
DATA MANAGEMENT			
Acquisition:			
Internal	***	**	-
External	**	***	***
Classification	**	**	-
Storage	*	***	-
Retrieval	-	***	-
Editing	**	**	*
Verification/QC	**	*	-
Presentation	-	**	**
Aggregation	*	**	**
Dissemination	**	*	-
Assessment	***	*	-
ANALYSIS			
Synthesis	***	*	-
Hypothesis	***	**	-
Assumptions testing	***	*	-
IMPLICATION	**	*	-

idiosyncratic company needs, an outside agent is unlikely to comprehend those as well as inside people, although outside expertise might be useful in helping define the parameters of classification.

The potential role of IT in information value adding in the CI function is clearly higher than its current actual role, and in every company there are serious efforts to increase the use of IT. Its potential contribution is clearly greatest in acquisition, classification, storage, and retrieval.

In external acquisition, the continuing proliferation of on-line data bases raises considerably the potential role of IT. What is needed to increase its use in this area is up-to-date and accurate assessment of the worth of the external data bases and detailed instruction in their use. Few companies have MIS groups that can provide this kind of specialized expertise, and few CI units have been able to develop it internally. The potential role of IT in internal acquisition is considerable, although it is probably less than the most optimistic proponents of IT would suggest. The ideal of a huge electronic network linking every desk in the company, with all individuals rountinely feeding in each piece of information about competitors that comes across that desk, has a powerful intuitive appeal. However, proponents tend to underestimate the burden that such a system would place on the other Data Management processes, particularly classification, storage, editing, and verification/quality control. Efforts to create such a system have generally tried to deal with the problem by having more of the value adding done at the acquisition point: that is, to ask the person contributing the information to classify it and do at least some verification. But to the extent that the value added activities expected of one person outside the formal CI system multiply, the level of probable cooperation will go down.

Where IT can probably have its greatest impact in internal acquisition is in linking the community of CI specialists throughout the company, and in picking up "high value/low value added" information that has immediate application potential. One of the problems facing the architects of the CI system is the extent to which its internal "surveillance" (as opposed to "search", although the word suggests hidden cameras) systems can and should be oriented to picking up such information. This will undoubtedly vary considerably across SBUs, and the relevance of such information for the larger CI system may well be quite low.

The role of IT in classification, storage, and retrieval has been discussed in some detail above; it is here that IT can probably play its greatest role. IT is also potentially useful in editing (allowing rapid scanning of electronic files and effortless "tagging" that allows an editor to see how often a particular set of data has been used); presentation/formatting; and aggregation (through electronic "cut-and-paste" systems). IT could also be useful in "hypothesis": programmes that allow the playing through of "what if" scenarios could be extremely useful (for example, what effect would changes in exchange rates have on the existing cost configurations of major competitors).

This leaves verification/Quality Control, dissemination, sythesis, assumption testing, and implication as areas where the potential contribution of IT is quite low, at least for the foreseeable future. The application of AI and expert systems in these areas might well change this assessment, but at present the levels of expertise in these areas are sufficiently low that translating existing expertise into an expert system would probably be more harmful than helpful. The fact that the CI function is on a learning curve actually has implications that go well beyond the limitations this places on the immediate resort to expert systems. An MIS specialist we interviewed in one company pointed out that one of the problems he faced was that every time a group changed the use they were making of CI (especially, in this case, each time they changed the structure of the developmental plans that CI was being used to support), they wanted to change the structure of the system. Moreover, the rapid turnover of people in the function made his job difficult; each new person had different ideas about how the system should be organized, and each person took about three months to understand the existing system. When people moved on to a new job virtually each year, the burden on the MIS support people became considerable.

The limitations of the application of IT in the CI function are as important as the recognition of its potential contribution, because one of the problems in the establishment of a central CI data base has been an unrealistically high level of expectation of what such a data base can do. The implication that it would simultaneously provide, as one MIS expert put it, "a central source of data from which people could do their own interpretation and analysis" and a repository of high value added information that would allow managers to find quickly they competitor information they needed to support their decision-making and planning activities was clearly unrealistic. IT itself does not, at this point, provide much help on the analysis and implications dimension. The idea of solving the inadequate use of CI by creating a data base that would make each manager his own analyst is not feasible. The major contribution of IT -- and it is an important one -- is in solving major problems on the Data Management dimension, and its major clients for that are in the CI function itself. The Data Management dimension, which looms so large for the CI specialist, is and should be largely invisible to the clients of the CI function. To put it in another way, the main users of IT in the CI function will be the CI specialists themselves, not the clients of the function.

There remains a more comprehensive question on the "make-or-buy" issue, and that concerns the feasibility of contracting out the design of a CI Information System. Can internal MIS people provide the needed expertise? The answer clearly must be based on an assessment of how similar the IT issues in the CI function are to those in other functions, and how much expertise in similar systems the in-house MIS community has developed as a result, and on the level of outside expertise in creating CI systems.

