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The Acquisition Of Equipment In A Research And Development Environment

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THE ACQUISITION OF EQUIPMENT IN A RESEARCH AND DEVELOPMENT ENVIRONMENT

by

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ABSTRACT

This research addressed a critical issue that has faced managers of business organizations: the efficient and effective utilization of diverse resources to achieve a common objective. The chosen environment for this research was the involvement of purchasing in the acquisition of equipment within a research and development function. The research involved new scale development, administration of questionnaires and field interviews with scientists, purchasers and managers in twenty seven research centres in Canada and the United States. Case vignettes are presented to enrich the understanding of the acquisition process.

Examples of both low and high purchasing involvement were found. In low involvement situations, the time spent by the scientist on the acquisition task was predictable. The scientists expressed little confidence in purchasing's ability to contribute beyond a narrow role definition of the buying task. Scientists felt strongly about control over the equipment decisions. The relationship between the scientist and the purchaser can be considered as one of task specialization with contradictory objectives.

In those cases where purchasing was playing a significant role in the equipment acquisition process, both direct financial

and perceptual benefits were recorded. The scientists expressed confidence in purchasing's ability to contribute during all stages in the acquisition process. A good predictor of high involvement was the purchaser's technical ability. The relationship between purchasing and the scientist was one of mutual respect and shared values. In all high involvement cases, purchasing regarded the scientist as a valued customer.

The research is believed to have merit to practicing managers and suggests future research opportunities. High involvement by purchasing may be a small but important contributor to the creation of a conducive research climate. The perceptual benefits from meaningful involvement (client satisfaction) may be more significant in the long term than the direct and measurable ones.

This research also adds support to the importance of cooperation and team work for business success. High levels of purchasing involvement may be indicative of the general management philosophy within the firm and a predictor of competitive success.

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CHAPTER I

OUTLINE OF THE PROBLEM

Introduction

This research focuses on the extent to which the purchasing function is meaningfully involved in the equipment acquisition process in Research and Development (R&D) environments. Meaningful involvement, in this context, is defined as:

> The timely and useful collaboration of purchasing's expertise and the scientist's knowledge in all aspects of the equipment acquisition process, including the decision making process, leading to the best buy decision with the objective of satisfying the immediate needs of the specifier and the long term needs and strategic objectives of the research centre as a whole.

Increasing the level of purchasing involvement in equipment acquisitions can provide a significant contribution to the R&D function. This contribution can take the form of satisfying the immediate equipment needs of the requesting scientist. It can also take the form of a contribution towards the achievement of the research centre's strategic objectives. While the concept of an increased purchasing role is not new, the examination of the required conditions and constraints for successful implementation in a scientific environment represents one of the novel aspects of this research. Further, this research explores a perennially difficult area of purchasing effectiveness: the capital buy decision.

The R&D setting is one of particular personal interest and experience. Further, past research in purchasing and R&D management indicated that this particular environment would represent a challenge to find examples of meaningful involvement. Purchasing involvement is anticipated to be low in an environment where capital spending is low, the formal education and technical skills of the specifier are extremely high, limited suppliers exist and the decision concerning what to buy is likely to be based primarily on technical merit. Yet finding, exploring and explaining the occurrences of unusual cases is of fundamental interest to both researchers and management. Examples of teamwork and co-operation may be indicative of "good management" in other areas of the organization of interest and a harbinger of corporate success.

The General Management Issue

Chester Barnard (1940) wrote that "successful cooperation in or by formal organizations is the abnormal, not the normal, condition"[1]. Barnard noted that "the vitality of organizations lies in the willingness of individuals to contribute forces to the co-operative system"[2]. The absence of this co-operation implies a threat to the long term life

[1] Barnard, Chester I., The Functions of The Executive, 2nd printing (Cambridge, Massachusetts: Harvard University Press, 1940) 5

[2] Ibid, 82

of the organization.

Koontz and O'Donnell (1968) stated that a business manager's task "must be ... to establish the environment for group effort so that individuals will contribute to group objectives with the least costs"[3] in order to achieve surplus.

Kotter, Schlesinger and Sathe (1979) indicated that some of the characteristics of highly effective organizations included:

> 1) "A large number of employees are relatively adaptive and have skills beyond a narrow specialty."
>
> 2) "There is a high level of trust between employees and management."
>
> 3) "Information flows freely with a minimum of distortion within and across groups."
>
> 4) "People in all positions of responsibility are willing to listen to and be influenced by others who might have relevant information."
>
> 5) "The organizational structure includes more than enough effective integrating mechanisms for the current situation and relies minimally on rules and procedures."
>
> 6) "Reward systems encourage people to identify needed changes and help implement them."[4]

Kotter added that:

> "Trusting, open relationships are viewed as essential to meaningful participation in decision making and goal

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[3] Koontz, H. and O'Donnell, C., The Principles of Management 4th edition (New York: McGraw-Hill Book Company, 1968) 7

[4] Kotter, J.P., Schlesinger, L.A. & Sathe, V., Organization: Text, Cases And Readings On The Management Of Organizational Design And Change (Illinois: Richard D. Irwin, 1979) 485

> setting. Openness to feedback and the willingness to confront issues are required if conflicts are to be creatively and thoroughly resolved."[5]

Kotter suggested that the final phase in the growth of the organization has been characterized by overcoming "red tape" through "team action", "simplicity", "rewards based on team performance", "matrix structures" and "teams formed across functions for task-group activity".[6]

Rosabeth Moss Kanter (1983) noted that the old assumptions that dominated American corporations, based on segmentation and division of labour, are being transformed. In particular, the traditional concept implied that:

> "specialization is desirable for both individuals and organizations; neither should be asked to go beyond their primary purpose. The ideal organization is divided into functional specialties clearly bounded from one another."[7]

Kanter's new philosophy recognizes that while:

> "differentiation of activities and their assignment to specialists is important, coordination is perhaps even more a critical problem, and thus it is important to avoid overspecialization and to find ways to connect specialists and help them communicate."[8]

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[5] Ibid, 561

[6] Ibid, 591

[7] Kanter, R.M., <u>The Change Masters: Innovations For Productivity In The American Corporation</u> (New York: Simon and Schuster, 1983) 59

[8] Ibid, 61

Bennis and Nanus (1985) discussed the growing popularity of "participative or collegial structure"[9] involving a strong cultural environment of information sharing. The authors noted the value of the Japanese in influencing the popularity of this new form of business organization. The authors' statement that this new philosophy was particularly suitable in "rapidly growing and highly competitive scientific technologies that rely on aggressive research and development divisions"[10] was of interest.

Finally, D.Q. Mills (1985) believed that:

> "what distinguishes top performing organizations is their ability to make a well-functioning unit of a group of people, while still identifying and recognizing individual merit".[11]

Balancing the needs of the individual while achieving group objectives is, needless to say, a difficult task.

The authors quoted span fifty years of writing on management. This period has witnessed little modification to what constitutes a fundamental problem in organizations. On the one hand, there is a natural tendency to focus on the economic benefits of the division of labour and the merits of

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[9] Bennis, W. and Nanus, B., Leaders: The Strategies For Taking Charge (New York: Harper & Row Publishers, 1984) 119-123

[10] Ibid, 123

[11] Mills, D.Q., The New Competitors (New York: John Wiley & Sons, 1985) 378

specialization. Specialization of this nature originates from the work of Adam Smith in 1776 and Dav'd Ricardo in the nineteenth century. On the other hand, the concepts of shared values, common goals and teamwork on the part of individuals to achieve corporate objectives within a framework of personal satisfaction have represented critical management tasks. Barnard referred to these as cooperative systems. Kotter mentioned teams and group activities. Kanter described the new philosophy in terms of coordination and communication, Mills in terms of a well-functioning unit. In all cases, achieving the correct balance is expected to provide strategic benefits for the organization and to ensure continued existence and success.

This research, therefore, can be considered in a broader management context. This investigation uses the R&D function as the organizational setting for investigation. But the setting and the relationship of the parties of interest is but one example of the broader management issue of cooperation between two specialists in the achievement of some common objective. The role of the human resources department in the hiring of a new employee for the operations function, the role of blood analysis group as a diagnostic service to the medical profession and the role of accountancy in providing information for management decisions all represent examples of service organizations that provide information and assistance in achieving some overriding corporate or organizational objective. Understanding how teamwork is effected in any environment is a challenge for management research.

Purchasing Effectiveness: The Traditional Model

Purchasing effectiveness has been discussed in terms of involvement levels of purchasing personnel during the various phases of the acquisition process. For example, the Robinson-Faris (1967) model described the acquisition process as a chronological sequence of stages. The process begins with identification of a need and ends with performance feedback and evaluation. Purchasing effectiveness can be considered in terms of involvement levels in each of these purchasing stages.

Purchasing effectiveness has also been defined as encompassing "those longer range strategic purchasing decisions which should mesh corporate goals with the purchasing decision process"[12]. Examples of such decisions include those related to supplier development, make vs. buy studies, integration with R&D, value analysis and purchasing engineering (Van Weele: 1985).

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[12] Spekman, Robert E. and Hill, Ronald P., "Strategy for Effective Procurement in the 1980's", Journal of Purchasing and Materials Management, Winter, 1980, 2

The definition of meaningful involvement used for this research combines the stage or task involvement of purchasing in meeting the scientist's equipment request and the requirement of purchasing to address the longer term strategic objectives of both the R&D centre and the corporation.

Purchasing effectiveness in a manufacturing setting has been the subject of renewed interest (Leenders, Fearon and England: 1985). This increased level of interest can be attributed to at least three factors.

First, the successful experiences of Japanese firms in supplier relations necessary for Just-In-Time (JIT) production methods has led to a resolve on the part of North American manufacturers to question the need for multiple suppliers and to force quality improvements on the supplier system. On-time delivery and competitive price are no longer considered as sufficient elements of a good purchasing focus. Effective purchasing and materials management must include a quality dimension and concepts related to supplier development.

Secondly, the increasing professional standards for purchasing personnel through the efforts of the National Association of Purchasing Management (NAPM) in the United States and the Purchasing Management Association of Canada (PMAC) in Canada have led to a higher degree of respect and credibility for purchasing as a career.

Finally, the high leverage that purchasing effectiveness can have on a company's profitability has meant that the purchasing function has become recognized as a competitive weapon in securing financial success for the corporate entity. The supply function is beginning to be viewed as a key element in the strategy of a firm and as a significant contributor to organizational objectives (Leenders and Blenkhorn: 1988). This contribution goes beyond the direct and measurable bottom line benefits from reduced cost of materials and services. The indirect benefits from improved material quality, reduced lead times & inventories and the development of new suppliers are believed to be of greater significance in a strategic sense.

Despite this enthusiasm for a new era in purchasing importance, success has not been immediately forthcoming. Purchasing effectiveness and involvement levels in capital acquisitions has been noted as an area of weakness. Leigh and Rethans (1985) indicated that the relative degree of influence that purchasing had over various aspects of the purchasing decision process was extremely low during the initial need identification and specification stages. Such low influence levels were in contrast to extremely high purchasing influence scores for developing a list of potential suppliers.

These low levels of involvement during the initial stages of the equipment acquisition process indicate a continuing challenge for the purchasing profession. Without meaningful involvement in these initial stages of the buying process, purchasing can not make a contribution to the strategic direction of the company. In this regard, purchasing would not be unique. If the marketing or operations functions had little involvement in the design and development of a new product, it would be difficult to imagine a firm having strategic success in the marketplace over extended periods of time.

Yet, purchasing can provide valuable input to the equipment choice decision through knowledge of suppliers and supplier quality, service requirements and peripheral considerations such as insurance and electrical standards. Low levels of influence at these critical buying stages might indicate that equipment was being acquired without due consideration of corporate goals and the possibility of unnecessary or unauthorized commitments to suppliers. Further, such low involvement levels could lead to lack of standardization in equipment, ineffective use of corporate purchasing power and the potential for post-installation service related problems. In short, the expertise and the very reason for the existence of a purchasing group would be ignored.

However, a solution to the problem of low involvement levels is not likely until the exact cause of the problem has been determined. There is an apparent need, therefore, to pursue research into the causal relationships affecting the acquisition process for equipment in a variety of situational contexts. Barclay's (1986) research, for instance, addressed conflict and conflict handling approaches between engineering and purchasers across several purchase classifications.

This research examines the level of and benefits from an increased and meaningful purchasing involvement in the equipment acquisition process in an R&D environment. In this respect, it is a narrower treatment of the subject, focusing only on equipment acquisitions in a very specific environment. However, such a narrow focus is necessary for a full understanding of the unique situations that may exist. This research also addresses a broader purchasing issue that has been of interest and concern since the evolvement of purchasing as a profession. Purchasing effectiveness and meaningful involvement, particularly in the perennially difficult capital acquisition process, has been an under addressed area of research.

<u>The R&D Context</u>

Van Weele's (1985) concept of integration with R&D was related to purchasing involvement with development activities for the introduction of new products. The purpose of such involvement is to investigate and to secure the availability of purchased parts for new product manufacturing. The focus of the purchasing activity in this context relates to the near term commercial viability of the product. However, the concept of involvement with the R&D function with respect to purchases for the purpose of performing in-house research is an unexplored area of purchasing effectiveness, both in terms of what constitutes purchasing effectiveness and the current state of practice.

In manufacturing environments, purchased goods and services normally comprise 60% of total spending. During the course of this research effort, purchasing in an R&D function was found to represent 20-35% of total R&D spending. Further, purchasing in an R&D context consists of three distinct purchasing classes: routine supplies and services (e.g. chemical compounds and lab materials), seldom occurring but very large expenditures (e.g. a new research wing) and equipment purchases (e.g. electron microscopes, lab scales, mass spectrometers). These two latter purchasing classes represent a general category of capitalized expenditures. A survey of U.S. firms[13] indicated capital expenditures represent 11 to 18% of total R&D spending.

Despite the relatively low levels of spending on purchases in R&D functions, one could argue that the leverage from focusing on purchasing in this environment would be significant. For one, the balance of R&D expenditures is largely composed of scientist and support function salaries that, at least in the short run, are considered by research managers as somewhat fixed. Nonetheless, the spending on capital equipment would represent a rather modest amount of financial resources to the corporation and to the research centre.

However, the R&D function equipment purchases can have considerable future implications. Preliminary interviews with scientists indicate that the initial test equipment purchase can often define the ultimate commercial equipment supplier. A distinct advantage in the process of moving from the lab to the production environment is achieved by the supplier, particularly when the equipment decision involves pilot projects to demonstrate commercial feasibility.

Further, the concepts of "design to cost", "design for manufacturability", etc. all assume some design latitude

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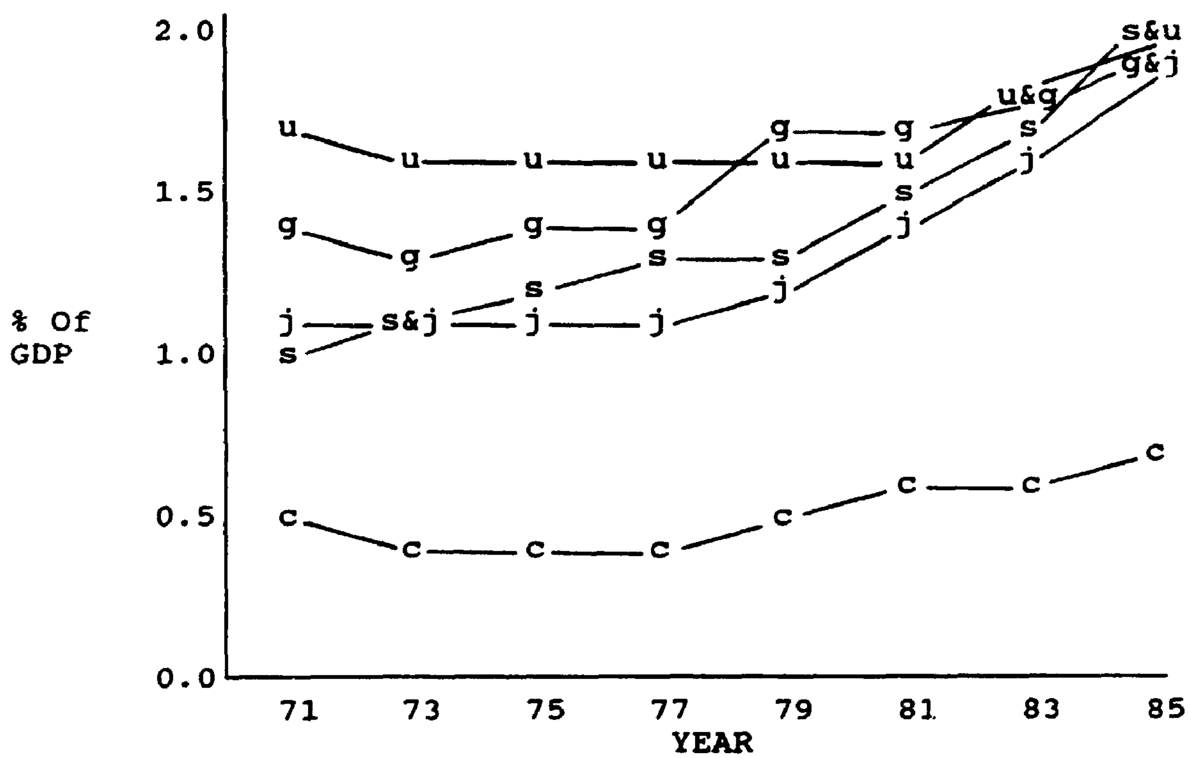
exists, even at the research phase, which can yield strategic benefits for the ultimate commercialization of the product. The equipment acquisition decision process could be as much a function and integral element of the future commercial product and process as the choice of materials and physical design. There is a link between the research function and the commercial process.

Some forms of purchasing may be the subject of extensive purchasing involvement. The design and construction of a new research facility would be a large expenditure for any firm and would likely include purchasing involvement at an early stage and to a great depth. As well, the specifications for laboratory supplies and chemicals may be well defined and purchasing involvement would be extensive.

The acquisition of equipment, however, is an area which may not have received this same degree of attention. These latter purchases can be highly technical and sophisticated pieces of equipment. They are thought to remain largely within the control of the scientist/user. Purchasing involvement is believed to be low and, when it does occur, might be too late in the acquisition process to achieve meaningful impact.

For research managers, purchasing involvement holds promise for improving the effective spending power on research in the absence of an absolute increase in input funding levels. Meaningful involvement of purchasing can liberate scientist time and yield better purchasing decisions permitting greater output from the research function. North American businesses have been criticized on numerous occasions for the relative low spending levels on R&D compared to other industrialized countries. In 1985, for example, Canada spent 1.3% of Gross Domestic Product (GDP) on R&D in contrast to the R&D efforts of Sweden, Japan and West Germany that were in the range of 2.6% of GDP. The industrial research effort has shown similar low levels of spending as illustrated in Exhibit 1.

Exhibit 1
Industrial R&D Expenditures As A
% Of Gross Domestic Product (GDP), By Country



SOURCE: Statistics Canada
KEY: c - CANADA g - WEST GERMANY j - Japan
u - UNITED STATES s - SWEDEN

Despite numerous government commitments to promote greater spending on R&D, there appears to be little prospect for an immediate improvement. The comparatively low spending levels on new product and process R&D by Canadian companies represents an absolute competitive disadvantage. Purchasing effectiveness, a small contributor though it might be, is believed to be one way in which R&D efficiency could be improved to offset this competitive disadvantage.

Some Anecdotal Examples

Previous management research in the fields of R&D management and purchasing indicated little academic research had been performed on the equipment acquisition process in an R&D environment. One might conclude from this lack of research that purchasing is handled well in research centres and there was little need for improvement. Yet two anecdotal examples in this environment are revealing in illustrating potentially typical (and ineffective) acquisition processes that occur and the potential benefits that could accrue from more meaningful purchasing involvement.

In one example, functional performance specifications and the operating environment for the equipment were reasonably well defined and two sources of equipment were discovered during a short supplier search. Through the influence of one group within the Research centre which had engineering and electronics expertise, it was decided that the more expensive equipment supplier would be the best choice given their previous reputation. Detailed specifications were drawn up in a manner that would preclude the less expensive supplier The bid for tender was then turned over to the purchasing department, as required by company policy, to find other potential supply sources and complete the bidding process. The purchasing department was <u>not meaningful involved</u> in this case. Their involvement was restricted to carrying out the purchasing request. The supplier search procedure was limited to known suppliers of the operating group, there was a deliberate attempt to circumvent the unbiased tendering procedure and purchasing involvement was restricted to clerical duties.

In a second example, a laboratory scale "high-shear" mixer was required to perform experiments on setting times of cement and glass fibre mixtures. The functional requirements of the mixer were so loosely defined that the equipment search process involved visits to several suppliers to run test samples. Only by seeing the mixer perform was the definition of the necessary performance specifications possible. The search process was complete as soon as an acceptable machine was found. In this case, the lack of purchasing involvement led to a supplier search process that was inadequate and limited. Further, this equipment choice had significant influence on the nature of conceivable commercial processes and the decision regarding commercial products that were reasonable to bring to market.

These anecdotal examples lead to the suspicion that there are significant opportunities and potential benefits that could accrue to an organization by a more meaningful purchasing involvement. Yet these examples also indicate that such opportunities are being ignored and, in some cases, eliminated or circumvented. Clearly, the purchasing group, in these cases, is not adequately contributing to organizational objectives.

Finally, previous research in the field of sociology (e.g. Allen: 1977) suggested that there are some unique traits associated with scientists (as opposed to engineers) and that implementation of meaningful purchasing involvement in an R&D setting faced some obstacles that are different from those pertaining to a normal manufacturing context. Previous studies have focused on the interface between engineering and purchasing or have inadvertently confused the two groups in the sample of interest.

The Concept Of Meaningful Involvement

Meaningful purchasing involvement represents a significant contribution by purchasing in each of the following four key areas: supplier input, functional equipment and technical specifications, equipment utilization and scientist and research project time savings.

A) Supplier Input

Meaningful purchasing involvement in the area of supplier input is characterized by the provision of network links between previously unknown equipment suppliers and the scientists as well as the encouragement of additional information flows from current suppliers.

The industrial R&D group is largely concerned with the generation of improved and new products and processes. Many new ideas for future products and processes have been the product of contacts external to the organization (Carter & Williams: 1957, Langrish: 1972, Meyers & Marquis: 1969). The contributions resulting from soliciting external ideas have been well documented.

Since the formal purchasing group would be in constant contact with suppliers attempting to secure future sales, purchasing's supply source information network is considered to be broader in scope than that of the individual scientist. Meaningful purchasing involvement that leads to a broader array of supplier contacts and increased levels of information flow into the research labs should result in improved output of ideas and research projects.

The equipment supplier may be in a good position to suggest methodological improvements for the experiment and to inform the scientist of other research activities and equipment choices in the same area. Such advice could decrease the failure rate and/or reduce the possibility of "reinventing the wheel". Clearly, the generation of new ideas and the development of new and improved products and processes is the "raison d'etre" of a research group and purchasing could assist in this fundamental area.

In summary, purchasing meaningful involvement, as it pertains to supplier input, achieves additional input from suppliers including advice, ideas for improved and new products and processes, knowledge, methodological improvements and information flow that would not otherwise be forthcoming. The anticipated benefits include improved new product success rates and increased research efficiency.

B) Functional Equipment & Technical Specifications

The scientist is assumed to be in the best position to define what his or her needs are in a functional sense. However, purchasing can make a contribution by translating these functional needs into equipment specifications suitable for sourcing purposes.

Some anecdotal examples will serve to illustrate the consequences of failure to obtain meaningful involvement in this area. One scientist purchased equipment that failed to meet Canadian electrical safety regulations. Technically, the insurance coverage for the research centre was violated. Another scientist acquired equipment that would not perform in the existing operating conditions. These operating conditions (in this case, background electrical noise) are often overlooked during the process of specification definition. Purchasing, by being more cognizant of the peripheral conditions for the experiment (as opposed to the scientist's concern with the science and the experiment itself), should be in a position to ensure that these operating conditions are adequately addressed during the specification stage.

Meaningful purchasing involvement requires understanding of the functional and technical specifications for the equipment as well as broad comprehension of the experiment for which the equipment is required. Such an understanding is believed to be a prerequisite for purchasing to "ask the right questions", to determine the difference between what the scientist "must have" and what the scientist "would like" and to incorporate this information in the search for available equipment in the market place.

Leenders, Fearon and England (1985) defined this notion under the concept of "the best buy"[14]. Analysis of tradeoffs between "technical quality" (state of the art" equipment) and "economic quality" ("is it absolutely necessary?") is an important element of purchasing effectiveness. Without purchasing input, the tradeoff between technical quality and economic quality is left to the discretion of the research manager and the scientist. Purchasing can contribute to this tradeoff and negotiation exercise.

The benefits that would accrue to both the scientist and the organization from purchasing involvement in this area are potentially substantial. Equipment that is operational and certifiable is necessary for obtaining liability insurance and for successful completion of the research work.

Second, an understanding of the difference between "musts" and "wants" should lead to an increase in supply sources and availability, a decrease in cost and/or better service, warranty and financing terms. The incremental cost of additional accuracy for some pieces of research equipment can be extremely high. Understanding and questioning the

[14] Leenders, M.R., Fearon, H.E. and England, W.B., Purchasing and Materials Management, 8th edition (Homewood, Illinois: Richard D. Irwin Inc., 1985) 112-113

scientist's accuracy requirements could have substantial benefits in an equipment supply environment that is characterized by a limited number of available sources.

Corey quoted one IBM purchasing manager's comments on this concept.

> "I think the only time we suffer is when some lab engineer who is working at the state-of-the-art asks for a piece of equipment. It would help if we had two or three high-powered technical people who could really question what he needed. Occasionally, I suspect, we buy a Cadillac where a Chevrolet would do. A lab engineer can write specifications so that the choice of supplier is very limited."[15]

C) Equipment Utilization

Purchasing may have a broader role and perspective in the objectives of the corporation than the individual scientist. A well informed purchasing function should be in a better position to identify other planned research projects that could be potential users of the scientist's required equipment. Meaningful purchasing involvement, therefore, includes recognition of the internal future requirements of the research centre and the potential standardization of research equipment and service. Even in a research centre, standardization of equipment and service contracts appears to be possible across numerous instrumentation classes.

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[15] Corey, E. Raymond, <u>Procurement Management: Strategy, Organization, And Decision-Making</u> (Boston, Massachusetts: CBI Publishing Inc., 1978) 93

The benefits from multiple project utilization and the efforts to standardize could be significant. By combining the understanding of the difference between needs and wants for a particular scientist, the availability of equipment in the market place and the future requirements of the research centre, purchasing could influence the equipment specifications to achieve multiple research project usage. In some cases, the scientist might receive equipment that is of higher technical quality than originally requested. However, with multiple project usage, the amortization of the equipment would result in significant reductions in individual project expense.

The standardization of equipment, where feasible, would lead to better service arrangements and equipment replacement and upgrading procedures with the supplying firm. Further, standardized equipment would have distinct advantages in operator learning requirements resulting in shorter completion times for experiments and research projects.

D) Time Savings

Bell Northern Research President Gedas Sakus (1987), citing a McKinsey Co. report on new product introduction, indicated that the greatest leverage to a corporation active in R&D is derived, not by focusing on the control of research expenditures, but by shortening the time to completion of the research project and thereby bringing new products to market in the shortest possible time. Purchasing can make a significant contribution in this area.

By assisting the scientist in converting the functional requirements into technical, detailed specifications suitable for Requests For Quotation (RFQ), purchasing could reduce the scientist time expended on this task. Furthermore, the purchaser, who made more frequent use of the acquisition forms and procedures established in the organization, would perform this task in a more efficient and effective manner.

A skilled and experienced purchaser would also assist the acquisition process with the knowledge base and contact network that the purchaser has established. This purchasing knowledge and expertise includes purchasers in other organizations who may have bought similar equipment in the past or would be willing to loan or sell idle but suitable equipment, insights regarding existing and new suppliers' reputation for quality or delivery, sources of used equipment in other company operated research centres and knowledge of the administrative practices that could provide budget or financing flexibility. There may be merit simply in the consistency of personnel dealing with the supplier in all aspects of the purchasing process. This might yield reduced equipment delivery time.

Finally, the purchasing power of the research centre and/or the entire corporation should have an influence in supplier delivery time. This purchasing power is largely negated where the equipment supplier is predetermined by the scientist without collaboration with the purchasing group. It is no accident that suppliers attempt to circumvent the normal contact point of purchasing in an attempt, not only to sell the scientist on the merits of the equipment, but to make the best possible deal from a supplier's viewpoint. Meaningful purchasing involvement could yield, therefore, a shorter time between the recognition of a need and delivery of the equipment as well as scientist time savings.

The concept of time savings can be best illustrated by reference to the chronological path networks illustrated in Exhibit 2.

<u>Exhibit 2</u>

Representation of Potential Scientist Time Savings

```
          <-----t0-------><------t1---------><--tp--->
Base Case I---------------I------------------I.........
          S(t0)           S(t1)              |
                          P(t1)              P(t2)     P(t3)


          <------t0'--><-----------t1'------->
Case 1    I-----------I----------------------I
          S(t0)      S(t1')                  |
                     P(t1')                  P(t2)


          <----t0"--><-------t1"-------->
Case 2    I---------I------------------I
          S(t0) |   S(t1")             |
               P(t1")                  P(t2")
```

Under the base case (low involvement) scenario, the acquisition process is a sequential one in which the scientist dominates the acquisition process through the initial stages, finds the equipment required and sends the purchase requisition to the purchasing group to effect the actual acquisition. S(t1)-S(t0) represents the scientist time expended while P(t2)-P(t1) represents the purchasing time required. Time tp represents the potential time penalty should the scientist's requested equipment fail due to poor recognition of the operating environment, safety standards, etc.

In Case 1 (modest involvement), purchasing involvement is earlier and partially replaces the scientist effort. The process is still sequential in nature with purchasing receiving functional specifications or technical specifications but with a mandate to locate the best possible supplier. The total time to effect the acquisition process (t0'+t1') is shown as identical to the base case (assuming that the scientist details the specifications accurately and fully) with some scientist time (S(t1)-S(t1')) being liberated to pursue other activities. The potential penalty time, tp, is eliminated in this case since purchasing involvement is presumed to substantially reduce the risk from poorly defined specifications and safety violations.

Under Case 2 (high involvement), the sequential nature of the acquisition process is replaced with a collaborative and chronologically overlapping acquisition process with some very significant implications. In Case 2, the scientist time is reduced from Case 1 as a result of combining multiple equipment requests and through the involvement by purchasing in the needs identification stage to assist in reaching a definition of equipment functions. Because of the overlapping nature of the involvement, the actual completion time (t0"+t1") of the acquisition process is reduced. According to G. Sakus, this shortened completion date would provide the optimum value to the corporation even if the total sum of purchasing and scientist time exceeds that of the base case.

Meaningful purchasing involvement, therefore, could result in three time savings. The first relates to the penalty time or opportunity cost of acquiring poor equipment. The second is the direct savings of scientist time in the acquisition process. The third is due to reduced delivery dates resulting from overlapping effort and the power of the purchasing group to elicit better delivery times from the supplier.

The benefits to the organization that accrue from time liberation through a more meaningful purchasing involvement in equipment acquisitions could have potential benefits. Numerous studies by economists (Solow: 1957, Terleckyj: 1959, Grilliches: 1964) estimated the rate of return from investments in R&D as extremely high, anywhere from 30% to 170%. If R&D productivity leads to greater research output, there would be financial benefits to the corporation, particularly when the scientific resources (personnel) are limited.

The concept of liberating scientist time to pursue research activities also carries with it the promise that the scientist could achieve higher levels of peer recognition by having more time to pursue research activities (Glaser: 1964), in support of the scientist's cosmopolitan (external to the organization) orientation (Merton: 1949, Pelz: 1953, Ritti: 1968). Meaningful purchasing involvement, therefore, could lead to a increased level of satisfaction on the part of industrial scientists in the area of peer recognition, status and review

(Schon: 1967). Ultimately, this could translate into higher levels of research output. Effective and meaningful purchasing can be a contributor to a creative climate, providing a service that is conducive to the generation of research results.

Finally, faster completion of research projects would ultimately result in new products and processes being established and brought to commercial status first. This has implications for development of competitive advantages.

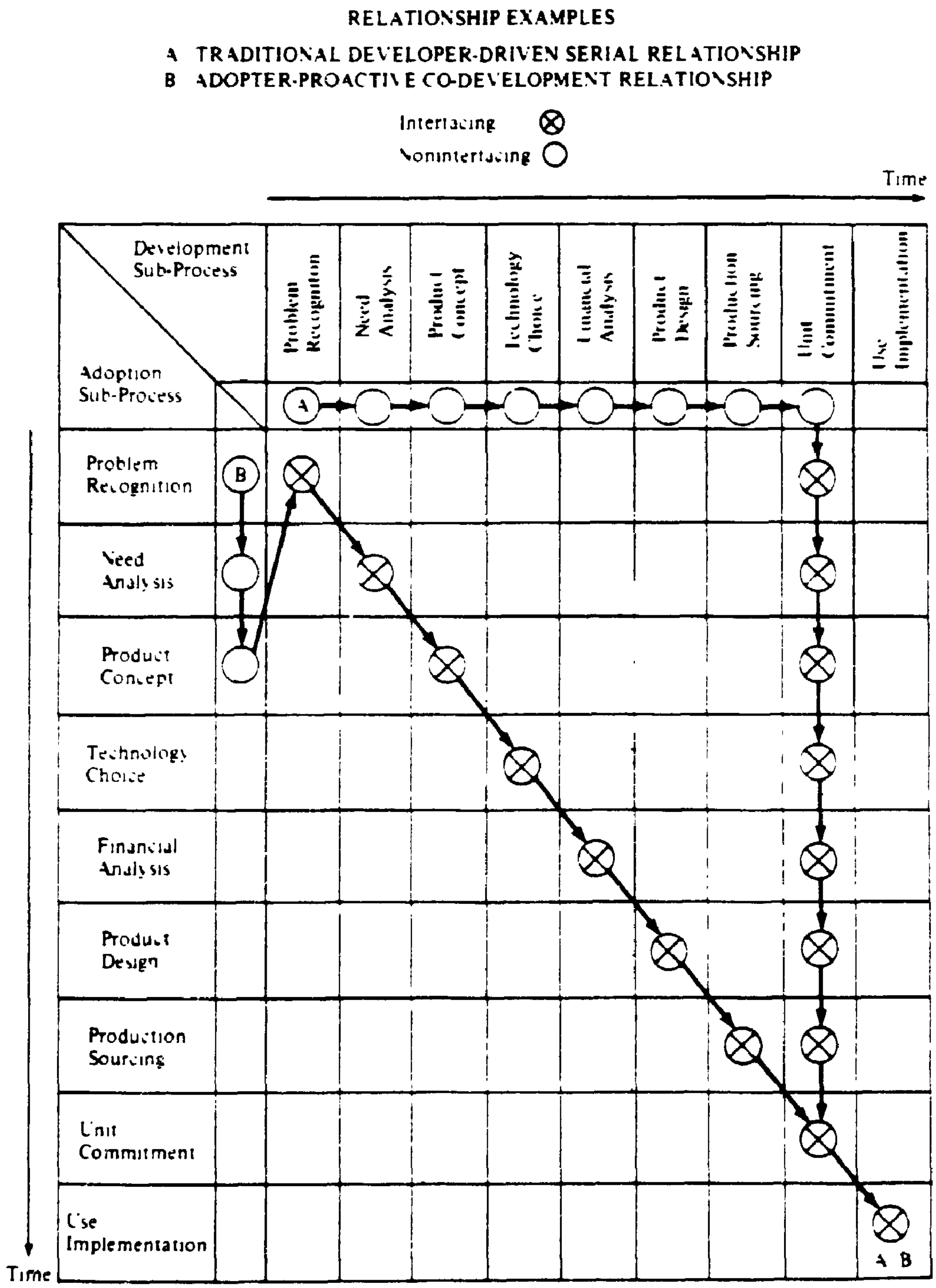
Inter-Relationships Of The Four Areas

While this operational description of meaningful involvement has been addressed as if each element is an independent area, there is undoubtedly an inter-relationship between them. For instance, additional supplier input, communication and information flow would not only provide an external source for new research ideas, it would result in a time saving for the research effort by reducing failure rates and re-invention of past research results. Similarly, the supplier advice and questions regarding future use of the equipment and the operating environment to which the equipment would be subjected might result in multiple project utilization and equipment that performs as expected. There would also be time savings from multiple project utilization since the acquisition of equipment would require a single acquisition process as opposed to two separate procedures (and lead times). The equipment would be on site and fully tested for the second planned project. Therefore, supplier input can be considered as a pervasive force that has influence in multiple areas.

The supplier has been considered as an important input in the achievement of organizational objectives in the development of new technology. A useful framework for evaluating this supplier relationship was developed by Roger More[16] (1986) and is shown in Exhibit 3.

16 More, R.A., "Developer/Adopter Relationships in New Industrial Product Situations", Journal of Business Research, 1986 vol.14 501-517

Exhibit 3
Supplier/Developer Relationship Framework



The framework, if applicable in an R&D setting, suggests that joint effort and a strong interfacing relationship between the supplier and the developer (in this case, the R&D lab) can have significant benefits. Maintaining a joint relationship between the developer and supplier is equivalent to a move along the diagonal of the framework and suggests faster development of new products and processes with higher success rates in the market place. The framework may also be applicable in considering the relationship between purchasing, the supplier and the scientist in the joint effort of equipment acquisitions.

Potential Risks

The potential risk from increased involvement of purchasing in the equipment acquisition process in an R&D context centers on three key issues. First, increased purchasing involvement might be viewed by scientists and research managers, current or future, as an infringement on professional autonomy and detrimental to the concept of a creative work environment. Since this would translate into the inability to attract or maintain top level scientists, a decrease in work morale/motivation and increased strain and tension, the consequences of a poorly implemented process and procedure for meaningful purchasing involvement would be severe.

Secondly, some authors argue that intimate knowledge of the measurement instruments is a fundamental part of a scientist's total knowledge. Specification of research equipment may be considered as an integral element of the measurement instrument. A less influential role in the equipment purchase decision might be viewed, therefore, as a threat to the pursuit of knowledge, a primary scientist orientation.

Finally, Corey (1978) indicated that the directions set by the recognized functional authority would be "determined largely by ... the perceived gains and risks of possible outcomes for the individual decision makers".[17] Relating this concept of risk vs. gains into the context of the equipment acquisition process leads to the following possibility: the scientist, with his/her cosmopolitan goals, would perceive the gains from meaningful purchasing involvement to be low and primarily related to company specific objectives. In contrast, the perceived risk to the scientist from meaningful involvement would be considered as high, particularly if professional status would be reduced and the possibility exists of receiving equipment that is inappropriate. Full control over the equipment acquisition decision process might be a risk reducing strategy for the scientist.

[17] Corey, 130

There is no known research that directly measured the relative importance that scientists placed on their control of the equipment acquisition process. The risk areas need to be examined as part of this research into meaningful involvement in an R&D environment. The third element of risk, that of perceived risk of equipment failing to operate as expected, is believed to be inversely related to the confidence the scientist has in purchasing's ability to understand the technical and functional requirements for the specified equipment.

Implementation Issues

Authors in the purchasing field have debated the best approach to achieve increased purchasing involvement in an organization. These solutions include modifications of organizational structure and reporting relationships, increasing the salary for purchasers and an increase in educational qualifications. For an industrial research lab, established theoretical concepts tend to diminish the applicability of some of these approaches.

The literature suggested that the "acceptance theory" of authority gives the best model for R&D settings (Van Fleet: 1973, Parker: 1977). According to this theory, the scientist would act as if his/her willing acceptance of a potential infringement on autonomy is an absolute requirement to the policy's implementation. Paterson's (1965) concept of sapiential authority would imply a need for knowledge on the part of purchasers of the technical and functional requirements of the scientist's equipment needs. Combining these two theories suggests that, for example, adopting a new organizational structure complete with new purchasing policies and procedures would be, in itself, ineffective in achieving the desired level of meaningful involvement. Such an organizational structure would need to be accompanied by a purchaser perceived as having knowledge-based authority.

Further, Allen (1977) noted that communication patterns of scientists in one lab tended to stratify along educational peer levels. In the study of interest, the doctorates tended "to form a tightly knit group both socially and for technical discussion. This behaviour had been noted numerous times in controlled experimental situations"[18]. Other studies (Pelz and Andrews: 1966 and Allen: 1977) were less specific in focusing on education as a stratifying variable. Instead, these studies measured the communication levels of "colleagues", defined as "those individuals with whom they had communicated about scientific or technical matters over the course of the given day".[19]

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[18] Allen, T.J., Managing The Flow of Technology (Boston, Massachusetts: Massachusetts Institute of Technology, 1977) 228-229

[19] Ibid, 32

Combining communication pattern research with the acceptance and sapiential theories of authority suggests a requirement for personnel in the purchasing function who possess technical expertise that could be considered sufficient to have knowledge-based authority for successful meaningful purchasing involvement in the technical stages of the purchasing process. The purchaser may have to be considered as a "colleague" in order that adequate communication flow would occur. This may imply a need for purchasing personnel with formal education in science or engineering and/or purchasing personnel well versed and experienced with the technology of interest.

Generalizability Of The Research

While this research work focuses on the very narrow context and work environment of industrial research and development activities, the implications of the findings could be of broader significance. While the R&D environment was chosen both due to personal experience and interest as well as contributing to the base of knowledge in the area of purchasing theory, this environment is not necessarily a unique one. Organized R&D functions represent one example of a group of professionals, all well educated, with a certain degree of independence and autonomy. Any professional service organization (consulting, law, accounting, medicine) that is staffed by well educated professionals is believed to represent a similar operating environment. The relationship between the purchaser and the user of the equipment in such environments could have similar obstacles and potential benefits. A limiting factor in the applicability of the research findings across different organizational functions would be the strength of the sociological theory regarding traits of scientists. The research findings may also have applicability in any country where research is an organized activity. The traits of scientists may be universal.

There was no reason to suspect that the theory for implementation could not be applied in other settings. The approach of formal education and technical expertise could be a universally valid one. However, the particular obstacles towards implementation, in this case professional autonomy and creative climate, appear to be affected by the nature of the research work Peter (1957). The proposed framework may be most appropriate in environments of basic and applied research with perhaps greatest applicability in a university or medical research setting.

Relevance For Managers

Beneficial results can be achieved through meaningful involvement of purchasing in equipment acquisitions. Through an understanding and consideration of the needs of other research projects, both now and in the future, the purchaser would be in a position to provide a broader range of supply sources, to examine equipment that may be more beneficial to the corporation based on full life cycle costs and to liberate valuable scientist time to pursue other research activities that generate value for the corporation.

For industrial R&D managers, this research may hold significant promise. The monetary benefits from R&D have been the subject of numerous studies. R&D has been consistently one of the higher discounted rate of return efforts of an organization. Any concept that leads to R&D productivity improvements, either through time savings, increased information flow and/or reduced research project failure rates, and ultimately, therefore, the pursuit of a greater number of successful research projects would be welcomed. Effectiveness and efficiency in R&D would be especially critical for Canadian industrial firms. The research results may have positive implications for practice in the university and medical environments where a large proportion of R&D spending occurs.

For purchasing managers, this research offers an in depth exploration of equipment purchasing practices in an environment that could be conducive to greater purchasing involvement. The scientist, despite the occasional characterization as a prima donna, is an individual who recognizes the value of professional expertise and who would be willing to co-operate under certain conditions. Further, an examination of the industrial R&D centre acquisition process and the impact of the capital budgeting system will be valuable outputs expected from this exploratory research effort.

Finally, this research is a further step in the understanding of how corporations can effectively use diverse resources in a collaborative effort to achieve mutual objectives. Purchasing, in this environment, faces a difficult task in terms of integration and team work. The equipment decision is largely a technical one, integrated into the research methodology and requiring theoretical scientific knowledge to perform an adequate value analysis. When combined with the low spending levels on equipment and the low levels of purchasing influence in equipment decisions in other environments, the very existence of meaningful purchasing involvement would be of major significance in and of itself. An understanding of the causal relationships in such an environment is believed to be an addition to management knowledge in the area of organizational effectiveness.

CHAPTER II

PREVIOUS RESEARCH IN EQUIPMENT ACQUISITIONS

Introduction

This chapter will serve as a summary of major research findings that defines the previous work performed in the area and that supports the formulation of a conceptual model. The literature was generally evaluated in three principal areas: Research Management, Purchasing Management and Sociology.

Purchasing

The Robinson-Faris Model

Traditional marketing literature has provided support for the Robinson-Faris (1968) buying model that described the purchase decision making process as constituting eight distinct stages or activities. As a rule, these activities are considered sequential. The following description of these activities, as it might pertain to the purchase of equipment, was adapted from Rosenberg (1977).

1) Anticipation or recognition of a problem (or need)

> Someone within the organization recognizes or has it pointed out to him/her that a need/problem exists and that the purchase of equipment will be necessary.

2) Determination of the characteristics and quantity of the needed item

> This stage involves the detailed examination of the equipment attributes and criteria that are required to meet the needs of the requesting group, department or individual.

3) Description of the characteristics and quantity of the needed item

The needs of the group, as defined in the previous stage, are communicated in a clear and comprehensible manner so that the request can be acted upon by others, in particular the procurement personnel.

4) Search for and qualification of potential sources

With a clear definition of the kind of equipment required completed, the firm can begin a search for potential suppliers. Depending on the frequency with which the item has been purchased in the past, this stage can be extensive.

5) Acquisition and analysis of proposals

With potential suppliers identified, the firm proceeds with a tender process and formal bids for supply. The bidding process can be a formal one involving submitted documents or an informal one of catalogue consultation or telephone calls.

6) Evaluation of proposals and selection of suppliers

The received proposals will be evaluated by the important members of the buying group and a decision rendered. In some cases, further negotiations may occur regarding some specific details of the proposal.

7) Selection of an order routine

This stage covers the tasks of actually processing the purchase order, including shipping, receiving and payment for the item. Some consider this to be part of the post purchase delivery process.

8) Performance feedback and evaluation

Once installed, the equipment will be evaluated on an on-going basis to determine the performance relative to written assurances from the supplier and warranty.

Suppliers are keenly interested in both identifying the key decision makers in the process and interacting at the formative stages of the buying process. Such an early involvement would permit, from a marketing perspective, a greater understanding of the customer's requirements and would allow for influence in setting the specifications in a manner that provides supplier advantages. From an internal purchasing group perspective, the success of supplier marketing influence could have important implications in achieving purchasing objectives. The supplier could influence the specifications necessary for the bidding process (Parket: 1971) and cause them to be so tight as to eliminate purchasing agents' freedom to choose among suppliers (Strauss: 1962).

Enhancements To The Model

The Robinson-Faris model has been tested on numerous occasions and has received general support. However, the model may be too simplistic for direct application in a research setting. The model proposes a sequential and well defined process. In contrast, the research environment has been sometimes characterized as one of serendipity and certainly not bureaucratic and purely deterministic. The essence of creativity is freedom to explore and test the unknown. If this creative approach applies to the quest for equipment, the model may not be applicable in a strict sense. An understanding of the sequence followed and the potential feedback loops in the decision making process would have important implications for identifying the critical points in time when the internal purchasing group and external supply organization could have a meaningful impact.

Second, the model avoids the budget approval and funds allocation process. The model assumes that cost of equipment is considered during the evaluation stage and that, if the need/problem exists, the funding would follow. In an R&D setting, however, gaining access to budget funds may precede the evaluation steps and may set a limit on the equipment options considered. Understanding the relationship between the capital budget approval and the equipment acquisition processes may be an important requirement for purchasers and suppliers.