INTERACTIONS ACROSS THE THREE DIMENSIONS

Although the three dimensions of value adding are analytically distinct,

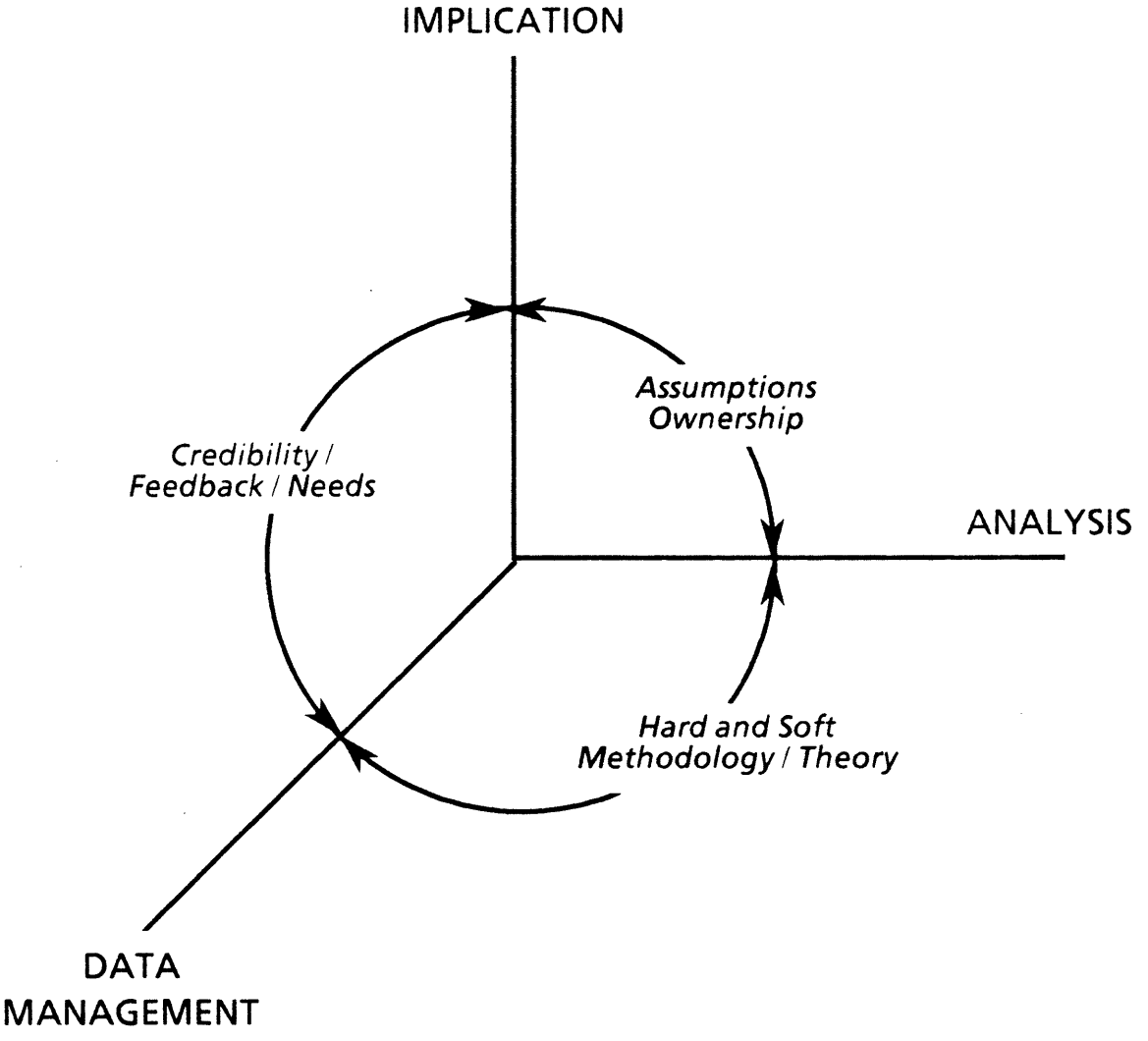
their interrelationships are complex and crucially important. Exhibit 5 indicates six of the major issues that concern the relationships across the three dimensions.

One of the key issues that lies between the dimensions of Data Management and Analysis, as we have seen, is the problem of processing the value-added outputs of the Analysis dimension in the data management processes, and the feedback from those processing to the analysts so that output can be organized so as to facilitate such processing. This issue is closely related to the problem of managing both hard and soft information that was noted by a significant proportion of both clients and scanners, but it clearly transcends it. Value-added quantitative information that involves various levels of analysis may also be extremely problematic: for example, the various ways in which benchmarking comparisons between Japanese firms and U.S. firms control for their very different levels of internal integration. The second issue is the shaping of data management processes by the needs of the analytical techniques developed on the Analysis dimension. The needs of the Analysis dimension should be an important force helping to target the acquisition of information and to improve the structure of classification, storage, and retrieval. Data Management processes that are shaped by the needs of Analysis will be more efficient and effective than those which try to be encyclopaedic because of a lack of guidance from Analysis. However, at the present stage of the development of the CI function, both the interaction on value-added information and the targeting of Data Management processes are made more difficult by the relatively slow development of analytical techniques. The methods of CI remain relatively underdeveloped, and this causes problems not only on the Analysis dimension itself but also on the interactions across dimensions.