Third, the financial constraints of the capital budgeting system combined with the potential long range implications of a measurement equipment purchase may imply that a researcher's needs might change as the acquisition process proceeds. An identified want may become a desireable need should the price of equipment be negotiated down to a level below the budget forecast. The budget may be a financial ceiling that the scientist may view as being his/her entitlement.

Finally, the model does not address the time spans that may occur within each stage. In a research environment, gaining budgetary permission to proceed with a planned purchase may require several years and a great deal of effort in external information gathering and internal communication and marketing. The process of gaining approval to buy any piece of equipment, in and of itself, may be considered as "completion"[20] of the equipment purchase process from a scientist's view (Strauss: 1962). The time delays that may occur before approval to purchase is secured may also lead to a revision of the defined needs.

Nonetheless, the Robinson-Faris model is a useful one for describing the stages when purchasing involvement could be evaluated for meaningful contribution. The sequential stages and examples of what constitutes potential meaningful involvement are illustrated in Exhibit 4.

Exhibit 4

Stage	Meaningful Involvement Practice
Need Anticipation	-involved in R&D long range planning -identify project leaders and project start dates -serve on research capital committee
Determination of Characteristics	-understand project purpose -classify "needs" and "wants" -clarify operating environment -current equipment compatability -formulate functional requirements -check future requirements
Specific Description	-formulate technical specifications -identify delivery needs -incorporate operating environment -future needs discussed -preliminary discussion of possible supply sources

[20] Strauss, G., "Tactics of Lateral Relationships: The Purchasing Agent", Administrative Science Quarterly, Vol.7, No.2, 1962, 164

Stage	Meaningful Involvement Practice
Search For/Qualification of Potential Suppliers	-external sources identified -internal equipment evaluated -arrange for demonstration of equipment -obtain delivery commitments
Examination of Sources Concerning How to Buy	-lease arrangements and upgrading possibilities -budget & timing considerations -scale up potential
Evaluation/Selection	-joint decision making -"best buy" selection -arrange field and on site equipment demonstrations
Establish Order Routine	-notification of success -follow up purchase -arrange for installation -payment
Performance Feedback	-post installation performance check -customer satisfaction survey -service arrangements

Current Involvement Levels

Purchasing involvement in the equipment acquisition decision may be characterized under the Robinson-Faris framework as the extent or degree of involvement by stage of entry into the process. The state of the art of purchasing involvement in the need identification and the specification stages appears to be quite low.

Pingry (1974), in a field study, found that purchasing and the engineer were jointly responsible only during the search for and qualification of supply sources. With respect to recognition of a problem, determination of technical specifications and the technical analysis of the bids, engineering played a dominant role. Pingry's study also indicated that engineering was the primary supplier selector for new purchase decisions.

Cooley, Jackson and Ostrom (1978) found low purchasing involvement in the product selection decision. They concluded that attempts to increase purchasing's role in the earlier stages of the equipment acquisition process should focus on the merits that purchasing involvement can yield (e.g. better quality, faster supply, more time for the scientist to pursue research projects).

Burt (1984) states that the largest failure of purchasing executives was one of not being involved at the appropriate points in the development process (of a new design or project). Burt also stated that plant engineering was best responsible for developing equipment requirements. He noted that there was an unfortunate tendency to accept and proceed with the first option that appeared to meet the need. While Burt was focusing on the design process, a similar statement could be valid when describing a scientist's search process for a piece of equipment.

Burt also found that many engineers enjoyed interacting with vendors. The same may be true of industrial scientists. Purchasing involvement may be viewed as an attempt to take away one of the scientists' pleasurable activities. Burt indicated that "obviously, an ability to speak 'engineering' was very helpful"[21] in achieving purchasing involvement.

Leigh and Rethans (1985) indicated that the lowest levels of purchasing influence occurred during the process of identifying needs, determining the general characteristics of the equipment and determining the final specifications of the equipment needed.

Despite these low levels of purchasing involvement in the early stages of the equipment acquisition process, Fearon's (1988) survey across a wide variety of industries and functional areas found that purchasing's role and responsibility had grown in capital equipment buying. The exact nature of this role and the R&D function's participation in it was unknown. Fearon's research methodology was too general to draw conclusions.

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[21] Burt, D.N., Proactive Procurement: The Key To Increased Profits, Productivity and Quality (Englewood Cliffs, New Jersey: Prentice Hall Inc., 1984) 32

Reasons For Low Involvement

Some researchers have attempted to understand why purchasing involvement in the earlier stages of the Robinson-Faris model has not been more prevalent. The explanations generally have centred on the concept of risk, buyer qualifications and organizational structure.

For example, Corey (1978) indicated that the perception of risks and potential gains would influence the roles and directions of the various functional groups. Technical competence and credibility, under Corey's framework, tended to reduce perceived risk and therefore led to earlier involvement of purchasing in the equipment acquisition decision. Corey stated that "the functional area or group recognized as having the relevant authority role will dominate the decision process".[22]

Interestingly, Barath and Hagstad (1979) noted that as the professional status of purchasing within the organization increased (purchasing influence, importance to the firm, promotability, etc.), the less likely that the purchasing manager would attempt to enter the purchasing process at an early stage. It would appear that professional association members tended to adopt the more traditional role of

[22]Corey, 130

purchasing activities which hindered entry at the need identification and specification stages. Barath and Hagstad's research indicated that as the professional status of the purchaser increased, the purchaser expanded the association with external professional groups at the expense of the corporate objectives. This is a cosmopolitain (as opposed to local or organizationally affiliated) approach that parallels Merton's (1951) social theories for scientists.

However, Barath and Hagstad's definition of professional status was related to status within the organization and involvement in the purchasing association. Professionalism, under the author's definition, did not relate to formal education, technical skills & ability or knowledge which are more traditional frameworks for professionalism.

In terms of organizational setting, Bacon's (1971) study of centralized versus decentralized purchasing in an academic institution represented probably the closest parallel to this research. Bacon's focus was clearly on the physical structural elements (e.g. office locations) with little emphasis on the notion of qualifications and technical requirements for purchasers. Further, Bacon's research focused on service to the user/specifier rather than expanded stage involvement under the Robinson-Faris model. In other words, Bacon was attempting to describe conditions under which purchasing would satisfy customers as opposed to achieving increased purchasing involvement.

Nonetheless, Bacon identified many traits regarding professional autonomy that are consistent with the premises of this research. Bacon's study had implications for geographical location as well as a framework for measuring performance (customer satisfaction).

Qualifications/Education?

A common theme for explaining low purchasing involvement has centred on the qualification of the buyer and his/her ability to interact with engineers on a technical basis. Roman (1968), for instance, argued that the operating environment was a compelling force in limiting the achievement of maximum functional potential and that:

> "the procurement process for a firm engaged in research and development is infinitely more complicated (than for a soft drink bottling plant) . The purchasing agent in such a situation could hardly function properly if he were a clerk".[23]

Strauss (1962) indicated that purchasing agents who were college graduates tended to be more expansionist (i.e. seeking greater responsibilities). He suggested that the college-trained purchaser may feel equal to the engineer and more

[23]Roman, D.D., "A Reinterpretation of Procurement To Close The Credibility Gap", Journal of Purchasing, Vol.4, No.4, 34-35

willing to come into conflict with him/her. Further, as the education level rose, so did reliance on less formal techniques for achieving meaningful involvement.

Strauss also noted that some purchasing departments attempted to achieve early involvement with engineering groups by using "ambassadors". These ambassadors were members of the purchasing department with engineering backgrounds who spent most of their time in the engineering department. The use of ambassadors combines elements of matrix reporting relationships, decentralized purchasing departments and technical training to achieve meaningful involvement.

Pinkerton (1970) surveyed purchasing educators and practitioners. The findings indicated a strong need for an engineering degree for capital equipment buying and as an assistance for coordination between technical departments such as engineering. However, the questionnaire responses depended on the perceived role for the purchasing function. When companies felt that the role for purchasing in the need identification and specification stages should be low, the educational qualifications took on a reduced level of importance. This concept had implications for achieving meaningful purchasing involvement. Purchasing's aspirations and managers' role perceptions would be important considerations in any conceptual model concerning role behaviour.

England (1973) expanded on Pinkerton's survey results and conclusions by stating that "the ideal educational background for a buyer in a technically oriented industry is an undergraduate degree in engineering and a masters degree from a top business school".[24]

Lambert (1976) indicated that engineers were likely to view the purchasing manager's role as merely paper shuffling due to the engineer's superior knowledge of requirements (for equipment). Lambert quoted an engineer who stated that it was "the engineer, after all, who understands 'the really important' factors to consider in evaluating a vendor"[25] (even more so, understanding the needs and specifications for the equipment). The tone of the engineer's comments indicated a certain perception of superiority commensurate with the educational and technical qualifications of an engineer.

[24]England, W.B., "Educate For The Long View", in Purchasing Management: Selected Readings, Gravereau, V.P. and Konopa, L.J., editors (Columbus, Ohio: Grid Inc., 1973) 14

[25]Lambert, D.R., "Purchasing Confidence vis-a-vis Engineering", Journal of Purchasing and Materials Management, Vol.12, No.1, 1976, 16

Sociological Context

The Engineer vs. The Scientist

The previous studies made almost exclusive reference to the engineer/purchasing interface. Even when referring to interface with R&D, the common mistake has been made in assuming an engineering presence (for example, Finnegan). However, from the sociology literature, the engineer and the scientist appear to demonstrate very different traits. It is the interface between purchasing and scientists that is of interest in this research.

Allen (1977) noted that:

> "Despite the fact that they should be the last to commit such an egregious error, social scientists studying the behaviour of scientists and engineers seldom distinguish properly between the two groups. The social science literature is replete with studies of 'scientists', who upon closer examination turn out to be engineers. Worse still, in many studies the populations are mixed, and no attempt is made to distinguish between the two subsets. This sort of error has led to an unbelievable amount of confusion over ... the applicability of research results to specific real-life situations. One might almost as readily lump physicians with fishermen. This has led at times to what would appear to be conflicting results (in information studies)."[26]

Allen further stated that:

> "Engineers and scientists, despite surface similarities, are so fundamentally different in their natures that one could hardly expect similarity in communication behaviour. Not only are the two groups socialized into entirely different subcultures but their educational processes are vastly different, and there is a considerable amount of evidence to show that they differ

[26] Allen, T.J., Managing The Flow Of Technology (Cambridge, Massachusetts: Massachusetts Institute of Technology, 1977) 35

in personality characteristics and family backgrounds as well."[27]

The comparison of engineers and scientists indicated some interesting contrasts. Pelz (1961) noted that engineers tended to be more cautious and conservative (i.e. risk averse) than scientists. Shepherd (1961), when comparing engineers and scientists, found that engineers preferred, by a two to one margin, the concept of organizing the work (administrative control) of a successful group. This administrative control conceivably could include the purchase of new equipment. Scientists, on the other hand, were much more interested in developing an original formula and a research idea (a strong task orientation). Shepherd's and Pelz's work tended to support the notion that an increased role for purchasing in a scientific environment would be somewhat easier to implement than in an engineering environment, particularly if some perceived risk was involved.

Ritti (1968) indicated substantial differences in the work goals of scientists and engineers. Engineers displayed a very "local" (related to goals of the company) attitude while scientists were very cosmopolitan (relating to personal and inter-organizational goals). The concept of cosmopolitans and locals was similar to Merton's (1949) views and those of Pelz et. al. (1953) who used the terms "science oriented" and

[27] Ibid, 36

"institution oriented". Ritti went on to state that an engineer with a bachelor's degree and a scientist with a PhD were about as dissimilar as one could imagine in terms of traits.

Ritti further noted that:

> "while publication of results and professional autonomy are clearly valued goals of Ph.D scientists, they are just as clearly the least valued goals of the baccalaureate engineer. For the engineer, advancement is tied to activities within the company, while for the scientist advancement is dependent upon the reputation established outside the company."[28]

Since company benefits to be derived from meaningful purchasing involvement can be considered as local goals, Ritti's findings did not augur well for potential success in finding high levels of meaningful involvement in an R&D setting. However, Ritti's study also indicated that the primary work goals of scientists were to work on projects that were self-initiated, to establish a reputation outside the company, to be viewed as an authority in the field and to publish.

In contrast with the work of Pelz, Ritti Shepherd and Allen, Peter's (1957) study indicated that scientists and engineers may not exhibit generalized trait differences. Instead, the nature of the goals, aspirations and company orientation may

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[28]Ritti, R., "Work Goals of Scientists and Engineers", Industrial Relations, Vol.7, No.2, 1968, 131

be more a function of job task performed. Peter's study concluded that for the 800 engineers studied, the relative interest of the engineers in economic affairs, people, things and ideas varied depending on whether the engineers worked in research, development, technical services, non-supervisory administration, supervisory and sales activities. The engineer, according to Peter, was a most flexible and adaptive person.

An inherent weakness in Peter's study was the lack of a science reference group against which to compare. If such a reference group had been available, the engineers, even in an R&D environment, may have scored considerably lower than scientists on such issues as interest in ideas and things. Furthermore, Peter's classification of interest areas did not easily parallel trait classifications.

In summary, most of the studies of scientists versus engineers would suggest that it would be advisable for this research to interview or solicit questionnaire responses from scientists only or at least to control for this variable.

Knowledge and Theories of Authority

Parker (1977) indicated that experts instinctively accept that status must reflect authority that stems from knowledge. A "scientist will not readily respond to authority that is expressed by the ... imposition of sanctions or allocation of tasks."[29] Thus, the purchasing agent must demonstrate knowledge to achieve increased participation in the equipment purchase decision making process. Parker concluded that Van Fleet's (1973) acceptance theory of authority gives the best model for R&D in which the individual behaves as if his/her willing acceptance was required for any request. Therefore, an increased purchasing role cannot be forced upon the researcher but instead must be gained by voluntary acceptance.

Lunt (1984) argued, however, that knowledge must be demonstrated by the scientist to gain peer credibility. Further, this knowledge may embody, not only knowledge of the relevant area of science, but also of the measurements required and the instruments necessary to perform the measuring task. Thus, Lunt, would argue that attempts to change the decision making process for scientific equipment would not be viewed favorably by the scientist.

At the same time, Lunt recognized that, while having a great deal of freedom regarding the choice of programs and procedures, the scientist may well have constraints on the facilities available for use and there may be procedures that

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[29] Parker, R.C., "Human Aspects of R&D Organization", R&D Management, Vol.7, No.3, 1977, 168

must be followed when using facilities not earmarked for the scientist's sole use or when work is required of other people.

Paterson (1966) described four classifications of authority: structural, sapiential, personal and moral. Of particular interest was sapiential authority whereby authority rested in a person based on his/her knowledge of a subject. An important aspect of Paterson's work was that the knowledge based authority rested with the individual and not the position and that this authority model would have relevance in a professional setting. At the individual level, Paterson's theory suggested that it would be the scientist's perceptions of a purchasing agent's technical knowledge that would permit acceptance of a more meaningful purchasing role.

Van Fleet's acceptance theory, Paterson's sapiential authority structure and Roman's (1968) comments regarding the fact that "real or imagined intellectual compatibility often acts to facilitate or impede internal communication and organizational alliances"[30] were combined to form a fundamental tenet of this research effort. Formal education (knowledge concerning the performance requirements of the equipment and the needs of the scientist) and technical knowledge & skill combine to become

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[30]Roman, D.D., Research & Development Management (New York: Appleton-Century Crofts, 1968) 285

a standard by which support staff within an organization would be evaluated by the scientist before acceptance to policy and procedures would be considered.

Implementation Issues

Much has been written on the subject of conflict in organizations between professionals and other parties. In fact, the study of the growth in corporate R&D functions has had as a central theme the extreme difficulty in balancing the needs of the scientist for a creative climate and the needs of the corporation for research results that would eventually lead to marketable products or improved processes.

Shepard (1956) indicated that for professional and scientific organizations, the scientist was expected to make all decisions relating to the research work. The idea of external controls and procedures was considered to be inconsistent with the basic tenets of professionalism. However, Shepard also argued that such tasks as "the drafting board", "hardware" and presumably purchasing are considered as "low level", "nonprofessional" or "an uneconomical use of professional time".[31] The use of project organizations and project teams were recommended as a method to overcome such conflicting attitudes between the professional and the support service

[31] Shepard, H.A., "Nine Dilemmas in Industrial Research", Administrative Science Quarterly, Vol. 1, No.3, 1956, 306

personnel. An intense loyalty developed among the team members. Further, since many professionals viewed projects as group efforts, the challenge would become one of convincing the scientist that a member of purchasing should be part of the group.

Moore and Renck (1955) studied the professional employee in industry and found that scientists expressed high levels of "frustration" with perceived status within the organization.[32] Interpersonal difficulties were common between the professional and the business oriented manager.

Orth (1959) indicated that scientists cannot and will not operate at their peak of creative potential in an atmosphere that puts pressures on them to conform to organizational requirements that they do not understand or believe to be necessary. Since maintaining an environment that is conducive to creativity is of paramount importance in an industrial research lab, the implementation of an increased purchasing function involvement in equipment purchase decisions must be accompanied by an implicit or explicit justification and acceptance process on the part of the scientist. Otherwise, the increased role would be accompanied by less than peak

[32] Moore, D.G. and Renck, R., "The Professional Employee In Industry", The Journal Of Business Of The University Of Chicago, Vol.28, No.1, 1955, 66

performance by the professional. However, Orth's description of the critical elements in a creative environment did not identify equipment control as a key parameter.

Parmerter and Garber (1971) surveyed over 100 scientists and concluded that the key environmental factors for creativity and innovativeness were recognition and appreciation, freedom to work on areas of greatest interest, broad contacts with stimulating colleagues and encouragement to take risks. None of these elements appeared to be seriously threatened by meaningful purchasing involvement in equipment purchase decisions.

Kornhauser (1962) surveyed engineers and scientists and found that 40% spent more than 25% of their time on duties that did not require specialized knowledge of their profession. This poor allocation of resources represented a major reason why companies would experience periodic shortages of scientists and engineers in the job market.

Kornhauser also indicated that scientists respect <u>all</u> kinds of professional judgments and contributions. Kornhauser's views were considered, therefore, as general support for the concept of purchasing as a "profession".

Kornhauser also noted that, as a member of a profession, the scientist would defer only to superior professional knowledge or competence. Task specialization and knowledge of a particular field would appear to be the best entry parameters for an increased role in the equipment acquisition decision. By the same token, members of support service that obtained their level of influence only through formal authority and mandated procedures were viewed as interlopers who had acquired status and power without having the necessary qualifications. Strain was minimized when "purchasing" remained strictly confined to its mandated activities. Kornhauser indicated that, in many organizations, the scientist was given authority to incur expenditures up to a certain point but that there was continual pressure from management for more conformity to organizational procedures.

La Porte (1965) noted that a professional orientation implied that scientists sought sufficient freedom to explore their specialties and the facilities (including, possibly, equipment) for that exploration. La Porte indicated that a survey of procedures hampering the creative environment showed that externally controlled (i.e. those outside the research division) procedures regarding equipment control and procurement, budgeting and funding were particularly troublesome. Once procedures were internally controlled, dissatisfaction ratings fell dramatically.

Thus, a non-dedicated, remote from the research centre purchasing function may be expected to achieve poor professional acceptance. A local (to the research centre) but smaller purchasing group would appear to have a much better chance of real success in reducing scientist dissatisfaction with loss of control.

La Porte also found that an organization's need for stability and continuity encouraged formal procedures that govern such things as procurement policies. These policies were viewed by the scientist as restraints and inhibiting factors in their research. French (1963) concluded that the confrontation between a professional's freedom or autonomy and the executive controls of the research manager created an untenable situation.

In summary, conflicting evidence existed with respect to the potential for success of an increased purchasing role in a scientific environment. The prospect of increased meaningful involvement would be determined largely by the extent to which the scientist felt that the acquisition of equipment represented an integral part of the research methodology. There were contradictory opinions on this concept. Some believed that knowledge of the measurement equipment was an integral component of a scientist's knowledge base (Lunt). Further, the scientist would likely resist increased involvement of purchasing in the acquisition process if there existed some perceived increase in risk with little offsetting benefit or gain. Others indicated that the scientist may view the acquisition task as not necessary for peer credibility and/or a poor use of time (Shepherd).

From an R&D manager's perspective, the purchasing function may not be permitted an attempt to increase its involvement for fear of interfering with the most sacred element of a successful corporate research organization: a creative environment. The difficult balance between autonomy and corporate policies and procedures has been a topic of considerable interest since the development of commercial research laboratories in the 1920's that have attempted to employ autonomous professionals outside of a university environment.

Previous management research pertaining to engineers was also found to be not necessarily applicable in a scientific environment. There was some support for a professional scientist giving recognition of purchasing specialization as an area of knowledge in itself, although, perhaps, of secondary importance as perceived by the scientist. At the same time, the sapiential authority represents a barrier that would inhibit meaningful involvement by purchasers lacking in technical qualifications.

Finally, contrary to Shealy's (1985) comments about the universality of purchasing tasks and education, the R&D environment represented at least one situation where buyers may not be able to transfer from other divisions. Educators must be cognizant of the peculiarities of the particular operating environment within which the purchaser will function. The theory of sapiential authority represented authority informally vested in the individual and not the position (Paterson: 1966). A new agent transferred from another department may be required to prove his/her technical competence before authority is "accepted" by the scientist.

Research & Development Management

R&D management research in the area of procurement was virtually non-existent. A more common theme in the R&D management has been on elements that help to establish an appropriate creative environment and the effective transfer of research results into practice.

For example, Foster, Linden, Whitely and Kantrow (1985) surveyed R&D directors concerning high return activities. Thirteen activities were identified as offering the potential for improvements of significance. None of these activities related to support services, in general, much less purchasing in particular.

Some management research had been done in the area of support services, in particular the importance of a technical library and patent department. It is possible to draw some parallels by studying these efforts.

Flagg (1966) and Cuthbert and Blinder (1973) noted that service functions are an integral and major part of the research organization. Flagg suggested involvement of the service functions at budget and program planning time in order to improve research effectiveness. Such services constituted anywhere from 15-17% of a research facility's expenditures (Murphy: 1969). The effectiveness of the service was best measured using customer satisfaction surveys and technical backgrounds, according to these authors, were a requirement.

Glaser, Harrison, Hilliard and Kangas (1973), in discussing the various research service functions at Exxon Research and Engineering, indicated that significant benefits were derived from these areas including using purchasing as an equipment purchase and disposal central agency. The authors noted that 25% of the cost of R&D was materials and equipment. Instrument savings from the central instrument inventory control were estimated at approximately 10% annually. Another 10% annual saving resulted from a proactive purchasing involvement in maintenance, repair and operating (MRO) buying (e.g. the scientist's use of crushed ice vs. dry ice pellets).

Holt (1978), in a study of a research firm's library and information system, found that the head of the firm's central library was an electronic engineer with supplementary library education. The chief librarian was actively involved on a weekly basis with internal consulting groups that reviewed the latest developments in tools, products, processes, etc. A similar proactive role by purchasing in equipment acquisitions would represent meaningful involvement.

In a similar study, Ryans and Ryans (1977) survey of library staff in R&D units showed staffing by personnel with master's or doctoral science degrees. Of particular importance was the ability of th service group to anticipate a client's needs. Need anticipation required effective internal communication.

Wolff (1983) indicated that the information specialists at the Amoco Research Centre had technical degrees and were involved early on in the research projects in order to fully understand the scientist's needs. Amoco believed it was easier to take someone with a technical background and teach them informational tools than to do the reverse.

In summary, evidence from R&D management supported the notion that meaningful purchasing involvement can occur and was more likely to be prevalent where the purchaser had a technical background, was actively involved in the planning function of the research centre and was able to anticipate client needs. Furthermore, as illustrated in the Exxon Research Centre example, the direct benefits from such involvement levels could be substantial.

Need For Increased Role

It would be natural to ask why purchasing should take a more active role in the acquisition process. The studies that were available indicated that scientists tended to waste a considerable amount of time and that scientists were not particularly good at the purchasing task. A scientist performing purchasing functions may be an inappropriate allocation of scarce resources.

Drucker (1952) noted several examples of time studies performed in research labs that resulted in the effective increase in research personnel through task specialization. In one case, a small research lab was able to delay the hiring of three additional scientists by hiring one master mechanic to perform many of the chores previously done by scientists.

Hirsch, Milwitt and Oakes (1958) defined time utilization with respect to "the performance of productive work for which the scientist has had unique training and experience". The authors found that scientists, in general, waste a majority their time on "activities beneath a scientist's abilities, assignments of little or no value and assignments of a personal or unnecessary nature".[33] The authors added that, if anything, this level of wasted time was understated due to the natural tendency to cast oneself in a better light than reality.

Roman (1968) took the Ricardian viewpoint regarding comparative advantage and the organizational division of labour. Roman noted that

> "engineers and scientists deplored administrative responsibilities as being unproductive distractions from their fundamental mission. Yet these same people often insisted on doing their own purchasing and budgeting, for example, or were drawn by the potential for greater recognition and financial return to assume administrative functions which they did not have the competence to perform adequately."[34]

Roman discussed the merits of transferring administrative functions away from the scientist in an effort to increase the effective level of professional staff. Roman also recognized that many R&D administrative functions (purchasing being one of them) were very sophisticated and demanded considerable formal education or training in their own right.

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[33] Hirsch, I., Milwitt, W. and Oakes, W.J., "Increasing the Productivity of Scientists", Harvard Business Review, Vol.36, No.2, 1958, 67

[34] Roman, D.D., Research & Development Management, 109

Glaser (1964), on writing of the organizational scientist, indicated that procedures introduced that reduce the scientist's role in purchasing may leave more time to spend on research. This will tend to cause increased levels of satisfaction and greater peer recognition.

Strauss (1962), in describing the purchasing agent's conflict with engineering, stated that:

> "Engineers write up the specifications for the products which the agents buy. If the specifications are too tight or, what is worse, if they call for one brand only, agents have little or no freedom to choose among suppliers...".[35]

The animosity recorded in Strauss's study arose as a direct function of the agent's desire to reverse the information flow and to be a contributor before the specifications were drawn. Timeliness of input into the specification process became critical, as viewed by the agent, in order to minimize the "completion barrier" problem that arose when the engineer had already achieved a level of accomplishment and completion. Strauss' study would, therefore, suggest that early (chronologically) involvement by purchasing is a critical element in achieving meaningful involvement.

Parket (1971) cited Strauss's comments on engineer's specifications and noted that the above tight specification

[35]Strauss, 164

was the potential result from the direct contact between a supplier salesman and the engineer. As Strauss explained, it may even have been the case that the engineer found a suitable piece of equipment and then defined the required performance and technical specifications based on that particular piece of equipment.

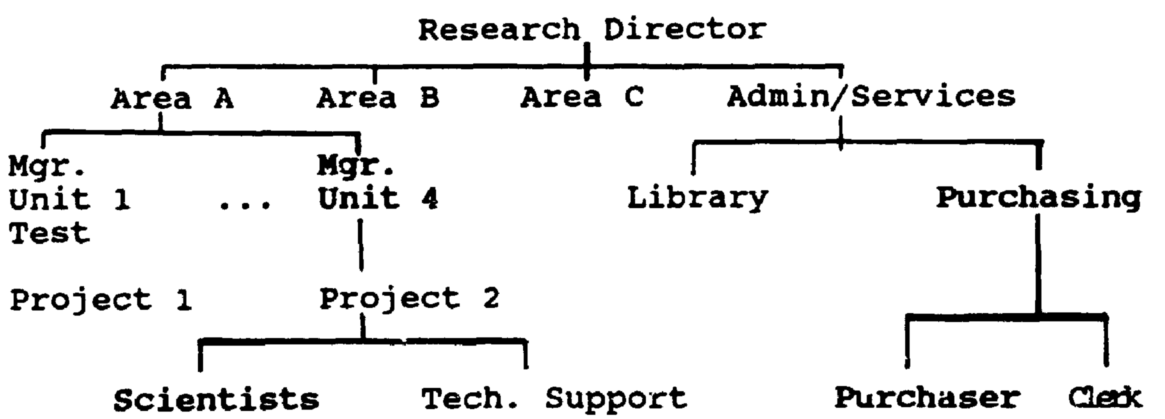
Parket's comments suggested that some form of controlled access between potential suppliers and the specifier would be an important factor in achieving a "best buy" decision. As for the past success of engineers and scientists in the purchasing area, Bauer (1976) recited the experience of an aerospace company's R&D staff that managed the procurement process well into the product's life cycle. The result was high material cost and poor vendor service.

Finally, Brown (1976) examined IBM's San Jose facility and their development of a procurement engineering function. The function's responsibilities included a review of purchase prints and specifications to ensure that the specifications were clear and inspectable and that the designed equipment would be manufacturable.

The Manager's Perspective

To this point, the focus has been primarily on the relationship between the purchaser and the specifier at the individual level. However, the managers of these individuals will have some bearing on the relationship that develops between the purchaser and the scientist. The influence of these managers will likely be at the more general level, perhaps with respect to overall directions and general policies and procedures. The organizational chart presented in Exhibit 5 illustrates the management levels in a typical R&D centre and will be the focus of the discussions following.

Exhibit 5
A Typical Research Centre Organizational Structure



Schon (1967) has classified the research manager as the man caught in the middle. On the one hand, the administrator must deal with the hard realities of the budget and financial expectations of the operating divisions or head corporate head office. On the other hand, the research administrator had been, at one point in time, an active scientist and is aware of the hindrance to a creative climate that excessive levels of policies and procedures create. The conflict from these opposing requirements might be particularly true for those that practiced research in the 1950's and 1960's when the philosophy in industrial settings was one of complete freedom for the scientist, an attempt to emulate a university atmosphere. French's (1963) comments about this untenable situation were previously noted.

Kaplan (1959) made an interesting point when discussing the administrative role in research organizations. He noted that it was the business trained administrator who felt that there was little difference between research functions and other departments. However, the more business oriented the research administrator, the less likely was the scientist to have full confidence in him. Co-operation became difficult to achieve. Regardless of whether the differences were real or perceived, if the scientist does not have confidence in the administrator, any attempt to change policies and procedures in the equipment acquisition decision process would fail.

From the purchasing management perspective, Gorman (1971) surveyed functional and purchasing managers regarding roles and responsibilities. The results indicated that the establishment of specifications was considered by both management groups, to an overwhelming extent, as a <u>functional</u> group responsibility. Gorman's survey did not explore the relative involvement of each group in the process.

Finnegan (1973) noted that top management believed that engineering science courses would enable the purchasing agent to have more rapport with engineers in design, manufacturing and R&D. Finnegan's work introduced **management perceptions** as affecting purchasing achievement of a more meaningful role. Barath and Hagstad's (1979) comments about professional status and the changing aspirations of the purchasing manager were previously cited.

Conclusions From Past Research

Meaningful involvement of purchasing in an R&D setting has been an unaddressed issue in management research. There have been numerous studies about equipment acquisitions in other environments, particularly in an engineering context, that would indicate low involvement levels for purchasers. However, sociological studies indicated that the research environment, in general, and scientists, in particular, were different from engineers in many respects. A direct inference from previous research findings using engineers may not be valid. Even so, incidences of meaningful involvement will be difficult to find.

There was some indication that meaningful purchasing involvement could lead to some direct benefits. These benefits might take the form of time savings or cost reductions. Purchasing involvement that leads to increased supply availability or reductions in price through effective negotiation using the company's purchasing power can result in greater efficiency in resource utilization. However, with such low levels of capital spending levels in an R&D environment, these cost reductions may not be of managerial significance. The time savings possible were unknown since no literature existed about the process followed and time consumed by scientists on equipment acquisitions. However, reducing scientist time wasted on unnecessary tasks can increase the effective scientific resource availability.

However, there may be other benefits from meaningful involvement that are indirect in nature but could be more managerially significant. For example, meaningful purchasing involvement may be a small but important element in the support and maintenance of a creative climate. An improved creative climate was known to be a critical element in the successful generation of research findings that could lead to competitive advantages in the marketplace.

The literature also introduced several concepts of note. In particular, the perspectives of both purchasing and research managers as well as purchasing's aspirations are influences on the level of meaningful involvement.

Finally, purchasing involvement will be more likely to occur when purchasers possess a certain level of technical expertise. Past studies have focused primarily on formal education (e.g. engineering science courses, engineering degree) as measurement criteria. Some examples were noted where purchasers with engineering backgrounds became involved through the use of team membership or matrix structures. It may be equally valid to discuss technical qualifications in a less formal sense such as Burt's comments regarding "the ability to speak engineering". Such knowledge or expertise might be necessary within the framework of applicable models about authority in research settings. These authority models would suggest power and influence is vested in the individual and not the position. Meaningful involvement of purchasing may be a dynamic process that will change over time depending on the knowledge of the purchaser.

CHAPTER III

THE CONCEPTUAL MODEL AND RESEARCH HYPOTHESES

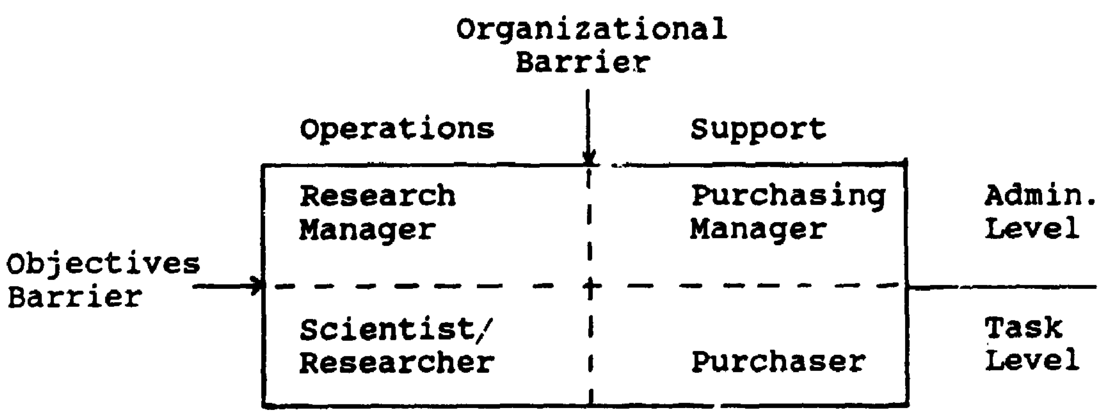
Introduction

This chapter will attempt to incorporate the results from previous research work and from preliminary field based interviews into a conceptual framework or model. The resulting model provides the basis for several research hypotheses that will be tested.

Conceptualizing The Acquisition Process

The literature regarding the personality traits of scientists, the role of purchasing and the important considerations of autonomy and creative climate in a research function was combined with personal experiences to develop a conceptual model. Included in the model are four critical people: the purchasing manager, the purchaser, the researcher and the research manager. The relationship of these four parties is illustrated in Exhibit 6.

Exhibit 6
Relationships Between The Four Parties



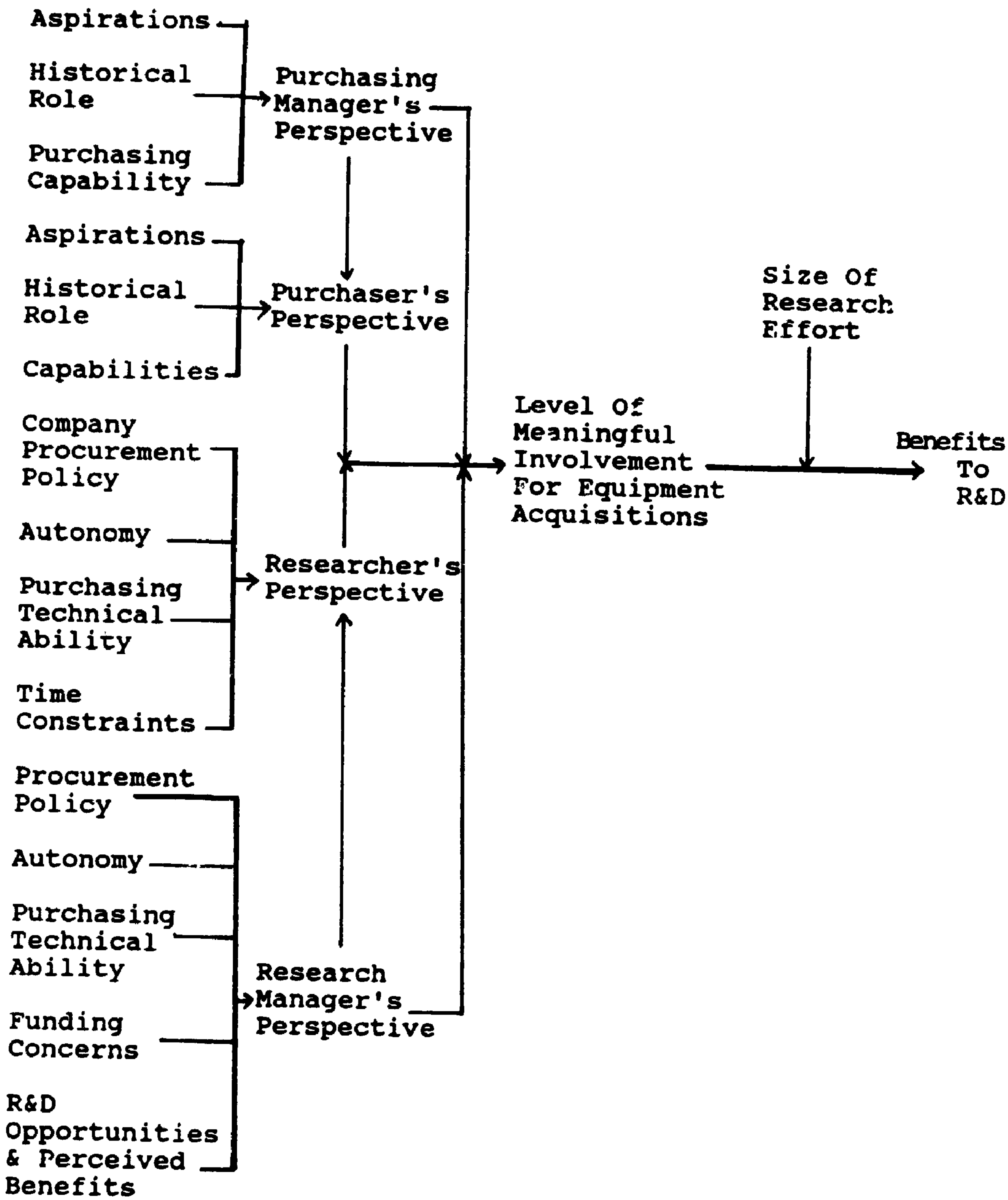
Depending on the size of the research centre, not all parties may exist. In small research centres, the purchaser may report to a research administrator or to a more general administrative manager who may hold responsibility for finance, laboratory services and testing, information services, etc.

The four parties play an instrumental role in defining the purchasing involvement in equipment acquisitions. The research manager must balance the need to maintain a creative climate, including freedom for the scientist to explore research avenues, with the business management needs and objectives of the corporation. The purchasing manager plays a strong role in determining the best policies and procedures for procurement in the research centre and in determining the objective function of this support service. The scientist and the purchaser operate at the individual transaction level. The scientist may be an infrequent user of the purchasing service. The purchaser, in contrast, must serve a generic role, providing service to a variety of customers. The organizational barrier between operations and support is presumed to be larger than the objectives barrier between managers and their subordinates.

The conceptual model that resulted from the literature search is illustrated in Exhibit 7.

Exhibit 7

A Conceptual Model For The Level Of Meaningful Involvement In Equipment Acquisitions In An R&D Environment



Description Of The Model: The Various Perspectives

The Research Manager's View

For research managers, several factors are considered important in determining a manager's perspective of purchasing's role in the equipment acquisition process. As the literature would suggest, a critical concern of R&D managers would be the development and maintenance of a creative climate for the generation of new ideas, improved products and processes and new products and processes. The concept of a creative climate is a broad one that includes autonomy, interaction among colleagues, publication of research findings, peer recognition and the opportunity for intellectual growth. The autonomy element of a creative climate is a more developed concept in terms of supervision of work, judgement, personal freedom and methodological control. It is hypothesized that control over the equipment acquisition decision will be an important element within this concept of autonomy. Therefore, the research manager would try to maintain the scientist's control over the equipment acquisition process consistent with the premise of maintaining a creative climate.

At the same time, the research manager needs to be cognizant of the fiscal responsibilities of the position including the continued financial support for the research effort. When funding for research becomes difficult, the research manager

Intervening And Dependent Variables

The size of the research centre spending is an intervening variable. Greater research spending provides more opportunities to achieve the direct, material benefits from meaningful involvement. Controlling for research centre spending normalizes the benefits from meaningful involvement. Meaningful involvement is just as likely to occur in small research centres as in large ones.

Finally, the level of meaningful involvement is believed to be positively related to the benefits flowing to the research centre when the research spending is controlled. As the level of meaningful involvement rises, so to would the actual and perceptual benefits from meaningful involvement. The greater the involvement levels, the greater would be time savings, supplier input, functional equipment and multiple project utilization.

The Dynamics Of The Conceptual Model

The model defines a set of relationships among four parties who influence the degree or extent of purchasing meaningful involvement. The management perspective is believed to have mainly indirect effects that will not influence involvement levels at the individual equipment acquisition level. The indirect effects may be more important for understanding the overall long term direction of the relationship. At the

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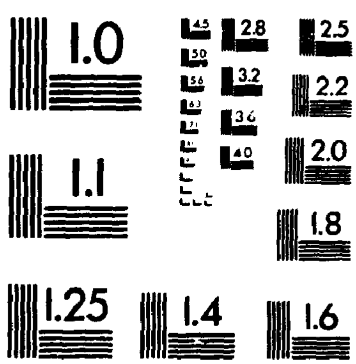

would look for methods that could effectively maintain the scientific nucleus. Research productivity may become a major focus. Some of these efforts may take the form of reduced conference and travel expense. Some of these efforts may pertain to internal efficiency improvements such as more meaningful purchasing involvement.

Another key factor of management concern relates to the research opportunities worth pursuing. If the research opportunities are quite limited, perhaps due to the advanced stage of the technology, then growth in financial funding may not be as important. The research centre may be a declining aspect of the business. If, however, the research opportunities are extensive and the funding is not easily obtained, meaningful purchasing involvement may be high.

Research managers will also incorporate into their assessment of purchasing's role their own perceptions of the benefits that could accrue from high levels of meaningful involvement. To the extent that managers do not perceive significant benefits from high purchasing involvement levels, it is unlikely that, in an attempt to improve efficiency, the manager would even consider purchasing as an area of opportunity.

Finally, research managers, in assessing the role of purchasing, would evaluate the purchasing function based on the perceived level of purchasing's **technical** capability. This would be consistent with the sapiential theory of authority and with what was perceived to be critical for high levels of meaningful involvement at the earlier stages of the Robinson-Faris model of the purchasing process.

It is possible that the research manager would have virtually no direct effect on the level of meaningful purchasing involvement at the individual acquisition level. Instead, the manager may have an indirect effect through the allocation of individual project funding and by the assignment of project work. Nonetheless, the research manager is responsible for creating and maintaining an environment under which the individual acquisition experiences occur. To the extent that the manager views purchasing's role as a vital input service, individual scientists would feel obligated, if not encouraged, to involve purchasing in the acquisition process.

The Scientist's View

The scientist's perspective of purchasing's role is, to a large measure, a function of the same inputs as the research manager's. The scientist would be influenced by the desire to maintain professional autonomy and control over the acquisition process. The scientist would also formulate a perception of purchasing's technical capability since the fundamental emphasis, as it relates to the scientist, is believed to be on the technical quality of the equipment. This is consistent with past research concerning the scientist in an industrial research environment and the theory of sapiential authority.

The scientist, in contrast with the manager, will not have significant concerns regarding funding levels other than avoiding excessive overspending of an allocated budget. It is possible that the scientist would desire to purchase equipment with the maximum technical quality under some agreed upon spending limit without due regard to whether or not such equipment exceeds the needs of the project. This concept is supported by the previous comments from Corey's (1978)[36] research regarding purchasing of a "Cadillac" where a "Chevrolet" would do. The scientist will have concerns regarding time constraints for completion of the project (and delivery of critical equipment) and will be influenced in the relationship by current purchasing policies and procedures.

The Purchaser's View

From the purchaser's perspective of purchasing's role, the critical considerations are fewer but much broader. This would be consistent with purchasing's broader view about

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[36] Corey, 93

successful equipment acquisition. Purchasing would evaluate expertise from a broader capability perspective (technical, scope of supplier sourcing, negotiating skills, consideration of operating environment, consideration of insurance aspects, consideration of delivery, terms and conditions, service, etc.) than would a scientist. Relatively speaking, purchasing would, therefore, downplay **technical** understanding as a critical factor. Purchasing would be more concerned with **early (timely) involvement**. Purchasing would not view scientific instrumentation and technical complexity as unique to the R&D environment.

Second, purchasing may be a victim of the its past role in the organization. This historical role may play a part in determining perceptions of what is possible. Past experiences regarding notable purchasing failures and successes would play a part in purchasing's assessment of what constitutes the important elements of meaningful involvement. For example, equipment that has failed due to lack of consideration of electrical standards would influence the perceived importance of purchasing being involved at an early stage so that such conformance parameters could be addressed.

Similarly, purchasing's aspirations for its future role would affect perceptions of important factors in the acquisition process. A purchasing group that perceived harmony in its relationship with the scientist and as being suitably rewarded for current performance might have little aspiration to become more involved at the need identification and specification stages of the acquisition process. With low levels of aspiration, the actual level of involvement is unlikely to change.

The Purchasing Manager's View

For the purchasing manager, the key factors determining his/her perspective of purchasing's role are presumed to be similar to those of the purchaser. Prior research suggested that the purchasing manager would differ from the individual purchaser (e.g. Barath and Hagstad: 1979). Any differences between purchasers and their managers would be an indication of potential conflict.

The purchasing manager is presumed to have both direct and indirect effects on purchasing's role. The direct effect of the purchasing manager would be largely a function of the relationship in the formal organization structure with the research manager. The indirect effect would be through the transfer of beliefs and aspirations to the purchaser, thereby influencing the role played by the purchaser over a period of time.

Intervening And Dependent Variables

The size of the research centre spending is an intervening variable. Greater research spending provides more opportunities to achieve the direct, material benefits from meaningful involvement. Controlling for research centre spending normalizes the benefits from meaningful involvement. Meaningful involvement is just as likely to occur in small research centres as in large ones.

Finally, the level of meaningful involvement is believed to be positively related to the benefits flowing to the research centre when the research spending is controlled. As the level of meaningful involvement rises, so to would the actual and perceptual benefits from meaningful involvement. The greater the involvement levels, the greater would be time savings, supplier input, functional equipment and multiple project utilization.

The Dynamics Of The Conceptual Model

The model defines a set of relationships among four parties who influence the degree or extent of purchasing meaningful involvement. The management perspective is believed to have mainly indirect effects that will not influence involvement levels at the individual equipment acquisition level. The indirect effects may be more important for understanding the overall long term direction of the relationship. At the individual level, it is unlikely that meaningful involvement will be constant regardless of the acquisition of interest. Not only will the requesting scientist be different from one acquisition to another, but the skills and expertise necessary to purchase the equipment might also vary from case to case. For extremely technical pieces of equipment, meaningful purchasing involvement may be quite low. It is just as likely that there will exist numerous cases where the acquisition is routine and high involvement levels might exist. The model allows for variation from purchase to purchase in the level of meaningful involvement.

Meaningful involvement measured at the individual equipment purchase level may, however, ignore or underestimate the concept of attitudinal respect and trust. While meaningful involvement might vary from acquisition to acquisition depending on relative technical expertise and situational specifics, such a variation, in and of itself, may indicate high meaningful involvement. Purchasing and the scientist may jointly recognize when high involvement of purchasing would be beneficial and when it would be a misallocation of resources. It is apparent, therefore, that not only would each acquisition require examination and evaluation on its own, but an assessment of relationship that exists within the purchasing/scientist interface would also be both relevant and important. The examination of equipment acquisitions needs to go beyond just the individual equipment experiences to gain a greater understanding of meaningful involvement at the macro level. This will be an important consideration in choosing an appropriate research design.

Research Hypotheses

From the conceptual framework, the following hypotheses are proposed.

Hypothesis I

> Meaningful purchasing involvement in the equipment acquisition process in an R&D environment leads to significant benefits for the research organization.

Meaningful involvement is believed to be a source of benefits to research organizations. These benefits represent R&D productivity improvements through:

> i) A reduction in scientist time spent on purchasing thereby permitting greater time to be spent on high return research projects.
>
> ii) The location of additional equipment suppliers that provide better value (i.e. lower cost, better service, warranty, and/or delivery but of equal technical quality).
>
> iii) The location of equipment that meets the needs of the researcher and can additionally satisfy the future needs of the organization or the requirements for future known research projects.
>
> iv) A reduction in the total time between need identification and delivery and installation of the equipment through a consistency in personnel handling the transaction and the parallel (overlapping) approach to the scientist and purchaser involvement in the acquisition process.

In addition to these quantifiable benefits, there are intangible benefits that are anticipated. For one, the expanded supplier sources would mean increased supplier contacts between the researcher and external contacts. Increased external contact would lead to new ideas and a better research effort.

Hypothesis 2

> Purchasing will view early involvement in the acquisition process (chronologically) as a significant element of meaningful involvement when compared to the scientist's view

When compared with scientist's views, purchasing will place greater emphasis on early, timely involvement in the acquisition process as an important element of meaningful involvement. Being aware of what is required would be of little benefit if the scientist has been influenced by the supplier or has reached the point where the specifications have been fully defined. Once defined, the distinction and modification of "needs" versus "wants" would be extremely difficult. Further, the scientist may view the equipment acquisition as complete and would be unwilling to consider alternatives.

Purchasing, if the involvement occurs too late in the process, will have little time to perform the search for other potential suppliers, to gain an adequate background and understanding of the functional requirements for the equipment specified, to incorporate future needs of the research centre and to negotiate favorable terms of delivery, price, and service on behalf of the corporation. Purchasing will view, therefore, being involved at the earliest possible time as the critical element in having a chance to influence the decision making process.

<u>Hypothesis 3</u>

> There is a relationship between the size of the research spending level and the benefits that can be realized.

The direct financial benefits that can be obtained through meaningful involvement of purchasing are directly related to dollar value of the equipment acquisitions made by the research function. The value of multiple project utilization, competitive bidding and better financial and service terms and conditions relates directly to the cost of equipment.

The other benefits of meaningful involvement (increased flow of ideas, time value of lead time reduction, opportunity cost of scientist time) may also be related to research size based on average levels of equipment costs, delivery times and rate of return on research projects. The nature of the relationship is unknown.

It is possible, however, that very small R&D centres may not have sufficient equipment transactions to achieve multiple project usage. Further, the purchasing task may not be assigned to someone other than the researcher until such time as the total research effort reaches some critical size.

Hypothesis 4

> The obstacles to achieving maximum benefits from meaningful purchasing involvement include:
>
> i) lack of the need to pursue productivity improvements because of adequate financial support and/or lack of research opportunities as expressed by research managers in low involvement companies
>
> ii) the inappropriate technical qualifications of the purchasing personnel as deemed necessary by the scientist under the "sapiential theory" of authority
>
> iii) the perception that increased involvement by purchasing may be considered as a potential threat to the professional autonomy of the researcher as expressed by research managers and by scientists

Despite the benefits that are potentially available to the research organization from a meaningful involvement of purchasing in the equipment acquisition process, the current state of practice is believed to be low.

It is hypothesized that there are three critical reasons for low levels of meaningful involvement. The first is simply a lack of awareness of the extent of researcher time spent on equipment purchases. Since little research has been performed in this area, measuring the time spent by the scientist would be a necessary requirement during the research effort.

Further, the pressure to increase R&D productivity depends to a great extent on the current business environment that the R&D administrators faces. An optimistic financial outlook or the lack of research opportunities would have a direct bearing on the desirability of pursuing R&D productivity improvement techniques involving purchasing.

Second, the qualifications of the buyer may be inappropriate given the technically sophisticated operating environment and equipment being purchased. The ability to understand the needs of the researcher both in terms of functional and technical specifications is hypothesized to require a level of technical expertise that would be perceived by the scientist as being high. When the perceived technical expertise is considered low (as it pertains to the particular equipment to be acquired), the purchaser would not have the credibility required to overcome the "acceptance theory" resistance level nor achieve sapiential authority. The researcher would tend to ignore policies and procedures designed to advance purchasing involvement.

Finally, the perception may exist that any attempt to interfere with the current practice of researcher autonomy represents a reduction in autonomy and can seriously affect the creative climate in the research centre. Since this is a critical area for management to maintain, attempts to increase purchasing involvement would be seriously resisted.

Hypothesis 5

> Research managers will view meaningful involvement of purchasing as a greater threat to professional autonomy and to a creative climate than will scientists.

Research managers, in an attempt to maintain a creative climate, will overstate the importance of scientist's equipment control as an element of professional autonomy when compared to scientist views. Measurement of scientists' relative importance ratings concerning the elements of professional autonomy is hypothesized to reveal that the control of the equipment acquisition process is not a strong factor in these constructs. In contrast, research managers would perceive a higher importance on preserving researcher autonomy over equipment decisions. By implication, this assumes that research managers will be more concerned with maintaining the creative research climate than on the financial control and research efficiency objectives.

Hypothesis 6

> Meaningful involvement will be perceived by purchasing to be greater for a repeat purchase decision than for new buy decision.

In accordance with the Pingry work of 1973, a repurchase of a piece of equipment by a purchaser would have an influence on the degree of meaningful purchasing involvement. Pingry's study indicated that the repurchase of equipment leads to higher levels of influence on the part of purchasing. In the model, such an occurrence could be explained by the scientist's perception that purchasing's technical understanding of the equipment will be higher under a repurchase procedure, the purchaser having learned from the first equipment purchase.

CHAPTER IV

RESEARCH METHODOLOGY

Introduction

This chapter explains the research approach used to investigate various aspects of the model and to test the proposed hypotheses.

General Overview

While this research may considered as exploratory, it seemed reasonable to strive for some generalizability through the use of formal questionnaires to gather some of the data. Professional autonomy, the concept of a creative climate and the Robinson-Faris model were well developed concepts which had been subjected to substantial research.

Limiting the scope of the research was the relative shortage of possible research facilities employing scientists. In fact, preliminary field interviews with firms carrying out research in Canada indicated that many were concentrating on the development aspects of R&D with an emphasis on engineering work. It became, therefore, an important issue to understand the type of research work carried out by the firm.

Thus, while formal questionnaires were used, the limited number of available research centres permitted on site interviews and open ended discussions that permitted exploration of the macro level relationship between purchasing and the scientist, an important step in evaluating the dynamic nature of meaningful involvement.

Field visits were considered to be the most reliable method of achieving responses that were directed towards an individual acquisition experience. The interview protocol was designed to ensure sufficient discussion by the individual parties on a particular acquisition experience to the extent that the response to the formal questionnaire could be considered as valid for that particular experience.

Once co-operation had been obtained to visit an R&D centre, the overall response rates to individual questionnaires was approximately 80%. Further, most questionnaire responses were received within one week of conducting the field interviews showing time validity and enthusiasm for the research approach. Low response rates from focusing on individual purchase experiences without the advantage of field visits had been cited as a particular drawback of the mailed questionnaire approach to information gathering (Barclay: 1986).

Furthermore, field interviews provided a richness to the information that would have been virtually impossible to elicit through other research methods. Such a depth of information was necessary because of exploratory nature of the research. Further, determining the actual acquisition process followed, including scientist time spent on the acquisition tasks, would not have been likely with mailed questionnaires. Field interviews arguably come closer to eliciting actual behaviour than would a survey approach.

The field interview process also permitted the use of a two phased approach to investigate meaningful involvement. The research centre has a high degree of technical sophistication and relatively low spending levels. Past purchasing research on equipment acquisitions in other environments indicated low levels of involvement and influence. Realistically, few instances of meaningful purchasing involvement were anticipated. Phase I of the research was considered as an investigation of the current state of the art for purchasing involvement in the acquisition of equipment. A second phase (Phase II) was also incorporated whereby the identified cases of high meaningful involvement were investigated to a greater extent. The purpose of this more detailed investigation was to attempt to understand why such cases existed.

Phase I

Sample Frame

One of the more reputable sampling frames available was the Financial Post Annual Survey of Industrial Research

Performers. This voluntary survey indicated the spending trends of most of Canada's largest R&D spenders. Nonetheless, over-reliance on a single voluntary survey was risky, particularly with respect to research spending. For competitive reasons, many companies prefer to keep their research spending a carefully guarded secret. The Financial Post survey also suffered from lack of background information on the nature of the work performed. However, the Financial Post's reputation in the business community suggested that companies on their list were worth consideration.

A second available sampling frame was the Statistics Canada publication "Directory of Industrial Research and Development Facilities in Canada, 1986". Statistics Canada sent questionnaires to over 1500 industrial firms, of which 791 responded. It was by far the most complete sampling frame available short of access to income tax files. However, sample frame did not indicate the spending levels of the research establishments but did provide descriptions of the equipment on site, the nature of the work performed and scientific staffing levels.

Interestingly, several firms on the Financial Post list were absent from the Statistics Canada list, in particular Atomic Energy of Canada Limited, Canada's second largest research spender. The two sampling frames taken together thus represented a relatively complete list of active Canadian research establishments. The Statistics Canada listing was used to identify firms that had equipment on site (and therefore previous purchasing histories) and who performed research work that could be classified as anything other than purely technical assistance and/or engineering support. Firms on the Financial Post list who did not appear in the Statistics Canada publication were contacted to ensure completeness.

In an effort to maximize the generalizability of findings, researchers should not restrict their geographical focus. However, logistics, time and money are significant constraints on a researcher's ability to pursue this objective. For Canada, the firms located in Ontario and Quebec were the subject of the research. In an attempt to broaden the horizon of research, an investigation of some United States based R&D centres in the North Eastern sector was attempted. In an effort to maximize the contribution of research in the U.S. while minimizing the expense of such travel, a former President of the National Association of Purchasing Management (NAPM) (and a former purchasing manager in a research centre) was contacted to obtain a short list of R&D centres considered to exhibit "best purchasing practice". The names of three firms were obtained in this manner. Another seventeen potential U.S. participants were identified by examining publicly available information sources such as Moody's Directory. Therefore, the U.S. sample was a purposeful one, including illustrations of best purchasing practice in equipment acquisitions from the perspective of a former purchasing manager.

The Sample Of Firms

With the comprehensive list of relevant firms to contact, the spending impact of the firms was examined. The sample included a small number of very large and a large number of very small Canadian research centres. All of the large firms were contacted. Canada's total R&D spending is heavily dominated by roughly ten corporations. In 1988, the three largest spenders accounted for over 50% of Canada's total Industrial R&D spending while the ten largest accounted for well over 75%. A census contact approach was necessary and feasible due to limited number of firms involved and the ever present potential of non-cooperation. Without an investigation of these larger firms, the impact and importance of the research findings would be diminished significantly. In contrast, a random sample of the small firms was chosen for contact. This sample represented an optimum balance between value of information obtained and the desire for statistical power.

Participation Rates

The Research Director in each firm was contacted to obtain approval to conduct the interviews. This permission was an important first step. Since the model included perceptual information from research administrators, purchasing managers, scientists and purchasers, approval from the Research Director provided the necessary assistance to achieve co-operation from the maximum number of individuals.

In total, 37 Canadian firms were contacted and twenty agreed to participate. Four other firms indicated that they had no purchasers or purchasing department and another two indicated that there was no active research on going and that the development effort was inappropriate for analysis. Eleven firms refused to co-operate. The effective participation in Canada was 20/31 or 65%. This participation rate was considered very high given the normal confidentiality of a research centres' work. The University of Western Ontario School of Business Administration's reputation may have assisted in achieving this high participation level.

In the United States, twenty firms (including three of the pre-identified high involvement companies) were contacted and seven agreed to participate (two pre-identified ones). Two others agreed to discuss the purchasing department role through a controlled telephone conversation but refused on site interviews. One of these two firms was a pre-identified "high involvement" company. Another two firms indicated that the research environment was inappropriate or that the research work was carried out in a more remote location (e.g. California). The effective participation rate in the United States was 7/18 or 39%. In general, the U.S. firms were reluctant to discuss purchasing procedures within the R&D environment, many citing the potential of proprietary information being disclosed. A 39% participation rate is considered reasonable.

Background Statistics

The Canadian firms investigated were found to be much more amenable to providing background data regarding the size of the research effort, the extent of equipment acquisitions and staffing levels at the sites. The U.S. based firms, in general, believed that such information was proprietary and should not be divulged. The following statistical information, provided by the Canadian research establishments, is provided to allow for generalizations and to illustrate the extent that this research effort approached census type information for Canada. There did not, on the surface, appear to be major differences in the spending profiles of the U.S. firms and some generalizations across countries may be possible.

The twenty Canadian establishments consisted of six large (R&D spending >$50 Million), five medium (R&D spending >$20 Million but <$50 Million) and five small (R&D spending >$5 Million but <$20 Million) research organizations. Seven of these firms did not appear on The Financial Post survey list. In total, the R&D effort of the Canadian firms that participated totalled in excess of $1.6 billion, roughly 50% of the total Canadian industrial R&D spending. The respondent companies represented a cross sectional representation of spending size and line of business. These companies operated in the chemical, food, pulp and paper, petroleum, electrical, bio-technology, electronics, glass, telecommunication, defense and computer industries.

A rule of thumb that proved to be valid for predicting the size of the R&D effort was that for every person at the centre, approximately $100,000 (Cdn.) would be spent. This heuristic was most useful since some firms were reluctant to provide exact spending figures but were more willing to discuss how many people were on site. Thus, a research centre with 400 people (scientists, technicians and support) would spend approximately $40 million.

For the Canadian research centres surveyed, outside purchases (including supplies, equipment and services) represented 20-35% of total expenditures. The balance was almost exclusively, salaries and benefits. Capital equipment represented a 9% average of total research spending with a range of 5-15%.

The 1988 total research spending of the U.S. firms visited totalled approximately $1.0 billion (U.S.) with an individual company range from $6 million to over $500 million. For the U.S. companies willing to divulge their purchasing patterns, outside purchases represented 35% of total spending with capital constituting approximately 12%.

The Research Approach

Once company support had been gained for the field visit and participation in the research, the participating firm was asked to select two or three recent equipment acquisitions for detailed analysis. It was stressed, both in the covering letter and during the field interviews, that these particular equipment purchases were to be representative of the manner in which most acquisitions occurred. This selection approach was chosen in an attempt to ensure currency of information and purchasing practice as well as high event recall ability. Companies were free to choose which examples would become the focus of the discussion. In this sense, one might anticipate that the best examples would have been presented. Such a bias was not considered a problem because the field interviews included discussions of whether or not the acquisition being discussed was representative of normal practice. In total, approximately sixty separate equipment acquisitions were investigated.

For each firm, information was recorded through a series of on-site interviews with research administrators, purchasing managers, the requesting scientist and the purchasing personnel who handled the scientist's purchase request. To ensure that both the relevant scientist and purchaser were available for discussion purposes (i.e. low mortality rate) and to ensure high levels of fact recall, only equipment acquisitions that had occurred within the last two years were investigated.

The discussion with administrative level personnel was of a general nature and explored issues related to purchasing policies and the budget process. The participants in both the equipment seeking and the purchasing role of a particular equipment acquisition were interviewed using a common set protocol and then had a questionnaire administered to them. These discussions tended to be more specific and detailed in an attempt to understand exactly what occurred and when during the particular acquisition experience. This methodology was chosen because it forced the two key respondents (scientist and purchaser) to focus on a common acquisition occurrence and made the comparison between respondents more explicit. It also permitted resp.nses regarding technical ability to be equipment acquisition experience specific. The interview protocol used is presented in Appendix B.

Because the interview process might have some influence on and introduce some bias to the questionnaire responses, a control group was an important element of the research methodology. This control group consisted of colleagues of the interviewed scientist. The members of the control group did not have any contact with the interviewer. Questionnaires similar to those which the scientist completed, excluding measurement of actual meaningful involvement levels on an acquisition experience, were distributed during the course of the filed visit. The information gathered was used as a test against interviewed scientists on several dimensions. Twenty of these non-interviewed scientist questionnaires were distributed in sixteen different companies.

Research Administrator Input

Research administrators were asked to discuss the role of the purchasing group as they saw it and to provide background information on spending and staffing levels in the research facility. Information required for testing of the model included equipment purchase levels, R&D size (spending and staffing), total purchases including services and the existence of an R&D firm level rate of return (e.g. a post audit review of the returns from R&D spending). For large research spenders, such post audits are traditionally used to provide a formal basis for the research centre's performance. This item would have been useful in evaluating the opportunity cost of a scientist "wasting" time on equipment acquisitions as opposed to pursuing research opportunities themselves. Unfortunately, the reluctance of many firms to reveal specific financial information meant that gaining access to this rate of return value was virtually impossible. Some information along these lines was obtained from Canadian firms that indicated direct benefit to cost ratios in excess of 4:1.

Research administrators were also asked to respond to a formal questionnaire that measured the business climate and financial pressure under which the research group operated and the benefits and opportunities that might exist from an increased involvement on the part of purchasing in the acquisition process. Research administrators also responded to a questionnaire that measured the importance of various elements for a creative climate and professional autonomy. Included in this measurement instrument were questions related to the control over equipment acquisitions. The administrators were also asked to rate the importance of various purchasing responsibilities and provide an assessment of purchasing's ability to perform these tasks. The administrator correlation matrix and questionnaire is presented in Appendix A.

Scientist Input

The input from scientists focused on identifying the time at which it was realized that equipment would be necessary, the time at which purchasing became involved in the acquisition process, the degree to which information from and selection of the supplier had occurred prior to purchasing involvement, the nature and extent of purchasing involvement, estimated time spent on the purchase process, education of the scientist, the classification of the research work and whether or not the purchase was a new buy. The collection of time spent on the acquisition process was a particularly important element of the data gathered.

Scientists were also asked to discuss their satisfaction with the purchasing process and their thoughts regarding where and how possible improvements to the process could be effected. This information was gathered through open ended questions.

At this point, an assessment on a scale of 1-7 was made by the interviewer regarding the degree of meaningful involvement of purchasing. This assessment level was subsequently compared with the results from the questionnaires administered to the scientist and to the purchaser. This was an attempt by the researcher to categorize subjective information regarding the true level of meaningful involvement levels and to a certain extent was non-scientific in methodology (i.e. the scores may not be reproducible by a different researcher under the same conditions: Kidder & Judd, pg.182). To maximize the generalizability of these observational data, particular care was taken to define explicitly the criteria that differentiated between levels of meaningful involvement. It should also be recognized that such a subjective assessment can be an important element in exploratory research and should not be summarily dismissed as irrelevant. In fact, Kidder & Judd strongly support such assessments in a negative case analysis approach (falsification of theory). The following guide, shown in Exhibit 8, was used in assigning the assessment level.

<u>Exhibit 8</u>
Observational Score Criteria

Score	Description	Critical Distinguishable Elements
1	Purchasing acts as a clerical function only carrying out the express desires of the scientist	
2	Purchasing shows some modest level of involvement, perhaps by soliciting bids	-suggests alternate bidders -negotiates warranty terms
	from other suppliers. The scientist still decides on his/her own regarding the successful bidder	-negotiates early delivery -gains service and delivery elements

Score	Description	Critical Distinguishable Elements
3	Purchasing shows an increasing involvement level, perhaps by finding sources of supply for the equipment and assist in drafting of technical specifications	-assists with technical specs. subject to scientist approval -shares in bid approval
4	Purchasing involvement is active including doing the necessary paper work for soliciting quotations, finding alternate suppliers and ensuring equipment will operate when installed	-suggests alternate viable suppliers -incorporates the operational reqts. into the spec. process
5	Meaningful involvement is quite high, includes the understanding of what is required, assisting with technical specifications and questioning the tolerance and accuracy needs of the equipment	-can describe the function of the equipt. to the the researcher -asks questions regarding the need for critical dimensions (speed, accuracy, etc.)
6	Meaningful involvement is high and includes incorporating future research needs into the existing acquisition. Active interchange with scientist occurs and involves negotiated tradeoffs between scientist's desires and corporate needs	-multiple project usage suggested -specs. change to achieve multiple project use -frequent mention of collaboration
7	Full involvement is occurring and includes contact from the scientist as soon as the need is identified. The scientist and the the purchaser act as a team to achieve a best buy decision. There is respect and trust between the parties	-scientist contact is immediate -actual need is defined jointly -scientist states "I define functional requirements and purchasing does the rest"

Scientists were also asked to respond to a questionnaire that measured the degree of importance of various aspects of professional autonomy and a creative climate. Included in this measurement instrument were questions related to the control over equipment acquisitions. Scientists also answered questions measuring the degree of importance and abilities of various purchasing tasks and responsibilities.

Finally, scientists provided their assessment of the degree of meaningful involvement of purchasing with respect to the particular equipment acquisition discussed. A copy of the scientist questionnaire and the correlation matrix is presented in Appendix A.

Purchaser Input

The interview approach and questions administered to the purchasers were identical to those administered to scientists except for the exclusion of questions pertaining to the creative climate and professional autonomy elements. The information obtained from the two parties, both on the open ended questions regarding methods for improvements and on the meaningful involvement scales for the identical equipment acquisition experience, could be compared and contrasted. A subjective assessment of the degree of meaningful involvement was made by the interviewer. The questionnaire and correlation matrix for purchasers is presented in Appendix A.

Perceptual differences were anticipated between the purchaser and the scientist regarding the outcome from an individual purchase. For one, the purchaser would not be completely aware of the commitments made and the preceding work performed by the scientist. Secondly, the scientist and the purchaser would have different impressions of the extent of work performed by each party and the relative importance for the various elements that were viewed as essential for meaningful involvement.

The conceptual model was heavily based on the formal educational and technical expertise/skill level of the purchaser. A score was assessed to the purchaser by the interviewer based on formal education under the criteria illustrated in Exhibit 9.

<u>Exhibit 9</u>
Technical Ability Score Criteria

Score	Criteria
1	High School Education or Less
2	Community College - Non Science/Eng.
3	Bachelor's Degree - Non Science/Eng.
4	Community College - Science/Eng.
5	Bachelor's Degree - Science/Eng.

Bonus Scores	Criteria
1	Previous Lab Experience
1	Post Graduate Education

The technical score was compared with the responses received from the scientist on various technical ability questions within the questionnaire. This information was used in an attempt to determine the predictive ability of technical ability in achieving meaningful involvement. Education based criteria have been used often in marketing research as a differentiating variable. It was considered a relatively standard approach to scaling with the exception that scientific and engineering backgrounds were given higher relative weights. Previous lab experience was thought to be relevant to understand the needs of the researcher. Similarly, post graduate education was believed to represent an increase of credibility in terms of sapiential authority, whether the discipline be scientific or not. The maximum score of 7 would have been achieved based on an engineering or science degree in combination with lab experience and post graduate education. The scientist who had worked in the research area and then pursued an MBA was considered, for example, as an ideal candidate for achieving meaningful involvement.

Purchasing Manager's Input

The purchasing manager (or administrative manager) was interviewed to elicit his/her opinion regarding the role of purchasing in equipment acquisitions. This interview was open ended and information was directly comparable with the comments of the research manager. The purchasing manager responded to a short questionnaire that measured the perceived importance and ability of purchasing for the various elements of meaningful involvement. The purchasing manager questionnaire and correlation matrix is shown in Appendix A.

The Control Group

Finally, non-interviewed scientists were requested to complete a questionnaire related to the elements important to a creative climate and professional autonomy as well as questions pertaining to purchasing's ability to perform various responsibilities and the relative importance of these tasks. The non interviewed group represented a control for interview effects. Since only the treatment differed (the presence of an interviewer asking questions regarding equipment acquisitions), the responses from interviewed and non-interviewed scientists could be compared on a paired basis for interview effects. The non interviewed scientist questionnaire was identical to the interviewed scientist questionnaire excluding measures of actual meaningful involvement levels on a particular equipment acquisition experience were not measured. The questionnaire and correlation matrix for non-interviewed scientists is presented in Appendix A.

Measurement Issues

Measurement is generally a troublesome area in social science research. This research effort was no different. However, it seemed reasonable to assume that files existed in the purchasing department that would indicate the equipment acquired, some preliminary quotes, some specifications and final terms of agreement. With the purchasing files and the appropriate purchasing agent's and scientist's help, the value and benefits achieved from time savings, multiple equipment usage and cost changes from relaxing specifications were anticipated to be identified. Measurement of the financial aspects of the dependent variable and the size of the research effort were not expected to be difficult.

In order to measure the other more perception oriented aspects of the meaningful involvement benefits and the level of meaningful involvement, new scales were developed and pretested during the summer of 1988. The meaningful involvement scale was developed based on reference to the Robinson-Faris model and incorporated longer term strategic elements. The benefits scale included measures that could not be quantified from archival data: time savings (qualitative assessment), supplier input and functional equipment & technical specifications. Purchasing aspirations, which attempted to measure the degree to which purchasing actively tried to increase its influence and role in equipment acquisitions, was measured **indirectly.** A questionnaire directly asking such aspiration questions was thought to be subject to "socially desirable" response bias. Purchasing aspirations were calculated based on the difference between purchasing confidence in their ability and their responses on the meaningful involvement scale.

Measurement of the other independent variables did not represent a considerable challenge. The constructs of professional autonomy (purposefully expanded to include equipment purchasing as a component) and creative environment were well established and had reliable associated measures. The autonomy scales were adapted from the work of Hrebiniak (1974), Bell (1965, 1966) and Grimes et. al. (1972) and further tested by Haywood-Farmer and Stuart (1987). The scales had been proven to be highly reliable. The scale for creative climate was an interpretation of Orth's (1959).

Results From The Interview Process

In the ideal, interviews would have been held with research administrators, purchasing managers, purchasers and scientists within each organization. It was thought that this process might be too difficult in all organizations, especially the small ones, due to the pre-visit organizational effort required and the possibility that an intrusion into a research lab would be time consuming for the company involved.

Therefore, in some cases, the actual interviews performed could not match the ideal.

Where both scientist and purchaser were available, the opportunity was available to compare and contrast both on subjective data and on the questionnaire responses. In some cases, this proved very valuable. In one case, the scientist indicated that he had initiated a purchasing request, a request that the purchasing agent had indicated was a purchasing initiative. After consideration, the scientist agreed that it was indeed a purchasing initiative. Without the two parties, the subjective assessment would not have been correct. Even so, there were cases where only the scientist was available to discuss the acquisition. These occurrences were from the smaller firms, often where purchasing was handled away from the research centre. The subjective assessment and scientist responses in these cases could be biased but there was strong indication that such was not the case.

Of the 27 companies visited, 10 companies had purchasing agents that acted functionally as purchasing managers and 4 companies could not arrange for interviews with the purchasing manager. It appeared that the minimum structural size of research effort before the two roles became distinct lay in the range of $15-20 million. Below this amount, purchasing generally reported directly to the research administrator. Of the thirteen companies that had purchasing managers who participated in the process, all but one of them responded with the returned written questionnaire.

Twenty research administrators agreed to participate in the interview process in sixteen of the firms and responses have been received from all of them. The firms where research administrators did not participate were very small and time constraints were evident.

Scientist responses were obtained from all companies visited, although in two instances, the purchasing agent was not available for the interview and the results were based on scientist responses only. Again, these missing respondents tended to come from the very small firms where everyone agreed that purchasings' role was restricted to clerical duties. Forty five responses from scientists and twenty six esponses from purchasers have been received.

Phase II

High scores of meaningful involvement were anticipated to be few, making statistical analysis difficult. To take maximum advantage of such an occurrence, the research methodology also included in depth discussions and case vignettes. The case vignettes, which are presented in Chapter VII, were used to amplify the questionnaire responses by explaining how and why these few companies exhibited high meaningful involvement levels. Such a research approach has been considered as a valuable method, particularly in explaining the "how" and "why" questions with a focus on contemporary events (Yin: 1984). The interview protocol developed is presented in Appendix C.

Within each of the companies that showed high levels of meaningful involvement, the field research was broadened to include discussions with participants who might have additional information on the development of the purchasing group. These discussions were expected to include research administrators other than those included in Phase I. The protocol and discussion criteria were developed based on potential reasons for high involvement levels. These reasons, stated as questions of interest, are presented below.

Research Questions Of Interest

Based on previous research work and expert opinions, there were several contributing factors that were considered as important for explaining the "high involvement" levels.

Question 1: Would total research spending influence the meaningful involvement levels?

From an economic benefit viewpoint, some absolute level of equipment purchases may be required before meaningful involvement could occur. When purchases reach this threshold, they may represent such a large expenditure and required the consumption of such large amounts of time, that the acquisition process would be examined for economic benefits obtainable. Such an examination would lead to a purchasing mandate that involved a high level of cooperation and involvement with the scientist. This would suggest that instead of controlling for size, the conceptual model should incorporate size as a direct input factor.

Question 2: Would high levels of meaningful involvement be found only where a research firm spends a high percentage of its research budget on equipment acquisitions?

Irrespective of size, high involvement levels may occur only where research firms, as a function of the research performed, spend a considerably higher percentage of annual expenditures on equipment acquisitions. Such a high equipment spending pattern would raise the profile of equipment as an area for control and budgetary concern.

Question 3: Would high meaningful involvement levels be present only in those firms where at some previous point in time a scientist or an engineer filled the role as purchaser?

While meaningful involvement can occur in the absence of a purchaser with formal engineering or scientific education and/or high levels of technical expertise, breaking through the threshold level of collaborative effort on equipment acquisitions may have required an engineer or scientist or a technically skilled person at some point in the past. Once the relationship between the purchasing function and the scientist had been established, the organization would view the purchasing position in a certain manner of prestige and importance. Future occupants of the position, irrespective of formal education and technical expertise, would be able to continue a meaningful involvement role.

Question 4: Would high meaningful involvement levels be present only if the current purchaser has high levels of formal education and proficiency?

This question was consistent with Paterson's (1966) comments regarding the importance of the scientist's perception of the capabilities of the current purchaser. Paterson was careful to point out that knowledge based authority was vested in the individual and not the position. Thus, the capability of any purchaser would be judged independently of previous purchasers or of policies and procedures that may have been developed during a previous purchaser's term.

Question 5: Would high meaningful involvement levels be present only in organizations where the purchaser reports directly to the research manager?

This question was based on the premise that information sources would be critical for early involvement in research projects and that early involvement would be a prerequisite for meaningful involvement. The simplest organizational method to ensure the appropriate level of communication and information might be a direct reporting relationship to the research manager as opposed to some administrative manager. Such a finding would have been consistent with Strauss' concept of using matrixed "ambassadors" from purchasing.

<u>Question 6:</u> Would high meaningful involvement levels be present only in organizations with flat and "organic" structures?

This question stemmed from Burns and Stalker's (1961) study on the management of innovation. Informal role descriptions and lack of formal rules would be as important to purchasing achieving a meaningful involvement level as they were to the generation of new ideas, products and processes.

<u>Question 7:</u> Would high meaningful involvement levels be present over time spans greater than two years only in organizations that formally recognize the factors of meaningful involvement as important elements in the annual appraisal of a purchaser's performance?

This question was based on the premise that performance (purchasing behaviour) leads to rewards (annual appraisal and feedback) that leads to a conditioned response (next year's behaviour) that is consistent with the reward criteria. Over a long period of time, a formal appraisal system that does not incorporate meaningful involvement as a criterion for extrinsic reward would lead to behaviour that does not promote meaningful involvement.

<u>Question 8:</u> Would high meaningful involvement levels be present only where the purchasing group is dedicated to purchasing for the research centre and where it is geographically local (on site)?

Previous field observations and Allen's (1977) and Bacon's (1971) studies of the communication patterns of scientists and decentralized purchasing groups were the basis of this question. It was possible that the more centralized (corporately) the purchasing group, the less influential would be the needs of the research group's purchases within the purchasing context of the entire organization. The purchasing demands of the production units would tend to become more important to purchasing. Thus, meaningful involvement would be high only where the purchasing function was located on site where communication patterns can be fostered.

The case studies and the analysis of high purchasing involvement situations are presented in Chapter VII.

CHAPTER V

THE MORE TYPICAL EQUIPMENT ACQUISITION PROCESS IN AN R&D SETTING

Introduction

Twenty seven research centres were visited during the course of this investigation. Seven were in the United States and twenty were in Canada. The majority (22 of 27) were classified as utilizing low levels of purchasing involvement in the acquisition process. While the purchasing involvement sometimes differed from firm to firm, the process that the scientists followed to meet their equipment needs was similar in all cases. This chapter will describe this common process with reference to time spent by the scientist during the various buying stages. The common process will then be evaluated with respect to the contact points that the scientist had with purchasing in low purchasing involvement cases.

A Typical Case Example

One equipment acquisition experience illustrates the decision making process followed and the timing of purchasing involvement in the majority (22 of 27 or 81%) of the firms visited. The case description is a valid account of an actual occurrence. The names of the individuals involved have been disguised.

Company A was one of Canada's largest research spenders and pursued research activities across a wide spectrum of research time frames, from basic research (development of new knowledge) to technical services (solving immediate customer problems). Approximately 7.5% of the research centre's total budget was spent on capital equipment.

The majority of capital acquisitions for Company A's research centre were made by the analytical laboratory. The analytical lab served as a service for the researchers and provided elemental analysis and measurement for experiments. The lab was responsible for maintaining a state of the art capability to serve the present and future needs of the customer (i.e. plant operations, researchers, etc.) and for improving the efficiency of the lab itself. There was a constant requirement for improved accuracy and therefore better measurement instruments, particularly to meet stricter government environmental regulations. Also, efficiency in the lab, as measured by cost per sample processed, required continual improvement. Investment in new measurement instrumentation was one method used to improve laboratory performance.

The laboratory members continually kept abreast of the current state of the art in equipment advancements through journal and trade publications dedicated to equipment, research journals that indicated the results of recent research findings including the equipment used during the research and annual attendance at major trade shows. The trade shows (in this case, the "Pittsburgh Conference") displayed and demonstrated the current state of the art in measurement capability with equipment from suppliers around the world. The equipment was exhibited in such a manner that test samples could be evaluated on the conference site.

The X-Ray Spectrometer Purchase

The analytical laboratory's staff had become aware (August 1987) of a new development in "wet state" test sampling capability. Another company research centre had recently purchased this type of equipment and users were favourably impressed. Previously, test samples had to be dried before sampling, resulting in at least a one day delay in obtaining results. Wet state analysis represented a significant reduction in turnaround time. If, for example, the tests were used to determine chemical waste emission concentrations in a continuous process, a speedy turnaround time would be beneficial in reducing company exposure to pollution problems and adverse publicity. Such time savings also represented a reduction in cost/sample.

Over the course of a one month period, the analytical staff discussed the potential use of such a machine among themselves and with contact personnel in the company's operations division. While the discussions occurred during a one month period, the actual time spent on this item was at most one person day.

There was general support for further evaluation of the equipment and a future Pittsburgh Conference (September 1987) provided an ideal opportunity to discuss the laboratory's needs with supplier representatives. The researcher who assumed responsibility for the purchase was Paul Livson, an engineering graduate and co-ordinator of elemental/X-Ray analysis. Paul spent most of two days at the Conference examining and evaluating the new equipment for "wet state" testing. Upon his return from the conference, Paul sought the opinions of researchers at the other centre. The answers to his detailed questions about the equipment's capability and adaptability to the local operating requirements satisfied the group and permitted progress in the equipment acquisition.

Paul proceeded with internal marketing efforts. He discussed the merits of the equipment with his supervisor and with customers of the analytical lab (September-October, 1987). He received tacit approval for carrying the evaluation further. While no firm commitments were given, this step in the process provided opinions and discussions from both the research manager and the customers. It also provided advance notice to the customer that sponsorship, in the form of budget commitments, probably would be requested in the near future.

By early October, Paul was prepared to make formal contacts with suppliers. In this case, only five suppliers made equipment that was of acceptable technical quality. Paul contacted these five suppliers to ascertain their capability to deliver the equipment, to discuss the technical capabilities and theoretical basis for their equipment and to quote a price for budgetary purposes. As a result of this pre-screening effort, one supplier was eliminated. The price quoted from the suppliers was considered a rough estimate of the cost of acquiring and installing the necessary equipment. The cost estimate was considered sufficiently accurate to use in the research centre's budget. The quote itself may or may not be a firm one (the initiative to make a formal quote to the scientist was left to the discretion of the supplier). The initial pre-screening and supplier discussions required approximately two days of the researcher's time.

Mr. Livson asked his supervisor (October-November 1987) that a budget estimate (based on the average of the quotes received) be included in the centre's 1988 capital budget. His was one of many requests for equipment that eventually had to be prioritized during the development of the capital portion of the centre's annual budget.

This company's capital budgeting process, like most visited during this investigation, was developed using a zero based budgeting system. Individual scientists were surveyed approximately one month in advance of the budget date to provide a list of all significant capital items. The total list of "wishes" was scrutinized, ranked and rationalized through at least one and sometimes several rounds of capital review meetings. For Paul Livson, it was a favorable year. His request was approved (to the extent of being included as an item in the budget for the following year) and funds were allocated for the purchase of an X-Ray spectrometer.

Mr. Livson, upon learning of his good fortune (December, 1987), began his selection criteria so that his evaluation would be done in a rigorous and unbiased manner. The technique used by this research centre was a Kepner-Tregoe (K-T) analysis that allowed needs and wants to be explicitly defined. Cost of equipment, as long as it lay within a reasonable level of the budget amount, was a secondary factor in the analysis at this point in time. The cost of equipment and the various options would become a more important aspect as the evaluation proceeded from technical levels to value analysis of features offered. A carefully prepared K-T analysis evaluation form required a full day of Paul's time.

Mr. Livson arranged to visit the four firms who had survived the pre-screening process (February-March, 1988) and requested that the suppliers prepare formal quotations. Paul was present during the running of test samples through the equipment. In this way, he assessed both the technical nature of the results and the speed at which they were produced. He also was able to evaluate the operating and machine learning requirements for testing of samples. During the course of the field visits and the running of the test samples, it became obvious that one particular equipment supplier had developed a superior piece of test equipment.

Mr. Livson's many years of experience in the analytical lab provided the basis for the high level of professional judgement used during the field visit and test sampling phase. Paul commented that the evaluation of the machine required some knowledge of the theoretical basis for the machine's measurement capability. This knowledge was peripheral to the Paul's actual job but constituted an important aspect of his knowledge base and was considered essential for the proper assessment of the equipment capability. The field visits and the test sample arrangements were a time consuming process. Each supplier visit required a day of Paul's time, although the actual testing of samples was a speedy process. Logistical arrangements meant that this field visit process required more than one calendar month.

When all the tests were completed, Mr. Livson used the K-T analysis to evaluate the equipment suppliers. He was not surprised that the technical winner was the superior equipment noted during the test process. The quoted price, however, was 50% more expensive than the other bidders. Nonetheless, the technical superiority of the selected equipment was of such a magnitude that a case was developed to try to persuade the key decision makers (the research centre management and the ultimate customer) that the purchase would be worthwhile. The detailed K-T analysis became a part of a formal justification package that was prepared in April. This required a 2 day effort from Paul. The justification package was sufficiently convincing that approval (Summer, 1988) of the research centre and the customer was received. After obtaining the necessary approval signatures, Paul passed the requisition order to purchasing to proceed with the acquisition and to take care of the necessary paperwork and payment. This was the first time that purchasing had become aware of the purchase.

The support from the customer, developed over a long period of time, was instrumental in allaying any concerns from the central purchasing group about the choice of the most expensive bidder. The purchasing group had no concept of the value added from the better supplier on technical grounds and with the analytical lab's customer supporting the purchase, there was little that purchasing could (or wanted to) do in trying to reverse Paul's decision. From purchasing's perspective, the justification memo was sufficiently well detailed to satisfy any future concerns from company auditors.

The entire process, from the first contact at The Pittsburgh Conference to the actual issuance of the purchase order covered one full calendar year. The actual time spent by the Mr. Livson on the equipment acquisition totalled approximately twelve days over that one year period. The purchase price of the equipment was approximately $150,000.

Comments From the Interviewed

The Researcher

Paul commented that there was nothing he would have done differently about the purchase of this equipment. There have been some problems, technical in nature, relating to the newness of the technology. These problems would have occurred no matter who had been selected to supply. Paul did feel that purchasing was unduly slow in acting upon his requested purchase. It took three weeks from the time that the approval levels were obtained to the time that the purchase order was sent to the supplier. Paul had expended considerable time and effort on the internal selling and approval process and had performed an extensive review of supplier capabilities. He had acted in an impartial manner in the evaluation of the suppliers. From his perspective, purchasing had no right to interfere in the process, thereby causing undue delays.

Mr. Livson also commented that the analytical laboratory was fairly independent. Staff members made professional judgments and recommendations to a cross section of people in the company.

> "It is our job to decide what we need. We are the only ones capable of judging the quality of the equipment. It requires judgement and knowledge of the theory behind the equipment. Can purchasing be an equivalent expert?"

Mr. Livson did not have much faith in purchasing. He did not believe that purchasing could write the specifications except for routine purchases. Generally, he felt that purchasing should not be involved at all. An expanded role for purchasing would not be worthwhile. Paul's preference would be for eliminating red tape and for purchasing to treat him like a customer. When Paul has a request that he has justified to research managers and to the customer, purchasing should "Do it fast. Attend to it quickly".

The Purchaser

The purchasing agent who handled this request was Mark Witmore. Mark had joined the company almost 25 years ago and had a high school education. He had advanced to the present position of purchasing agent through the clerical ranks. Mark's office, located in the basement area of the research centre, was cluttered with requisitions requiring immediate attention. In discussing the acquisitions that were being investigated, Mark found it much easier to identify them by the equipment supplier than by the requesting scientist. Mark reflected on this particular buy and on others in general.

Mr. Witmore's biggest complaint was that purchasing requests too often come to him at the last minute. It was his responsibility to ensure that the terms of payment were in accordance with standard company policy, that the shipping weight and method of shipping were correct and that the equipment had the appropriate hydro approval. Equipment coming from anywhere other than the U.S. was often a significant problem when it came to the hydro approvals. Purchasing also was responsible for ensuring that the justification was properly performed.

> "I check the package over to make sure everything is covered and in order"

Mr. Witmore commented that most of the time, the justification was O.K. However, terms of payment were often out of line with company practice and the shipper chosen by the supplier frequently had a poor reputation in getting the equipment through customs. Purchasing's concerns at customs documentation and the required last minute negotiations with the supplier to change the terms of payment occasionally would cause delays in the issuance of purchase orders. These last minute delays were construed, by the scientist, as obstructing the acquisition process. From a purchasing perspective, however, Mark was simply doing his job, making sure that the equipment was received promptly and that the company received the equipment as specified before paying for it.

Mark suggested that advance notice of a forthcoming equipment request would improve the acquisition process. But in terms of being more involved in the equipment choice, Mark doubted that he could make a large contribution.

> "I can help with issues such as customs, codes and transportation. I'm not sure that I can make a difference beyond this."

The Purchasing Manager

Peter Saxton, the business services manager at the research centre, was Mark's supervisor Peter was responsible for financial, stenographic, drafting, graphics and purchasing services. Peter reported directly to the Operations Manager and had a dotted line relationship to the centralized corporate purchasing group in the company's head office 200 miles away. Peter possessed a bachelor's degree in economics and was a Certified Management Accountant.

Mr. Saxton saw the division of responsibility between purchasing and the scientist as reasonably clear cut. The laboratory people were responsible for deciding what sort of equipment was needed, when it was needed and the reason for it. Purchasing was responsible for getting competitive quotes, where the money would be spent and the terms and conditions of the purchase contract.

Mr. Saxton noted that:

> "in the past, the researcher did a lot of buying through catalogues and personal contacts. Right now, the researcher is still making too many firm commitments. In the future, purchasing and the scientist should try to work in tandem. I'd like to see purchasing and the scientist jointly attending meetings with the purpose of covering the commercial terms up front. Eventually, the commercial terms will become part of the negotiating/thinking process during any acquisition".

Mr. Saxton also noted that planning for future purchases was unlikely to be easy. The five year budget forecast was considered a wish list that was virtually useless as a manpower planning tool. It might be three times greater than the research centre would ever spend. The one year budget forecast was, however, relatively fixed. Peter did not consider the forecast as useful for purchasing, only as a cash flow projection.

Mr. Saxton discussed some of the internal public relations efforts that would be necessary to improve the process. The effort would be directed towards internal understanding, ensuring that suppliers are aware of the company policies about the distinction between informal and formal contacts with scientists and striving to reduce red tape, both internally (i.e. the research centre) and externally (i.e. head office). For example, two years ago, all major purchases were handled by head office. Now, head office usually defers to the research centre's requests.

> "The scientist can make mistakes although I must admit that it doesn't happen often. I don't anticipate any problems from a more active role. It may take more time and we might have to bring in more buyers. But we hired the scientists to do research. They should be doing that, not spending their time buying equipment."

The Research Manager

Bob Lambert was Paul Livson's immediate supervisor. He was in charge of the analytical laboratory at the research centre. Bob possessed a doctorate degree in chemistry. Bob, like Peter Saxton, saw the division of responsibility in relatively clear terms.

> "Purchasing can help with the finer commercial issues, such as freight, customs and tariffs. But when it comes to getting the quotes and the decision, only I can decide".

Bob rarely considered price as a driving force. The equipment decision was mainly regarded as a technical one.

Mr. Lambert also discussed the budgetary process. Four to five months prior to budget deadlines, the analytical laboratory would look at the previous year's work load and define what might be required in the future. The group would identify the lab's needs and also contact the customer to see what might be the client's future requirements. Not only did this process help in putting together a budget package, it also was the initial step in building client support. Bob believed that the one year stepout budget was very detailed and quite firm. He was not involved in the capital rationalization exercise but believed that it would be useful for purchasing to have access to the make up of the final capital budget total.

Mr. Lambert also discussed the nature of the supplier relationship for any planned purchase.

> "We work with the vendor to solve our problems. We need to cover such technical issues such as vibration and electrical specifications. We don't need other partners during the discussion. Is purchasing prepared to sit with us during these discussions? It may be a lot less efficient. If we talk prices, we probably should have purchasing there. But right now, they don't come out of the offices enough. Do they have the time to commit to the process. Whatsmore, it would be helpful if they had some technical background."

Analysis

To a certain extent, all situations are unique. This description of one particular example of an equipment acquisition had some unique aspects to it. For instance, it was not usual for purchasing to be physically located in the basement. Nonetheless, the case has many aspects found in other low involvement companies. These common elements are presented below.