This is also true for the relationship between Analysis and Implications. One of the key issues here is the commonality of assumptions across the two dimensions: the assumptions that undergird the analysis of competitor behaviour must be shared by the managers and planners who will integrate the output of the analysis into their own response to competitors, or the outputs will be discredited and ignored. To the extent that the assumptions on the analysis dimension are not articulated, accepted and shared by clients, CI analysis that does not fit the existing mental maps of its clients will not be used. Or even worse, CI analysis that does fit the mental maps of its clients will be used, despite poorly articulated, untest, and unsophisticated assumptions. A second issue on the Implication-Analysis relationship is that of ownership: that is, the level of personal and organizational investment that clients feel toward the outputs of the Analysis dimension. When this is low, the outputs may well be ignored, no matter how high their quality.

Finally, the relationship between the Implication and Data Management dimension raises two important issues. One is the credibility problem mentioned by clients and scanners alike in the assessments of CI. To the extent that those involved in the Data Management processes build up a confidence in the quality, comprehensiveness, and timeliness of the information they are delivering both to clients directly and to the

EXHIBIT 5: INTERACTIONS ACROSS VALUE-ADDING DIMENSIONS



Analysis dimension, the contribution of Data Management to Implication will be considerable. To the extent that the credibility is lacking, the CI function may be ignored. A second issue, also mentioned by scanners in their assessments of the CI function's problems, is feedback from clients that helps target and focus not only acquisition but also the other value adding processes of CI. Data Management should be largely driven by its interactions with the other two dimensions.

CONCLUSION

The three interactive dimensions of value adding provide a conceptual framework for understanding the complexity of the processes by which information about one important aspect of the external environment--competitor behaviour -- can be processed within the corporation to enhance its value. The potential role of Information Technology in these processes is considerable, and yet it is still much greater in potential than it currently is in reality. A clearer understanding of the processes involved in adding value to competitor information can help to guide the application of IT as well as the development of individual expertise and organizational systems -- building learning curves -- in the CI function. If the importance of competitor information is really as great as the managers and planners we interviewed believe, then the investment of time and resources in building those learning curves is clearly warranted.

FOOTNOTES

1. See S. Ghoshal, "Environmental Scanning: An Individual and Organizational Level Analysis." Doctoral dissertation, Sloan School of Management, 1985, and S. Ghoshal and S.K. Kim, "Building effective intelligence systems for competitive advantage," Sloan Management Review 28-1 (1986).

2. Taisei Kensetsu, one of Japan's Big Six general contractors, set up a special system in 1975 that established a dedicated telephone number for employees to call if they heard any information that might be relevant to identifying a business opportunity, and arranged for transmission of that information to the appropriate business manager. Taisei estimated that within five years of operation it had led to more than 200 orders with earnings of twenty-seven billion yen. Okumura Tomoya, Kensetsugyo. Atarashii Sangyo Rinen no Kakuritsu no tame ni. Tokyo: Toyo Keizai Shimpo Sha, 1980.

3. As we saw in the examples given by clients of how they use CI, only 4 of 63 examples involved information that had immediate action implications.

4. At first this may seem identical with the three categories of analysis used by Richard L. Daft and Karl E. Weick in their 1984 article, "Toward a Model of Organizations as Interpretation Systems" (Academy of Management Review 9-2: 284-295) which consists of information acquisition, interpretation, and learning. It is different on several counts: first, the data management dimension is much more than "acquisition;" second, we separate out analysis (interpretation of what the information means in terms of competitor behaviour) and implication (what the information and analysis, combined with the knowledge of one's own company, together suggest for one's own behaviour); and third, "learning" is one of our value adding processes; learning, in the sense Daft and Weick use it, is a result of using value added information, not an information value adding process, although when learning about competitors' behaviour is turned into information and added to the company's information stock, it contributes to the value adding process.

5. One of the solutions to the scarce resource problems is to get informants, especially within the organization, to assume more of the value-adding tasks -- classification, editing, verification and quality control in particular. But to the extent that these activites require special skills and take time, efforts to push off more of the value adding on the data management dimension onto people whose jobs are not centred on adding value to CI will lower the incentives for involvement.

6. See for example Leonard Fuld, Competitor Intelligence: How to get it, How to use it (New York: John Wiley and Sons, 1985).

7. This number does not include two of the scanners who were interviewed. One was in the process of beginning the establishment of a CI system and the sources were not yet routinized, and so the respondent preferred not to answer that question; in the other, the responses on sources were all given by another scanner with whom the interview was jointly conducted, and the authors decided not to double-count by ascribing those answers to both scanners.

8. See Management in the 1990s Working Paper 88-047: "The Competitor Intelligence function in the very large-scale organization: assessments and uses."

9. See Edward Tufte's work on statistical graphics and their use and misuse in his book The Visual Display of Quantitative Information (Cheshire, CT: Graphics Press, 1983).