During the acquisition process, it was the norm for the scientist to determine his/her needs, develop necessary evaluation criteria and specifications, select the appropriate suppliers for evaluation purposes, carry out the evaluation and analysis and select the supplier in virtual isolation from the purchasing group. The scientist regularly expressed the opinion that a lot of work, time and effort had been placed in achieving approval for purchasing a piece of equipment. This effort can be considered as a barrier to a request for decision modifications. The interviews and case examples studied did not provide evidence to determine whether or not the researcher was making poor decisions nor whether he/she was acting in a manner that could be construed as not of benefit to the corporation. There was some evidence that the researcher suffered unnecessary delays in obtaining delivery of the equipment due to lack of recognition of best shipping procedures and custom requirements, agreement to terms of payment that violated corporate guidelines and the failure to recognize additional costs such as federal tax and shipping charges. These oversights, particularly the poor recognition of customs and shipping procedures, caused last minute problems for purchasing. The subsequent attempts to rectify the problems resulted in a perception that purchasing was obstructing the acquisition process.

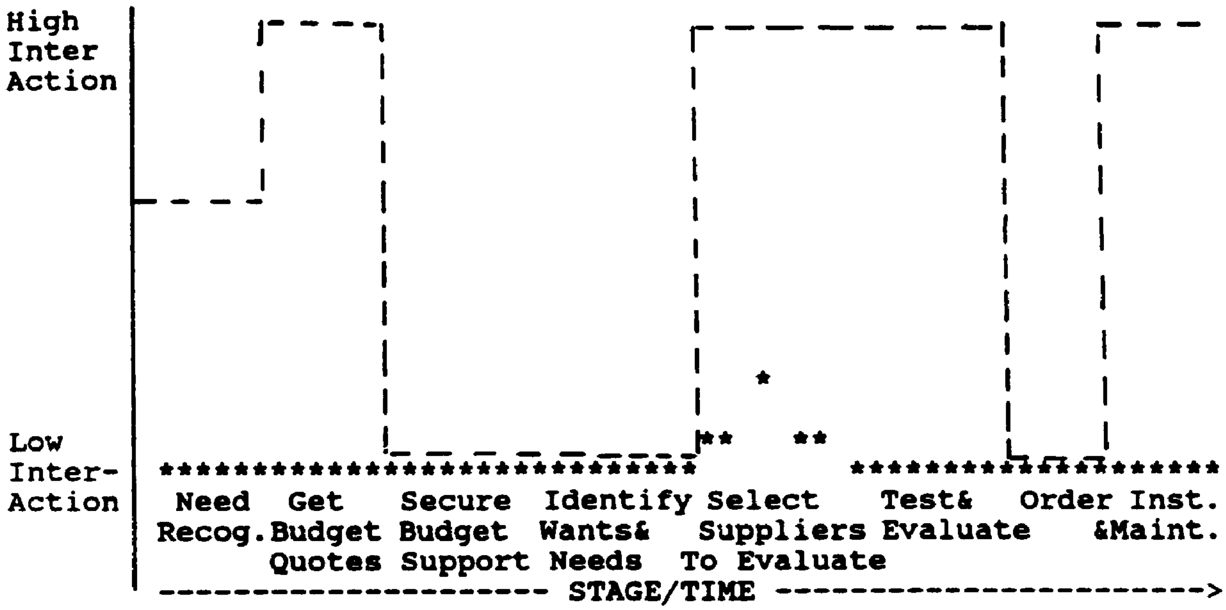
An interesting observation seen in many of the low involvement companies was the purchaser's unit of reference. Like Mark, many purchasers related to the supplier company name to an easier extent than to the requesting scientist or the piece of equipment. In high involvement cases, the customer was always the reference unit. Paul's comment about being treated like a customer was a telling one.

Finally, the field interviews revealed that the scientist and his immediate supervisor were in close agreement about role definition. A similar statement can be made for purchasers and their managers.

<u>A Framework For Analysis</u>

The normal interaction between purchasing and the scientist can be illustrated as a sequential process where the major decisions regarding what and from whom to buy are made by the scientist. Purchasing involvement is largely restricted to carrying out the scientist's request and arranging for payment. In contrast, the interaction between the supplier and the scientist is cyclical and frequent during various stages in the buying process. The interaction process is illustrated in Exhibit 10.

Exhibit 10
Profile Of Scientist/Supplier
And Scientist/Purchaser Interaction Points
(Low Involvement Cases)



KEY: ------ Supplier/Scientist Interaction
****** Purchasing/Scientist Interaction

The profile indicates three critical time periods when the supplier and the scientist interact. The first period includes the stimulation of a need (e.g. through trade show displays or periodic visits to the research centre) and the solicitation of quotations for budgetary purposes.

The second involves the formal evaluation process including site visits, contacts with other users of the suppliers equipment, the running of test samples and the solicitation of formal quotations.

The final period consists of the installation, start up, service and maintenance of the equipment after delivery. The interaction with the scientist after the sale has been made can be considered as the beginning of a new purchase, either through a better understanding of the customers future requirements or the identification of other personnel within the research centre who might need similar measurement equipment.

In contrast with the cycles of supplier/scientist interaction, purchasing and the scientist rarely meet during the process. In most cases, purchasing involvement occurs at the actual ordering stage and the contact with scientist, if it occurs at all, tends to be confrontational (i.e. the terms of payment are wrong, duties are incorrectly calculated) as opposed to positive collaboration. Often this interaction occurs by non-visible means and is certainly not one of a "high-contact" and personable nature.

The direction of information exchange and task activity is one of "over the wall". Purchasing is involved very late in the process and with little real ability to influence the negotiations or supplier choice. In contrast, supplier interactions occur frequently during the scientist's work activities and have a definite influence in supplier consideration during the buying process. The early contact at the budget quotation stage and at the trade shows that might trigger a need recognition is critical for the supplier in terms of identifying potential purchases and scientific contacts as well as providing advanced notice that permits development of a marketing package.

Variations Between Firms

Within the twenty two firms that were classified as having low purchasing involvement levels and following the illustrated contact points, some minor variations in purchasing's approach to the task were noted. Two variations were of particular interest although on the meaningful involvement scale discussed previously, these variations were not of distinguishing significance.

Other Suppliers

In three firms, the purchasing group, through formal policies and procedures, was responsible for suggesting additional supply sources for equipment tender purposes. This was a slight variation from the normal process described in the sense that the scientist relinquished control of the process for a short period of time. This process occurred after the scientist had evaluated known suppliers and had essentially reached a decision regarding the "best buy". The scientist would draft a specification document that would be submitted to purchasing to solicit formal bids under a tender process.

Purchasing would add suppliers, if known, to the scientist's list of potential suppliers and send out the proposal in a formal tendering process.

Purchasing, upon receipt of the bids, presented a short summary statement with an emphasis on the quoted price of the deliverables. If the scientist chose the low bidder, the final justification and approval process was short. However, if the scientist rejected the low bidder, the justification and approval process appeared to be more intense than, for example, the case description suggested. Purchasing perceived the receipt of a bid as equivalent to meeting all requested specifications. Purchasing's view was that price and delivery time could be the only key deciding factors at this point. In most cases, the formal bidding process can be considered as less obstructionist when the actual purchase order required processing. From a scientist perspective, however, these procedures appeared more bureaucratic in nature.

The scientist was still solely responsible for deciding on what was needed and defining specifications. Being realistic, in most cases the scientist had also decided upon a preferred piece of equipment (as distinct from preferred supplier). The possibility that some other supplier would submit a bid to supply could potentially lead to unanticipated problems. The scientist could attempt to make the specifications for the bid process extremely tight to ensure that the preferred equipment was the only one which could meet the specifications. This would overcome the situation when purchasing recommends the low cost bid while the scientist places greater proportionate value on the more expensive equipment. It was not the intent of this investigation to examine the occurrence of this practice. Such a research question that would be difficult to investigate. However, several scientists acknowledged that the potential existed for such practice where purchasing did not have the technical expertise to evaluate proposals on anything other than a delivery and cost basis.

Value Assessment

Perhaps the most interesting variation on the normal process was found in one U.S. firm identified prior to the study as demonstrating high meaningful involvement levels. A visit to this firm did not find the process followed as representing high meaningful involvement in the sense defined for this research. However, the professionalism in which the purchasing agent approached his job and extent to which the commercial aspects of the acquisition were investigated were superior.

The purchasing manager recognized two key aspects of the operating environment. First, the equipment supply environment was extremely tight, often with only one viable supplier of equipment. Obviously, competitive bidding with one supplier to get a better price from another was not going to be a common occurrence. Further, negotiations to achieve maximum benefits would be a difficult task, working from a relatively weak bargaining position.

Second, his expertise was in the commercial aspects of the purchasing process. He recognized that the equipment decision was largely a technical one that had to be left to the scientist. Where the purchasing manager added value in the process was to solicit competitive price bids for value analysis purposes. He would use his supplier contact network to elicit information regarding the options that the scientist's preferred supplier offered. This was done in an attempt to ensure that value was being received for these options. The suppliers contacted were all informed that they were not viable suppliers for the equipment for technical reasons but they generally co-operated, in the hopes of securing future business. The process assisted the purchasing manager in assessing the extent to which the preferred supplier's options represented reasonable value.

The Acquisition Process - An Enhanced Model

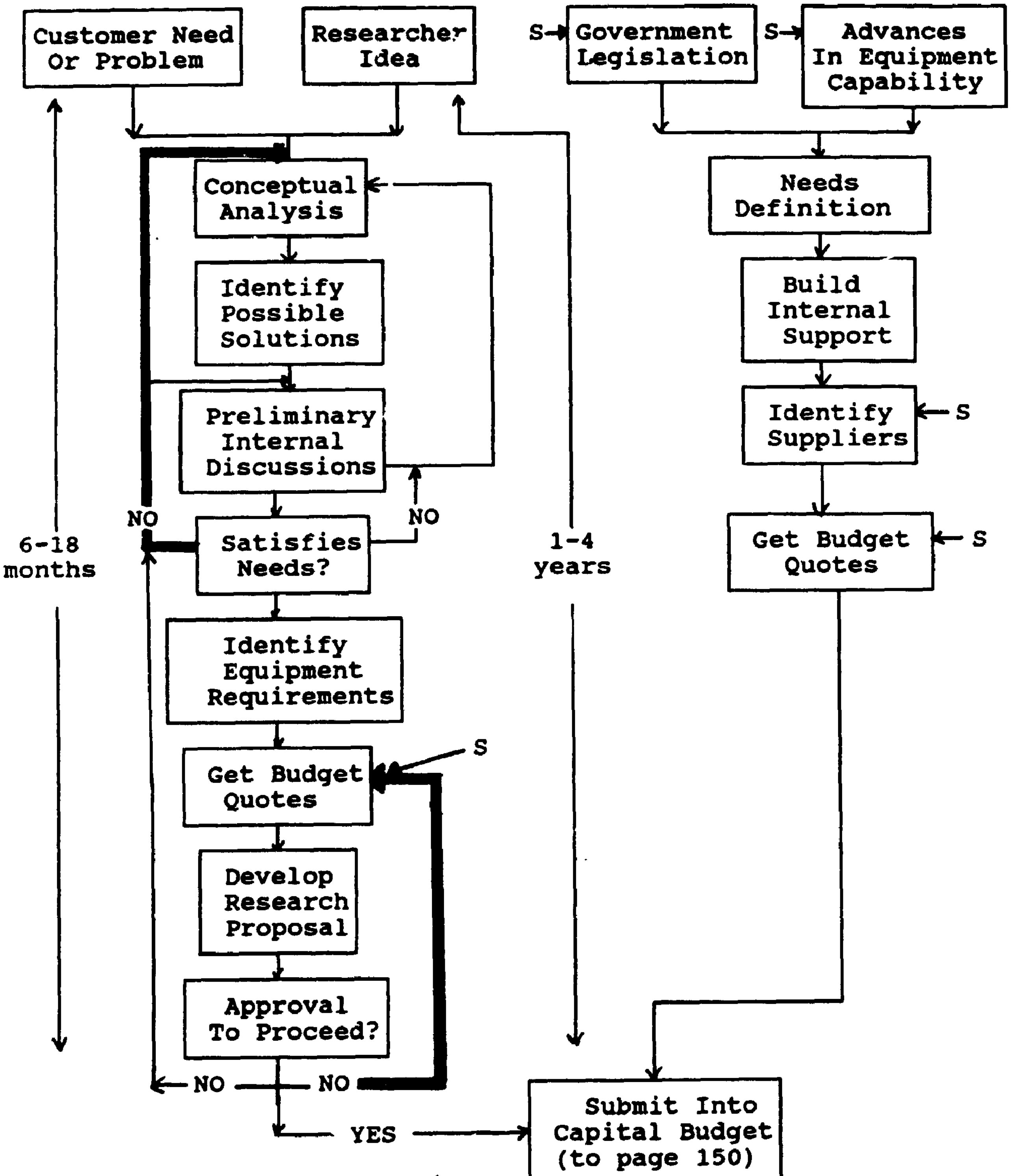
The research design provided the opportunity to investigate the equipment acquisition process in an R&D environment from a descriptive point of view. Enhancements to the Robinson-

Faris model were anticipated, mainly due to the influence of the capital budget process. As a result of the interviews, the following model, illustrated in Exhibit 11, was derived illustrating the typical acquisition process. The model has two major components or flows: one where equipment was a direct result of pursuing a research project and one where equipment was required to upgrade the capability of the research laboratory's analytical group. The first part of Exhibit 11 illustrates the need derivation for these two sources of equipment requests. The second part of Exhibit 11 describes the capital budegt approval process and the equipment supplier selection procedure. The indicated supplier and purchasing inputs illustrate the typical timing of interaction. The time frames indicated are based on the field interview discussions.

Exhibit 11

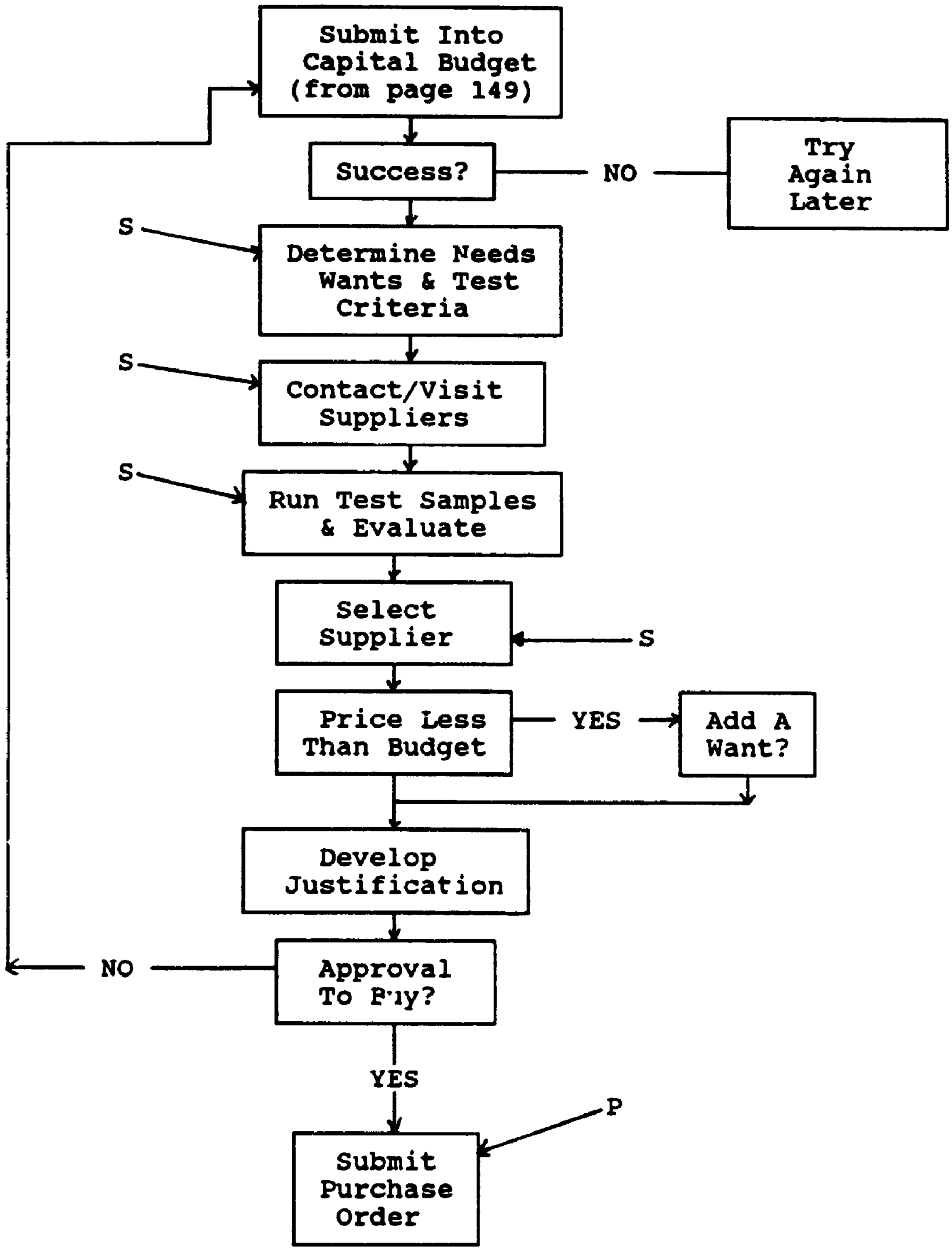
The Acquisition Process For Equipment In A Research Centre

Research Program Based Need **Analytical Lab Based Need**



KEY: S - Supplier Interaction
NOTE: The thickness of the feedback lines is representative of frequency of occurrence

Exhibit 11 (cont.)



KEY: S - Supplier Interaction
P - Purchasing Interaction

Acquisition Process Description

Equipment Bought In Support Of A Research Project

A customer (loosely defined to include other internal functional groups or sponsors and outside customers) may have suggested an idea or had a problem warranting investigation by the R&D group. The research centre itself may have its own ideas regarding future customer requirements or a desire to build knowledge in a specific area of interest. The scientist, in this case, was the driving force for the research idea.

The two noted sources of ideas for the research project have time implications before the equipment is included in the capital budget. Ideas generated from the research centre had a longer gestation period, perhaps requiring as much as an additional 2 -3 years. During the course of this time period, the definition of equipment needs was likely to change. In many research centres, scientists can pursue investigations into their particular area of interest in their spare time. When these research pursuits resulted in a need for equipment, significant time delays were evident. The research centre's discretionary funds were often limited.

Whatever the source for the work idea, the idea or problem had to be examined from a conceptual viewpoint, usually in an informal method, to evaluate possible research proposals that would yield a solution. This was an interactive process between the customer or other scientists and the scientist who was championing the cause. The purpose of this informal dialogue was to identify the specific needs of the customer and the constraints under which a solution must be found. Solutions were found through reference to literature, other company solutions, past experience and knowledge, etc.

After a period of preliminary investigation, a proposal was developed involving costs and resources required to find a practical solution. At this point, the requirement to purchase equipment may have become apparent and some contact with a potential supplier would occur in order to develop a reasonably accurate cost proposal. In some cases, the scientist's knowledge or knowledge within the research centre was sufficient make formal contact with the supplier unnecessary. Equipment costs often were considered to be a part of a scientist's knowledge base.

The customer or a research manager would then evaluate the proposal and agree to it, reject it or modify the extent of resources to be allocated to the project.

In some cases, the need for equipment was only evident after a certain period of research investigation. The cost of the equipment was usually in addition to funds allocated to the research program and sometimes required a budgetary addition. In one such case, the research program had continued for three years before dedicated measurement equipment became a necessity. Even though the need at this point appeared to be pressing, only in unusual cases was a purchase made using contingency funding. Almost all equipment purchases had to be forecasted in advance and the costs submitted as part of the capital budget.

When equipment purchases were the direct result of a research idea, the process of gaining customer and research administration approval took, on average, two to four years (and as long as seven years in one case!). Perhaps of greater significance, the process to this point had been virtually informal. Contact with customers, suppliers and other scientists had been related to understanding the problem and exploring theory and journals to find potential solutions. This process was consistent with Jewkes' (1958) concepts of invention. In many cases, the need for equipment arose after research had been performed for some time. Nevertheless, such equipment still required approval in a capital budget and the approval process remained the same. However, the probability of approval under these circumstances was very high.

Because all equipment requests eventually become part of the capital budget, the request for capital equipment flows into the continuation of Exhibit 11.

Analytical Lab Equipment Requests

As illustrated in Exhibit 11, the analytic laboratory within a research function may have determined that equipment was required. The equipment need might arise from poor reliability or capacity constraints of existing equipment, new government regulations regarding environmental control, the availability of new equipment with capabilities previously not possible (a common example was advancement in non-destructive test measurement capability) or simply a desire on the part of the laboratory to maintain or build a state-of-the-art measurement capability.

With the need identified, the first step in the acquisition process was getting the required funds into the capital portion of the next year's budget. In most research companies, the forward year budget was built up from individual requests for lab equipment and ranked during a capital approval committee process. This capital budget wish list also included input from research program/project requests. Although some discretion existed for purchases not identified on an individual basis, the vast majority of equipment buys occurring during a given year were individually identified in the formal budget process. This represented the first formal key information landmark for internal functions (e.g. purchasing) if they chose to act upon it. In order to seek and receive approval for a piece of equipment, some interaction with potential suppliers was mandatory because a budget forecast was required. This interaction might have occurred at the time that the capital budget was being formulated or, in some cases, the supplier contact, equipment quality assessment and knowledge of costs represented a fundamental part of the analytical staff member's expertise and job. Frequently mentioned sources of this knowledge of equipment cost and suppliers included the annual equipment trade shows (e.g. The Pittsburgh Conference) and scientific research journal articles that might indicate the test equipment used during an experiment.

The Capital Budget Approval & Buying Process

Once the budget had been approved, the buying process became much more formal and predictable. Evaluation criteria, the needs and wants, were identified, often using some formalized techniques such as Kepner-Tregoe Analysis. Suppliers were contacted to arrange for test sample evaluations, often through field visits by the requesting scientist to witness and evaluate the equipment during the test process. Final evaluation, in a formal sense, generally occurred after the field trials but was considered by most to be a mere formality. The field visits and equipment trials, combined with the scientist's knowledge and judgement of the theory upon which the measurement equipment was based, were instrumental in identifying the best piece of equipment.

In the majority of firms, the results of the field tests were used as a basis for writing a justification package that was presented through the various levels of approval within the research administration. In some cases, a researchers' desired equipment involved an expenditure in excess of the allocated budgetary funds. However, if the justification was strong enough, funds would be allocated to buy the "best". Building customer (sponsor) support at the formative stage was a critical factor in receiving approval if the capital requirements were in excess of allocated funds. Once the justification received the necessary approvals, purchasing normally became involved to carry out the necessary paper work.

Scientist Time On Equipment Acquisition

The research also provided an opportunity to gain a better understanding of the actual time spent by a scientist on the equipment acquisition process. As indicated in the process description, the time span for the acquisition process was sometimes very long.

While the time span for the purchase decision making process can be great, the actual physical time spent on the purchasing task was found to be relatively short and reasonably predictable. The scientist implicitly may make time allocation decisions based on the value of equipment purchased (and, perhaps, based on a presumption of the level and detail of justification required to gain budgetary approval). A resulting predictive equation could be useful for any research firm in determining manpower planning requirements based on future activities. Further, such a time study could be a first step in the examination of research productivity and the potential for organizational division of labour along comparative advantage concepts (Drucker: 1952, Hirsch, Milwitt and Oakes: 1958 and Roman: 1968).

During the course of the interviews, scientists were asked to estimate the time they actually spent on the buy process. For various tasks in the buying process, the average results on a percentage of total time basis are presented in Exhibit 12.

Exhibit 12
Average Task Activity Time Allocations

Task Activity	% Of Total Actual Time
Initial Budget Quotes	5%
Identify Potential Suppliers	10%
Develop Evaluation Criteria	10%
Arrange For Samples	10%
Field Visits/Tests	50%
Justification/Selection	15%

The identified task times were added and the total actual time was used to determine the relationship with total equipment cost. All cases analyzed were consistent in the extent to which the scientist was involved in the purchasing process. All times used were from examples where the scientist had moved the purchase process to the point where the supplier had been determined and justifications had received administrative approval. All equipment acquisitions were made during the previous two years.

The data were split between respondents from U.S. based firms and Canadian based firms in order to control for such variations as differences in federal sales tax rates and foreign currency differences between the two countries. The equipment requests were carried out by scientists of various education levels and the equipment purchases were of varying technical sophistication.

Some caution is advised concerning the information herewith presented. Since the data gathering process required recall over a period of several years, an exact true figure was unlikely and, perhaps, somewhat understated. The time spent included supplier contacts, visits to trade shows for the express purpose of information gathering and supplier evaluation, sample testing, specification and criteria setting, evaluations, justifications and purchase order requests.

The data were evaluated using regression analysis. For the Canadian data, there was a strong relationship between time spent and the cost of the equipment. In fact, 85% of the variance between time spent by scientists was explained by the cost of the equipment. The remaining unexplained variance could be the result of effective last minute bargaining by a skilled purchasing negotiator, errors in the recall of time spent on the decision and search process and the impact from inflation induced cost discrepancies (purchases were evaluated over a two year time span).

Such a regression equation has predictive value in terms of resource allocation and resource capacity planning. Any company that has information regarding the total equipment purchases in a year can reasonably predict how much scientist time will be spent on those purchases (as opposed to pursuing research activities). The regression equation appears to be applicable over an equipment cost range of $4000 to $650,000 ($CDN 1988).

The regression equation is presented below (Equation 1) and the plot of Canadian data points is illustrated in Exhibit S1 in Appendix D. The regression equation is:

$$ST = .071 * C + .57 \qquad (1)$$

where ST = Scientist Time (days)
C = Cost of the equipment ($ CDN. (000))

The constant term in Equation 1 indicates that for any purchase, there is a fixed level of paper work and analysis that is required, regardless of the cost, equivalent to slightly more than 1/2 day. As the cost increases, the constant term becomes less relevant. As a rough rule of thumb, every $14,000 increase in cost of equipment would require an extra day of scientist time on the purchase task.

As an example of how this equation might be used for capacity planning purposes, a Canadian research firm that spends $5 million on equipment purchases and processes approximately 250 purchase requests per year would need to plan for 497 days of scientist time (approximately 3 person years) for the acquisition of equipment.

The United States data came from a considerably smaller number of investigated firms and the number of data points was limited (a total of 11 valid cases). As a result, the regression equation is quite volatile. Nonetheless, the regression equation indicated a similarly strong relationship between cost and time spent on the acquisition process. In fact, 95% of the time variance between individual cases was explained by the cost of the equipment. The U.S. equation is presented below and the plot of U.S. data points is presented in Exhibit S2 in Appendix D. The U.S. equation is:

$$ST\ (U.S.) = .075 * C + 1.4 \qquad (2)$$

where ST (U.S.) = U.S. Scientist Time (Days)
C = Cost of Equipment ($ U.S. (000))

Given the limited number of data points from the United States, it would be tenuous to draw specific conclusions in a comparison of U.S. versus Canadian data. In particular, the significantly higher value for the constant term in the equation would suggest that U.S. scientists face a greater degree of constant level effort to purchase any one particular piece of equipment.

Conceptually and from the field visit observations, this difference did not make a great deal of sense. Therefore, some data manipulation was performed by subtracting the Canadian constant value from the U.S. data points and forcing the U.S. regression curve to pass through the origin. This manipulation had the effect of assuming a similar constant effort for any purchase regardless of the country in which the firm operates. The resulting slope of the U.S. regression equation was .077. Comparing the U.S. and Canadian equational slopes gives a ratio of .071/.077= 0.922 which, all else being equal should have been equivalent to the Canadian/U.S. dollar exchange rate, import duties and/or differences in Federal sales tax. Since the ratio was considerably higher than exchange rates alone, the data would suggest that Canadian scientists spend less time on the purchase of equipment than their U.S. counterparts. Such results would support the notion that, given the relative low levels of research spending in Canada when compared to the United States industrial firms, Canadian scientists attempt to overcome the absolute spending disadvantages by saving time in other areas, in this case, the evaluation and selection of equipment.

Implications Of The Findings

While useful as a predictive tool, management should be cautious in the purpose for which such predictive equations could be used. If it becomes management's intention to replace this time spent using different resources (for example, purchasing), management should carefully examine whether the time is really wasted and unproductive, particularly if the knowledge of the equipment is considered an integral element of the professional's job. This is the focus of the following concluding section and one purpose for the study of high involvement cases presented in Chapter VII.

Conclusions

The following conclusions were derived based on the analysis and descriptions of the process presented above.

1) Very few purchasing groups made significant contributions to the acquisition process as viewed from the scientist's (client's) perspective.

2) Purchasing was generally involved too late in the process to make significant contributions. This late involvement sometimes led to problems with the contractual agreement to terms of payment and shipping procedures. Attempts by purchasing to rectify these problems were construed by the scientist as interference

in the acquisition process.

3) In most companies and in most cases, enough information existed within the research centre to indicate that early involvement of purchasing was possible. The formal capital budget process was found to be an integral part of the acquisition process and was built up from individual scientist equipment requests. Access to this information was found to be possible for purchasing if they so wished.

4) Gaining access to this budget information and perhaps involving themselves in attendance at trade shows and field trials is believed to be a practical method for purchasing to remedy the stated delivery and payment term problems. The potential exists that additional manpower to proact at this time would be necessary. The direct cost of such action may be outweighed by faster processing of the final purchase request and increased client satisfaction.

5) The actual time spent by scientists in the acquisition process was found to be highly predictable depending largely on the cost of equipment. Such a predictive equation could be used for manpower planning purposes.

6) The scientist's decision regarding the technical quality of the equipment was found to be a dominating influence in the decision making process. The actual supplier and the concept of "brand name" was found to be of little value. This latter concept of brand preference did appear to be more prominent when upgrading of current equipment or the addition of options to existing equipment was the focus of interest.

7) In most low involvement cases, purchasing did not see their role as client satisfaction. Instead, the reference unit was the supplier organization. Task specialization was found to be extreme with purchasing operating within a narrowly defined role and responsibility.

A Prescription For An Improved Process

Even in low involvement companies, significant improvements to the existing process are warranted and possible. While the scientist had been remiss in not addressing all the commercial aspects of the acquisition process, purchasing had ignored several key signposts where initiative on their part could have prevented these problems. For instance, the formal budgetary process identified highly probable purchases within the next year including the primary researcher responsible for the acquisition. It would be a positive move on purchasing's part to obtain access to the capital budget details and to contact the scientist responsible for the equipment purchase to discuss the appropriate commercial aspects of the future contract. It may also be most worthwhile for purchasing to attend, with the scientist, the equipment trade shows of interest and the field trials where the decision on which equipment was best was implicitly made. At the time of the visit, purchasing could discuss with the potential supplier modes of shipping, custom requirements and company policies regarding terms of payment. In this way, once the scientist had decided on the best buy, the request would not have been a surprise and the process of formally acquiring the asset would be handled with haste.

Such actions, while meritorious, would necessarily require initiative on behalf of purchasing, co-operation from the scientist and probably some minor additional manpower in the purchasing group. Most of the purchasers visited appeared to be under severe time pressure. The backlog of current work that must be performed may make it necessary for additional manpower to become available before earlier and more active involvement can occur.

Most parties in low involvement companies saw only modest advances in involvement levels as worthwhile. The scientist questioned the technical ability of purchasing to make a meaningful contribution in what was considered as a very technical decision making process. Purchasing did not usually see a more meaningful role as being anything other than related to commercial terms at an early time in the acquisition process. This can be contrasted with the relationship between the scientist and the supplier. In the case example, Don mentioned "working with the vendor to solve our problems". A similar team approach between purchasing and the scientist to satisfy the scientist's needs was rarely heard in conversations in low purchasing involvement companies.

There was however, an apparent desire by all purchasing personnel to do more. The feeling was generally striving to contribute to a greater extent in the acquisition process at an earlier time without causing excessive or increased "red tape".

Twenty seven firms were visited to determine the relationship between the purchasing group and scientist in the equipment acquisition process. Five of these firms illustrated differences, on a consistent basis, from the described sequential process, the level and the timing purchasing involvement. Two other firms demonstrated isolated cases of high involvement. These cases warranted further investigation and analysis, the results of which are presented in Chapter VII.

CHAPTER VI

STATISTICAL ANALYSIS

Preliminary Comments

This section of the research report describes the statistical tests performed on the questionnaire responses obtained from scientists, research administrators, purchasing managers and purchasers. Prior to performing any test, the data were tested for normality. Where the data were not normal, non-parametric statistics were used. In the majority of cases, normality was evident and t-test statistics were satisfactory. The major exception was analysis involvement levels.

For the purposes of this report, an hypothesis was considered rejected if the probability that the results could be obtained by chance alone was less than or equal to 5% (p=.05 or less). Where the word "significant" arises, it refers to this test of statistical significance. In some cases, statistical significance was not achieved but was approaching the p=.05 level. In these cases, some mention of the results will be made as "directional support" for an hypothesis. Where results were considered managerial significant, words such as "strong relationship" have been employed.

An attempt has been made in this research to present only the key points of interest and in a form that can be readily understood by managers. For reference, correlation matrices are presented in the appendix accompanying the questionnaire (Appendices A). In the interests of readability, some of the data have been placed in Statistical Appendix D and illustrated in this chapter in graphical format.

This section has been divided into two parts. The first part addresses issues of measurement instrument validity and reliability as well as the tests for interview effects. The second part addresses the hypothesis testing and statistical results.

Part 1: Tests Of Validity and Reliability

Control For Interview Effects

During the field visits, discussions were held with scientists, purchasers, etc., concerning their experiences during the acquisitions of equipment. The possibility existed for bias in the responses from those interviewed due to the these conversations. As a precautionary step, the the same questionnaire that interviewed scientists received was presented to friends or colleagues of the interviewed scientist that had dealt with purchasing in the past but who did not participate in the discussion stage.

While not a perfect technique (there is always the risk that those not interviewed were in some way different from those interviewed, perhaps due to differences in frequency of purchasing of equipment), this process allowed for an attempt to control for interview effects that may have caused response bias. The results from the test between interviewed and non interviewed personnel are presented where appropriate.

Measuring Purchasing Involvement Levels

A new instrument for measuring the actual levels of meaningful involvement by purchasing was developed prior to the field interviews. The data were tested for reliability in construct measures. Churchill (1979) stated that coefficient alpha absolutely should be the first measure one calculates to assess the quality of a measurement instrument. The alpha indicates the degree to which various questions developed to measure some construct "hang together". Put another way, the alpha measures the degree of internal consistency of the questionnaire using a single method to measure values for a construct. Internal consistency should be as high as possible. Nunally[37] (1978) indicated that modest reliability values of .70 are sufficient for basic research and that values in excess of .80 are desireable but may not be worth time and funds involved in achieving this level.

From the above comments and the exploratory nature of this

[37] Nunnally, J.C., Psychometric Theory (New York: McGraw Hill, 1978) 245

research, the measurement instrument used was a good one. The instrument required scale development for understanding needs (alpha=.87), alternate suppliers (alpha=.88), early (timely) involvement (alpha=.88), the actual buying task (alpha=.63), long term focus (alpha=.85), after sales installation and service (alpha=.89) and technical assistance (alpha=.94). The reliability tests were favorable. The high alpha values showed a large measure of internal consistency in measuring the meaningful involvement level. Only the scale for the buying task would require some improvements if the scale were to be used for further purchasing involvement research. Additional questions for this measure and some wording modification would be in order.

In another test for questionnaire validity in reflecting the "true measure of meaningful involvement", the sum of the responses from scientists on all seven measures of meaningful involvement was compared against the observational measure of meaningful involvement assigned by the interviewer after the interview phase of the field visits (the MISCORE previously described). The value R (a measure of association with maximum value of 1.0) between the two measurement forms was .75 and in the correct direction. The non-parametric test of association was also statistically significant with a rho value of .76. The R value signified a high level of correspondence between the questionnaire responses and the observational measure. Such a high correspondence indicated that what was measured through the administration of a questionnaire was similar to the intent of the measurement instrument and significantly improved the satisfaction of "convergent validity"[38][39] for this research effort. A similar analysis between the MISCORE and the responses from purchasers revealed an R value of .61 and a non-parametric rho value of .61.

Matched paired data were also analyzed for the degree of association. In this case, parametric and non-parametric degrees of association were calculated only when a paired scientist and purchasing response for a single acquisition was available. Under these circumstances, the R value between the observational scores and scientists' responses was .85 (rho=.85), between the observational scores and purchasers' responses was .69 (rho=.67) and between purchasers' responses and scientists' responses was .60 (rho=.57). The lower correlations on the purchasing/scientist comparison was likely a direct result of the lower number of paired cases available for analysis. With purchasing responses, a definite position bias was in effect with the mean value exceeding the

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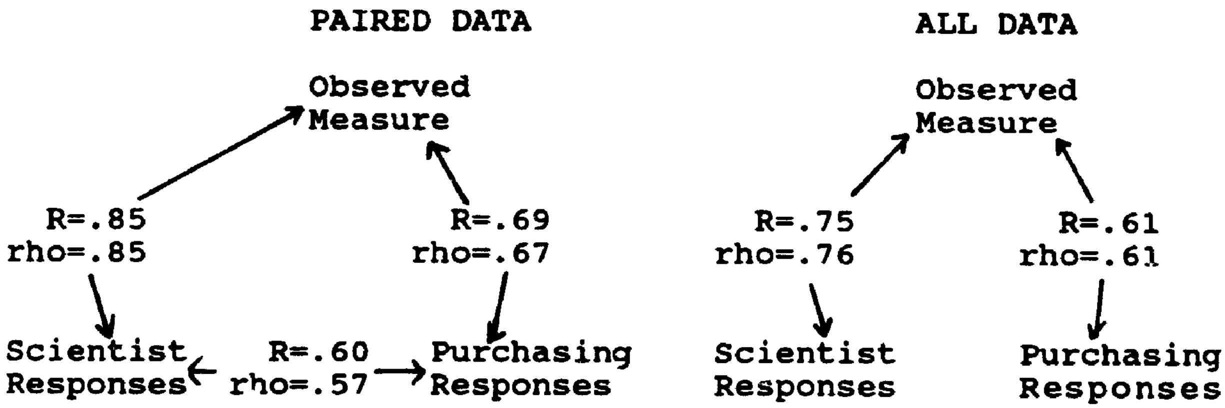
[38] Kidder, L.H. & Judd, C.M., Research Methods In Social Relations (New York: Holt, Rinehart and Winston, 1986) 56

[39] Cook, T.D. and Campbell, D.T., Quasi-Experimentation: Design & Analysis for Field Settings (Boston: Houghton Mifflin Company, 1979) 60-62

observational scores by approximately 1.0 scale point. The score given by scientists, on average, exceeded the observational score by .4 scale points. All correlations were statistically significant. The results are illustrated in Exhibit 13.

<u>Exhibit 13</u>
Path Correlations For Various Meaningful Involvement Measurement Methods



The level of correlation R between the observational measure and other measurement forms can be considered in relation to the internal consistency of the meaningful involvement questionnaire as given by the Cronbach's alpha values described previously. The highest levels of consistency should be given by the same method measuring the same construct. The second highest level of consistency should be with the measurement of the same construct using a different instrument. This second level of consistency corresponded to the observational score (MISCORE) based on set criteria that purported to differentiate in the same way that the questionnaire did.

In summary, the degree of association recorded between scientists, purchasers and through the use of an observed score showed very consistent results with high levels of convergence. This indicated a significant degree of convergent validity, an important aspect of research methodology.

Finally, factor analysis was performed to examine the questionnaire's potential to indicate simple structure. If the purported measures of the constructs were separate elements of meaningful involvement construct, then factor analysis should have yielded seven distinct factors. The results of the factor analysis are presented in Exhibit 14.

Exhibit 14
Factor Analysis For The Meaningful Involvement Scale

Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Needs (9)	Service (17)	Supply (5)	Timely (11)	Buying (1)
Needs (10)	Service (18)	Supply (7)	Timely (14)	
L.Term (6)	Service (19)	Needs (2)	Buying (13)	
L.Term (8)	Service (20)	Buying (22)		
L.Term (15)				
Tech. (3)				
Tech. (4)				
Tech. (12)				
Timely (16)				

Note: Bracketed numbers refer to scientist questionnaire numbers in Appendix A (Confidence In Ability).

Simple structure was not clearly evident. This lack of clarity was the first hint that the scale developed to measure meaningful involvement would reflect strongly the field based opinions that the equipment supply issue was largely a technical one. The ability to assist with technical specifications, understanding the scientist's needs and long term issues tended to be correlated with each other. The other factors indicated a degree of discriminant validity between other elements of meaningful involvement (i.e. installation and operation, supply sources, timely involvement and the actual buying task). The general conclusion resulting from the reliability and factor analysis can be summarized as follows: the questionnaire was highly reliable between respondents for the various constructs of interest but indicated that total scores of meaningful involvement, for the environment under study, would be influenced largely by technical ability (needs understanding, technical assistance) since these constructs tended to vary in a similar manner.

The scores obtained for meaningful involvement levels were generally quite low. The nature of the distribution of cases showed definite signs of non-normality and indicated a dichotomous relationship. A large number of low values were recorded with a smaller clustering of medium to high values. Therefore, non-parametric statistics were required for analysis that involved meaningful involvement scores.

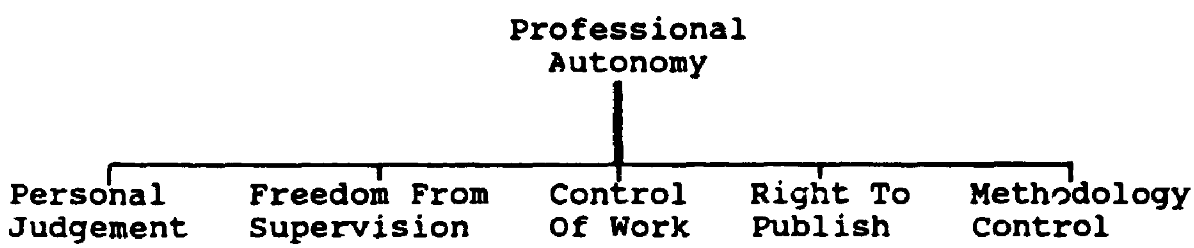
Measuring Benefits From Meaningful Involvement

Some benefits, such as supplier input, were anticipated to be perceptual in nature, requiring opinions from scientists as opposed to direct measurement. To test whether or not the high involvement companies illustrated higher perceptual benefits, a questionnaire was developed and administered to the interviewed scientists. As discussed in Chapter III, perceptual benefits from purchasing involvement were believed to centre on supplier input, time savings and functional equipment. The cronbach alpha values for the three scales developed to measure supplier input, time savings and functional equipment were .85, .86 and .83, respectively. With reference to Nunally (1978), these alpha values were highly respectable given the exploratory nature of the research.

Professional Autonomy

Autonomy is an extremely important element of a professional's status. The concept of autonomy was composed of several sub-constructs. The sub-constructs covered such issues as the professional's reliance on personal judgement, freedom from direct supervision of work, direct control of work and work patterns, the right to publish the research for peer review and control over the methodology used in the research experiment (including decisions regarding type and accuracy of equipment required). The concept of professional autonomy is illustrated in Exhibit 15.

Exhibit 15
Professional Autonomy Elements



The values for Cronbach's alpha for the five measures of supervision, work, judgement, methodology and publication were .90, .66, .67, .78 and .95 respectively. The high alpha values again show high internal validity. Further, when responses from non-interviewed scientists and research administrators to the same questions were factored in, the reliability coefficients for all measures remained constant.

This provided further evidence of measurement instrument validity across various groups of scientists. A further test of the validity was the factor analysis results. Again, the questionnaire for autonomy was found to be reliable in this regard indicating six reasonably distinct factors. The factor results are illustrated in Exhibit 16.

Exhibit 16
Factor Analysis For Autonomy Constructs

Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor6
Superv(10)	Method(2)	Publish(3)	Work(1)	Judge(14)	Work(8)
Superv(11)	Method(4)	Publish(6)	Work(7)	Judge(15)	Judge(16)
Superv(12)	Method(5)				
Superv(13)	Method(9)				

Note: The bracketed numbers refer to the scientist questionnaire numbers in Appendix A (Autonomy Questions).

A relatively simple structure was obtained. Some improvement to the questionnaire should be attempted on the work rules and judgement constructs. This would be consistent with the lower reliability values of alpha associated with these measures.

Control For Interview Effects

Responses from interviewed and non-interviewed scientists for task importance and confidence in purchasing ability were compared to test for possible interview effects. The results are shown in Exhibit 17.

Exhibit 17
Interviewed vs. Non-interviewed Scientists On Purchasing Task Ratings (Mean Values)

Task	Confidence In Ability		Importance	
	Interviewed	Non Inter.	Interviewed	Non-Inter.
Needs	2.61	2.66	3.20	3.98**
Supply	2.84	3.43**	3.44	4.59**
Timeliness	2.80	2.89	3.27	3.71
Buying	4.42	4.37	4.94	5.57**
Long Term	3.01	2.85	3.96	4.68
Service	2.64	1.92**	3.01	3.75
Technical	2.43	2.34	2.88	3.59**

** Statistically significant at the .05 level

Interviewed scientists consistently recorded lower values on the importance of purchasing input for all the tasks. Despite the constancy of views for confidence in ability, some interview effects appeared on the importance ratings. The difference in total importance score (4.21 vs. 3.44) was also statistically significant.

There are several potential explanations for this difference. The first, the basis for administering the control test in the first place, was that the interview process itself affected the responses. The discussion process forced the scientist to relive every step taken during the acquisition experience and may have refreshed his/her memory about the exact role

Part II: Tests Of Hypotheses and Other Research Results

High vs. Low Involvement Cases

Because the data in terms of meaningful involvement levels were highly skewed, the individual equipment purchase experiences were classified based on high and low involvement scores.

The scientist responses on the meaningful involvement questionnaire were analyzed to examine where improvement in perceived purchasing involvement levels were recorded. For this analysis, the observational measure was used to distinguish between high and low involvement cases. Analysis based on the scientist responses would have lacked independence. Observational scores of four or greater were classified as high involvement. The comparison between the high involvement and low involvement cases is shown in Exhibit 19 and the actual values are in Exhibit S3 in Appendix D.

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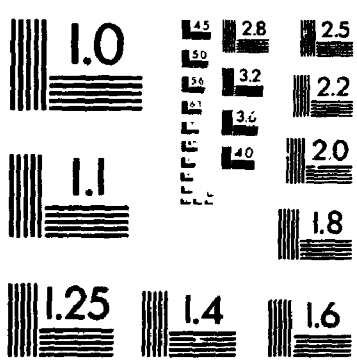


played by purchasing (in this case, lowering the importance associated with the seven activity areas). This would be further confirmation of the organizational psychology reference to position bias: a person's tendency to overrate their own importance and influence and underrate someone else's importance and influence (Silk and Kalwani: 1982). The above analysis indicated that the relative underrating and overrating was influenced further by the intervention of interviews as opposed to the use of mailed questionnaires.

Alternative explanations were considered and dismissed. An argument of fundamental differences between the two groups of individuals was reduced in credibility by the constancy of responses for confidence in ability scores. Non-interviewed scientist may not have been randomly selected or may have misunderstood the questionnaire. However, the process by which the questionnaire was sent to the non-interviewed scientist (it was distributed to a close colleague by the interviewed scientist) and the covering letter that explained the purpose of the questionnaire should have been sufficient control for such respondent bias.

Therefore, the interview process had a distinct effect on the questionnaire responses from scientists. Since both scientists and purchasers were interviewed during the process, a special adjustment for this effect was not necessary. Scale bias on the importance ratings were noted when comparing data across the purchasing/scientist organizational barrier. However, this analysis of interviewed and non-interviewed personnel indicates two cautionary notes to this and other research. First, interviewed personnel need to come from both sides of the organization in order to eliminate the interview effect. Any research that interviews, for instance, purchasir ; and solicits a non interviewed response from a scientist might introduce a one sided bias to the responses. Secondly, the mean values expressed by both parties lose meaning due to the bias. Therefore, confidence levels and interpretation of the meaning of the responses were not possible to generate. Any scale adjustment necessary in the future hypotheses testing likely would exceed .77, the average difference on the scale. Purchasing agents, who were also interviewed, would overrate their importance, thereby amplifying the position bias.

For professional autonomy, the results from a paired t-test of the average responses between interviewed and non-interviewed scientists indicated that the interview process may have raised concerns for judgement and methodology and lowered concerns over freedom from supervision but only to a minor extent. The actual mean values for interviewed and non-interviewed scientists together with the rank ordering within groups is presented in Exhibit 18.

Exhibit 18
Professional Autonomy Importance Ratings
Interviewed vs. Non-Interviewed Scientists
(mean values and (rank))

Element	Interviewed	Non Interviewed	Significant Between Groups
Freedom From Supervision	5.69 (1)	5.71 (1)	No
Work Control	4.73 (4)	4.97 (4)	No
Professional Judgement	5.85 (1)	5.74 (1)	No
Methodology	5.99 (1)	5.91 (1)	No
Publication	3.82 (5)	5.01 (4)	Yes

The interviews appeared to cause a lowering of the importance for publication of the results to a statistically significant extent. This may have been a result of the relevancy and newness of the equipment purchase causing a reduced emphasis on publication. Perhaps the sample of non-interviewed scientists may have been more basic research intensive than those buying equipment. However, for the purposes of this study, the constancy of importance for the methodology construct was more important. The observational measures of this construct were largely composed of equipment related measures. In summary, the results from using the control indicated that the process of in depth interviews and discussions about equipment acquisitions did not alter the responses on the more critical aspects of the formal questionnaires.

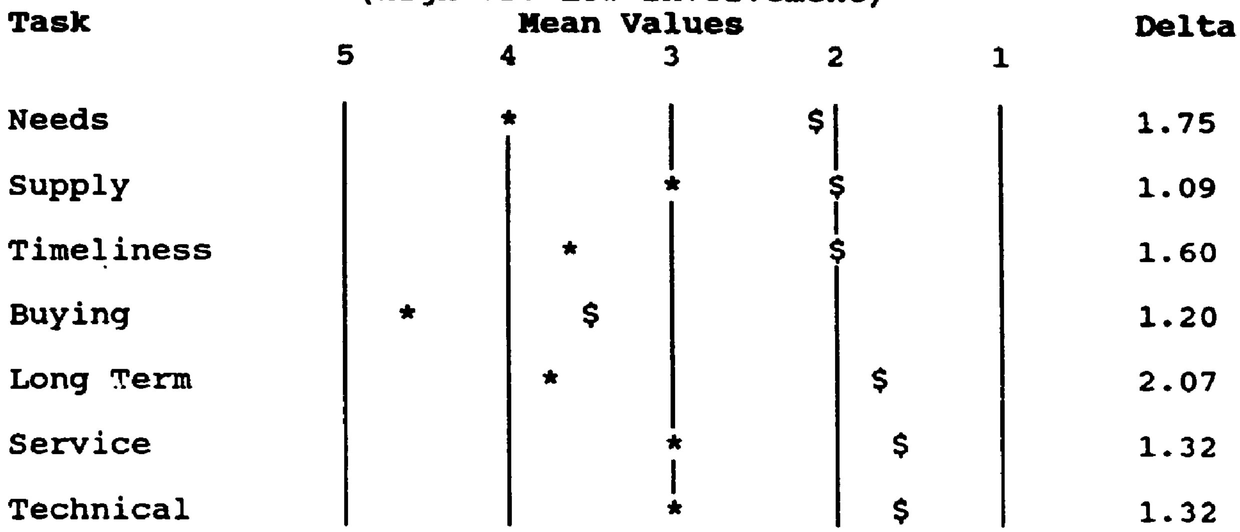
Part II: Tests Of Hypotheses and Other Research Results

High vs. Low Involvement Cases

Because the data in terms of meaningful involvement levels were highly skewed, the individual equipment purchase experiences were classified based on high and low involvement scores.

The scientist responses on the meaningful involvement questionnaire were analyzed to examine where improvement in perceived purchasing involvement levels were recorded. For this analysis, the observational measure was used to distinguish between high and low involvement cases. Analysis based on the scientist responses would have lacked independence. Observational scores of four or greater were classified as high involvement. The comparison between the high involvement and low involvement cases is shown in Exhibit 19 and the actual values are in Exhibit S3 in Appendix D.

Exhibit 19
Scientist Responses Of Purchasing Involvement
(High vs. Low Involvement)



Key: * High Involvement $ Low Involvement

The results indicate that purchasing in low involvement situations received relatively high scores in a narrow task area of the buying process with little perceived contribution in other areas. In high involvement situations, the contribution from purchasing was higher in all areas with delta values showing largest increments in long term issues, needs understanding and timely involvement. Highly involved purchasers were perceived as contributing beyond a narrowly defined task area and at an early point in the process.

Benefits From High Involvement

The descriptions of those firms that illustrated high involvement (Chapter VII) will show some dramatic impacts from meaningful purchasing involvement. In some cases, the identified benefits represented concrete values in terms of reduced costs or the purchase of additional options and equipment with the surplus funds. Scientists also responded to questions about the perceived benefits from purchasing involvement. Since the meaningful involvement scores were dichotomous, the non-parametric Mann-Whitney U test of significance was used for analysis. The results, based on differentiating the groups by the questionnaire responses, are illustrated in Exhibit 20. A high involvement score was deemed to be any summary response that exceed 3.5 on the scale from 1 to 7.

Exhibit 20
Perceptual Benefits From Purchasing Involvement
High vs. Low Involvement Cases
(Mean Values)

Benefit Area	Low Involvement	High Involvement	Significant
Supplier Input	2.22	4.25	Yes (p=.001)
Time Savings	2.23	4.58	Yes (p=.004)
Functional Equip.	2.06	4.27	Yes (p=.001)
Total Benefit	2.18	4.37	Yes (p=.000)

The individual benefit areas (supplier input, time savings and functional equipment) as well as the total benefit score were found to be higher in high involvement situations. All differences were statistically significant. Therefore, scientists perceived the benefits from meaningful involvement to be in the areas tested and in the direction anticipated.

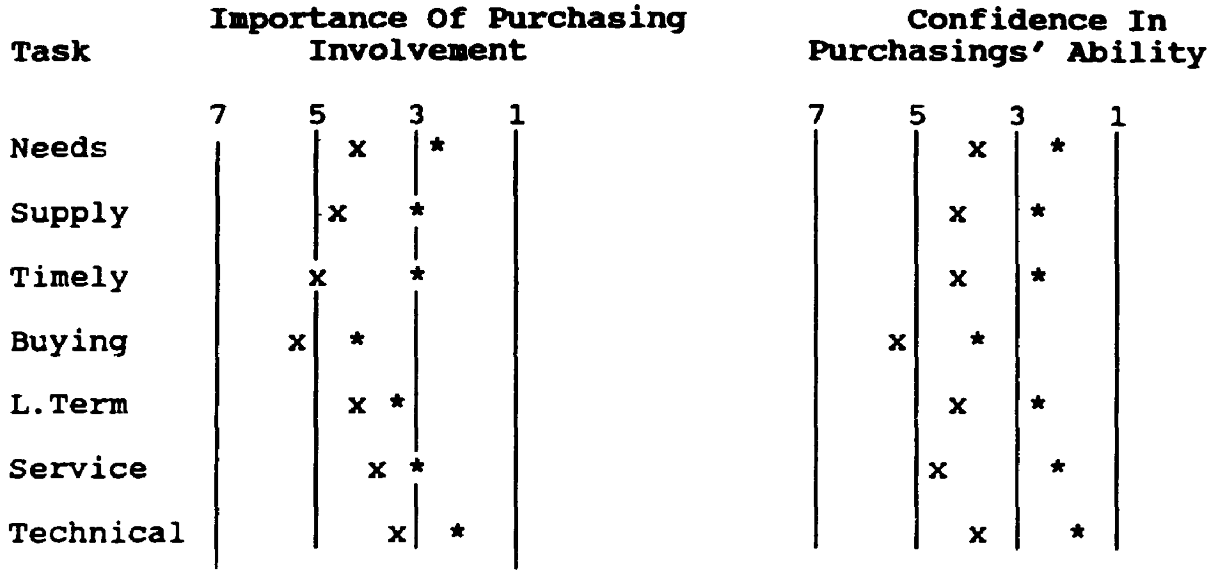
Parallel and confirmatory results were obtained when the scores were compared based on segmenting the groups using the observational score for meaningful involvement as opposed to using the questionnaire measure.

In summary, scientists in companies with high purchasing involvement perceived purchasing input to result in improved supplier input, time savings and functional equipment. This was strong support for Hypothesis 1 which had stated that there are significant benefits to the R&D organization from meaningful involvement.

Purchasers vs. Scientists

The responses from purchasing agents and interviewed scientists on an instrument to measure the importance of various elements in the acquisition of equipment were compared. The mean values are illustrated in Exhibit 21.

Exhibit 21
Purchasers vs. Scientists - Purchasing Task Ratings
(Mean Values)



KEY: x - Purchasing Responses * - Scientist Responses

In all cases, scientists rated the importance of purchasing assistance on each task as less important than did purchasers. The previously discussed bias on the scales was likely in effect. An adjustment for the bias was incorporated, therefore, before testing for statistical differences.

This bias adjustment was calculated based on the difference in the average responses to all the tasks. This scale difference was then added to the scores on each response for scientists. Once this adjustment was made, only the buying task was considered as different to a statistically significant extent. Hypothesis 2 had stated that purchasers would view timely involvement as a significant element in the acquisition process. The early and timely tasks approached statistically significant differences and in the direction predicted in Hypothesis 2. Purchasers regarded their early and timely involvement in the acquisition process as higher in importance than did scientists but the difference was not statistically significant. Hypothesis 2 was directionally supported. In other respects, the scientist viewed the longer term utilization of the equipment as more important than did purchasing but the difference was not significant.

For confidence in ability, the adjusted results indicate that the scientist directionally regarded purchasings' ability to provide after sales service and installation as very low while they expressed more confidence in purchasings ability to handle the buying task. The results are presented in Exhibit S4 in the Appendix D.

The data were further analyzed to test the within group rankings of the various task importance and are shown in Exhibit 22.

Exhibit 22
Purchasers vs. Scientists On Importance Factors (Mean Value and Rank)

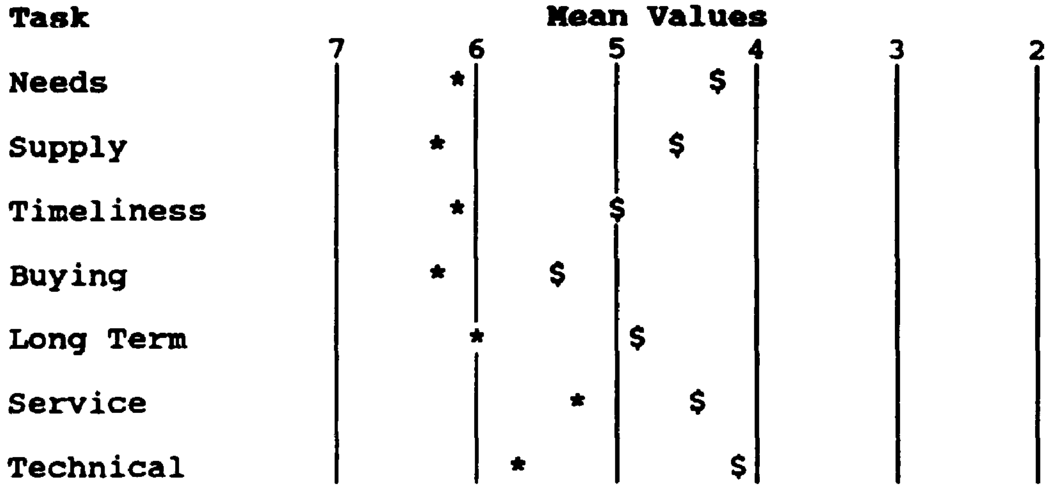
Task	Scientists Responses*		Purchasing Responses	
	Value	Rank	Value	Rank
Needs	3.34	3	4.54	4
Supply	3.54	3	4.82	4
Timely	3.50	3	5.21	2
Buying	5.00	1	5.74	1
L.Term	4.06	2	4.96	2
Service	3.20	3	4.71	4
Technical	2.95	7	4.37	7

* Values differ from those in Exhibit 17 due to paired data used in Exhibit 17

The ranking analysis indicated a fair measure of agreement between purchasers and scientist about the important activities that purchasing should focus on. In particular, both scientist and purchasers regarded the buying task and long term issues as the first and second most important task areas. They both agreed that technical understanding was of least importance. However, while the scientist regarded supply sources and timely involvement as third in ranking, purchasing could not make a statistically significant differentiation between timely involvement and the ranking for long term issues. Therefore, the within group rankings illustrated that timely involvement was considered by purchasing to be of significantly more importance than the scientist perceived it. This represented a weak form (rank differences) of support for Hypothesis 2. This conclusion was directionally supported by the between group comparison in Exhibit S4 in Appendix D.

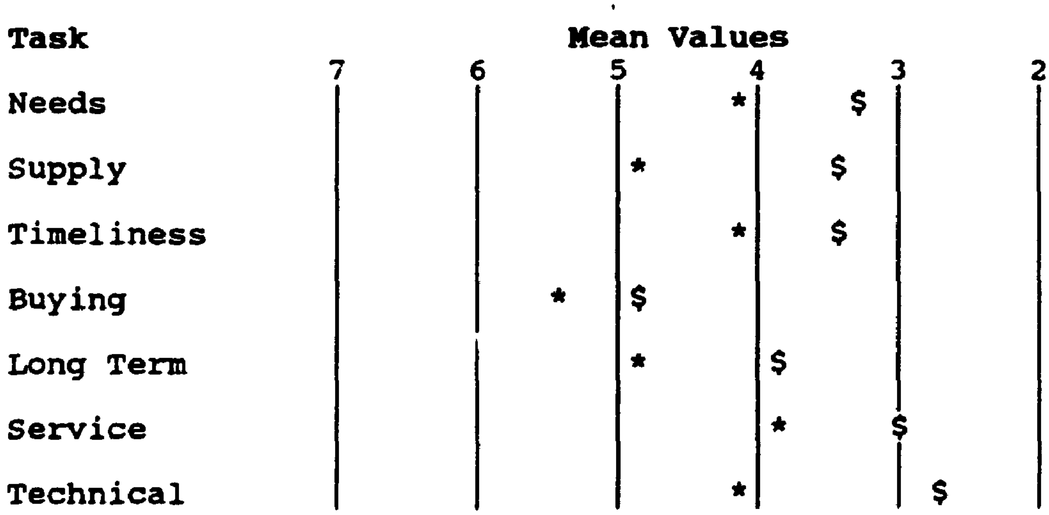
Finally, both the scientist and purchasing responses were grouped on the basis of whether or not they came from high involvement cases. Responses from high involvement cases might exhibit some differences in ranking and absolute values on several tasks, in particular those related to needs understanding and technical assistance. The results of this analysis are presented in graphical format in Exhibits 23, 24, 25 and 26 and in tabular format in Exhibits S5 and S6 in Appendix D. Due to the limited case examples, comparisons of within group ranking orders for high involvement cases were not statistically different.

Exhibit 23
Purchasers' Ratings Of Task Importance
High vs. Low Involvement Cases



KEY: * High Involvement
$ Low Involvement

Exhibit 24
Scientists' Ratings Of Task Importance
High vs. Low Involvement Cases



KEY: * High Involvement
$ Low Involvement

Exhibit 25
Scientists' Confidence in Purchasing Ability
High vs. Low Involvement Cases

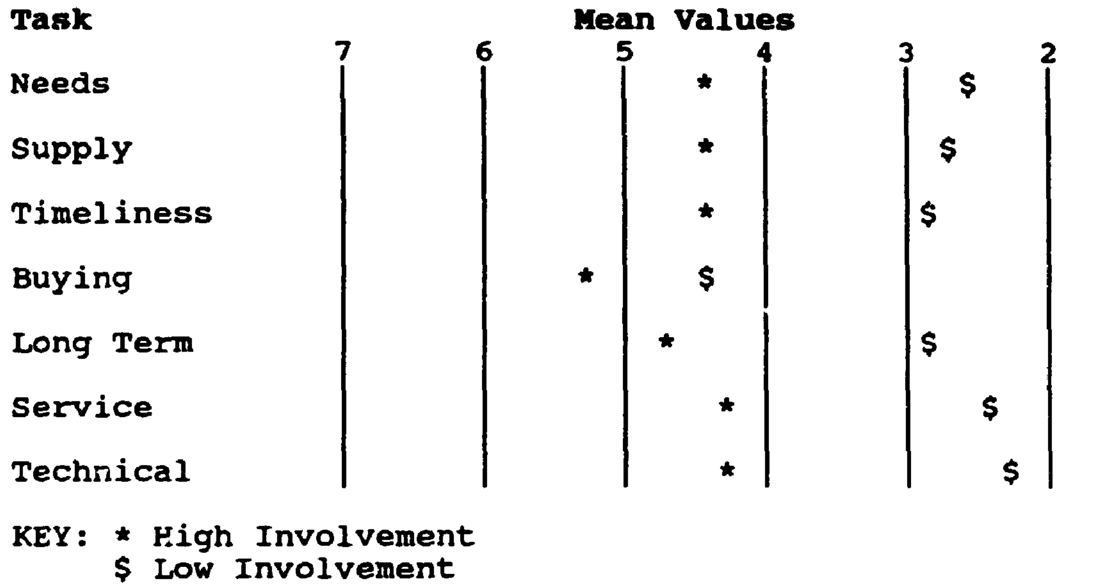
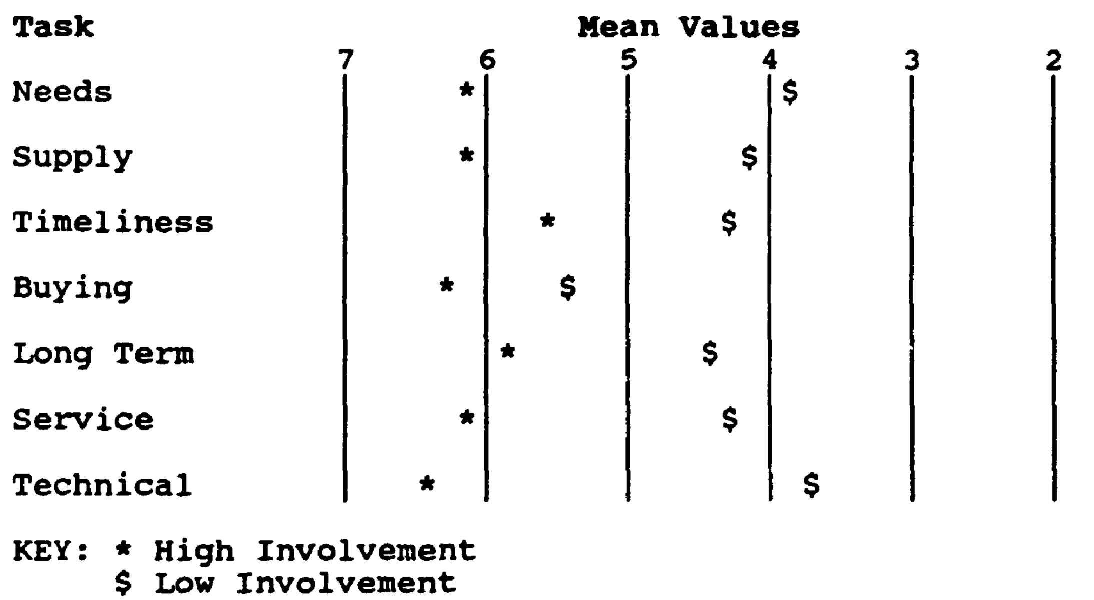


Exhibit 26
Purchasers' Confidence in Purchasing Ability
High vs. Low Involvement Cases



Exhibits 23-26 indicate the major shifts between low and high involvement cases from both a purchasing and a scientist perspective. In high involvement companies, there was an obvious balance, with the possible exception of service related issues, that purchasers expressed in the relative importance on the seven task areas. The difference between high and low involvement purchasing responses was mainly due to the large increments in the perceived importance on needs understanding, technical and supply issues (Exhibit 23). For purchasers, the differences between responses from high and low involvement cases were statistically significant on all tasks except buying.

For the scientist, the differences in the importance placed on supply and technical issues were evident (Exhibit 24). Their responses showed two distinct clustering of importance in tasks. The primary important issues surrounded elements of supply, buying task and long term objectives. The secondary importance issues included needs understanding, timeliness of involvement, service and technical issues. The differences recorded for scientists between high and low involvement cases were significant in needs understanding, supply sourcing and technical specifications.

Marked changes were also apparent in the confidence that both parties had in purchasings ability. In fact, in the case of purchasing, their confidence in the technical area actually exceed their confidence in the buying task (Exhibit 26)! Scientists' and purchasers' confidence differences between high and low involvement cases were statistically significant in all areas except the buying task.

Clearly, there were marked differences between the high involvement and low involvement purchasers and the perceptions of their scientific colleagues regarding the relative weights and confidence expressed in purchasing for the various acquisitions tasks. Low involvement purchasing may be characterized as a narrow range of expertise and skill while high involvement cases indicated balance and confidence in all areas.

Benefits And Size

The very few cases of consistent meaningful involvement recorded during the study meant that testing this hypothesis was impractical. These cases will be discussed in detail in Chapter VII. Cognos and C-I-L Corporate, both very small research establishments, recorded some impressive examples from high involvement purchasing groups. CAE, which in general illustrated low involvement levels, did provide a glimpse of the beneficial impact from higher dollar spending. CAE's savings on one particular buying experience exceeded the entire equipment budget for C-I-L Corporate. IBM, while large, employed a boundary spanning technique (an approach involving multiple functional representation on the buying team) and was in the early stage of meaningful involvement development.

One could surmise that generalizing the results from C-I-L and Cognos, where time savings and reduced expenditures were recorded, to firms where the research spending was significantly higher would support the hypothesis that total benefits would depend on research size. Certainly, the available data regarding the size of capital equipment budget (8%-12% of research spending) indicated a positive relationship between total research spending and equipment purchases. The higher levels of equipment acquisition would provide more opportunities for meaningful involvement practice and concrete results. However, even the simplicity of this hypothesis was untestable due to the very few cases of beneficial results and meaningful involvement. Hypothesis 3, which stated that there was a relationship between size of research spending and the benefits realized, was observationally correct but could not be tested. A possible approach for future research would be to perform a far more detailed case study of IBM versus C-I-L and Cognos to test this hypothesis, perhaps by examining each and every purchasing request over a length of time.

Is Technical Ability Important?

The research was based on the premise that the purchaser's technical ability would be an important determinant of the level of meaningful purchasing involvement. An attempt was made to determine the level of association between meaningful involvement and the scientist's confidence in purchasings technical ability. This was a test of perceptions and not necessarily a test of the real purchasing technical ability. However, perception may be reality. The scientist's perception of the contribution that purchasing could make in the various stages may determine the level of contribution sought. Therefore, a test of perceived technical ability would have merit.

The scores from scientist responses for confidence in purchasings ability on the seven tasks were regressed against a summary score for meaningful involvement. This summary score was the mean of the responses for all seven tasks measured. There was a very strong relationship (R of .74) between the meaningful involvement score and the summary score for confidence in technical assistance. If technical assistance was not available in the regression analysis, a strong relationship (R of .73) existed between meaningful involvement and confidence in the ability of purchasing to understand the needs of the scientist. No other variables came close to these levels of association. A similar analysis using the non-parametric Kendall rank order correlation showed high degrees of association between the meaningful involvement score and the needs understanding and technical assistance scores (tau=.645 and .606, respectively).

A second test was performed based on the formal educational level of the purchasing personnel involved. This measure showed a somewhat weaker level of association with meaningful involvement (R of .62) and in the direction predicted. Since the design of the research prevented the availability of a correct measure of confidence levels prior to a purchasing experience, the educational score may actually be a better predictor of meaningful involvement. It certainly is an independent measure.

confidence may be strongly influenced by past purchase experiences and the dependent variable might not be time independent, a necessary condition for linear regression. Suffice it to say that there existed a strong relationship between confidence in technical ability and the degree of meaningful involvement.

A research design that measured the confidence levels of scientists before the acquisition was required and subsequently remeasured after the purchase was completed might be a more rigorous method for determining the importance of technical ability. The formal education score was found to have a fair measure of predictive quality. However, several instances were noted where the skill level of the purchasing agent was not being fully utilized due to time constraints and lack of proactive enthusiasm. These intervening variables should be measured in future research efforts.

In summary, the best available predictor of meaningful involvement was the ability of purchasing to assist with technical specifications. A reasonable surrogate for this confidence in technical ability was the formal education score described in Chapter IV. Hypothesis 4 (ii), which stated that technical qualifications would be important for meaningful involvement from the scientist's perspective, was supported.

Professional Autonomy Results

The results of the autonomy questionnaire were evaluated to determine the relative importance of the key elements. If the results indicated that the equipment related element (methodology) was considered relatively unimportant, then there would be reason to believe that any purchasing group might have high levels of success in achieving high meaningful involvement levels.

As a group, scientists ranked the methodology as most important. However, there was no statistical difference between freedom from supervision, professional judgement and methodology. Control of work ranked fourth and publication fifth for interviewed scientists. The data were further analyzed by segmentation based on research type. Since few interviewed scientists believed (or admitted) that they were conducting basic research, the research type was classified into basic/applied research and development work. The results of this test are presented in Exhibit 27.

<u>Exhibit 27</u>
Importance of Autonomy Elements
By Research Type
(Interviewed Scientists Only)
Mean Value (Rank)

Element	Basic/Applied	Development	Total*
Freedom From Supervision	5.74 (1)	5.72 (1)	5.73 (1)
Work Control	4.93 (4)	4.71 (4)	4.85 (4)
Personal Judgement	5.92 (1)	5.63 (1)	5.81 (1)
Methodology	5.97 (1)	5.78 (1)	5.90 (1)
Publication	4.24 (5)	3.22 (5)	3.84 (5)

* Differences between these values and those in Exhibit 18 are due to the use of PAIRED observations in Exhibit 18

The results indicated that methodology, freedom from supervision and personal judgement were consistently rated as the most important elements of professional autonomy, regardless of research type. In all cases, the difference in importance ratings between these three elements was not statistically significant. As a result, they were all ranked of primary importance. Control over the choice of research projects and work rules was consistently ranked fourth while publication rights were considered least important. The directional change between the importance of publication depending on research type was in the predicted direction. This may have been the result of the type of research being done or the nature of the personnel doing research since corporations may have a tendency to utilize new PhD graduates in the more basic/applied research areas. Publication rights may be viewed by these personnel as important for establishing a reputation among their professional peers in science. The high level of importance given by researchers to the methodology element was of particular significance. The equipment decision was considered an integral part of the research and is held in high regard and importance. Hypothesis 4 (iii), which stated that professional autonomy would be an obstacle to meaningful involvement, is supported.

Autonomy - High vs. Low Involvement Cases

The case examples where meaningful purchasing involvement were high were compared with low involement cases. If there existed a difference between these groups, it would be explained in possibly two ways. First, the concept of high degrees of control over methodology and equipment decisions was neither a strongly held one that could not be overcome by a purchasing group nor was it independent of the scientist's evaluation of the purchasing group. In other words, the scientist would evaluate the purchasing group based on a perceived level of expertise and would determine the threat to autonomy accordingly. Alternatively, there may be something unique about the actual scientist responding to the questionnaire who indicated a reduced level of importance associated with control over the purchasing decisions.

When scientists were responding after a discussion about a high meaningful involvement experience, the autonomy responses were generally unchanged in all respects except the responses given for those questions relating to methodology and equipment. The scientists' rating of importance of the equipment related decisions had a mean value of 5.15 which was considerably lower than the group total in Exhibit 27. The null hypothesis in all cases could not be rejected using a two tailed test. However, the directional change was anticipated and a one tailed test of significance would be valid. Under this assumption, the difference on the methodology element is statistically significant. The comparison of low and high involvement results is shown in Exhibit 28.

<u>Exhibit 28</u>
Scientists' Ratings Of Autonomy
High vs. Low Involvement Cases
(Mean Values)

Element	High Involvement	Low Involvement	Significant
Freedom From Supervision	5.55	5.75	No
Work Control	5.00	4.83	No
Professional Judgement	5.87	5.80	No
Methodology	5.15	6.00	Yes (p=.04) (1 tail)
Publication	3.60	3.88	No

While methodology and equipment control was an important part of a professional's autonomy, the concept was not so rigidly held that an effective purchaser could not make contributions

in the acquisition process without threatening professional autonomy.

Taking the analysis one step further, the information gathered was split depending on whether or not the respondent was a scientist or an engineer. While great care was taken to exclude engineers from the research, in some companies this proved virtually impossible. In total, 14 of the 44 respondents to the questionnaire on autonomy had engineering backgrounds. The interview process identified the educational background of these individuals as a control. The results of the engineer vs. scientist analysis are shown in Exhibit 29.

Exhibit 29
Ratings Of Autonomy - Scientists vs. Engineers
(Mean Values)

Element	High Involvement		Low Involvement	
	Eng.	Sc.	Eng.	Sc.
Freedom From Supervision	6.50	5.31	5.95	5.65
			p=.14	
Work Control	4.00**	5.25**	5.33	4.55
	p=.03			
Professional Judgement	6.00	5.83	5.85	5.78
			p=.06	
Methodology	6.25**	4.88**	6.25	5.86**
	p=.06			
Publication	1.00	4.25	4.14	3.70

NOTE: All p values are for two tailed tests
* Statistically significant difference (1 tailed)

A strong case can be made that one tailed tests were appropriate because the direction of change was anticipated. The data for high involvement, engineering were based on a single case and any conclusions drawn from such extreme low levels of sampling would be tenuous at best. However, some potential inferences can be drawn and suggested areas for future research.

For one, scientists definitely reduced the level of importance associated with methodology in high involvement companies. Differences in work control are also approaching statistically significant levels. The engineer, on the other hand, did not reduce his perception of the importance of equipment control, regardless of the level of purchasing involvement. Engineers may feel, therefore, that control of equipment decisions should always remain within their domain. Cases of high involvement may be considered as isolated instances and do not reflect changing attitudes towards professional autonomy. While Hypothesis 4 (iii) was supported regarding the importance of equipment decisions as an element of professional autonomy, the implications of the data would indicate that equipment control was not held tightly by scientists (as opposed to engineers) and meaningful purchasing involvement would not be considered as a threat. Therefore, hypothesis 4 (iii) may depend on the educational/sociological background of the respondent. The engineer appeared to be more willing to modify control over what kind of work he/she would do and when the work would be done than to give up control over equipment decisions.

Research Administrators vs. Scientists

Research administrators, defined as those personnel who were previously active researchers but were spending at least 50% of their time on administrative duties, were interviewed to elicit their views about the role of purchasing in the acquisition process for equipment and to confirm the budgetary capital budget and approval process. Further, these administrators were asked to respond to a questionnaire that measured the importance of various elements of autonomy, purchasing tasks, the current business climate and the research opportunities for the firm.

The comparison of research managers' responses between low and high involvement companies are shown in Exhibit 30. The scores were recorded on a scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Exhibit 30
Research Managers' Perceptions Of Business Climate And Purchasing Productivity Potential In High vs. Low Involvement Cases (Mean Values)

Issue	Low Involvement	High Invovlement	Significant
Research Opportunities	6.21	5.25	YES (p=.05)
Productivity Opportunitics Limited	3.42	4.00	NO (p=.40)
Financial Access Difficult	5.05	5.50	NO (p=.95)
Purchasing Doing Good Job	4.26	5.00	NO (p=.46)

Research managers in low involvement companies believed there to be greater research opportunities (significant), greater opportunities for research productivity improvements, financial access was easier and that purchasing was not doing as much as could be expected when compared with the responses from high involvement companies. Low involvement company research managers appeared to recognize that there were better ways to manage the research effort and the research opportunities existed. The relatively easier access to financing meant that purchasing involvement was not of the highest priority. These managers tended to view the access to more researchers as the solution, not research productivity improvements.

Hypothesis 4 (i) had stated that research managers in low

involvement companies would have adequate funds and/or a lack of research opportunities. The hypothesis was generally refuted from these results. There was no statistical difference between high and low companies regarding financial access, although the direction was correct. Low involvement companies had greater research opportunities available. Greater research opportunities were not anticipated to be found in low involvement companies. However, there may be support for hypothesis 4 (i) over time. The perception of opportunities represented a future horizon while the involvement levels of purchasing were current events. The presence of opportunities may lead to purchasing involvement at a later date. A time series analysis might be required to explore the time based validity of this hypothesis.

The research managers' responses to the autonomy and task importance questions were compared to those from scientists. There were only minor differences recorded to the autonomy elements as shown in Exhibit S7 in Appendix D.

Scientists and administrators were in virtual agreement on the importance of supervision, freedom from rules and regulations and the control over methodology. Research administrators believed work rules to be more important than scientists while scientists viewed the need for professional judgement to be more important than administrators. In both cases, the differences were not statistically significant. Publication results, however, were believed to be more important as viewed by administrators than by scientists. This may reflect the belief of the previous generation of scientists that the route to peer recognition lay in the publication of research results in journals and other publication forums. The new breed of scientists in industry may feel peer recognition can be found through other forums.

The results from this comparison imply that purchasing would not find either administrators or scientific personnel as easier targets for achieving higher meaningful involvement levels. Neither party viewed the methodology as being of any less importance. Hypothesis 5, which stated that research managers would view meaningful purchasing involvement as a greater threat to autonomy than would scientists, was, therefore, not supported.

In terms of importance of various purchasing tasks, the research administrators and scientists did not differ to a large extent. The results are presented in Exhibit S8 in Appendix D.

As a general summary, both scientists and administrators believed that the most important task areas for purchasing effort related to the buying task and long term issues.

Timeliness and supply issues were secondary. The higher mean values recorded by administrators on all issues was an interesting one but no scale adjustments. A possible explanation for this finding may be a greater degree of "common courtesy" and respect that administrators exhibit.

The data would suggest that if purchasing chooses to increase meaningful involvement in the absence of technical ability and within the context of support from administrators and scientists, then purchasing should focus more on streamlining the actual paperwork and procedures involved in acquiring equipment and assist in pursuing a long term objective of multiple research project equipment utilization. This would necessarily involve greater involvement in the research capital committees and long range planning. Efforts in this area would likely receive favorable support from all parties.

Finally, the two groups were compared on the basis of their perceptions of the confidence they expressed in purchasings' ability to carry out the various tasks. The results are shown in Exhibit S9 in Appendix D.

There was generally low level of confidence expressed by the scientist and the administrator in purchasings' ability to handle anything other than the actual buying task. Both the scientist and the administrator recognized the expertise that purchasing possessed in this area. If purchasing were to become more involved in the acquisition process, both the scientist and administrator expressed confidence, but to a significantly less extent than in the buying expertise, to make a contribution to long term needs, supply related issues and timely involvement. These secondary areas of focus match the areas of importance as expressed in Exhibit S8 in Appendix D.

When confidence and importance rankings are evaluated together, a distinct opportunity exists for purchasing to pursue the long term issues regarding equipment acquisitions.

The Re-Purchase vs. New Purchase of Equipment

Scientists and purchasers were asked whether or not they previously had bought similar equipment. While Pingry's study was based solely on the purchasing re-purchase perspective (i.e. learning through the first purchase leads to greater involved on subsequent purchases), the scientists relative knowledge also may impact on the purchaser's involvement. From the comments from scientists, when equipment fell into the re-purchase category, the level of purchasing meaningful involvement either remained constant or declined.

In one specific example, the purchasing agent was involved early enough on the first acquisition to suggest a supply source that was more reputable. Since the equipment that the purchasing agent suggested met the needs of the scientist, the purchaser's source was chosen. Subsequently, the scientist decided that a second piece of equipment would be necessary. The scientist was so pleased with the purchaser's previous suggested supply source that the scientist carried the acquisition process to the point of specifying the supply source for this new acquisition. The timeliness and degree of purchasing involvement declined considerably. The purchasing agent felt somewhat frustrated since there was insufficient or bargaining power to make a better financial deal on the second purchase.

Furthermore, discussions with scientists would suggest that equipment acquisitions, in many instances, cannot be viewed as isolated experiences. The purchase of measurement equipment often involves as much software as hardware. As the software advances, the capability of the machine itself advances. An analytical lab, in order to maintain its status of state of the art capability, will be forced to upgrade the measurement system's software. Because of the nature of the purchase and the possibility of trade in value, the option and desirability of seeking alternate suppliers is not always a viable option. Earlier involvement of purchasing and assistance with technical specifications for tendering purposes may not be possible nor practical.

As a final test of Pingry's work, the meaningful involvement of purchasing for re-purchases was compared with case examples where purchasing agents within the same company discussed acquisitions that were first buys (i.e the analysis was restricted to companies where the purchasing agent discussed equipment acquisitions that came from both groups). Because of the limited samples available, the Mann-Whitney U test was used and the results displayed in Exhibit 31.

Exhibit 31
New Buy vs. Re-Purchase Involvement Levels

Purchase Type	M.I. Value	Significance
Repurchase	3.31	p=.622 and in the opposite direction from predicted
New Buy	3.70	

Meaningful involvement, as expressed by purchasing agents, increased if the equipment had not been purchased previously. The difference was in the opposite direction to that which would be expected from Pingry's work although it was not statistically significant. **Hypothesis 6, which had stated that meaningful involvement would be higher in the re-purchase decision, was not supported.**

Purchasings' Aspirations

As mentioned in Chapter IV, the research measured the level of purchasing aspiration in an indirect manner. A direct measurement was thought to lead to poor quality and information bias. The aspiration level of purchasing was determined by taking the difference between the confidence that purchasing agents expressed in their ability to carry out certain tasks and the actual level of involvement on these tasks. Purchasing agents in high involvement companies likely would respond with mean of zero (i.e. they were achieving their level of confidence) while low involvement company responses would indicate that frustration existed with high delta values recorded. The results from this test are shown in Exhibit 32 using using the Wilcoxon matched pair signed ranks test.

<u>Exhibit 32</u>
Purchasings' Aspirations
(Confidence in Ability - Actual Level of Involvement)
High vs. Low Involvement Cases

Task	High Involvement Delta	Low Involvement Delta
Needs	0.98 (p=.47)	0.61* (p=.02)
Supply	0.90 (p=.47)	0.95* (p=.02)
Timeliness	1.53* (p=.04)	1.81* (p=.003)
Buying	1.07 (p=.11)	0.49* (p=.09)
Long Term	0.90* (p=.04)	1.35* (p=.01)
Service	1.45* (p=.07)	0.99* (p=.007)
Technical	0.90 (p=.20)	0.89* (p=.02)
Total	1.10* (p=.04)	1.00* (p=.002)

* Statistically Significant

There were more statistically different tasks in the low involvement company deltas (seven) than in the high involvement company deltas (three). However, focusing on the statistical significance in this case may be partly misleading. In some cases, the absolute value of the differences in high involvement companies exceeded the deltas in low involvement companies (needs identification, buying and service). The test statistic used combined with the low sample numbers were partially responsible for the lower number of statistically significant differences. The summary difference score for both groups was statistically significant and the mean value for the delta was greater in high involvement companies. In all cases, the confidence level exceeded the actual involvement levels (i.e the delta value was in the positive direction). The results indicated that not only was purchasing in high involvement companies outperforming their counterparts in low involvement companies, there was every indication that these highly involved purchasing agents felt, to an equal extent as those in low involvement cases, that they could do more. Their future aspirations were equal to purchasing agents in low involvement companies.

Purchasers vs. Purchasing Managers

The responses for purchasers and for purchasing managers were compared to determine whether or not differences existed in confidence in ability and degree of importance for various purchasing tasks. In all cases, the two parties agreed in importance and ability and in the priority ranking within each group. Both parties believed that the buying task, early and timely involvement, supply and long term issues, respectively, were the most important factors for purchasing to address. In the service area, purchasing managers did not feel that purchasers could provide a reasonable measure of warranty and installation service to the customer to the same extent that individual purchasers did, although the difference was not significant. These results were consistent with the initial hypothesis that the two groups would think similarly about the role of purchasing in the research centre. The actual results are presented in Exhibit S10 in Appendix D.

Of particular interest were the low scores recorded for importance and ability to understand the needs of the customer and to interact on a technical level. The low level for technical understanding was consistent with the view that purchasing should be concerned with commercial aspects and that it was not important to understand what the equipment had to do to achieve effective purchasing.

Research Administrators versus Purchasing Managers

A final test of comparative groups was performed on the responses from research administrators and purchasing managers. Once again, the results indicated a possible scaling effect since research managers consistently rated ability and importance lower than purchasing managers. The data were adjusted for this possible scale effect by reducing the purchasing scores by an amount equivalent to the total scale mean. The unadjusted and adjusted values are shown in Exhibit S11 in Appendix D.

Unadjusted, the differences between research administrators and purchasing managers on the importance of supply, timeliness service and technical issues were all statistically significant. For confidence in ability, needs understanding, supply, service and technical issues were all significant. When adjusted for the difference in scale means, no differences were statistically significant but the importance of timely involvement (purchasing managers greater than research managers) and the importance and confidence in the ability to perform the buying task (research managers greater than purchasing managers) were approaching statistical significance. The latter result was of particular interest since it could indicate that the research managers understood and respected the purchasing group as a professional entity more capable than themselves in a narrowly defined buying task area. The absolute values for both the confidence in ability and importance for this buying element were quite high and were statisticall different from all other task areas.

Interestingly, research managers apparently viewed efforts by purchasing in the area of ensuring appropriate coverage of long term issues, such as multiple project utilization and equipment standardization, as important areas for further effort. Purchasing managers, in contrast, looked to early and timely involvement as being fruitful areas of concentration followed by supply and long term issues. Their confidence in the purchasers' ability to achieve anything in this area was similarly distributed.

Summary of Results

This chapter has presented a good deal of information that is difficult to absorb in any simple manner. It is useful, therefore, to summarize the key points from the analysis, incorporating both the field discussions with the various tests of statistical significance.

Scientists' Views Of Equipment Acquisitions

Many of the scientists interviewed expressed the feeling that the purchase of research equipment, normally to measure research results, was a fundamental and integral part of a scientist's job. The decision of what to buy virtually defined from whom to buy it. The decision was largely based on technical evaluations, subject to a perception of budgetary constraints, and required a high level of judgement and knowledge of the theoretical basis for the equipment.

Scientists questioned whether it would be of any value to have purchasing personnel who were capable of understanding the equipment to the extent necessary to make the correct purchase decision. The scientists readily admitted that if the technical expertise existed, they would relinquish control over the decision. The difference expressed in high involvement companies on the importance of equipment control confirms this statement. In fact, the data suggests that scientists are more amenable to reducing their influence on equipment acquisitions than are engineers. This would indicate a more willing environment for purchasing efforts to become meaningfully involved. But scientists questioned the merits of having such technical expertise in a purchasing position as opposed to utilizing such skill in the research lab.

Therefore, scientists, in general, preferred purchasing to concentrate on those areas where high levels of technical expertise were not necessary, such as attempts to standardize equipment or to merge budget amounts across several requests to get better (but less numerous) pieces of equipment. Furthermore, where the scientist had bought similar equipment before or where the equipment represented an upgrade to an existing piece of equipment, scientists were less willing to permit meaningful purchasing role in the early stages of the acquisition process.

Scientists were in general agreement with the scientific administrators on the importance of purchasing activities and most elements of professional autonomy. In particular, administrators believed purchasing could help in the longer term issues such as multiple project utilization of equipment and standardization of lab equipment.

Benefits From Meaningful Involvement

The data indicated that the benefits from high levels of meaningful involvement exist. As involvement levels rose, so too did the scores for time savings, supplier input and functional equipment. As broad measures of satisfaction, these results are encouraging. Perception may be reality. Direct measurable benefits from high involvement levels in time savings, supplier input and functional equipment were not found. For one, the time that a scientist spent on the equipment purchase was quite low. However, as long as the positive perception exists, higher involvement levels may be a worthwhile effort, particularly when client satisfaction is the primary objective. The results would suggest that many benefits were subtle and could not be measured in concrete ways. A client satisfaction survey may be the most reliable method of measuring such benefits. If in parallel, direct financial benefits such as those that will be presented in Chapter VII, could be documented, all the better.

Finally, when the information gathered was divided between companies that exhibited high and low meaningful involvement levels, differences surfaced in terms of both scientist and purchasing views of the important areas of purchasing's focus and the confidence in purchasing's ability to contribute in these areas. One could characterize the responses from high involvement companies as expressing a level of **balance** in all stages of the acquisition process. Both the scientist and the purchaser recognized the strength of the purchasing resource beyond a narrowly defined area of the buying task. The balance was noted in both confidence in ability and task importance scores. Further, balance was expressed from both the purchasers and the scientists.

Finally, meaningful involvement was strongly associated with scientist confidence in purchasing's technical ability. A reasonable surrogate for technical ability was the formal education score developed previously. However, the case analysis for Avco-Everett, which will be presented in Chapter VII, suggests that technical deficiency can be overcome under circumstances of high economic necessity.

Purchasers

The interviews with purchasing personnel indicated an occasional feeling of controlled frustration that information did not come to them at an earlier date. Too often, purchasing was informed at the last minute, after most of the critical decisions had been made, and received a purchase order that sometimes was incomplete or not in accordance with company payment guidelines or best shipping practices. When attempts to rectify these problems were made, purchasing was viewed as a somewhat obstructionist service department. Surprisingly, the solution to many of these problems appears relatively easy. Almost without exception, advance information of purchasing intentions was available by contacting research administrators, examining the capital submission requests from the various research departments and acting upon it.

It was not surprising, therefore, to find that purchasing agents viewed timely involvement to be more important than did scientists (significant in ranking, nearly significant in absolute terms).

Of interest was purchasing's view that long term and service related issues were important and that confidence in their ability to play a role in these stages was relatively high. Several companies were experimenting with the concept of purchasing involvement in "cradle to grave" control of the assets. Sometimes this was a result of a continuing depreciation charge against the research department until the asset was removed from active service. Whatever the reason, it is possible that the first step in achieving higher levels of meaningful purchasing involvement may be through action at the post-purchase stages by monitoring the installation, operation and continued service of the equipment. This effort might be extended to longer term issues with higher levels of support from scientists and administrators. Some, if not many, future equipment purchases may require upgrading of current equipment through software improvements. Providing service for existing equipment would provide purchasers with advance notice of intention to effect such upgrades in the future.

Purchasers generally agreed with their managers about confidence in ability and importance of various aspects of the acquisition process. Purchasing agents did exhibit higher confidence in their ability to assist with longer term and service related issues than did their managers. Perhaps purchasers' continued exposure to the scientific environment through individual purchase requests caused them to view these service aspects as more important. Purchasers did indicate that they viewed the buying task as more important than timeliness (purchasing managers were unable to make this distinction to a significant extent) and that long term issues were also very important. Since the purchasing manager has an influence on directional efforts, it might be wise for the two parties to recognize a common area of focus. Purchasing managers expected results in terms of supply competition and early involvement (while at the same time expressing low levels of confidence in purchasing's ability to achieve such results) while purchasers believed that the solution lay in the post decision making stages, including a focus on the long term. This difference in views represents a potential conflict in objectives.

Finally, all purchasers indicated that they had greater confidence in their ability to perform the meaningful involvement tasks than they were actually achieving. As a measure of aspiration, these results indicated that both high and low involvement purchasers aspired to do more in the future. The summary scores for the differences between confidence in ability and actual involvement were statistically significant regardless of whether the results came from high or low involvement cases.

Research Managers and Purchasing Managers

These two management groups tended to agree on many issues. However, purchasing managers viewed timely involvement and supply sources as key areas for focus while research managers tended to believe that focusing on longer term issues and service components might be equally, if not more, important areas for greater efforts. In this regard, research managers, researchers and purchasers all tended to agree that focusing on the buying task and the subsequent stages with an added emphasis on longer term issues is an area where purchasing should focus and build strength. The purchasing manager appeared to be somewhat out of phase with these views.

Re Purchase vs. New Purchase

Finally, a re-purchase of equipment was associated with lower levels of meaningful involvement as perceived by purchasers. This was contrary to previous purchasing research but was consistent with the scientists' opinions that individual equipment purchases may depend on current satisfaction with existing equipment and computer software integration.

CHAPTER VII

THE CASES OF HIGH PURCHASING INVOLVEMENT

Introduction

This section of the research reports on the non-typical examples of purchasing groups that were investigated during Phase II of the research. The examples for investigation were selected based on the observational score assigned during Phase I of the research.

High involvement cases are divided into three distinct classifications. The first section involves companies and purchasers who consistently practiced meaningful involvement in the equipment acquisition process. The second section contains instances where purchasing per se may have been illustrative of low involvement levels but where some boundary spanning role was played by a third group such as engineering procurement. When combined with the purchasing group activities, these activities amounted to high purchasing involvement. The third section represents aberrations from normal purchasing practices within a specified firm. These represent isolated instances of high involvement levels that were not representative of the typical purchasing involvement levels. Perhaps, such instances represent the initial phases of a more meaningful involvement by the purchasing group as whole in the equipment acquisition process.

As an assistance in understanding the case description purpose, Exhibit 33 indicates the key elements that the following case descriptions will cover.

Exhibit 33
Key Points Of Interest In The Case Studies

Company	Key Issues
C-I-L	-Technical ability of purchasing -Involvement levels vary by situation -Scientist as frame of reference -Confidence to use used equipment -Anticipation of long term needs -Financial benefits
Avco	-Technical ability offset by economic necessity -Knowledge vested in the individual -Active information seeking behaviour
Cognos	-Work required to maintain technical ability -Long term view of equipment acquisitions -Financial benefits
IBM	-Not equipment related -Boundary spanning technique -Supplier development -Team concept explicit
Polysar	-Boundary spanning technique -Purchasing hindered by physical barrier
CAE	-Financial benefits -Supplier development -Purchasing persistence
Dow	-Evolving relationship

Highly Involved Purchasers

C-I-L Chemicals Corporate Research Laboratory

The C-I-L Chemicals Research Laboratory was located within the Sheridan Park Research Community, west of Toronto, Ontario, employed approximately seventy people and spent roughly $200k-$300k per year on capital and another $500k per year on other purchases. The balance of the research centre's annual budget of $7 million primarily went to professional and support salaries and benefits.

The corporate research lab carried out work in applied and basic research. C-I-L also had research labs close to the various manufacturing facilities which filled technical assistance and quality assurance functions. Numerous patent awards in the front entrance attested to C-I-L's solid reputation in chemical research.

The purchasing manager and supervisor of laboratory services (including pilot plant operations) was Mr. Geoff Dunlop, a university science graduate in biology. Geoff Dunlop had worked for 6 years with C-I-L's parent firm in the sewage treatment facility, including the commissioning of plants and pilot facilities. He transferred to the Sheridan Park facility in December 1980 to take a position as a researcher in the laboratory.

The recession of 1981 took its toll on the company and the research effort at Sheridan Park. Geoff was offered, in lieu of active research, the position as purchasing manager and supervisor of laboratory services which included the daily operation of the pilot facility. Purchasing had previously been the responsibility of the senior research scientist.

Mr. Dunlop commented that when he first took the position, it was common to have a repair part arrive before the purchase order form had even arrived at his desk. There were still the occasional slips but his credibility as a scientist has meant a far different role for purchasing these days. It was not uncommon now to have the scientist come to Geoff and explain the scientist's needs in a functional sense. It then became Mr. Dunlop's responsibility to satisfy those requirements.

Geoff also commented that there were a lot of very skilled technical people selling equipment these days. In his words:

> "There were a lot of chemists that lost their jobs during the recession of 1982. A lot of them are in marketing positions now, selling their products."

According to Geoff, sales personnels' ability to talk on a technical level with scientists represented a distinct disadvantage for any purchaser who could not do the same.

Mr. Dunlop made extensive use of the supplier information network in the Sheridan Park research park and within the C-I-L research community. One critical source of equipment supply was the C-I-L used/surplus equipment list. Often the description of the equipment was dissimilar to what the scientist may have requested but was functionally the same.

Geoff Dunlop's technical ability and previous experience was instrumental in gaining credibility with the scientists. This helped him to achieve involvement at the formative stages of the acquisition process. He was also responsible for laboratory services encompassing installation of equipment, operation and maintenance of the pilot plant. His involvement was, therefore, in all stages of the process. During the course of the field interviews, Mr. Dunlop discussed his participation on two individual acquisition experiences. A third case example, described from the perspective of the scientist, is also presented.

The New Greenhouse
(Observational Score=6, Scientist Score=4.86)

One example of a need satisfied involved the requirement for an atmospheric control chamber. The C-I-L surplus equipment list had indicated the availability of a used humidity control device. Geoff Dunlop discussed the availability of this equipment with a senior scientist in the lab, Neil Gray. For some time, Neil had been thinking of acquiring a "growth chamber" for future experiments. The anticipated cost of $60k-$70k had meant that this item was a of low priority. Neil was most enthusiastic regarding the potential equipment addition well in advance of his expectations and requirements.

The used humidity control device was acquired. The device was modified to suit the needs of the centre and $4000 was spent to enclose the control unit within a greenhouse-like chamber. With refurbishment and modification, the used equipment satisfied the scientist's need, a need that had not been formally recognized through any request for budget funds. The direct financial benefit was in the order of $60,000.

A Microwave Generator

One another occasion, Mr. Dunlop brought his pilot plant expertise to bear on a scientist's request for a microwave generator. On this occasion, the operating conditions for the microwave generator were very close to the upper limit of the original specified equipment. Geoff suggested that equipment be bought that would put the operating conditions towards the mid point of the tolerance range. He also knew of a used microwave generator that was available. The used one had three times the capacity of the original planned purchase. The scientist agreed and, in the end, it proved to be a wise decision for long term life of the equipment. The original planned purchase would have resulted in numerous failures during the course of the experiments. The used equipment was of superior technical quality and was obtained for a direct financial benefit of $5000 (10% of original estimated cost).

The Fermenter

Geoff was not always involved in the need identification stage. Mr. Gray discussed Mr. Dunlop's role in the acquisition of a fermenter. Two known companies were separately invited to come to the research lab to discuss the centre's needs and the potential training requirements should C-I-L purchase a fermenter. This preliminary discussion involved only Neil Gray and the biologists who worked for Neil. Neil described it as a "technical session." At the conclusion of the technical session, the suppliers were asked to submit formal quotes for the research centre to evaluate.

Second meetings were held with each company. At this second session, Neil, five microbiologists and Geoff Dunlop discussed with the supplier representatives various aspects of the formal quotes. Geoff was able to discuss the commercial aspects of the proposals and participated with the microbiologists when technical issues were discussed. Over the course of the next month, Geoff negotiated with the potential suppliers over such issues as technical changes and price.

Analysis and Discussion

The C-I-L cases illustrate some interesting points. There was no doubt in either Geoff's or Neil's mind that Geoff's technical ability was of great assistance in developing a relationship with the scientists in the lab. It is questionable, for example, whether or not a purchasing agent trained in commercial aspects of the buy process would be capable of recognizing the link between the humidity control device and the atmospheric chamber. Anticipating the research centre's ultimate requirement for such a device likely would be beyond expectations.

Second, depending on the situation and Geoff Dunlop's relative expertise and technical ability, Geoff's involvement levels differed. His involvement ranged from stimulating the need for equipment to supplier evaluation and early involvement that ensured all commercial aspects of the purchase were covered. Geoff classified purchases into three categories. When the potential existed for multiple project utilization and/or the investment was of a long term nature, Geoff would occasionally get involved at the need identification and definition stages. When the equipment related to operation within the pilot plant and with issues surrounding standardization, installation and after sales service, Geoff would always be involved from the beginning. However, Geoff would rarely do anything other than satisfy a purchase order request if the item was, in Mr. Gray's words, "compatible with existing systems and we have no desire or interest to change the system".

The lab was apparently too small to extensively move towards equipment standardization and multiple research project usage.

However, this was the only research lab found during the field research where used equipment was routinely evaluated to see if the scientist's needs could be satisfied.

Finally, in all the discussions with Geoff, the unit of his reference was the requesting scientist on a first name basis. It was clearly evident that a strong yet informal relationship had developed between Geoff and the scientists in the lab.

Avco Research Laboratories

Avco is a for-profit contract research company located in the North-Eastern United States. The research centre employs approximately 400 people. The centre is now part of Textron Inc. and specializes in aerospace and defence research.

The purchasing department was strategically located immediately at the top of the first flight of stairs and across from the company cafeteria. With a single controlled access to the centre, one could not enter or leave the building nor have lunch without passing the purchasing offices.

While the previous purchasing manager did not have a technical degree or background, the current purchasing manager, John Wild, possessed a Bachelor's degree in Engineering. The previous purchasing manager had indicated that his lack of formal technical education had not limited his role in any way. Mr. Wild commented.

> "That doesn't mean that knowledge isn't gained during the job. On the contrary. But the knowledge I bring to the picture is specifically vendor quality and reputation and the cost of the work to be farmed out."

The firm had a team approach to contract submission and successful completion of the project. John believed that each team memmber had certain strengths and weaknesses and there was reliance on each other at various stages to do what is required.

Equipment and service purchases at Avco fell into two distinct categories: equipment for general lab purposes and equipment and services required to meet the requirements for government research contracts.

The government research contract process involved developing a very complete package of proposed work, cost estimates and delivery dates. The research firm's continued existence, profitability, and success in contract bidding depended on the accuracy of the bid to government. Any requirements to purchase outside equipment or services had to be well thought out and estimated.

The contract bid process normally would begin with some announcement in a government publication that a contract would be tendered to satisfy some need. Mr. Wild indicated that once publicized in this manner, the process was probably too far along for a bidder to be successful. The most successful approach was to anticipate a future government or industry requirement and to be involved in the selling or marketing of the idea or concept in the formative stages.

If Avco decided to enter a bid on a government contract, an "E" number was required from accounting. A copy of the E number and the contract proposal description was automatically sent to purchasing. Information and contact was, therefore, early in the process. John purposely augmented this information flow by informal means.

> "At least once a day, I walk down the halls to see what the engineers are working on and how the bid packages are coming along."

Once purchasing received the E number description, John took the initiative to communicate with the program manager responsible for the bid. Thus, purchasing would become aware of any buying requirements at an early stage. Purchasing would then seek proposals from suppliers that would be included in the contract bid package to the government. The common goal of all was to win the government contract.

The second category of purchase (and from a spending point of view, of less significance at approximately $250,000 U.S. per year) arose through the use of surplus funds remaining at the end of the year to improve the laboratory's facilities and measurement capability. An Avco Facilities Committee would meet twice a year or on special notice to decide upon specific requests for equipment. These pieces of equipment were related to a desire to improve the research centre's basic capability. The process followed for such equipment was similar to the process followed for equipment acquisitions at other research centres investigated.

The need for such equipment and, to some extent, the supply source, was largely determined by the scientist. If approved by the Facilities Committee, of which Mr. Wild was a member, purchasing would meet with the scientist to find possible alternate supply sources and to arrange for the bidding process. The timing of purchasing involvement was considerably later in the acquisition process than for contract bidding but the requests were never a surprise. Both th notice of an upcoming Facilities Committee meeting and John's informal information gathering process provided such advance notice.

The process was very informal, very effective and probably an idea] balanced relationship depending on the economic necessity of the purchase. An example of a government bid process, a laser paint stripping device and an example of a purchase request through the Facilities Committee process, a laser spectrometer, were discussed during the field visit and are described below.

The Laser Paint Stripper
(Observational Score=5, Scientist Score=2.65)

The need for this device became apparent when one brand of commercial aircraft experienced stress-induced metal fatigue in some fuselage welds. Avco researchers saw that government and industry would require a quick method of stripping paint to examine the welds. The marketing group and the engineers met to discuss whether Avco's expertise in laser technology could result in successful development of such a device. Avco had been marketing a similar idea for four years with the Transport Ministry. There was a natural link for trying to win the project.

John knew that Avco also would require some outside help, particularly with the robotics. The engineer was prodded by purchasing into producing a 15 page document that later became the basis of the government bid.

Henry Aldag, a research contract project co-ordinator with a master's degree in physics, added some further insights into the process.

"The bid process requires a lot of guesswork and

> experience. To make the bottom line come out right, we must be within 10% of the actual cost. Even before opening an E number, a lot of work goes on. The lead scientist will form a working group to decide if and how we could do it. Then we have to figure out whether we will at least breakeven or make a profit. Purchasing is not always involved in this stage."

Henry added that once the E number was opened, the scientist would make a list of all equipment and services, along with potential suppliers, that would be required. Purchasing involvement at this stage was considered mandatory and useful. Purchasing was free to add vendors where possible. Mr. Aldag stated that in "90% of the cases, the knowledge that I have is critical".

In most cases, the bid is not won or lost on the first round. The company will be notified that they are one of the finalists. At this point, some reexamination of material costs usually occurs. In some cases, estimating the cost of a new research prototype is extremely difficult. The government may indicate areas where the cost estimate seems out of line or poorly estimated. At this time, purchasing and the scientists will get together to rectify these areas of "fuzziness".

Henry indicated that purchasing expertise lies in the areas of vendor quality and expert machine shops. But the expertise lies in the person not the position. Henry commented:

> "Gene Provenzano in purchasing is brilliant with the knowledge of machine shops in the area. He used to be

> a machinist before so he has considerable knowledge and a real understanding of his job. If he were to leave, well ..."

Laser Spectroscopy
(Observational Score=3, Scientist Score=2.50)

An example of an equipment acquisition that required the approval of the Facilities Committee was discussed with Dave Stickler. Dr. Stickler, a research scientist, has been working with Avco for approximately 15 years. He recognized that the laboratory lacked the measurement equipment necessary to examine the physical structure of materials when interacting with fluids in dynamic conditions. In October, 1988, it appeared that funds might be available from the Facilities Committee to purchase such an instrument.

Dr. Stickler began a process of soliciting internal support and potential use for such equipment. He also used his information from the literature to identify potential supply sources and gathered rough estimates of installed costs and operating requirements. This process of internal selling and external information gathering required eight person days. By December 1988, Dave had gathered enough information that formal quotations were required. He approached purchasing and provided Mr. Wild with supplier names and the necessary technical information to solicit bids. Unfortunately, a combination of an economic downturn and the requirement for a dedicated equipment operator (i.e. added overhead) resulted in the request being denied in January, 1989.

Dr. Stickler commented that a combination of how things were done for government contracts (i.e. competitive bidding and government auditing procedures) and the ability of purchasing to understand what his needs were implied a desire to involve purchasing at a reasonably early time period. For most purchases to build the research labs capability, purchasing was involved later in the process, mainly due to the technical specifics of the measurement equipment. Even so "early involvement of purchasing makes the whole process a little easier".

Analysis

There are some interesting observations to be made from the Avco-Everett examples. First, the bid project example was the one of two cases where the observed meaningful involvement score exceeded the scientist score to a measurable degree (89%). The scientist did not see the process in the same manner as this researcher did.

Second, the strategic location of purchasing, the formal information E number system and John Wild's informal and proactive information gathering process combined to permit purchasing to have early, timely information to assist in the development of a bidding package. Information is unlikely to come to those that wait for its arrival.

Third, the economic necessity of being within 10% of actual costs in order to be successful in for-profit research undoubtedly had a bearing on purchasing involvement. Some evidence is provided to suggest that technical skill may not be an absolute necessity under these conditions. The relationship of purchasing in the contract bidding was similar in the past under the previous purchasing manager's tenure, a manager who did not possess the same level of formal technical ability.

Fourth, despite John Wild's insistence that the processes did not differ, equipment requests through the Facilities Committee were considered as cases where purchasing involvement levels was lower. Even so, purchasing had decision authority on the Facilities Committee and was involved in assisting with supplier selection.

Fifth, Henry Aldag's comments regarding the expertise and knowledge of Gene Provenzano provides further evidence that knowledge based authority is vested in the individual and not the position. Purchasing involvement may vary with a change of personnel.

Finally, mutual trust, co-operation and a team approach to achieving common objectives were indicated in all discussions.

Cognos Incorporated

Cognos is an advanced computer software company in Ottawa, Canada. Incorporated in 1968, the company had grown significantly during the last five years. In 1982, revenues totaled less than $8 million with R&D costs at $720K. By 1989, revenues were anticipated to exceed $100 million. In 1987-88, Cognos spent approximately $12 million in R&D and probably will spend more than $15 million in 1988-89. Capital purchases (mainly computer equipment) totaled approximately $3 million in 1987-88 and will likely reach $5 million in 1988-89. As a percentage of R&D expenditures, this total was one of the highest of the firms visited.

The Company's recent success was evident. Powerhouse, their base product, had been sold to over 120 of the Fortune 500 companies. Awards of merit from the Ottawa area Chamber of Commerce and the 1986 Export Product Award from the Government of Canada were prominently displayed on the walls of the interview room.

Mr. Rob Ashe, corporate controller, when discussing the company's rapid growth, indicated that the administrative controls and procedures generally lagged behind the sales growth. While there was no person who officially could be called a purchasing agent (in the sense of cheque signing authority and purchase order forms control), all purchases of equipment had to be approved by the Pricing group. All quotations that became part of the budget development process were also handled by this group. The Pricing group was headed by Mr. Stan Chan. An organization chart is presented in Exhibit 34 to assist in understanding Cognos' structure.

<u>Exhibit 34</u>

Cognos Organizational Chart

Board

Chief Executive Officer

President

V.P. Research	V.P. Develop.	V.P. Marketing	V.P. Fin.&Admin.	V.P. Support	V.P. Regions

Pricing   Controller

P.C.   DEC   Computer   Network   Tech. Services   Purchasing

Stan Chan was a graduate in computer science with honours in statistics. In describing his role in the purchase process, Stan used phrases such as "tell me functionally what you need and I'll fill in the blanks" or "it's a team concept here. We work together to meet the required needs". Stan indicated that he spends at least 12 hours a day on the job, almost half of the time keeping abreast of the current technology. He regularly attended equipment supply conferences and spent a great deal of time informally communicating with those active in the R&D activities. Most important, according to Mr. Chan, was his active seeking of information.

> "If I'm not up to date on the technology and information, I'm not doing my job".

The Pricing Group's role in determining the capital budget for the following year provides a unique perspective on purchasing involvement. All future equipment requests were required to be priced by this group. The price forecast provided would be used in developing the capital budget for the following year. As a result, Stan became aware of a scientist's needs at the need formulation stage.

On a general note related to determination of the planned budget for next year, Stan took the Development group's needs for ten work stations, assessed it in terms of future requirements and decided that twenty work stations were necessary. Stan was able to negotiate a better volume discount by looking at the Development group's longer term requirements.

Computer Work Stations
(Observational Score=6, Scientist Score=4.05)

Brian Andrew and Brett Barlow, members of the development team for a new company software product, discussed the role of the pricing group and Stan Chan with respect to one equipment acquisition. The specifications for a computer workstation were defined by the scientist in support of a product line. This need had been identified in April, 1988 in order to provide an adequate level of customer service and support for the new software product. The request was built into the capital budget in May, 1988 using a price estimate from Mr. Chan. When the time to purchase arrived, the scientist approached Stan to request his assistance. Stan made some phone calls and investigations and determined that the requested piece of equipment would not serve the future goals of the company. In Stan's words:

> "It was old technology. The company (Cognos) was moving to a new standard in the future. The unit I suggested was a better one in terms of meeting our future objectives. We are here, after all, to know what equipment is needed now and for the future".

The supplier was changed at a reduced cost ($25,000 versus $35,000). The balance of funds was used to provide the requesting researchers with a laser printer, an unforseen benefit from Stan's input. Brett and Brian commented that they could have phoned the suppliers themselves to get the price quotes and to order the equipment.

> "However, we chose to give the request to someone (Stan) who knew what we needed and what the firm would require in the future. The Pricing group has the technical

> expertise, the solid knowledge base and a better understanding and recognition of corporate standards that permits such equipment decisions to be made."

Analysis

Like C-I-L, the Cognos example illustrates the benefits from technical expertise in a purchasing role. The comments regarding what is required of Stan Chan to maintain his expertise are also revealing. The industry may be unusual in terms of its speed of technical progress. It does, however, illustrate the work involved if the purchaser is to maintain technical expertise at the same time as fulfilling an administrative role.

Cognos was, perhaps, the clearest example found of a purchaser taking a long term perspective to the research centre's needs. This long term perspective was an important aspect of the meaningful involvement concept and definition. Further, all parties concerned stressed the team approach to satisfying needs and the recognition of who could contribute to the decision in the best manner possible.

The case also provides an example where the scientists received superior equipment for a direct financial benefit of $10,000. However, instead of the financial benefits flowing to the bottom line, they were used to augment the capability of the scientists' work with a new printer.

Boundary Spanning Approaches

Not all the firms with high levels of purchasing involvement used the individual as the source of expertise. The following cases illustrate the role of a boundary spanning technique, affirmation of Strauss's (1962) observations regarding the use of "ambassadors". Such boundary spanning approaches appeared to be an approach that larger research centres found useful.

IBM Canada Laboratory

In contrast to the size of C-I-L and Cognos, IBM Canada was one of Canada's largest research spenders. The annual budget of approximately $138 Million was largely spent in one Toronto facility. The research centre employed over 1200 people. The focus of IBM research in Canada had shifted in recent years away from hardware development and more towards software development.

Very little equipment was bought at IBM to begin with. Further, what was bought was almost exclusively IBM manufactured and followed a very simple purchase procedure since it was an internal company requisition. After a lengthy discussion regarding equipment acquisitions at IBM and the relative merits of discussing the acquisition of competitor equipment, an area of potential interest surfaced. The focus of the discussion eventually centered on the purchase of contract software development services to be performed by other firms. Because of the relation between the IBM scientist's needs, purchasing and the technical expertise of the contracted firm, the same issues regarding professional autonomy and technical expertise were considered to prevail.

The concept of contract software development arose from the natural evolution and specialization of IBM plants around the world combined with IBM's human resource policies. When the Toronto plant gained primary responsibility for a product, the product group also gained responsibility for product support and future development. This resulted in requirements for new developments to enhance the product.

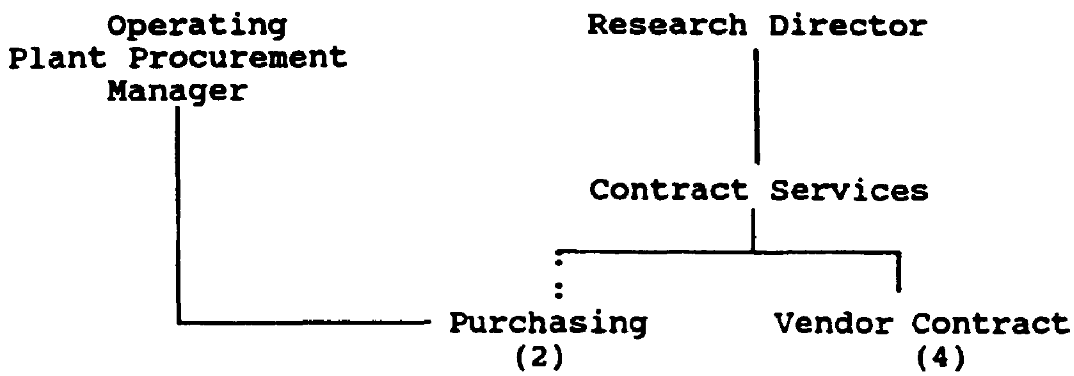
IBM's philosophy in terms of maintaining a stable work force level meant that when requirements grew, excess work demand was handled through the contracting out of some work (referred to internally as vendoring). This philosophy also applied to development work. The group responsible for negotiation and development of terms for the deliverables between the IBM scientist and the development firm was Contract Services.

Various perspectives were gathered on the group's evolution. Paul Cule, currently Manager of Strategy at the IBM research lab, assisted with an understanding of the group's origin. The research lab at San Jose, California was the first to extend the philosophy of smoothing the work load into the more sensitive area of R&D. The Toronto Contract Services group began when IBM Canada received the primary responsibility for the SPD software language in 1984. IBM brought in an experienced contract manager on an assignment basis. One of those working under this contract manager was Bill Small who remained in Toronto and centralized the group's activities. Bill was now the Manager of Contract Services.

Mr. Small commented that vendoring is now the fastest growing component of IBM's business operations. As a result, recent years had seen a large growth in contract services for development of new software products.

The Contract Services group consisted of six people. Two people were purchasing personnel seconded from the local manufacturing plant. They reported directly to both the Manager of Contract Services and the Procurement Manager at the manufacturing facility. They were members of the procurement group, not staff members of the Contract Services. Their role was to ensure that the purchase requests were in order and that appropriate signing authority was obtained. The organizational structure is illustrated in Exhibit 35.

Exhibit 35
Organizational Structure of IBM Contract Services



The other four personnel worked directly under the Manager of Contract Services. Their backgrounds were a combination of development work in the research centre, software programming, project management and some contract exposure.

These administrators viewed their technical proficiency as critical to understanding the scientist's needs and the nature and purpose of the contract under negotiation. Of the various people contacted during the visit, none believed that a "Bay Street" lawyer (a reference to a traditional law firm employee) would be capable of performing the task. The key element in successful contracting centred on a very good understanding of the scientist's needs. One vendor contractor commented that "the 'Bay Street' lawyer would just not be able to understand what we are trying to do." Apparently, the members of the group simply found this kind of work interesting and wished to be part of Contract Services.

The Database Study
(Observational Score=5, Scientist Score=3.81)

Jack Dawson was responsible for SQL/DS Planning at the IBM Canada laboratory. He discussed the relationship that had developed between himself and Kingsley Welton, one of the contract service administrators, during the course of the database study.

When IBM Canada had acquired primary responsibility for the SDL product line in 1984, Mr. Dawson had decided that the research laboratory required an understanding of the database market place. For three years, the idea remained on the back burner. Higher priority was given to building up development skills related to the product, learning the technology and selling the product itself. By the time of the Fall, 1987 budget plan, however, Jack sought for and received approval to spend $100,000 in both 1988 and 1989 towards a database study.

Mr. Dawson spent a couple of days during the first half of 1988 in developing an initial step. He wanted to hire a consultant to perform approximately $10,000 worth of scoping work leading to the full scale study. In one sense, Mr. Dawson wanted a consultant to help him define what his needs were. In July, 1988, Jack approached Contract Services to arrange for supplier bidding towards the awarding of the contract.

The results of the first scoping contract led to a narrowing of questions of interest for the next phase and provided the basis for the development of the full contract specifications. On this second occasion, Contract Services made recommendations regarding potential suppliers for the bid and assisted with the evaluation of the bids. Their recommended supplier was considered better and less expensive than Jack's original choice.

Mr. Dawson had just recently entered the third phase of the process.

> "The results from the last study have indicated that there is a supplier with whom we would like to build a relationship. I told Kingsley that I'd like to hire this firm to do some development work and he almost fainted. IBM does not want to appear as biased in the awarding of contracts. Then Kingsley suggested an alternative approach that would satisfy IBM's procurement policies and my needs at the same time."

Jack commented that five years ago, he would have had to do all this work himself. Now:

> "Kingsley will do a better job and a faster one than I can do. He has contract expertise, knows law, and has a knowledge base that is helpful. Another person would not know the terminology of software. Kingsley understands the software development environment and what we are trying to do. I suppose, when I examine it, it isn't Kingsley himself that is important. It is the knowledge that Kingsley has."

Kingsley Welton, contract administrator in Contract Services, added his own thoughts on his role.

> "I don't negotiate the contract pricing. That is the responsibility of the procurement members of the team. I manage the interface between the vendor and the development group. My job is also to deal with any problems that occur during the course of the contract. I assist and help the development group achieve its objective. I also help them find a vendor. To do all of this, it is absolutely essential that I understand the development group's requirements. I could not do it if I hadn't been a software developer in the past."

Mr. Welton added that the area that requires further work in the relationship between Contract Services and the developer is a better identification and clarification of needs.

> "More time spent on reviewing statements of work with the development group prior to talking to vendors would sole a lot of problems."

Analysis

The role of the Contract Services group was evolving and growing. The group itself was only four years in existence. The group had evolved from an emphasis on contract negotiation to knowledge of supply possibilities and recently to one of supplier development, one of two such occurrences recorded in the research. Meaningful involvement may, in fact, be a precursor to supplier development.

Second, the IBM example is an extension beyond the narrowly defined original equipment focus of this research. The concepts of professional autonomy and technical expertise were felt to be equally applicable in the choice for contract development as they were for equipment acquisitions in the other research centres.

Once again, high relevant technical ability was observed in the purchasing group. The contract administrators all had software development backgrounds and expertise. All parties felt that such technical ability was important to understand the client's needs. The two purchasing agents appeared to consider themselves as integral members of the team.

Particularly interesting was Kingsley Welton reference to the collective "we". Kingsley understood and identified with the scientist's objectives. The frequent mention of team work and support for the objectives of the customer (i.e. the scientist) suggested that the boundary spanning approach of IBM had successfully bridged the formal role definitions and task specializations.

Polysar-Sarnia

The Polysar facility in Sarnia was large and included production facilities in rubber, plastics and diversified products. Purchasing was handled centrally including purchasing for the R&D group. Approximately 320 people were dedicated to Polysar R&D in the Sarnia area, with operating expenses at $30-$35 million and $5-$7 million in capital spending.

For small purchases, the process was of the typical variety discussed in Chapter V. The researcher would determine his/her requirements, evaluate and select the supplier and pass the request on to the appropriate purchasing contact. Purchasing was physically situated on the other side of Vidal Street, an imposing 6 lane artery through Sarnia's Chemical Valley.

For all purchase requests, a research projects co-ordinator was available, on request, to help. If the purchase cost exceeded $1,000 and was capital (not expense), the research project co-ordinator involvement became mandatory. The occupant of the position was Mr. Herman Meixner.

Herman came to the research group on a permanent basis after being involved on a loan basis from the Polysar project engineering group to assist on several research pilot plant projects. The Central Engineering group viewed R&D as a low priority area. As a result, the small and ad-hoc requests from R&D suffered. Mr. Meixner was asked to be a dedicated engineering contact for two specific jobs in 1985. With the successful completion of these initial projects, the R&D centre asked him to join them on a permanent basis. From an initial start on those two jobs, Herman now becomes involved in 65 jobs, on average, in any one year.

Mr. Meixner, in discussing his role, perceived it from a purchasing and operational perspective. Since he had a central perspective in a vast number of purchases, he was familiar with the commercial terms on which purchasing focused. Herman would check any purchase request to ensure that such issues as duty, transport, performance guarantees, installation, justifications and quotations were in order.

From an operational perspective, it was Mr. Meixner's role to ensure the inclusion and co-ordination of the electrical, ventilation, piping and other peripheral requirements for the purchase. These items had to be included and budgeted for so that funds were available upon receipt of the equipment. Herman was responsible for ensuring that equipment became operational, a full involvement in the post-delivery stage of the acquisition process.

Mr. Meixner did not pass judgement on the supplier selection process, although he would, occasionally, assist in supplier evaluation and selection. His role in this area was considered a passive one. Herman was primarily concerned with ensuring that the scientist's decision was properly justified and documented to speed up the approval process. His involvement normally did not extend beyond the immediate request from the scientist into the longer term strategic issues of multiple project utilization or equipment standardization. R&D purchases tended to be one of a kind. Mr. Meixner stated that at Polysar, 40-50% of the capital spending could not be forecasted one year out. Flexibility was provided through the use of blanket AFEs (Appropriation For Expenditures).

Mr. Howard Whitton, a purchasing agent for Polysar, termed Herman as his main information source within the Research group. Before Mr. Meixner's arrival, Howard admitted that there were lots of complaints about purchasing's role. In discussing the difficulty with the research group, Howard noted that the instrument technology was moving so quickly that his electronics background and ten years of instrument buying experience were no longer enough to understand the equipment requests to the level deemed necessary to seriously influence the decisions.

> "My knowledge base is less usable now. The best I can hope for is to be kept informed".

Mr. Whitton concluded that he would like to have a dedicated purchaser in the research building. His desires for a dedicated purchaser were supported firmly by several scientists who commented on the significant barrier that the roadway between the research centre and the purchasing offices created. Howard commented.

> "If the lab moved off site or if the volume of requests grew, I'd like to put someone there full time. I'd be looking for someone with an electronics background who really understood the research lab work. We'd be no better off if the person was just clerical in nature. He wouldn't be able to ask the right questions".

The EDPM Pilot Plant
(Observational Score=4, Scientist Score=4.03)

Purchasing and the research co-ordinator's relationship with the scientist was discussed as it pertained to Polysar's recent EDPM pilot plant construction project. The managing engineer for the project was Lorne Skelton, a Senior Research Engineer with the Process Development Group.

Lorne noted that the need for the pilot plant had been present since Polysar had purchased the EDPM business from B.F. Goodrich in 1981. It wasn't until 1985, however, that a strong need for product and process development capability was expressed. Two years later, the R&D group decided to put some updated back of the envelope estimates into the budget for the following year. Mr. Skelton had visited the one outside supplier who had expertise in the area to get these estimates. Purchasing only became involved when it became necessary to let the contract for some preliminary engineering work in January 1988.

Throughout the process, the purchasing involvement was low.

Mr. Meixner, however, was heavily involved, both at the front end and in the pilot plant construction and commissioning. Lorne suggested that purchasing would not have been able to help.

> "I'm buying expertise, knowledge and previous experience. I'm not really buying equipment nor am I interested in alternate suppliers. Still, I should have contacted purchasing earlier, if for no other reason than common courtesy."

Nicola Rooney, Lorne's supervisor, also commented on Mr. Meixner's role in the acquisition process.

> "Before we had Herman, we got ourselves into a lot of trouble. R&D personnel don't know much about customs and tariffs. We often forget about maintenance and electrical considerations. Herman solves these problems for us. If purchasing wanted to do more, they must first realize that we are different. Purchasing tries to control and use standard procedures, we're trying to explore the unknown. Howie does understand us but I wonder how many people have ever seen his face. We need people who can understand why R&D is different. It would be really useful if we had a dedicated purchasing agent with a technical background on this side of the road."

<u>Analysis</u>

Beyond affirmation of the usefulness of technically trained people in a boundary spanning role, Polysar adds one more information landmark. Geographical location can be a significant barrier to communication. The Vidal Street artery is a very imposing barrier to personal contact.

Second, Polysar indicates how difficult the maintenance of a purchasing/R&D link can be. Howard Whitton's technical background was extensive, particularly for instrumentation. Yet, by his own admission, the instrument technology has advanced far beyond his capability to be meaningfully involved. Meaningful involvement has dynamic dimensions to it both away from as well as towards increased involvement.

Finally, Lorne's comments regarding what he was buying are interesting. He did not visualize the acquisition in terms of hardware and equipment. Instead, he believed it to be an acquisition of knowledge and expertise. The equipment was simply the embodiment of the knowledge he was acquiring.

Companies Exhibiting Isolated High Involvement Levels

In two companies, while the normal process for equipment acquisitions involved low purchasing involvement, isolated instances of high involvement levels were noted and are presented in a brief discussion below.

CAE

The CAE holding company included business segments in three key areas: electronics, aerospace and the manufacture of a variety of industrial products. The CAE electronics operation in Montreal was the site visited during the research. The main area of business for the Montreal operation was the development and manufacture of flight simulators.

CAE was Canada's tenth largest R&D spender. R&D was directed primarily toward improved and new flight simulators. Virtually every flight simulator built for the airlines required some development work. More traditional research work was performed as part of Canadian and U.S. military contracts with the nature of the deliverable being a prototype simulator.

The purchasing group organization at CAE was based on product line contract responsibility. Every purchasing agent had certain assigned product lines. For example, purchasing requirements for development of Boeing 747 flight simulators would be handled by one agent. The purchasing agent was responsible for all purchases related to a particular flight simulator contract.

In general, the purchasing agent's role was to carry out the required request of the engineer responsible for the contract. There was little room for variation in specifications. The simulator was required to conform to the instrumentation that the airline used. For example, if a certain brand of instrument was used on the Air Canada jets, that brand of instrument was specified for the simulator.

While purchasing, as a functional group, was involved in the bid pricing proposal stage, the individual purchasing agents would usually become aware of a new contract approximately two months after the contract was awarded to CAE. Generally, purchasing involvement occurred late in the process. However, there still remained a certain level of latitude regarding the internal, hidden mechanisms in any flight simulator. It was one such example that came to light, by chance, during the visit to CAE.

Digital vs. Analog Meters
(Observational Score=5 Scientist Score=2.90)

In putting together the bid for a flight simulator contract, the engineering group had decided on the use of a digital meter for data display purposes. Five suppliers were available and the quotations for budget purposes were acceptable. After the contract was awarded, however, the number of qualified suppliers was reduced to one because of certain peculiarities with the technical specifications and accuracy requirements for military purposes. Further, the new quotation was dramatically (2.5 times) higher than originally budgeted. Jim McNeill, purchasing agent for this contract, described what happened.

> "The engineer had specified digital equipment and I requested bids according to his specifications. But when I found out how much the supplier wanted to charge us to meet the specifications, I said to myself, 'there must be a better alternative'. I checked the catalogues with analog equipment in mind. At first, engineering was apprehensive about the thought of going analog. It was

> old technology and some accuracy would be lost. But we all agreed that the cost of digital was too high. I kept asking them to re-evaluate their needs to see if digital was absolutely necessary. Engineering did this and agreed that analog equipment, while not ideal, would be acceptable. Even then, there weren't any military quality equipment suppliers around. I found a supplier who would be willing to modify his commercially available equipment to do the job.

The end result was a compromise that met the basic needs of engineering and the customer, that was by no means ideal, but which cost $103k instead of the quoted digital equipment at $477k. Mr. McNeill explained that this was a highly unusual case. "Purchasing usually gets involved too late in the process to have any effect". But in this case, the price discrepancy combined with Jim's electronics background and his previous experience in selling analog equipment to Hydro Quebec meant that he could understand the pros and cons of the two alternatives.

Mr. Rangesh Kasturi, the engineer in charge of this military contract, concurred with Mr. McNeill.

> "The analog option had always been a possibility from the start. However, it was certainly preferable to go digital. But I was very upset when the supplier changed the price from the earlier quotation."

The engineering group re-analyzed the requirements with the customer and decided that analog equipment would suffice. Even then, finding military equipment was difficult.

> "Purchasing had an idea regarding the modification of commercial equipment and pursued it. It resulted in an acceptable vendor and one that could be counted on in the

future."

Rangesh also commented that a more active role on purchasing's part would be useful, particularly with contract requirements and reliability issues other than design.

> "They could carry the ball longer and better. My time is better spent elsewhere."

Analysis

The CAE case illustrates, once again, the relative technical expertise that the purchaser required to interact on a meaningful basis. It was a rare occasion where purchasing involvement was late but still made a difference. This case also demonstrated the direct financial benefits from meaningful involvement and it was the second example where meaningful involvement and supplier development appeared to be linked.

CAE also provided a second case where the observational score greatly exceeded the scientist response score (72%).

Dow Chemical
(Observational Score=3, Scientist Response=2.61)

The Sarnia operations at Dow Chemical were divided into two fairly distinct research areas. The pure research occurred close to the operating plants in Sarnia's "chemical valley" while technical services were located at the Corporate centre on the outskirts of Sarnia. Mr. Ron Allison was the purchasing agent responsible for buying for the technical centre R&D activities.

Ron described his role as meeting the formal requests of the scientist/researcher. The major emphasis for most purchase requests was to specify shipping arrangements, to ease passage through customs and to ensure the purchase conforms to company payment policies. To a large extent, the opportunity to modify the request was not available. The process technical service attempted to simulate the customer's process as closely as possible. Therefore, much of the equipment and control systems had to conform to that used in the customer's operations.

Mr. Allison did, however, get involved in the installation and operation of the pilot process to solve customer problems. On occasion, this involved knowledge of equipment and processing technology without the ability or luxury of time to contact the engineer or scientist responsible.

Ron indicated that each time he was involved in a purchase request, the involvement time was a little earlier than the last. With no knowledge of the planning budget, he made extensive use of informal networking and people contacts. His background as a chemical technologist and nine years in the research labs prior to joining purchasing had meant an ability to think along the same lines as the scientist. Mr. Allison was building a reputation for understanding the needs of the scientists and thinking in a strategic sense.

Summary Conclusions From Case Examples

The seven case descriptions given above illustrated three different scenarios for meaningful purchasing involvement. The C-I-L Corporate, Avco and Cognos examples represent cases where purchasing, in a formal sense, interacted on a consistently frequent basis in the equipment acquisition process. Even when such high involvement levels occurred, the extent of the involvement varied depending on the situation. At C-I-L and Cognos, the purchasing agent had very high technical skills. But the Avco example illustrates that it is not an absolute necessity to be technically proficient to achieve high purchasing involvement levels. This technical deficiency can be overcome by high levels of economic necessity.

However, Avco also indicated a significant reduction in purchasing involvement levels when economic necessity is not critical. When it came to using profits from the contracts to upgrade lab capability, Avco purchasing involvement levels declined, as perceived by this researcher. The scientist did not make such a distinction.

Some direct evidence was gathered to suggest that meaningful involvement results in direct and measurable benefits. A summary of these benefits is presented in Exhibit 36.

Exhibit 36
Summary of Direct Benefits From Meaningful Involvement

Company	Case	Measured Benefits
C-I-L	Greenhouse	-$56k saved (93% of cost) -Scientist time savings of 5 days (from the regression equation) -Equipment on site at least 1 year ahead of expectations
	Microwave	-$5k saved (10% of cost) -Penalty time eliminated
Cognos	Work station	-$10k saved (29% of cost) -Superior equipment
CAE	Analog meter	-$374k saved (78% of cost) -New supplier developed

The CAE example was clearly the most impressive in an absolute sense. But from the statistical analysis presented in the previous chapter, the perceptual benefits were equally significant and potentially more valuable. Meaningful involvement of purchasing, if measured only in concrete financial and direct benefits to the corporation, will be underrated in importance and in frequency of occurrence. If purchasing assists in creating and maintaining a creative climate, the long term benefits demonstrated in the form of improved research success will be more strategic in nature.

Observational Analysis

It useful at this point to assess the information presented to this point. There were interesting factors being observed in many of these firms that suggest some future research opportunities and which answered many of the "questions of interest" posed as adjuncts to the research hypotheses. These observational notes are presented in Exhibit 37 as case evidence both for and against the related question.

Exhibit 37
Observational Evidence From Case Studies
Of High Involvement Cases

Suggestion	Supporting Evidence	Refuting Evidence	Conclusion
Need for High Tech. Skill	C-I-L, Cognos CAE (case), IBM	Avco (contracts)	Not Absolutely Necessary Provided Economic Criteria High
Location of Purchasing at Research Centre	C-I-L, Cognos, CAE, Avco	NONE	Appears to be a necessary but not sufficient criteria. Often mentioned during interviews as an important factor
Early, Timely Involvement	IBM, C-I-L, COGNOS	CAE	The CAE case indicates economic criteria can overcome lack of early involvement but the process is difficult

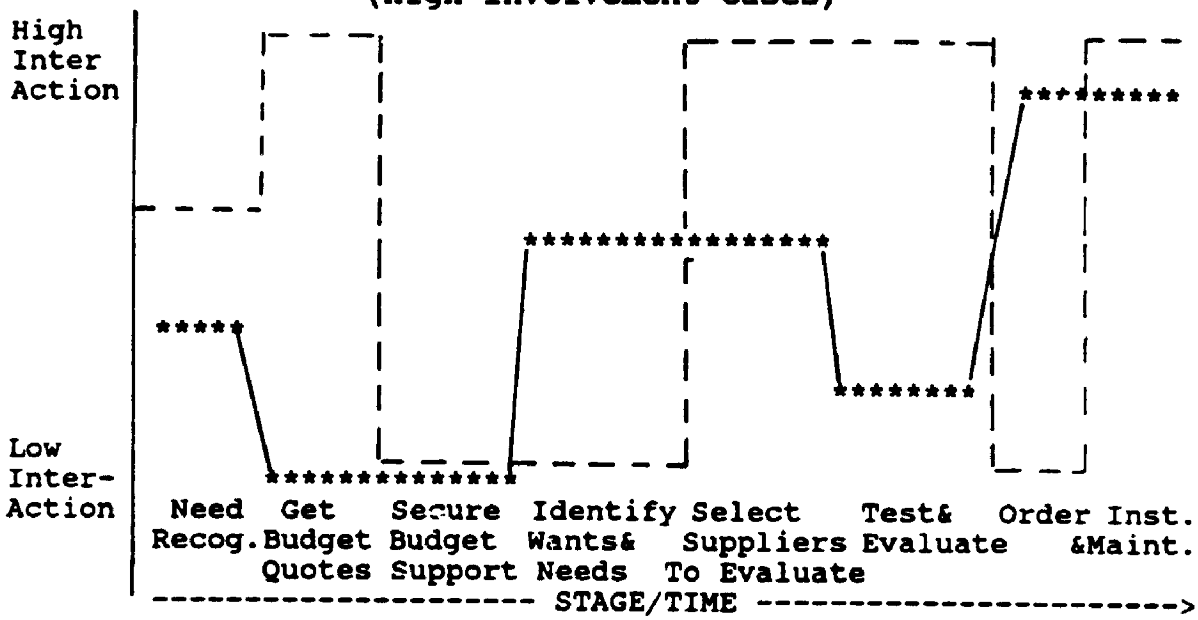
Suggestion	Supporting Evidence	Refuting Evidence	Conclusion
Size of Research Effort (small)	Cognos, C-I-L	IBM,CAE	Size did not appear to have a bearing on involvement but may dictate the choice between purchasing and boundary spanning techniques
Equipment spending as % R&D	Cognos	All others	Does not appear be a factor
Pro-active purchasing	All	None	Where purchasing was reactive and did not actively seek info., involvement was low
Meaningful Involvement is Company Specific	IBM, Cognos	C-I-L, Dow	Both C-I-L and DOW illustrated different levels of purchasing involvement at different sites
Meaningful Involvement Site Specific	C-I-L, Dow, IBM	Avco, CAE	The unit of analysis for is meaningful invol. appears to be situation/case specific relying on the individuals involved and based to a large extent on "RELATIVE LEVELS OF TECHNICAL EXPERTISE"

Of the twenty seven firms that accepted on site interviews and discussions, only three exhibited the purest forms of high purchasing involvement levels. Another two firms (IBM and Polysar) had developed a purchasing group that included trained purchasing agents and staff from the development group or engineering procurement personnel. These additional resources provided early and late stage involvement. As a whole, these groups could also be considered as high involvement examples but the unit analysis would be at the group and not the individual level. At best, therefore, 5 of the 27 (18.5%) firms illustrated consistently high involvement levels. Additional telephone discussions were held with another eight firms that indicated that only one of these (12.5%) would approach the acquisition of equipment in a team approach involving an early collaborative effort. This lone case involved a purchasing group, an engineering co-ordinating group and the scientist working as a team to effect the best possible purchase experience. The closest example similar to this arrangement would be the bridging effort of Polysar.

The Unusual Cases Mapped On The Analytical Framework

Using the analytical framework developed in Chapter V, the purchasing process for high involvement companies is illustrated in Exhibit 38.

<u>Exhibit 38</u>
Profile Of Scientist/Supplier
And Scientist/Purchaser Interaction Points
(High Involvement Cases)



KEY: ------ Supplier/Scientist Interaction
****** Purchasing/Scientist Interaction

The high purchasing involvement cases show purchasing interaction occurring frequently and in parallel with that of the scientist/supplier contact. The process is cyclical as opposed to sequential in nature. This is in distinct contrast with the approach illustrated in Chapter V for the low purchasing involvement process. As illustrated in Exhibit 38, purchasing involvement occurs earlier, more frequently and from the interviews, is more collaborative. Purchasing proacts early with the scientist in order to maintain information flow regarding planned purchases. Smaller companies appear to use the individual as the unit of analysis for ensuring that information flows, either through a formal process such as Cognos's budgetary pricing requirements or through informal information flow (C-I-L). The larger firms appear to use boundary spanning groups and teams as an effective response to the problem.

Conclusions

In summary, meaningful involvement appeared to require four key ingredients. First, purchasing needed to be pro-active, actively searching for information concerning future directions of the research centre and anticipated purchases. The information was found to be readily available to those that wished to use it through the development of the capital budget and other less formal information channels.

Second, purchasing needed to be physically located close to the customer. Research centres tend to have informal information flows. Purchasing that was centralized in some remote location (with reference to Allen (1978), remcte might mean a distance exceeding 100 feet)[41] did not have ready access to the information.

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[41] Allen, Managing The Flow of Technology, 238-241 Allen measured communication patterns of scientists in the lab and plotted the probability of communication as a function of distance, controllling for organizational bonds. Communications showed a exponentially declining probability of occurrence reaching an asymptotic level at approximately 30 metres.

Third, the research suggests that purchasing should be **armed with a high relative and relevant level of technical expertise.** This deficiency can be overcome in circumstances of economic necessity. However, economic necessity is a rather unusual occurrence in a traditional research centre. Many organizations operate a research centre on a cost basis, not a for-profit basis. In this highly technical environment, involvement in the early stages of the acquisition process was considerably lower if the technical background was not present. More fruitful results, if technical expertise is low, may be obtained by focusing on the **post-purchase decision stages.** These stages cover the installation and service aspects of the equipment as well as broader, strategic issues such as standardization of equipment and multiple project usage. Such efforts appear to have benefits for client satisfaction.

Early involvement was a necessity if purchasing was to fulfil a meaningful role in the need identification and specification stages of the acquisition process. But purchasing appeared to play a meaningful role only if purchasing could offer the scientist some tangible benefit from the involvement. Purchasing did not appear to be on the scientists' list of critical people to talk to when considering the purchase of a new measurement instrument.

Some companies used the skill and technical expertise of a dedicated purchaser to interact with the scientist. Others chose a boundary spanning technique involving purchasing, the scientist and an intermediate group such as project coordinator or contract administrators. The larger research firms appeared to choose this boundary spanning approach.

Purchasers in high involvement instances commonly discussed the role in terms of client satisfaction, mutual objectives and team membership. The reference point for these purchasers was the scientist and not the supplier. The relationship between the parties of interest was one of mutual respect and joint effort.

Finally, two examples of high purchasing involvement cases could be classified as supplier development efforts. For IBM, a new software development company had been targeted for "building a long term relationship". For CAE, an industrial equipment manufacturer had been developed into a military quality supplier. Meaningful involvement may represent the first step towards a much broader and more powerful supplier/buyer relationship.

CHAPTER VIII

CONCLUSIONS

Introduction

This research has potentially broad implications for both the management and academic communities. This final chapter will provide practicing managers with some guidance and advice based on the research results. The chapter will also serve to present some suggestions for further research.

General Conclusions

Meaningful involvement was defined in this research effort as:

> The timely and useful collaboration of purchasing's expertise and the scientist's knowledge in all aspects of the equipment acquisition process, including the decision making process, leading to the best buy decision with the objective of satisfying the immediate needs of the specifier and the long term needs and strategic objectives of the research centre as a whole.

Meaningful purchasing involvement was found in several research centres despite strong indications from the literature that such would not be the case. Where such meaningful involvement levels occurred, scientists expressed higher levels of satisfaction with purchasing's contribution to the acquisition process. There were also cited examples of direct financial benefits resulting from high involvement of purchasing personnel. The field interview analysis suggests that the indirect benefits might be more substantial and of greater corporate significance. The noted comments from participants suggested the adoption of a team approach to the acquisition of equipment in high involvement companies. Meaningful involvement appeared to be a small but significant contributor to a creative research climate and to potential research success.

Control and influence over the equipment decision was found to be an important factor in professional autonomy regardless of the level of purchasing involvement. However, in high involvement cases, scientists reduced the perceived importance of equipment control. Such a shift in importance was not evident when engineers were tested. Thus, the scientist may be more flexible in his/her attitude about the elements of professional autonomy.

Achievement of high levels of meaningful involvement was dependent on several key factors. The best predictor for meaningful involvement was the confidence that the scientist expressed in purchasing's ability to assist with technical specifications (R=.74). A reasonable surrogate for this measure (R=.62) was a modified formal education score biased towards a scientific or engineering background.

The approach used by high involvement companies differed depending on the size of the research centre. Small research centres appeared to bridge the scientist/purchasing interface

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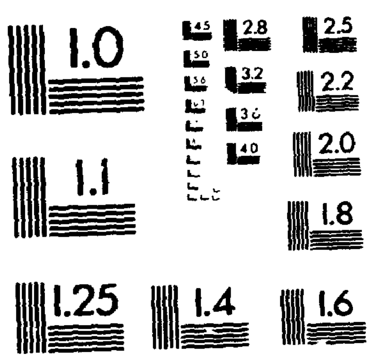


with a purchaser possessing high technical skills (e.g. Cognos, C-I-L). Larger research centres used a boundary spanning technique (e.g. Polysar, IBM). This involved a combination of purchasing agents and procurement engineering, project engineering co-ordinator or some other form of technical bridging personnel. Both approaches appeared to be equally effective.

High involvement was not always dependent on technical ability. In one case, the economic necessity for co-operation due to the funding process was an influencing factor. The necessity for cooperation appeared to bring the various parties together to achieve a mutual objective: winning the government research contract. However, high levels of economic necessity were not the norm for most research centres.

High purchasing involvement was found only where the physical location of the purchasing group or purchaser was on the research centre site and when purchasing actively sought the information required to make a timely contribution to the process. The physical location and timely involvement of purchasing were considered important factors in accessing the relevant information and building good client relationships. Access to timely information was found to be available for all purchasers. The capital budget system in the research centre was managed in such a manner that, generally, individual equipment acquisitions were generally planned in advance. Scientists submitted an annual wish list for equipment that went through several iterations of rationalization before the capital budget was finalized. The level of budget detail that was available appeared adequate and timely enough to provide a pro-active purchaser with the necessary information to interact with the specifier well in advance of the actual acquisition. However, many purchasers were found to be busy and a move to this level of pre-purchase involvement may be difficult to effect. Consideration of the scientist as a customer was prevalent in high involvement cases. In low involvement companies, purchasing was more concerned with the supplier relationship.

Interestingly, whether the involvement levels were high or low, purchasers stated that they could make a significant improvement to the equipment acquisition process. These aspirations for future improvements were evident in all research centres visited.

At low purchasing involvement centres, the time spent by the scientist to acquire equipment was found to be predictable, based on the equipment cost. The equations explained 85% of the variance for Canadian and 95% for U.S. purchases. The scientist may be making implicit time allocations based on the value of the equipment or on the level of detail required to justify the acquisitions. The equations appeared to differ between Canadian and United States research centres but the U.S. data were based on a smaller sample and the relevant equations may not, in fact, be significantly different. The equations are:

$$\text{Scientist Time (Canada)} = .071*\text{Cost(\$Cdn.)} + .57$$
$$\text{Scientist Time (U.S.)} = .075*\text{Cost(\$U.S.)} + 1.4$$

where time = person days
and cost = cost of equipment (000)

These equations were valid over a broad cost range ($4000 - $650,000) and covered the scientist time from the need identification stage through to purchase order issuance. While the time spent by the scientist was not extensive, the internal approval effort represented a significant completion barrier. Efforts by purchasing to influence the decision making process after the supplier search and field testing process had been completed were strongly resisted.

Implications For Managers

For practicing managers, particularly those in research and development functions, there are some useful conclusions from the results.

When purchasing played an active role in the acquisition process, concrete financial benefits were evident. Further, there was a strong relationship among the perceived benefits (supplier advice and input, time savings and functional equipment) and the level of purchasing involvement. These are "soft" benefits that may contribute to a more creative and supportive research climate but do not show hard, quantifiable impacts. It may be enough that the client (i.e. the scientist) was more satisfied with the support service.

The time spent by a scientist on the acquisition of equipment was predictable. The regression equation developed could be used as a manpower planning tool both at the individual purchase level and at the macro, gross capital expenditure level.

However, if management chooses to attempt to replace time spent by the scientist on the acquisition of equipment, caution is strongly advised. Where purchasing was heavily involved in the acquisition process, it appeared that the purchasing personnel needed some technical expertise relevant to the equipment decision. Two approaches that worked with equal effectiveness were the use of individuals with high technical skills and the use of boundary spanning functions such as research project co-ordinators. If the technical ability does not exist, a purchasing attempt to increase the level of involvement will likely be resisted. Decision control over the equipment choice was an important element of the scientist's professional autonomy.

If technical skills within the purchasing group are impractical, then management may wish to focus on purchasing involvement in the latter stages of the acquisition process and towards addressing longer term issues. An attempt by purchasing to provide service in the installation and start-up of the new equipment as well as after sales service and warranty may be a more logical and realistic form of increased involvement. The scientists indicated that these latter stages were viewed as very important activities to which purchasing should respond. Of perhaps greater merit would be a longer term perspective of purchasing. In particular, efforts to combine budget funds to buy better (and, perhaps, more expensive equipment) and to standardize equipment where applicable would receive the scientist's support. Purchasing, therefore, should participate actively in the budget allocation and prioritization system and the research centre's long range planning. Research and purchasing managers should ensure that this capital approval process and the resulting information are made available to the purchasers.

A new measurement instrument was developed that could be useful to monitor the purchasing group's progress. One manager has indicated that:

> "I think your questionnaire was very thought provoking, and if you do not object, I would like to use it as a

> basis to measure our starting point and assess future capability after the local materials unit is up and running, and hopefully having initial success".

Perhaps other managers will recognize that such questionnaires, modified or unmodified, are useful, if not essential, to gauge changes in the customer/service group relationship.

The existing process, whereby purchasing becomes aware of a purchase request only after the decision as to what and from whom to buy has been made, should be modified. There are legitimate commercial aspects of any acquisition that need to be addressed including terms of payment, duties and customs regulations and shipping methods. Often, purchasing became involved too late in the process to correct inadequacies in these areas without being viewed by the scientist as an obstructionist service group. In all companies visited, sufficient information existed, as a result of the budgetary process, to overcome this problem. Either purchasing needs to be more aggressive in finding the required budget information so that individual scientists can be approached or the scientist needs to be encouraged to provide adequate advance notice of purchase intention without concern or fear that this will impinge on the technical choice of the equipment. Given the nature of the scientist and his/her primary concern with achieving research results, it is perhaps most appropriate if purchasing takes the initiative in this area. Even if nothing else occurs in the relationship and involvement levels of purchasing with the scientist, this advance notice will improve the efficiency and effectiveness of the actual purchasing task.

Finally, the equipment acquisition decision was a highly technical one, requiring knowledge and skill to make a best buy decision, that was best left to the scientist in the absence of relevant technical ability in purchasing. The adoption by purchasing of an attitude that recognizes their role as a service function in support of the scientist will be necessary for harmonious relationships. Purchasing's frame of reference was often noted as the equipment supplier. Focusing on the customer (i.e. the scientist) would seem more reasonable.

Beyond The Industrial R&D Environment

This research also has implications beyond the strict domain of Research and Development. The purchasing function can be classified as a support service group. The research group, and the scientist in particular, can be viewed as professionals who occasionally require the support of various services to achieve corporate objectives. The relationships and problems encountered in the purchasing/scientist interface are not fundamentally different from those that might be encountered between, for example, a doctor and a laboratory analysis service performing blood tests or a real estate lawyer requiring a title search on a property. When the information or equipment is highly technical in nature (technical, in this case, implies requiring specialised knowledge and judgement), the service group must be technically proficient (in a relative sense) to assist with these decisions and activities. Alternately, the service group must recognize the limitations to involvement that exist and should concentrate on simply achieving advance notice of the requests.

The research results are, therefore, believed to have implications in other management settings and situations. One such setting that did not involve equipment acquisitions was presented in the case examples. Another setting would be the University environment where considerable R&D expenditures occur. The research is likely to be generalizeable across geographical boundaries. No apparent differences were evident between the questionnaire responses from U.S. and Canadian scientists. In other settings with less apparent parallels, the concept of professional autonomy may need to be replaced with more appropriate models.

Finally, the results contribute to the growing body of management literature related to participative management and team approaches to achieving success. R&D settings and equipment acquisitions are unlikely places to find high purchasing involvement levels. Yet high involvement situations existed. When high levels of meaningful involvement were found, phrases such as "teams", "collaboration" and "client satisfaction" were used. Achieving purchasing involvement, either through the technical expertise of an individual purchaser or the boundary spanning approach, is another example of Barnard's (1938) co-operative systems, Kanter's (1983) new philosophy of management and Mill's (1985) "well functioning" unit of a group.

Potential Avenues Of Future Research

The research results also indicate some promising areas of investigation. First, the process of buying equipment in a research environment deviated somewhat from the Robinson-Faris model. The Robinson-Faris model assumed sequential phases. The research results would indicate a great deal of feedback in the stages as well as identification of suppliers occurring in advance of evaluation criteria. This out-of-sequence process was a direct result of the capital budget system within the research centre. Further, the Robinson-Faris model failed to recognize the significant times required to formalize the need and to secure budget approval. These delays can be quite lengthy and can result in redefined needs. In some cases, the need occurs in advance of the appropriate instrument technology development but remains an idea in the scientist's mind. Often, it takes a journal article or a demonstration at a trade show for the researcher to recognize formally the need. Potential enhancements to the model will provide a useful basis for future research in industrial buying.

The consequences of incorporating the budget process into the Robinson-Faris model implies potential research. Suppliers submitting budget quotes for the research centre's capital budget process have an edge in the final selection process. A request for budget quotation indicates to the equipment supplier that the scientist has identified a need and is attempting to build funding support. Advance knowledge of this information may permit a more complete analysis of buyer requirements. This could ultimately lead to specification determination by the scientist that is in favour of an individual supplier. Providing budget quotes may prove a useful target marketing approach for suppliers.

Regression of scientist time on the acquisition process indicated some differences between the Canadian and United States data. If, after future research, this difference remains, an in depth understanding of the cause would be desirable. This difference may be the result of the lower level of absolute R&D funding in Canada. Different buying habits between scientists in the two countries might support the hypothesis that, in order to overcome the absolute R&D financial handicap, Canadian scientists spend slightly less time on the purchases than their U.S. counterparts.

The research indicated that purchasing normally performs only clerical duties in the acquisition of equipment. Longitudinal research to track the performance of firms with high involvement levels is warranted. It is proposed that those companies who illustrate high levels of meaningful involvement are more successful, in terms of research results, over time. Meaningful involvement of purchasing can be a small but important contributor to a creative climate and research productivity. Further, meaningful involvement of purchasing may be an indicator of how the particular company approaches management in a number of other areas. All the companies in this study that indicated high levels of meaningful involvement were successful. Benefits from meaningful involvement will include both the direct, financial and the indirect (client satisfaction, a climate more conducive to generating new products and processes, supplier development, shared mutual objectives, teamwork in action).

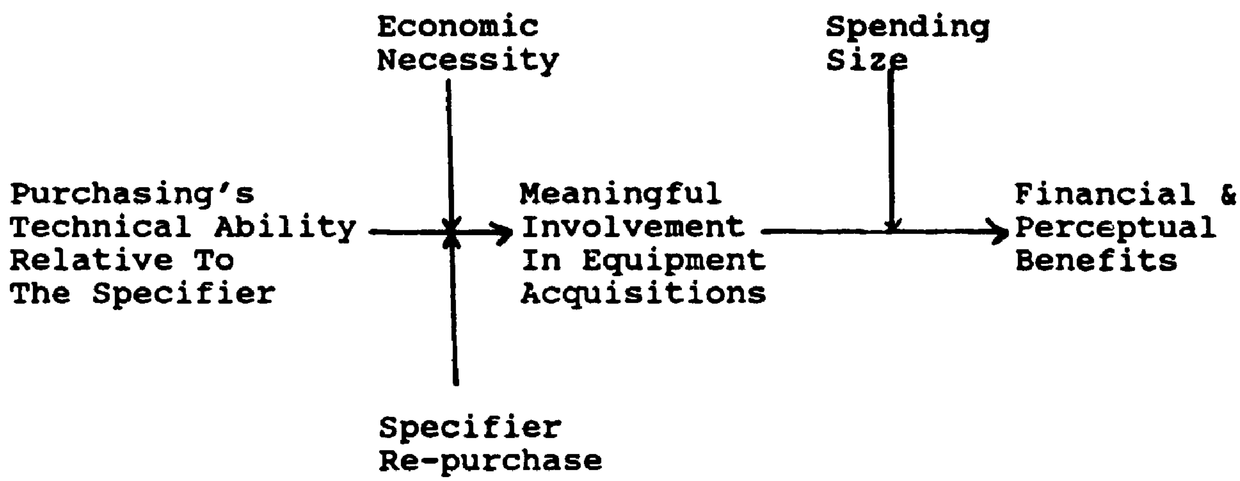
The results have implications for educators, particularly those promoting general business management skills for purchasing personnel. The operating environment can have a significant impact on what can be operationally effective.

For future research, it is proposed that the important determinant of meaningful involvement levels in equipment acquisitions is the "relative technical expertise" of the purchaser. As difference in technical expertise between the scientist and the purchaser narrows, meaningful involvement will increase. This relative technical expertise may be perceptual.

The research indicated that the scientist's past experience in purchasing a specific piece of equipment was an important factor in level of purchasing involvement, perhaps more so than the purchasing new buy versus re-purchase criteria. The data provided counter evidence to Pingry's (1974) conclusion, both from the quantitative analysis and from the field discussions. Therefore, it is proposed that purchasing meaningful involvement levels will decline if the equipment specified is a rebought item from the scientist's perspective.

The research findings also have implications for the conceptual model presented earlier. The revised model should recognize that technical ability, at least in a relative sense, is a fundamental force predicting meaningful involvement levels as defined within this research context. The revised model should also incorporate the potential for the intervening effects of "economic necessity" and the scientist's previous experience in using or purchasing the equipment. The revised conceptual model is presented in Exhibit 39 and is purposely modified to be of a more generic nature.

Exhibit 39
Revised Conceptual Model
For Meaningful Involvement In Equipment Acquisitions
At The Transactional Level



Finally, there is tentative evidence to suggest that engineers fundamentally differ from scientists. The type of research performed was a discriminating variable in support of Peter's (1957) work. But the data from high involvement cases indicates that scientists are more willing than engineers to modify the relative importance placed on control over equipment decisions. The number of case examples was limited and no firm conclusions could be drawn regarding trait differences. Nonetheless, the data suggests that scientists will be willing to allow a technically proficient purchasing agent to become more involved with the acquisition of

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S4Q1	S4Q2	S4Q3	S4Q4	S4Q5	S4Q6	S4Q7	S4Q8	S4Q9	S4Q10	S4Q11
S4Q1	1.0000 (0) P= .	.8559 (26) P= .000	.7186 (26) P= .000	.6801 (26) P= .000	.6645 (26) P= .000	.6783 (26) P= .000	.0043 (23) P= .492	.6340 (24) P= .000	.0000 (18) P= .500	.7295 (18) P= .000	.4414 (18) P= .033
S4Q2	.8559 (26) P= .000	1.0000 (0) P= .	.6499 (27) P= .000	.6501 (26) P= .000	.5106 (26) P= .004	.5275 (27) P= .002	.2716 (23) P= .105	.5544 (25) P= .002	-.0458 (19) P= .426	.6432 (19) P= .001	.4881 (19) P= .017
S4Q3	.7186 (26) P= .000	.6499 (27) P= .000	1.0000 (0) P= .	.7155 (26) P= .000	.7815 (26) P= .000	.6317 (27) P= .000	.0894 (23) P= .343	.5808 (25) P= .001	-.3170 (19) P= .093	.6733 (19) P= .001	.6895 (19) P= .001
S4Q4	.6801 (26) P= .000	.6501 (26) P= .000	.7155 (26) P= .000	1.0000 (0) P= .	.5830 (26) P= .001	.7766 (26) P= .000	.0617 (23) P= .390	.3953 (24) P= .078	-.2197 (18) P= .191	.7227 (18) P= .000	.6415 (18) P= .002
S4Q5	.6645 (26) P= .000	.5106 (26) P= .004	.7815 (26) P= .000	.5830 (26) P= .001	1.0000 (0) P= .	.7571 (26) P= .000	.2107 (23) P= .167	.4833 (24) P= .008	-.1062 (18) P= .338	.7882 (18) P= .000	.6627 (18) P= .001
S4Q6	.6783 (26) P= .000	.5275 (27) P= .002	.6317 (27) P= .000	.7766 (26) P= .000	.7571 (26) P= .000	1.0000 (0) P= .	.2893 (23) P= .090	.5044 (25) P= .005	.2618 (19) P= .139	.7204 (19) P= .000	.4975 (19) P= .015
S4Q7	-.0043 (23) P= .492	-.2716 (23) P= .105	-.0894 (23) P= .343	.0617 (23) P= .390	.2107 (23) P= .167	.2893 (23) P= .090	1.0000 (0) P= .	.1317 (23) P= .275	.2814 (15) P= .155	.0384 (15) P= .446	-.0805 (15) P= .388
S4Q8	.6340 (24) P= .000	.5544 (25) P= .002	.5808 (25) P= .001	.3953 (24) P= .028	.4833 (24) P= .008	.5044 (25) P= .005	.1317 (23) P= .275	1.0000 (0) P= .	-.1720 (17) P= .255	.5337 (17) P= .014	.5076 (17) P= .019
S4Q9	.0000 (18) P= .500	-.0458 (19) P= .426	-.3170 (19) P= .093	.2197 (18) P= .191	-.1062 (18) P= .338	.2618 (19) P= .139	.2814 (15) P= .155	-.1720 (17) P= .255	1.0000 (0) P= .	.1655 (19) P= .249	-.2927 (19) P= .112
S4Q10	.7295 (18) P= .000	.6432 (19) P= .001	.6733 (19) P= .001	.7227 (18) P= .000	.7882 (18) P= .000	.7204 (19) P= .000	.0384 (15) P= .446	.5337 (17) P= .014	.1655 (19) P= .249	1.0000 (0) P= .	.5199 (19) P= .011
S4Q11	.4414 (18) P= .033	.4881 (19) P= .017	.6895 (19) P= .001	.6415 (18) P= .002	.6627 (18) P= .001	.4975 (19) P= .015	-.0805 (15) P= .388	.5076 (17) P= .019	-.2927 (19) P= .112	.5199 (15) P= .011	1.0000 (0) P= .

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and informal information networks and social psychology trait theories, defining and measuring the "optimal" level of contribution is difficult. The research presented in this paper represents one small step towards a further understanding of the much broader issue of organizational effectiveness. Further research on this issue remains the challenge in all functional areas, not just purchasing.

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Appendix A
Master Questionnaire

The questionnaires administered to the various interviewed parties are presented in the following pages. In the interests of brevity, each questionnaire is identified as a "Part" and a purpose. The following table identifies who received each part of the questionnaire. In some "Parts", the pronouns were changed to reflect the proper position of those being asked to respond. For example, "my" in Part 4 was used for scientists while purchasers saw the word "the researcher".

Part	Administered To	Reference In Correlation Matrix
1	Research Admin.	S1Q1 to S1Q8
	Purchasing Mgrs.	S1Q1 to S1Q8
2	Research Admin.	S2Q1 to S2Q16
	Int. Scientist	S1Q1 to S1Q16
	Non-Int. Scientist	S1Q1 to S1Q16
3	Research Admin.	S3Q1 to S3Q9
	Int. Scientist	S2Q1 to S2Q9
	Non-Int. Scientist	S2Q1 to S2Q9
4	Research Admin.	S4Q1 to S4Q22
	Purchasing Mgrs.	S2Q1 to S2Q22
	Int. Scientist	S3Q1 to S3Q22
	Non-Int. Scientist	S3Q1 to S3Q22
	Purchasers	S1Q1 to S1Q22
5	Research Admin.	S5Q1 to S5Q10
	Purchasing Mgrs.	S3Q1 to S3Q10
	Int. Scientist	S4Q1 to S4Q10
	Non-Int. Scientist	S4Q1 to S4Q10
	Purchasers	S2Q1 to S2Q10
6	Research Admin.	S6Q1 to S6Q22
	Purchasing Mgrs.	S4Q1 to S4Q22
	Int. Scientist	S5Q1 to S5Q22
	Non-Int. Scientist	S5Q1 to S5Q22
	Purchasers	S3Q1 to S3Q22
7	Int. Scientist	S6Q1 to S6Q31
	Purchasers	S4Q1 to S4Q31

Part 1: Business Environment Questions
(Q1 to Q8)

Please respond to the following statements regarding the concepts of a creative climate, professional autonomy and research productivity. Simply circle the most appropriate response on the seven point scale given.

	Strongly Agree						Strongly Disagree
1) We always seem to have more research opportunities than we can pursue	7	6	5	4	3	2	1
2) Getting adequate financial support is always a struggle	7	6	5	4	3	2	1
3) I doubt that there exist many opportunities to improve the efficiency of our research spending	7	6	5	4	3	2	1
4) Our researchers don't waste much time on activities that could be better done by someone else	7	6	5	4	3	2	1
5) It always seems that I could use at least one more quality researcher on the team	7	6	5	4	3	2	1
6) This company's business environment looks very exciting	7	6	5	4	3	2	1
7) The purchasing activity in the research area is doing about as much as could be expected	7	6	5	4	3	2	1
8) No one can know as well as the researcher what is needed to perform the work	7	6	5	4	3	2	1

Part 2: Professional Autonomy Questions
(Q1 to Q16)

Instructions: This short survey is intended to measur the relative weight that you associate with the concepts of professional autonomy from the perspective of the scientist. Please mark your response to the following questions based on the seven point scale shown.

	Degree of Importance						
	Very High			Medium			Very Low
1) The choice I have concerning the types of research projects in which I am involved.	7	6	5	4	3	2	1
2) The choice I have concerning the research methodology which shall be used for the experiment	7	6	5	4	3	2	1
3) The choice I have concerning when I can publish the research results	7	6	5	4	3	2	1
4) The choice I have concerning which equipment is necessary for successful measurement of the results	7	6	5	4	3	2	1
5) The choice I have concerning from whom to buy the necessary equipment	7	6	5	4	3	2	1
6) The choice I have concerning where I can publish the research results	7	6	5	4	3	2	1
7) The choice I have concerning when I can perform my research experiments	7	6	5	4	3	2	1
8) The choice I have concerning at what time of day I can work	7	6	5	4	3	2	1
9) The choice I have concerning how accurate the measurement equipment must be that is required	7	6	5	4	3	2	1
10) The freedom to set the requirements for my work	7	6	5	4	3	2	1

	Degree of Importance						
	Very High			Medium			Very Low
11) The freedom from constant observation of my work by my supervisor	7	6	5	4	3	2	1
12) The freedom from constant checking of my work by my supervisor	7	6	5	4	3	2	1
13) The freedom to largely determine my work activities on a typical day without the direct influence of my supervisor	7	6	5	4	3	2	1
14) The judgement that I must make because of a lack of procedures that must be followed whatever the situation	7	6	5	4	3	2	1
15) The judgement that I must make because of a lack of rules to cover every situation that might occur	7	6	5	4	3	2	1
16) The judgement that I must make because almost every research experiment is different and requires unique treatment	7	6	5	4	3	2	1

Part 3: Creative Climate Questions
(Q1-Q9)

This second section of questions refers to your opinions concerning the relative importance of various components that constitute the concept of a creative climate for research. Please respond to the following questions by circling the most appropriate response on the seven point scale.

	Degree of Importance						
	Very High			Medium			Very Low
1) Choosing the research projects which I shall be involved in.	7	6	5	4	3	2	1
2) A low-pressure environment in which I can work	7	6	5	4	3	2	1
3) The opportunity for constant interaction with colleagues and professional peers	7	6	5	4	3	2	1
4) The opportunity for continuous intellectual development and achievement	7	6	5	4	3	2	1
5) Authority and control over the equipment specifications for the experiment	7	6	5	4	3	2	1
6) The right to publish my research results	7	6	5	4	3	2	1
7) The opinions and judgements of my professional peers in terms of my knowledge and ability to conduct research	7	6	5	4	3	2	1
8) The freedom to plan my own work schedule	7	6	5	4	3	2	1
9) The right to choose the equipment supplier for the research experiment	7	6	5	4	3	2	1

Part 4: Confidence in Purchasing Ability Questions
(Q1-Q22)

This next series of questions is designed to obtain your opinions concerning the ability of your research firm's purchasing group to assist in equipment supply decisions. You will be asked to give your opinions in reference to purchasings' abilities with respect to the equipment purchase that we have just discussed. Simply circle the most appropriate response on the seven point scale. Your responses will be kept totally confidential.

	DEGREE OF CONFIDENCE						
	VERY HIGH			MEDIUM			VERY LOW
1) Purchasings' ability to carry the actual purchasing task and formal paper work	7	6	5	4	3	2	1
2) Purchasings' ability to understand my needs	7	6	5	4	3	2	1
3) Purchasings' ability to assist with technical specifications for the equipment	7	6	5	4	3	2	1
4) Purchasings' ability to question the need for the accuracy I think I require from the equipment	7	6	5	4	3	2	1
5) Purchasings' ability to find other suppliers of similar equipment that I was not ware of	7	6	5	4	3	2	1
6) Purchasings' ability to be aware of other research projects underway that may require similar equipment	7	6	5	4	3	2	1
7) Purchasings' ability to question my preferred supply source	7	6	5	4	3	2	1
8) Purchasings' ability to be involved in company decisions regarding the standardization of lab equipment	7	6	5	4	3	2	1
9) Purchasings' ability to help me define what equipment will be needed for the experiment	7	6	5	4	3	2	1
10) Purchasings' ability to fully understand the functional requirements of the required equipment	7	6	5	4	3	2	1

	DEGREE OF CONFIDENCE						
	VERY HIGH			MEDIUM			VERY LOW
11) Purchasings' ability to be involved in the acquisition process before specifications become defined	7	6	5	4	3	2	1
12) Purchasings' ability to fully understand the technical specifications of the required equipment	7	6	5	4	3	2	1
13) Purchasings' ability to discuss possible modifications to my specifications for the equipment for purposes such as delivery, service and/or price	7	6	5	4	3	2	1
14) Purchasings' ability to be involved at the earliest possible time in the acquisition decision process	7	6	5	4	3	2	1
15) Purchasings' ability to find equipment that meets my needs and the future needs of the research centre	7	6	5	4	3	2	1
16) Purchasings' ability to assist me at the time when I needed to define what the equipment had to do	7	6	5	4	3	2	1
17) Purchasings' ability to help in getting the equipment operational	7	6	5	4	3	2	1
18) Purchasings' ability to check on a continuing basis to ensure that the equipment is doing what it was supposed to do	7	6	5	4	3	2	1
19) Purchasings' ability to keep in contact with me to ensure that I am happy with what was bought	7	6	5	4	3	2	1
20) Purchasings' ability to find solutions to problems with the equipment that are the fault of the supplier	7	6	5	4	3	2	1
21) Purchasings' ability to gain knowledge from this purchase experience that will be of assistance in future purchases	7	6	5	4	3	2	1
22) Purchasings' ability to provide equipment that arrives earlier than would have been possible if I had to do the purchasing task myself	7	6	5	4	3	2	1

Part 5: Assessment Factors Questions
(Q1-Q10)

When you were responding to the questions regarding purchasings' abilities, how important, in your opinion, were the following factors during the evaluation?

	Degree of Importance: VERY HIGH			MEDIUM			VERY LOW
1) The purchaser's personality traits	7	6	5	4	3	2	1
2) The purchaser's experience (or inexperience) as a buyer	7	6	5	4	3	2	1
3) The purchaser's formal educational background (or lack thereof)	7	6	5	4	3	2	1
4) The purchaser's technical ability (or lack thereof)	7	6	5	4	3	2	1
5) The formal procedures that exist regarding purchasing involvement	7	6	5	4	3	2	1
6) The informal network that the purchaser has built up (or lacks) in the research centre	7	6	5	4	3	2	1
7) The purchaser's previous successes (or failures) in buying for other researchers	7	6	5	4	3	2	1
8) The purchaser's contacts with other research centre buying groups (or lack thereof)	7	6	5	4	3	2	1
9) The efforts that the purchase has made to be informed of research projects that might be forthcoming (or the purchaser's lack of knowledge of such projects)	7	6	5	4	3	2	1
10) The amount of work that I had already performed with regard to the buying decision process	7	6	5	4	3	2	1

Part 6: Task Importance Questions
(Q1-Q22)

This next series of questions is designed to obtain your opinions concerning the importance that you place on purchasing's abilities to provide a meaningful service for the researcher's equipment acquisition. Again, simply circle the most appropriate response on the seven point scale. Your responses will be kept totally confidential.

	DEGREE OF IMPORTANCE						
	VERY HIGH			MEDIUM			VERY LOW
1) Purchasings' ability to carry the actual purchasing task and formal paper work	7	6	5	4	3	2	1
2) Purchasings' ability to understand my needs	7	6	5	4	3	2	1
3) Purchasings' ability to assist with technical specifications for the equipment	7	6	5	4	3	2	1
4) Purchasings' ability to question the need for the accuracy I think I require from the equipment	7	6	5	4	3	2	1
5) Purchasings' ability to find other suppliers of similar equipment that I was not ware of	7	6	5	4	3	2	1
6) Purchasings' ability to be aware of other research projects underway that may require similar equipment	7	6	5	4	3	2	1
7) Purchasings' ability to question my preferred supply source	7	6	5	4	3	2	1
8) Purchasings' ability to be involved in company decisions regarding the standardization of lab equipment	7	6	5	4	3	2	1
9) Purchasings' ability to help me define what equipment will be needed for the experiment	7	6	5	4	3	2	1
10) Purchasings' ability to fully understand the functional requirements of the required equipment	7	6	5	4	3	2	1

	DEGREE OF IMPORTANCE						
	VERY HIGH			MEDIUM			VERY LOW
11) Purchasings' ability to be involved in the acquisition process before specifications become defined	7	6	5	4	3	2	1
12) Purchasings' ability to fully understand the technical specifications of the required equipment	7	6	5	4	3	2	1
13) Purchasings' ability to discuss possible modifications to my specifications for the equipment for purposes such as delivery, service and/or price	7	6	5	4	3	2	1
14) Purchasings' ability to be involved at the earliest possible time in the acquisition decision process	7	6	5	4	3	2	1
15) Purchasings' ability to find equipment that meets my needs and the future needs of the research centre	7	6	5	4	3	2	1
16) Purchasings' ability to assist me at the time when I needed to define what the equipment had to do	7	6	5	4	3	2	1
17) Purchasings' ability to help in getting the equipment operational	7	6	5	4	3	2	1
18) Purchasings' ability to check on a continuing basis to ensure that the equipment is doing what it was supposed to do	7	6	5	4	3	2	1
19) Purchasings' ability to keep in contact with me to ensure that I am happy with what was bought	7	6	5	4	3	2	1
20) Purchasings' ability to find solutions to problems with the equipment that are the fault of the supplier	7	6	5	4	3	2	1
21) Purchasings' ability to gain knowledge from this purchase experience that will be of assistance in future purchases	7	6	5	4	3	2	1
22) Purchasings' ability to provide equipment that arrives earlier than would have been possible if I had to do the purchasing task myself	7	6	5	4	3	2	1

Part 7: Meaningful Involvement Questions
(Q1-Q31)

Finally, would you please respond to the following questions regarding the outcome from purchasing involvement in the equipment acquisition process that we have been talking about. If a particular question is not yet applicable (e.g. Q.28) please do not circle any response.

	STRONGLY AGREE						STRONGLY DISAGREE
1) As a result of purchasing involvement, I received useful advice from the supplier(s)	7	6	5	4	3	2	1
2) As a result of purchasing involvement, I have a piece of equipment that does the job for me	7	6	5	4	3	2	1
3) If it hadn't been for purchasing, I would have wasted precious time trying to source this equipment	7	6	5	4	3	2	1
4) Thanks to purchasing, I was able to purchase equipment from a better quality supplier	7	6	5	4	3	2	1
5) I have a greater amount of respect for purchasing as a result of this purchase experience	7	6	5	4	3	2	1
6) I got some really good ideas from suppliers as a result of purchasing involvement	7	6	5	4	3	2	1
7) Because of purchasing involvement, I received my equipment before I expected to	7	6	5	4	3	2	1
8) If it hadn't been for purchasing, I may have bought a "white elephant" piece of equipment	7	6	5	4	3	2	1
9) Purchasing carried out the actual purchasing task and formal paper work in an effective manner	7	6	5	4	3	2	1
10) Purchasing really understood my needs	7	6	5	4	3	2	1
11) Purchasing assisted with with the technical specifications for the equipment	7	6	5	4	3	2	1

	STRONGLY AGREE						STRONGLY DISAGREE
12) Purchasing questioned the need for the accuracy I thought I required from the equipment	7	6	5	4	3	2	1
13) Purchasing found other suppliers of similar equipment that I was not aware of	7	6	5	4	3	2	1
14) Purchasing was aware of other research projects underway that may require similar equipment	7	6	5	4	3	2	1
15) Purchasing questioned my preferred supply source	7	6	5	4	3	2	1
16) Purchasing examined this equipment purchase with regard to the standardization of lab equipment	7	6	5	4	3	2	1
17) Purchasing helped me define what equipment would be needed for the experiment	7	6	5	4	3	2	1
18) Purchasing fully understood the functional requirements of the required equipment	7	6	5	4	3	2	1
19) Purchasing was involved in the acquisition process before specifications became defined	7	6	5	4	3	2	1
20) Purchasing fully understood the technical specifications of the required equipment	7	6	5	4	3	2	1
21) Purchasing discussed possible modifications to my specifications for the equipment for purposes such as delivery, service and/or price	7	6	5	4	3	2	1
22) Purchasing was involved at the earliest possible time in the acquisition decision process	7	6	5	4	3	2	1
23) Purchasing found equipment that met my needs and the future needs of the research centre	7	6	5	4	3	2	1

	STRONGLY AGREE						STRONGLY DISAGREE
24) Purchasing assisted me at the time when I needed to define what the equipment had to do	7	6	5	4	3	2	1
25) Purchasing helped in getting the equipment operational	7	6	5	4	3	2	1
26) Purchasing checked on a frequent basis to ensure that the equipment is doing what it was supposed to do	7	6	5	4	3	2	1
27) Purchasing kept in contact with me to ensure that I was happy with what was bought	7	6	5	4	3	2	1
28) Purchasing has found solutions to problems with the equipment that are the fault of the supplier	7	6	5	4	3	2	1
29) Purchasing has gained knowledge from this purchase experience that will be of assistance in future purchases	7	6	5	4	3	2	1
30) Purchasing provided equipment that arrived earlier than would have been possible if I had had to do the purchasing task myself	7	6	5	4	3	2	1
31) I was generally pleased and satisfied with purchasing input on this particular acquisition	7	6	5	4	3	2	1

Please indicate the appropriate salary range for yourself

$20,000-$39,999 per year ....
$40,000-$59,999 per year ....
$60,000-$79,999 per year ....
$80,000-$99,999 per year ....
over $99,999 per year ....

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:41:38 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - -

	S1Q1	S1Q2	S1Q3	S1Q4	S1Q5	S1Q6	S1Q7	S1Q8	S1Q9	S1Q10	S1Q11
S1Q1	1.0000 (0) P= .	.2162 (44) P= .079	.4146 (43) P= .003	-.1481 (44) P= .169	-.4617 (44) P= .001	.3280 (41) P= .018	.5114 (44) P= .000	.2114 (44) P= .084	.0905 (44) P= .280	.1273 (42) P= .211	-.1196 (44) P= .220
S1Q2	.2162 (44) P= .079	1.0000 (0) P= .	.0050 (43) P= .487	.3727 (44) P= .006	.0655 (44) P= .336	.0899 (41) P= .288	.2214 (44) P= .074	.0680 (44) P= .330	.4670 (44) P= .001	.3646 (42) P= .009	.2655 (44) P= .041
S1Q3	.4146 (43) P= .003	.0050 (43) P= .487	1.0000 (0) P= .	-.1455 (43) P= .176	-.1150 (43) P= .231	.9129 (41) P= .000	.2932 (43) P= .028	.0904 (43) P= .282	.0395 (43) P= .401	.0509 (41) P= .376	-.1803 (43) P= .124
S1Q4	-.1481 (44) P= .169	.3727 (44) P= .006	-.1455 (43) P= .176	1.0000 (0) P= .	.5646 (44) P= .000	-.1128 (41) P= .241	.1164 (44) P= .226	.2025 (44) P= .094	.6956 (44) P= .000	.1923 (42) P= .111	.2649 (44) P= .041
S1Q5	-.4617 (44) P= .001	.0655 (44) P= .336	-.1150 (43) P= .231	.5646 (44) P= .000	1.0000 (0) P= .	-.0950 (41) P= .277	.0799 (44) P= .303	.1646 (44) P= .143	.2580 (44) P= .045	.2186 (42) P= .082	.4013 (44) P= .003
S1Q6	.3280 (41) P= .018	.0899 (41) P= .288	.9129 (41) P= .000	-.1128 (41) P= .241	-.0950 (41) P= .277	1.0000 (0) P= .	.2686 (41) P= .045	.1185 (41) P= .230	.1566 (41) P= .164	.0010 (39) P= .498	-.2677 (41) P= .045
S1Q7	.5114 (44) P= .000	.2214 (44) P= .074	.2932 (43) P= .028	.1164 (44) P= .226	.0799 (44) P= .303	.2686 (41) P= .045	1.0000 (0) P= .	.3981 (44) P= .004	.2561 (44) P= .047	.4127 (42) P= .003	.3400 (44) P= .012
S1Q8	.2114 (44) P= .084	.0680 (44) P= .330	.0904 (43) P= .282	.2025 (44) P= .094	.1646 (44) P= .143	.1185 (41) P= .230	.3981 (44) P= .004	1.0000 (0) P= .	.0862 (44) P= .289	.3756 (42) P= .007	.2651 (44) P= .041
S1Q9	.0905 (44) P= .280	.4670 (44) P= .001	.0395 (43) P= .401	.6956 (44) P= .000	.2580 (44) P= .045	.1566 (41) P= .164	.2561 (44) P= .047	.0862 (44) P= .289	1.0000 (0) P= .	.1029 (42) P= .258	.0077 (44) P= .480
S1Q10	.1273 (42) P= .211	.3646 (42) P= .009	.0509 (41) P= .376	.1923 (42) P= .111	.2186 (42) P= .082	.0010 (39) P= .498	.4127 (42) P= .003	.3756 (42) P= .007	.1029 (42) P= .258	1.0000 (0) P= .	.7175 (42) P= .000
S1Q11	-.1196 (44) P= .220	.2655 (44) P= .041	-.1803 (43) P= .124	.2649 (44) P= .041	.4013 (44) P= .003	.2677 (41) P= .045	.3400 (44) P= .012	.2651 (44) P= .041	.0077 (44) P= .480	.7175 (42) P= .000	1.0000 (0) P= .

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- - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S1Q1	S1Q2	S1Q3	S1Q4	S1Q5	S1Q6	S1Q7	S1Q8	S1Q9	S1Q10	S1Q11
S1Q12	-.0017	.1380	-.1105	-.0306	.2150	-.1658	.4125	.3505	-.0622	.6145	.7657
	(44)	(44)	(43)	(44)	(44)	(41)	(44)	(44)	(44)	(42)	(44)
	P= .496	P= .186	P= .240	P= .422	P= .081	P= .150	P= .003	P= .010	P= .344	P= .000	P= .000
S1Q13	-.1017	.1850	-.0633	.1078	.2308	-.1337	.2224	.4286	-.1089	.6652	.7338
	(43)	(43)	(42)	(43)	(43)	(40)	(43)	(43)	(43)	(41)	(43)
	P= .258	P= .118	P= .345	P= .246	P= .068	P= .205	P= .076	P= .002	P= .243	P= .000	P= .000
S1Q14	-.0213	.2794	.0432	.1185	.0696	.0617	.3610	.3317	.1085	.4837	.4153
	(42)	(42)	(41)	(42)	(42)	(39)	(42)	(42)	(42)	(41)	(42)
	P= .447	P= .037	P= .394	P= .227	P= .331	P= .354	P= .009	P= .016	P= .247	P= .001	P= .003
S1Q15	.0377	.2322	.0359	.2081	.0823	.0309	.2987	.2784	.1603	.2509	.2351
	(42)	(42)	(41)	(42)	(42)	(39)	(42)	(42)	(42)	(41)	(42)
	P= .406	P= .069	P= .412	P= .093	P= .302	P= .426	P= .027	P= .037	P= .155	P= .057	P= .067
S1Q16	.3504	.0525	.1214	.0499	.0163	.0868	.3021	.4651	.1664	.2623	.1245
	(41)	(41)	(41)	(41)	(41)	(39)	(41)	(41)	(41)	(40)	(41)
	P= .012	P= .372	P= .225	P= .378	P= .460	P= .300	P= .027	P= .001	P= .149	P= .051	P= .219

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- - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - -

	S1Q12	S1Q13	S1Q14	S1Q15	S1Q16
S1Q1	-.0017	-.1017	-.0213	.0377	.3504
	(44)	(43)	(42)	(42)	(41)
	P= .496	P= .258	P= .447	P= .406	P= .012
S1Q2	.1380	.1850	.2794	.2322	.0525
	(44)	(43)	(42)	(42)	(41)
	P= .186	P= .118	P= .037	P= .069	P= .372
S1Q3	-.1105	-.0633	.0432	.0359	.1214
	(43)	(42)	(41)	(41)	(41)
	P= .240	P= .345	P= .394	P= .412	P= .225
S1Q4	-.0306	.1078	.1185	.2081	.0499
	(44)	(43)	(42)	(42)	(41)
	P= .422	P= .246	P= .227	P= .093	P= .378
S1Q5	.2150	.2308	.0696	.0823	.0163
	(44)	(43)	(42)	(42)	(41)
	P= .081	P= .068	P= .331	P= .302	P= .460
S1Q6	-.1658	-.1332	.0617	.0309	.0868
	(41)	(40)	(39)	(39)	(39)
	P= .150	P= .205	P= .354	P= .426	P= .300
S1Q7	.4125	.2224	.3610	.2987	.3021
	(44)	(43)	(42)	(42)	(41)
	P= .003	P= .076	P= .009	P= .027	P= .027
S1Q8	.3505	.4286	.3317	.2784	.4651
	(44)	(43)	(42)	(42)	(41)
	P= .010	P= .002	P= .016	P= .037	P= .001
S1Q9	-.0622	-.1089	.1085	.1603	.1664
	(44)	(43)	(42)	(42)	(41)
	P= .344	P= .243	P= .247	P= .155	P= .149
S1Q10	.6145	.6652	.4837	.2509	.2623
	(42)	(41)	(41)	(41)	(40)
	P= .000	P= .000	P= .001	P= .057	P= .051
S1Q11	.7657	.7338	.4153	.2351	.1245
	(44)	(43)	(42)	(42)	(41)
	P= .000	P= .000	P= .003	P= .067	P= .219

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- - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S1Q12	S1Q13	S1Q14	S1Q15	S1Q16
S1Q12	1.0000	.7590	.5066	.3283	.2393
	(0)	(43)	(42)	(42)	(41)
	P= .	P= .000	P= .000	P= .017	P= .066
S1Q13	.7590	1.0000	.4217	.2688	.2427
	(43)	(0)	(41)	(41)	(40)
	P= .000	P= .	P= .003	P= .045	P= .066
S1Q14	.5066	.4217	1.0000	.7980	.3374
	(42)	(41)	(0)	(42)	(41)
	P= .000	P= .003	P= .	P= .000	P= .016
S1Q15	.3283	.2688	.7980	1.0000	.2808
	(42)	(41)	(42)	(0)	(41)
	P= .017	P= .045	P= .000	P= .	P= .038
S1Q16	.2393	.2427	.3374	.2808	1.0000
	(41)	(40)	(41)	(41)	(0)
	P= .066	P= .066	P= .016	P= .038	P= .

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	S201	S202	S203	S204	S205	S206	S207	S208	S209
S201	1.0000	.4065	.2822	.2702	.0815	.3365	-.0874	.2546	-.1352
	(0)	(44)	(44)	(44)	(44)	(44)	(42)	(44)	(43)
	P= .	P= .003	P= .032	P= .038	P= .299	P= .013	P= .291	P= .048	P= .194
S202	.4065	1.0000	.2086	.2013	-.0325	.4187	-.1275	.2737	-.2203
	(44)	(0)	(44)	(44)	(44)	(44)	(42)	(44)	(43)
	P= .003	P= .	P= .087	P= .095	P= .417	P= .002	P= .210	P= .036	P= .078
S203	.2822	.2086	1.0000	.3182	.0907	.1684	.0753	.0265	.0387
	(44)	(44)	(0)	(44)	(44)	(44)	(42)	(44)	(43)
	P= .032	P= .087	P= .	P= .018	P= .279	P= .137	P= .318	P= .432	P= .403
S204	.2702	.2013	.3182	1.0000	.2780	.2395	.1480	.5006	.2297
	(44)	(44)	(44)	(0)	(44)	(44)	(42)	(44)	(43)
	P= .038	P= .095	P= .018	P= .	P= .034	P= .059	P= .175	P= .000	P= .069
S205	.0815	-.0325	.0907	.2780	1.0000	.0972	.1392	.1082	.7483
	(44)	(44)	(44)	(44)	(0)	(44)	(42)	(44)	(43)
	P= .299	P= .417	P= .279	P= .034	P= .	P= .265	P= .190	P= .242	P= .000
S206	.3365	.4187	.1684	.2395	.0972	1.0000	.4012	.1170	.0090
	(44)	(44)	(44)	(44)	(44)	(0)	(42)	(44)	(43)
	P= .013	P= .002	P= .137	P= .059	P= .265	P= .	P= .004	P= .225	P= .477
S207	-.0874	-.1275	.0753	.1480	.1392	.4012	1.0000	.3202	.2197
	(42)	(42)	(42)	(42)	(42)	(42)	(0)	(42)	(42)
	P= .291	P= .210	P= .318	P= .175	P= .190	P= .004	P= .	P= .019	P= .081
S208	.2546	.2737	.0265	.5006	.1082	.1170	.3202	1.0000	.2378
	(44)	(44)	(44)	(44)	(44)	(44)	(42)	(0)	(43)
	P= .048	P= .036	P= .432	P= .000	P= .242	P= .225	P= .019	P= .	P= .062
S209	-.1352	-.2203	.0387	.2297	.7483	.0090	.2197	.2378	1.0000
	(43)	(43)	(43)	(43)	(43)	(43)	(42)	(43)	(0)
	P= .194	P= .078	P= .403	P= .069	P= .000	P= .477	P= .081	P= .062	P= .

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- - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S3Q1	S3Q2	S3Q3	S3Q4	S3Q5	S3Q6	S3Q7	S3Q8	S3Q9	S3Q10	S3Q11
S3Q1	1.0000 (0) P= .	.2807 (35) P= .051	.2708 (35) P= .058	.1041 (35) P= .276	.0710 (35) P= .343	.2179 (35) P= .104	.1858 (34) P= .146	.3124 (33) P= .038	.2641 (34) P= .066	.1580 (35) P= .182	.2305 (35) P= .091
S3Q2	.2807 (35) P= .051	1.0000 (0) P= .	.6834 (46) P= .000	.5109 (46) P= .000	.5885 (46) P= .000	.5036 (46) P= .000	.6529 (45) P= .000	.5411 (44) P= .000	.5460 (45) P= .000	.5986 (46) P= .000	.4145 (46) P= .002
S3Q3	.2708 (35) P= .058	.6834 (46) P= .000	1.0000 (0) P= .	.8254 (46) P= .000	.7245 (46) P= .000	.6575 (46) P= .000	.7246 (45) P= .000	.6628 (44) P= .000	.7877 (45) P= .000	.8375 (46) P= .000	.6284 (46) P= .000
S3Q4	.1041 (35) P= .276	.5109 (46) P= .000	.8254 (46) P= .000	1.0000 (0) P= .	.6082 (46) P= .000	.5011 (46) P= .000	.5768 (45) P= .000	.5867 (44) P= .000	.7246 (45) P= .000	.7995 (46) P= .000	.5517 (46) P= .000
S3Q5	.0710 (35) P= .343	.5885 (46) P= .000	.7245 (46) P= .000	.6082 (46) P= .000	1.0000 (0) P= .	.7007 (46) P= .000	.7711 (45) P= .000	.6151 (44) P= .000	.4594 (45) P= .001	.6544 (46) P= .000	.4743 (46) P= .000
S3Q6	.2179 (35) P= .104	.5036 (46) P= .000	.6575 (46) P= .000	.5011 (46) P= .000	.7007 (46) P= .000	1.0000 (0) P= .	.6220 (45) P= .000	.7192 (44) P= .000	.5552 (45) P= .000	.6786 (46) P= .000	.4720 (46) P= .000
S3Q7	.1858 (34) P= .146	.6529 (45) P= .000	.7246 (45) P= .000	.5768 (45) P= .000	.7711 (45) P= .000	.6220 (45) P= .000	1.0000 (0) P= .	.5533 (43) P= .000	.4848 (45) P= .000	.6773 (45) P= .000	.5512 (45) P= .000
S3Q8	.3124 (33) P= .038	.5411 (44) P= .000	.6628 (44) P= .000	.5867 (44) P= .000	.6151 (44) P= .000	.7192 (44) P= .000	.5533 (43) P= .000	1.0000 (0) P= .	.5751 (43) P= .000	.6965 (44) P= .000	.3252 (44) P= .016
S3Q9	.2641 (34) P= .066	.5460 (45) P= .000	.7877 (45) P= .000	.7246 (45) P= .000	.4594 (45) P= .001	.5552 (45) P= .000	.4848 (45) P= .000	.5751 (43) P= .000	1.0000 (0) P= .	.7536 (45) P= .000	.4732 (45) P= .001
S3Q10	.1580 (35) P= .182	.5986 (46) P= .000	.8375 (46) P= .000	.7995 (46) P= .000	.6544 (46) P= .000	.6786 (46) P= .000	.6773 (45) P= .000	.6965 (44) P= .000	.7536 (45) P= .000	1.0000 (0) P= .	.7351 (46) P= .000
S3Q11	.2305 (35) P= .091	.4145 (46) P= .002	.6284 (46) P= .000	.5517 (46) P= .000	.4743 (46) P= .000	.4720 (46) P= .000	.5512 (45) P= .000	.3252 (44) P= .016	.4732 (45) P= .001	.7351 (46) P= .000	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S3Q1	S3Q2	S3Q3	S3Q4	S3Q5	S3Q6	S3Q7	S3Q8	S3Q9	S3Q10	S3Q11
S3Q12	.2219 (35) P= .100	.5677 (46) P= .000	.8001 (46) P= .000	.7329 (46) P= .000	.7136 (46) P= .000	.6801 (46) P= .000	.5944 (45) P= .000	.6372 (44) P= .000	.7073 (45) P= .000	.8643 (46) P= .000	.6414 (46) P= .000
S3Q13	.3398 (35) P= .023	.5048 (46) P= .000	.4948 (46) P= .000	.4436 (46) P= .001	.4955 (46) P= .000	.4557 (46) P= .001	.4847 (45) P= .000	.4499 (44) P= .001	.2737 (45) P= .034	.5436 (46) P= .000	.5532 (46) P= .000
S3Q14	.3750 (35) P= .013	.3703 (46) P= .006	.6066 (46) P= .000	.6043 (46) P= .000	.5229 (46) P= .000	.3490 (46) P= .009	.4563 (45) P= .001	.4723 (44) P= .001	.3800 (45) P= .005	.6469 (46) P= .000	.6673 (46) P= .000
S3Q15	.2667 (34) P= .064	.4657 (45) P= .001	.6675 (45) P= .000	.5652 (45) P= .000	.6832 (45) P= .000	.7388 (45) P= .000	.5337 (45) P= .000	.5410 (43) P= .000	.5357 (45) P= .000	.6970 (45) P= .000	.5496 (45) P= .000
S3Q16	.1900 (34) P= .141	.4782 (45) P= .000	.8153 (45) P= .000	.7249 (45) P= .000	.5905 (45) P= .000	.5689 (45) P= .000	.5829 (44) P= .000	.6301 (44) P= .000	.7705 (44) P= .000	.8191 (45) P= .000	.5919 (45) P= .000
S3Q17	.0189 (34) P= .458	.3937 (34) P= .011	.7470 (34) P= .000	.7216 (34) P= .000	.5722 (34) P= .000	.5622 (34) P= .000	.5452 (33) P= .001	.5729 (32) P= .000	.5952 (33) P= .000	.7385 (34) P= .000	.5202 (34) P= .001
S3Q18	-.0536 (34) P= .382	.4087 (34) P= .008	.5471 (34) P= .000	.5326 (34) P= .001	.2829 (34) P= .052	.2431 (34) P= .083	.3481 (33) P= .024	.4330 (32) P= .007	.5471 (33) P= .000	.5969 (34) P= .000	.3625 (34) P= .018
S3Q19	-.0105 (34) P= .476	.3931 (34) P= .011	.5156 (34) P= .001	.3893 (34) P= .011	.3802 (34) P= .013	.4162 (34) P= .007	.3962 (33) P= .011	.4628 (32) P= .004	.5022 (33) P= .001	.5295 (34) P= .001	.3836 (34) P= .013
S3Q20	.0771 (34) P= .332	.4392 (34) P= .005	.6291 (34) P= .000	.4787 (34) P= .002	.4321 (34) P= .005	.5308 (34) P= .001	.4394 (33) P= .005	.4328 (32) P= .007	.4053 (33) P= .010	.5915 (34) P= .000	.4564 (34) P= .003
S3Q21	.0908 (34) P= .305	.6311 (34) P= .000	.6440 (34) P= .000	.6581 (34) P= .000	.6390 (34) P= .000	.5803 (34) P= .000	.6779 (33) P= .000	.6341 (32) P= .000	.4704 (33) P= .003	.7165 (34) P= .000	.5115 (34) P= .001
S3Q22	.2100 (34) P= .117	.7168 (34) P= .000	.7778 (34) P= .000	.6419 (34) P= .000	.7306 (34) P= .000	.5521 (34) P= .000	.8005 (33) P= .000	.6456 (32) P= .000	.5381 (33) P= .001	.6594 (34) P= .000	.4726 (34) P= .002

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:10:57 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S3Q12	S3Q13	S3Q14	S3Q15	S3Q16	S3Q17	S3Q18	S3Q19	S3Q20	S3Q21	S3Q22
S3Q1	.2219	.3398	.3750	.2667	.1900	.0189	-.0536	-.0105	.0771	.0908	.2100
	(35)	(35)	(35)	(34)	(34)	(34)	(34)	(34)	(34)	(34)	(34)
	P= .100	P= .023	P= .013	P= .064	P= .141	P= .458	P= .382	P= .476	P= .332	P= .305	P= .117
S3Q2	.5677	.5048	.3703	.4657	.4782	.3937	.4087	.3931	.4392	.6311	.7168
	(46)	(46)	(46)	(45)	(45)	(34)	(34)	(34)	(34)	(34)	(34)
	P= .000	P= .000	P= .006	P= .001	P= .000	P= .011	P= .008	P= .011	P= .005	P= .000	P= .000
S3Q3	.8001	.4948	.6066	.6675	.8153	.7470	.5421	.5156	.6291	.6448	.7778
	(46)	(46)	(46)	(45)	(45)	(34)	(34)	(34)	(34)	(34)	(34)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .001	P= .000	P= .000	P= .000
S3Q4	.7329	.4436	.6043	.5652	.7249	.7216	.5326	.3893	.4787	.6581	.6419
	(46)	(46)	(46)	(45)	(45)	(34)	(34)	(34)	(34)	(34)	(34)
	P= .000	P= .001	P= .000	P= .000	P= .000	P= .000	P= .001	P= .011	P= .002	P= .000	P= .000
S3Q5	.7136	.4955	.5229	.6832	.5905	.5722	.2829	.3802	.4321	.6390	.7306
	(46)	(46)	(46)	(45)	(45)	(34)	(34)	(34)	(34)	(34)	(34)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .052	P= .013	P= .005	P= .000	P= .000
S3Q6	.6801	.4557	.3490	.7388	.5689	.5622	.2431	.4162	.5308	.5803	.5521
	(46)	(46)	(46)	(45)	(45)	(34)	(34)	(34)	(34)	(34)	(34)
	P= .000	P= .001	P= .009	P= .000	P= .000	P= .000	P= .083	P= .007	P= .001	P= .000	P= .000
S3Q7	.5944	.4847	.4563	.5337	.5829	.5452	.3481	.3962	.4394	.6779	.8005
	(45)	(45)	(45)	(45)	(44)	(33)	(33)	(33)	(33)	(33)	(33)
	P= .000	P= .000	P= .001	P= .000	P= .000	P= .001	P= .024	P= .011	P= .005	P= .000	P= .000
S3Q8	.6372	.4499	.4723	.5410	.6301	.5729	.4330	.4628	.4328	.6341	.6456
	(44)	(44)	(44)	(43)	(44)	(32)	(32)	(32)	(32)	(32)	(32)
	P= .000	P= .001	P= .001	P= .000	P= .000	P= .000	P= .007	P= .004	P= .007	P= .000	P= .000
S3Q9	.7073	.2737	.3800	.5357	.7705	.5952	.5471	.5022	.4053	.4704	.5381
	(45)	(45)	(45)	(45)	(44)	(33)	(33)	(33)	(3)	(33)	(33)
	P= .000	P= .034	P= .005	P= .000	P= .000	P= .000	P= .000	P= .001	P= .010	P= .003	P= .001
S3Q10	.8643	.5436	.6469	.6970	.8191	.7385	.5969	.5295	.5915	.7165	.6594
	(46)	(46)	(46)	(45)	(45)	(34)	(34)	(34)	(34)	(34)	(34)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .001	P= .000	P= .000	P= .000
S3Q11	.6414	.5532	.6673	.5496	.5919	.5202	.3625	.3836	.4564	.5115	.4726
	(46)	(46)	(46)	(45)	(45)	(34)	(34)	(34)	(34)	(34)	(34)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .001	P= .018	P= .013	P= .003	P= .001	P= .002

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:10:57 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - -

	S3Q12	S3Q13	S3Q14	S3Q15	S3Q16	S3Q17	S3Q18	S3Q19	S3Q20	S3Q21	S3Q22
S3Q12	1.0000	.5688	.6212	.7561	.6769	.7755	.5669	.5502	.5668	.7175	.6605
	(0)	(46)	(46)	(45)	(45)	(34)	(34)	(34)	(34)	(34)	(34)
	P= .	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
S3Q13	.5688	1.0000	.6581	.5628	.3625	.3730	.2377	.1098	.2793	.4568	.4169
	(46)	(0)	(46)	(45)	(45)	(34)	(34)	(34)	(34)	(34)	(34)
	P= .000	P= .	P= .000	P= .000	P= .007	P= .015	P= .088	P= .268	P= .055	P= .003	P= .007
S3Q14	.6212	.6581	1.0000	.5085	.5623	.4221	.2334	.2395	.3276	.5148	.5284
	(46)	(46)	(0)	(45)	(45)	(34)	(34)	(34)	(34)	(34)	(34)
	P= .000	P= .000	P= .	P= .000	P= .000	P= .006	P= .092	P= .086	P= .029	P= .001	P= .001
S3Q15	.7561	.5628	.5085	1.0000	.6559	.6257	.4025	.4514	.6545	.6632	.6183
	(45)	(45)	(45)	(0)	(44)	(33)	(33)	(33)	(33)	(33)	(33)
	P= .000	P= .000	P= .000	P= .	P= .000	P= .000	P= .010	P= .004	P= .000	P= .000	P= .000
S3Q16	.6769	.3625	.5623	.6559	1.0000	.7661	.4923	.4269	.5603	.5177	.5836
	(45)	(45)	(45)	(44)	(0)	(33)	(33)	(33)	(33)	(33)	(33)
	P= .000	P= .007	P= .000	P= .000	P= .	P= .000	P= .002	P= .007	P= .000	P= .001	P= .000
S3Q17	.7755	.3730	.4221	.6257	.7661	1.0000	.7060	.5244	.6822	.6132	.5730
	(34)	(34)	(34)	(33)	(33)	(0)	(33)	(33)	(34)	(34)	(34)
	P= .000	P= .015	P= .006	P= .000	P= .000	P= .	P= .000	P= .001	P= .000	P= .000	P= .000
S3Q18	.5669	.2377	.2334	.4025	.4923	.7060	1.0000	.7403	.4961	.5005	.5068
	(34)	(34)	(34)	(33)	(33)	(33)	(0)	(34)	(33)	(33)	(33)
	P= .000	P= .088	P= .092	P= .010	P= .002	P= .000	P= .	P= .000	P= .002	P= .002	P= .001
S3Q19	.5502	.1098	.2395	.4514	.4269	.5244	.7403	1.0000	.6054	.5148	.5459
	(34)	(34)	(34)	(33)	(33)	(33)	(34)	(0)	(33)	(33)	(33)
	P= .000	P= .268	P= .086	P= .004	P= .007	P= .001	P= .000	P= .	P= .000	P= .001	P= .001
S3Q20	.5668	.2793	.3276	.6545	.5603	.6822	.4961	.6054	1.0000	.5822	.6396
	(34)	(34)	(34)	(33)	(33)	(34)	(33)	(33)	(0)	(34)	(34)
	P= .000	P= .055	P= .029	P= .000	P= .000	P= .000	P= .002	P= .000	P= .	P= .000	P= .000
S3Q21	.7175	.4568	.5148	.6632	.5177	.6132	.5005	.5148	.5822	1.0000	.7290
	(34)	(34)	(34)	(33)	(33)	(34)	(33)	(33)	(34)	(0)	(34)
	P= .000	P= .003	P= .001	P= .000	P= .001	P= .000	P= .002	P= .001	P= .000	P= .	P= .000
S3Q22	.6605	.4169	.5284	.6183	.5836	.5730	.5068	.5459	.6396	.7290	1.0000
	(34)	(34)	(34)	(33)	(33)	(34)	(33)	(33)	(34)	(34)	(0)
	P= .000	P= .007	P= .001	P= .000	P= .000	P= .000	P= .001	P= .001	P= .000	P= .000	P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

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11 APR 89   SPSS-X RELEASE 2.2  FOR IBM VM/CMS
14:10:57    U.W.O. SCHOOL OF BUSINESS      IBM 4381 MOD 13  VM/SP CMS
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	S4Q1	S4Q2	S4Q3	S4Q4	S4Q5	S4Q6	S4Q7	S4Q8	S4Q9	S4Q10
S4Q1	1.0000	.4667	-.0072	-.2809	.1125	.4134	.5648	.3131	.0845	.1397
	(0)	(42)	(43)	(43)	(32)	(30)	(30)	(30)	(30)	(32)
	P= .	P= .001	P= .482	P= .034	P= .270	P= .012	P= .001	P= .046	P= .329	P= .223
S4Q2	.4667	1.0000	-.0015	-.1696	.2681	-.0420	.0940	.2834	.0464	.3570
	(42)	(0)	(43)	(43)	(32)	(30)	(31)	(30)	(30)	(32)
	P= .001	P= .	P= .496	P= .138	P= .069	P= .413	P= .308	P= .065	P= .404	P= .022
S4Q3	-.0072	-.0015	1.0000	.5335	.2553	.2940	.2751	.5450	.3703	.3134
	(43)	(43)	(0)	(44)	(33)	(31)	(31)	(31)	(31)	(33)
	P= .482	P= .496	P= .	P= .000	P= .076	P= .054	P= .067	P= .001	P= .020	P= .038
S4Q4	-.2809	-.1696	.5335	1.0000	-.0938	.3657	.1587	.3697	.6252	-.0394
	(43)	(43)	(44)	(0)	(33)	(31)	(31)	(31)	(31)	(33)
	P= .034	P= .138	P= .000	P= .	P= .302	P= .022	P= .197	P= .020	P= .000	P= .414
S4Q5	.1125	.2681	.2553	-.0938	1.0000	.0516	.0919	.5122	-.2123	.2234
	(32)	(32)	(33)	(33)	(0)	(31)	(31)	(31)	(31)	(33)
	P= .270	P= .069	P= .076	P= .302	P= .	P= .391	P= .312	P= .002	P= .126	P= .106
S4Q6	.4134	-.0420	.2940	.3657	.0516	1.0000	.7706	.4027	.7136	.3174
	(30)	(30)	(31)	(31)	(31)	(0)	(30)	(30)	(31)	(31)
	P= .012	P= .413	P= .054	P= .022	P= .391	P= .	P= .000	P= .014	P= .000	P= .041
S4Q7	.5648	.0940	.2751	.1587	.0919	.7706	1.0000	.6357	.4929	-.1368
	(30)	(31)	(31)	(31)	(31)	(30)	(0)	(30)	(30)	(31)
	P= .001	P= .308	P= .067	P= .197	P= .312	P= .000	P= .	P= .000	P= .003	P= .232
S4Q8	.3131	.2834	.5450	.3697	.5122	.4027	.6357	1.0000	.4093	.1629
	(30)	(30)	(31)	(31)	(31)	(30)	(30)	(0)	(30)	(31)
	P= .046	P= .065	P= .001	P= .020	P= .002	P= .014	P= .000	P= .	P= .012	P= .191
S4Q9	.0845	.0464	.3703	.6252	-.2123	.7136	.4929	.4093	1.0000	-.2528
	(30)	(30)	(31)	(31)	(31)	(31)	(30)	(30)	(0)	(31)
	P= .329	P= .404	P= .020	P= .000	P= .126	P= .000	P= .003	P= .012	P= .	P= .085
S4Q10	.1397	.3570	.3134	-.0394	.2234	-.3174	-.1368	.1629	-.2528	1.0000
	(32)	(32)	(33)	(33)	(33)	(31)	(31)	(31)	(31)	(0)
	P= .223	P= .022	P= .038	P= .414	P= .106	P= .041	P= .232	P= .191	P= .085	P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:10:58 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S5Q1	S5Q2	S5Q3	S5Q4	S5Q5	S5Q6	S5Q7	S5Q8	S5Q9	S5Q10	S5Q11
S5Q1	1.0000 (0) P= .	-.1555 (34) P= .190	-.2320 (34) P= .093	-.1439 (34) P= .208	-.2110 (34) P= .115	-.0584 (33) P= .374	-.0799 (33) P= .329	-.1049 (33) P= .281	-.1934 (33) P= .140	-.1827 (34) P= .151	-.2239 (34) P= .102
S5Q2	-.1555 (34) P= .190	1.0000 (0) P= .	.4944 (45) P= .000	.4896 (45) P= .000	.2978 (45) P= .023	.2491 (44) P= .052	.2868 (44) P= .030	.3314 (43) P= .015	.4232 (44) P= .002	.4447 (45) P= .001	.3903 (45) P= .004
S5Q3	-.2320 (34) P= .093	.4944 (45) P= .000	1.0000 (0) P= .	.7310 (45) P= .000	.5633 (45) P= .000	.2950 (44) P= .026	.5971 (44) P= .000	.5752 (43) P= .000	.7727 (44) P= .000	.5495 (45) P= .000	.6784 (45) P= .000
S5Q4	-.1439 (34) P= .208	.4896 (45) P= .000	.7310 (45) P= .000	1.0000 (0) P= .	.5600 (45) P= .000	.3223 (44) P= .016	.6391 (44) P= .000	.4942 (43) P= .000	.6924 (44) P= .000	.4185 (45) P= .002	.4455 (45) P= .001
S5Q5	-.2110 (34) P= .115	.2978 (45) P= .023	.5633 (45) P= .000	.5600 (45) P= .000	1.0000 (0) P= .	.7125 (44) P= .000	.7350 (44) P= .000	.5250 (43) P= .000	.5525 (44) P= .000	.4927 (45) P= .000	.5734 (45) P= .000
S5Q6	-.0584 (33) P= .374	.2491 (44) P= .052	.2950 (44) P= .026	.3223 (44) P= .016	.7125 (44) P= .000	1.0000 (0) P= .	.4104 (44) P= .003	.6199 (42) P= .000	.3719 (44) P= .006	.3927 (44) P= .004	.4090 (44) P= .003
S5Q7	-.0799 (33) P= .329	.2868 (44) P= .030	.5971 (44) P= .000	.6391 (44) P= .000	.7350 (44) P= .000	.4104 (44) P= .003	1.0000 (0) P= .	.3576 (42) P= .010	.5000 (44) P= .000	.4810 (44) P= .000	.4511 (44) P= .001
S5Q8	-.1049 (33) P= .281	.3314 (43) P= .015	.5752 (43) P= .000	.4942 (43) P= .000	.5250 (43) P= .000	.6199 (42) P= .000	.3576 (42) P= .010	1.0000 (0) P= .	.5834 (42) P= .000	.3105 (43) P= .021	.4283 (43) P= .002
S5Q9	-.1934 (33) P= .140	.4232 (44) P= .002	.7727 (44) P= .000	.6924 (44) P= .000	.5525 (44) P= .000	.3719 (44) P= .006	.5000 (44) P= .000	.5834 (42) P= .000	1.0000 (0) P= .	.6324 (44) P= .000	.6125 (44) P= .000
S5Q10	-.1827 (34) P= .151	.4447 (45) P= .001	.5495 (45) P= .000	.4185 (45) P= .002	.4927 (45) P= .000	.3927 (44) P= .004	.4810 (44) P= .000	.3105 (43) P= .021	.6324 (44) P= .000	1.0000 (0) P= .	.7657 (45) P= .000
S5Q11	-.2239 (34) P= .102	.3903 (45) P= .004	.6784 (45) P= .000	.4455 (45) P= .001	.5734 (45) P= .000	.4090 (44) P= .003	.4511 (44) P= .001	.4283 (43) P= .002	.6125 (44) P= .000	.7657 (45) P= .000	1.0000 (0) P= .

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11 APR 89   SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:10:58   U.W.O. SCHOOL OF BUSINESS   IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S5Q1	S5Q2	S5Q3	S5Q4	S5Q5	S5Q6	S5Q7	S5Q8	S5Q9	S5Q10	S5Q11
S5Q12	-.2098	.2028	.5015	.4206	.5855	.4468	.4026	.4258	.6611	.6809	.7380
	(34)	(45)	(45)	(45)	(45)	(44)	(44)	(43)	(44)	(45)	(45)
	P= .117	P= .091	P= .000	P= .002	P= .000	P= .001	P= .003	P= .002	P= .000	P= .000	P= .000
S5Q13	-.1159	.3447	.3351	.3168	.4687	.5310	.2415	.5146	.3885	.2961	.3217
	(34)	(44)	(44)	(44)	(44)	(43)	(43)	(42)	(43)	(44)	(44)
	P= .257	P= .011	P= .013	P= .018	P= .001	P= .000	P= .059	P= .000	P= .005	P= .026	P= .017
S5Q14	-.0705	.3520	.4283	.3228	.3622	.1661	.3806	.2590	.3861	.6047	.4261
	(34)	(45)	(45)	(45)	(45)	(44)	(44)	(43)	(44)	(45)	(45)
	P= .346	P= .009	P= .002	P= .015	P= .007	P= .141	P= .005	P= .047	P= .005	P= .000	P= .002
S5Q15	-.1501	.2781	.6121	.5030	.6938	.5175	.5249	.6071	.6077	.5263	.6191
	(34)	(45)	(45)	(45)	(45)	(44)	(44)	(43)	(44)	(45)	(45)
	P= .198	P= .032	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
S5Q16	-.2442	.3085	.6934	.4865	.6195	.4594	.4431	.5480	.7362	.6286	.5629
	(34)	(45)	(45)	(45)	(45)	(44)	(44)	(43)	(44)	(45)	(45)
	P= .082	P= .020	P= .000	P= .000	P= .000	P= .001	P= .001	P= .000	P= .000	P= .000	P= .000
S5Q17	-.0239	.1633	.2949	.3757	.3715	.2973	.2816	.2055	.4669	.5137	.2217
	(34)	(34)	(34)	(34)	(34)	(33)	(33)	(33)	(33)	(34)	(34)
	P= .447	P= .178	P= .045	P= .014	P= .015	P= .046	P= .056	P= .126	P= .003	P= .001	P= .104
S5Q18	-.0168	.1000	.3274	.3703	.3307	.4054	.3041	.3348	.2011	.2560	.1159
	(34)	(34)	(34)	(34)	(34)	(33)	(33)	(33)	(33)	(34)	(34)
	P= .462	P= .287	P= .029	P= .016	P= .028	P= .010	P= .043	P= .028	P= .131	P= .072	P= .257
S5Q19	-.0297	.1246	.1475	.4281	.3344	.3490	.2875	.1686	.1459	.1512	.0396
	(34)	(34)	(34)	(34)	(34)	(33)	(33)	(33)	(33)	(34)	(34)
	P= .434	P= .241	P= .203	P= .006	P= .027	P= .023	P= .052	P= .174	P= .209	P= .197	P= .412
S5Q20	.0149	.0779	.2085	.0199	.1548	.0349	.1378	.0402	.0402	.2733	.1424
	(34)	(34)	(34)	(34)	(34)	(33)	(33)	(33)	(33)	(34)	(34)
	P= .467	P= .331	P= .118	P= .456	P= .191	P= .423	P= .222	P= .412	P= .412	P= .059	P= .211
S5Q21	-.1105	.4103	.5010	.5410	.6416	.3800	.5681	.3832	.5470	.5944	.6688
	(34)	(34)	(34)	(34)	(34)	(33)	(33)	(33)	(33)	(34)	(34)
	P= .267	P= .008	P= .001	P= .000	P= .000	P= .015	P= .000	P= .014	P= .000	P= .000	P= .000
S5Q22	-.1351	.2126	.6487	.4685	.6362	.4744	.5966	.4988	.6177	.4739	.5154
	(34)	(34)	(34)	(34)	(34)	(33)	(33)	(33)	(33)	(34)	(34)
	P= .223	P= .114	P= .000	P= .003	P= .000	P= .003	P= .000	P= .002	P= .000	P= .002	P= .001

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11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:10:58 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S5Q12	S5Q13	S5Q14	S5Q15	S5Q16	S5Q17	S5Q18	S5Q19	S5Q20	S5Q21	S5Q22
S5Q1	-.2098 (34) P= .117	-.1159 (34) P= .257	-.0705 (34) P= .346	-.1501 (34) P= .198	-.2442 (34) P= .082	-.0239 (34) P= .447	-.0168 (34) P= .462	-.0297 (34) P= .434	.0149 (34) P= .467	-.1105 (34) P= .267	-.1351 (34) P= .223
S5Q2	.2028 (45) P= .091	.3447 (44) P= .011	.3520 (45) P= .009	.2781 (45) P= .032	.3085 (45) P= .020	.1633 (34) P= .178	.1000 (34) P= .287	.1246 (34) P= .241	.0779 (34) P= .331	.4103 (34) P= .008	.2126 (34) P= .114
S5Q3	.5015 (45) P= .000	.3351 (44) P= .013	.4283 (45) P= .002	.6121 (45) P= .000	.6934 (45) P= .000	.2949 (34) P= .045	.3274 (34) P= .029	.1475 (34) P= .203	.2085 (34) P= .118	.5010 (34) P= .001	.6487 (34) P= .000
S5Q4	.4206 (45) P= .002	.3168 (44) P= .018	.3228 (45) P= .015	.5030 (45) P= .000	.4865 (45) P= .000	.3757 (34) P= .014	.3703 (34) P= .016	.4281 (34) P= .006	.0199 (34) P= .456	.5410 (34) P= .000	.4685 (34) P= .003
S5Q5	.5855 (45) P= .000	.4687 (44) P= .001	.3622 (45) P= .007	.6938 (45) P= .000	.6195 (45) P= .000	.3715 (34) P= .015	.3307 (34) P= .028	.3344 (34) P= .027	.1548 (34) P= .191	.6416 (34) P= .000	.6362 (34) P= .000
S5Q6	.4468 (44) P= .001	.5310 (43) P= .000	.1661 (44) P= .141	.5175 (44) P= .000	.4594 (44) P= .001	.2973 (33) P= .046	.4054 (33) P= .010	.3490 (33) P= .023	.0349 (33) P= .423	.3800 (33) P= .015	.4744 (33) P= .003
S5Q7	.4026 (44) P= .003	.2415 (43) P= .059	.3886 (44) P= .005	.5249 (44) P= .000	.4431 (44) P= .001	.2816 (33) P= .056	.3041 (33) P= .043	.2875 (33) P= .052	.1378 (33) P= .222	.5681 (33) P= .000	.5966 (33) P= .000
S5Q8	.4258 (43) P= .002	.5146 (42) P= .000	.2590 (43) P= .047	.6071 (43) P= .000	.5480 (43) P= .000	.2055 (33) P= .126	.3348 (33) P= .028	.1686 (33) P= .174	.0402 (33) P= .412	.3832 (33) P= .014	.4988 (33) P= .002
S5Q9	.6611 (44) P= .000	.3885 (43) P= .005	.3861 (44) P= .005	.6077 (44) P= .000	.7362 (44) P= .000	.4669 (33) P= .003	.2011 (33) P= .131	.1459 (33) P= .209	.0402 (33) P= .412	.5470 (33) P= .000	.6177 (33) P= .000
S5Q10	.6809 (45) P= .000	.2961 (44) P= .026	.6047 (45) P= .000	.5263 (45) P= .000	.6286 (45) P= .000	.5137 (34) P= .001	.2560 (34) P= .072	.1512 (34) P= .197	.2733 (34) P= .059	.5944 (34) P= .000	.4739 (34) P= .002
S5Q11	.7380 (45) P= .000	.3217 (44) P= .017	.4261 (45) P= .002	.6191 (45) P= .000	.5629 (45) P= .000	.2217 (34) P= .104	.1159 (34) P= .257	.0396 (34) P= .412	.1424 (34) P= .211	.6688 (34) P= .000	.5154 (34) P= .001

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11 APR 89   SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:10:58   U.W.O. SCHOOL OF BUSINESS   IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S5Q12	S5Q13	S5Q14	S5Q15	S5Q16	S5Q17	S5Q18	S5Q19	S5Q20	S5Q21	S5Q22
S5Q12	1.0000 (0) P= .	.3610 (44) P= .008	.2582 (45) P= .043	.5271 (45) P= .000	.6073 (45) P= .000	.5085 (34) P= .001	.1846 (34) P= .148	.1954 (34) P= .134	.2856 (34) P= .051	.6340 (34) P= .000	.4487 (34) P= .004
S5Q13	.3610 (44) P= .008	1.0000 (0) P= .	.3691 (44) P= .007	.5533 (44) P= .000	.4095 (44) P= .003	.3154 (34) P= .035	.2300 (34) P= .095	.1798 (34) P= .154	.2660 (34) P= .064	.2649 (34) P= .065	.4137 (34) P= .008
S5Q14	.2582 (45) P= .043	.3691 (44) P= .007	1.0000 (0) P= .	.4933 (45) P= .000	.5019 (45) P= .000	.3378 (34) P= .025	.3294 (34) P= .029	.2508 (34) P= .076	.3719 (34) P= .015	.6626 (34) P= .000	.4739 (34) P= .002
S5Q15	.5271 (45) P= .000	.5533 (44) P= .000	.4933 (45) P= .000	1.0000 (0) P= .	.7182 (45) P= .000	.4126 (34) P= .008	.3629 (34) P= .017	.3193 (34) P= .033	.2336 (34) P= .092	.6658 (34) P= .000	.6596 (34) P= .000
S5Q16	.6073 (45) P= .000	.4095 (44) P= .003	.5019 (45) P= .000	.7182 (45) P= .000	1.0000 (0) P= .	.4616 (34) P= .003	.4170 (34) P= .007	.2535 (34) P= .074	.3107 (34) P= .037	.5130 (34) P= .001	.6040 (34) P= .000
S5Q17	.5085 (34) P= .001	.3154 (34) P= .035	.3378 (34) P= .025	.4126 (34) P= .008	.4616 (34) P= .003	1.0000 (0) P= .	.5592 (34) P= .000	.4514 (34) P= .004	.6127 (34) P= .000	.3435 (34) P= .023	.2219 (34) P= .104
S5Q18	.1846 (34) P= .148	.2300 (34) P= .095	.3294 (34) P= .029	.3629 (34) P= .017	.4170 (34) P= .007	.5592 (34) P= .000	1.0000 (0) P= .	.8370 (34) P= .000	.5988 (34) P= .000	.2925 (34) P= .047	.1951 (34) P= .134
S5Q19	.1954 (34) P= .134	.1798 (34) P= .154	.2508 (34) P= .076	.3193 (34) P= .033	.2535 (34) P= .074	.4514 (34) P= .004	.8370 (34) P= .000	1.0000 (0) P= .	.4109 (34) P= .008	.3669 (34) P= .016	.0735 (34) P= .340
S5Q20	.2856 (34) P= .051	.2660 (34) P= .064	.3719 (34) P= .015	.2336 (34) P= .092	.3107 (34) P= .037	.6127 (34) P= .000	.5988 (34) P= .000	.4109 (34) P= .008	1.0000 (0) P= .	.2542 (34) P= .073	.2758 (34) P= .057
S5Q21	.6340 (34) P= .000	.2649 (34) P= .065	.6626 (34) P= .000	.6658 (34) P= .000	.5130 (34) P= .001	.3435 (34) P= .023	.2925 (34) P= .047	.3669 (34) P= .016	.2542 (34) P= .073	1.0000 (0) P= .	.5083 (34) P= .001
S5Q22	.4487 (34) P= .004	.4137 (34) P= .008	.4739 (34) P= .002	.6596 (34) P= .000	.6040 (34) P= .000	.2219 (34) P= .104	.1951 (34) P= .134	.0735 (34) P= .340	.2758 (34) P= .057	.5083 (34) P= .001	1.0000 (0) P= .

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- - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S6Q1	S6Q2	S6Q3	S6Q4	S6Q5	S6Q6	S6Q7	S6Q8	S6Q9	S6Q10	S6Q11
S6Q1	1.0000 (0) P= .	.7939 (38) P= .000	.5481 (40) P= .000	.6701 (41) P= .000	.4540 (42) P= .001	.6399 (40) P= .000	.3376 (38) P= .019	.5745 (40) P= .000	.0179 (32) P= .461	.5619 (31) P= .001	.4842 (32) P= .002
S6Q2	.7939 (38) P= .000	1.0000 (0) P= .	.5744 (38) P= .000	.6170 (38) P= .000	.4646 (39) P= .001	.6730 (37) P= .000	.3928 (38) P= .007	.4456 (38) P= .003	.1217 (29) P= .265	.5023 (28) P= .003	.4010 (28) P= .017
S6Q3	.5481 (40) P= .000	.5744 (38) P= .000	1.0000 (0) P= .	.7538 (40) P= .000	.5522 (41) P= .000	.5559 (40) P= .000	.3090 (38) P= .030	.6379 (40) P= .000	-.1437 (31) P= .220	.5416 (31) P= .001	.3614 (30) P= .025
S6Q4	.6701 (41) P= .000	.6170 (38) P= .000	.7538 (40) P= .000	1.0000 (0) P= .	.5150 (41) P= .000	.8130 (40) P= .000	.3537 (38) P= .015	.6665 (40) P= .000	-.1952 (31) P= .146	.5286 (30) P= .001	.3859 (31) P= .016
S6Q5	.4540 (42) P= .001	.4646 (39) P= .001	.5522 (41) P= .000	.5150 (41) P= .000	1.0000 (0) P= .	.5123 (40) P= .000	.3531 (39) P= .014	.2950 (41) P= .031	.1192 (33) P= .254	.7965 (32) P= .000	.3986 (32) P= .012
S6Q6	.6399 (40) P= .000	.6730 (37) P= .000	.5559 (40) P= .000	.8130 (40) P= .000	.5123 (40) P= .000	1.0000 (0) P= .	.3736 (37) P= .011	.5386 (39) P= .000	.0950 (30) P= .309	.5336 (30) P= .001	.4550 (30) P= .006
S6Q7	.3376 (38) P= .019	.3928 (38) P= .007	.3090 (38) P= .030	.3537 (38) P= .015	.3531 (39) P= .014	.3736 (37) P= .011	1.0000 (0) P= .	.3932 (39) P= .007	-.0879 (29) P= .325	.5815 (28) P= .001	.4615 (28) P= .007
S6Q8	.5745 (40) P= .000	.4456 (38) P= .003	.6379 (40) P= .000	.6665 (40) P= .000	.2950 (41) P= .031	.5386 (39) P= .000	.3932 (39) P= .007	1.0000 (0) P= .	-.1142 (31) P= .270	.4594 (30) P= .005	.1755 (30) P= .177
S6Q9	.0179 (32) P= .461	.1217 (29) P= .265	-.1437 (31) P= .220	.1952 (31) P= .146	.1192 (33) P= .254	-.0950 (30) P= .309	-.0879 (29) P= .325	-.1142 (31) P= .270	1.0000 (0) P= .	.1031 (32) P= .287	.1564 (32) P= .196
S6Q10	.5619 (31) P= .001	.5023 (28) P= .003	.5416 (31) P= .001	.5286 (30) P= .001	.7965 (32) P= .000	.5336 (30) P= .001	.5815 (28) P= .001	.4594 (30) P= .005	.1031 (32) P= .287	1.0000 (0) P= .	.5251 (31) P= .001
S6Q11	.4842 (32) P= .002	.4010 (28) P= .017	.3614 (30) P= .025	.3859 (31) P= .016	.3986 (32) P= .012	.4550 (30) P= .006	.4615 (28) P= .007	.1755 (30) P= .177	.1564 (32) P= .196	.5251 (31) P= .001	1.0000 (0) P= .

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11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:17:03 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

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	S6Q1	S6Q2	S6Q3	S6Q4	S6Q5	S6Q6	S6Q7	S6Q8	S6Q9	S6Q10	S6Q11
S6Q12	.5414	.5095	.4760	.6252	.4147	.7216	.4983	.5799	-.0848	.4824	.6605
	(30)	(26)	(29)	(29)	(30)	(29)	(26)	(28)	(30)	(30)	(30)
	P= .001	P= .004	P= .005	P= .000	P= .011	P= .000	P= .005	P= .001	P= .328	P= .003	P= .000
S6Q13	.5482	.4106	.6472	.6384	.3580	.3739	.3541	.6789	-.1489	.4280	.0992
	(32)	(28)	(30)	(31)	(32)	(30)	(28)	(30)	(32)	(31)	(32)
	P= .001	P= .015	P= .000	P= .000	P= .022	P= .021	P= .032	P= .000	P= .208	P= .008	P= .294
S6Q14	.4218	.5336	.5729	.6023	.4077	.6079	.5380	.7570	-.3128	.4883	.0177
	(30)	(27)	(30)	(29)	(31)	(29)	(27)	(29)	(31)	(31)	(30)
	P= .010	P= .002	P= .000	P= .000	P= .011	P= .000	P= .002	P= .000	P= .043	P= .003	P= .463
S6Q15	.3473	.2344	.3281	.2479	.4632	.1865	.0168	.4003	-.0234	.2150	.1773
	(30)	(27)	(29)	(29)	(30)	(29)	(27)	(28)	(30)	(30)	(30)
	P= .030	P= .120	P= .041	P= .097	P= .005	P= .166	P= .467	P= .017	P= .451	P= .127	P= .174
S6Q16	.4288	.4551	.4257	.4647	.5532	.6397	.3670	.7098	.0782	.5023	.3999
	(28)	(27)	(28)	(28)	(28)	(28)	(26)	(27)	(28)	(28)	(28)
	P= .011	P= .009	P= .012	P= .006	P= .001	P= .000	P= .033	P= .000	P= .346	P= .003	P= .018
S6Q17	.3904	.3143	.4505	.4688	.2750	.4673	.4298	.8497	-.2362	.3645	.1405
	(31)	(27)	(29)	(30)	(31)	(29)	(27)	(29)	(31)	(30)	(31)
	P= .015	P= .055	P= .007	P= .004	P= .067	P= .005	P= .013	P= .000	P= .100	P= .024	P= .225
S6Q18	.5686	.5882	.6199	.4181	.6008	.4687	.3502	.4671	.2023	.7380	.5795
	(32)	(29)	(31)	(31)	(33)	(30)	(29)	(31)	(33)	(32)	(32)
	P= .000	P= .000	P= .000	P= .010	P= .000	P= .005	P= .031	P= .004	P= .130	P= .000	P= .000
S6Q19	.6075	.6096	.6082	.6096	.6231	.5007	.3731	.3782	.0997	.5974	.5767
	(32)	(29)	(31)	(31)	(33)	(30)	(29)	(31)	(33)	(32)	(32)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .002	P= .023	P= .018	P= .290	P= .000	P= .000
S6Q20	.6387	.5316	.7078	.6073	.5807	.3771	.2977	.6743	.1621	.6599	.5032
	(31)	(28)	(31)	(30)	(32)	(30)	(28)	(30)	(32)	(32)	(31)
	P= .000	P= .002	P= .000	P= .000	P= .000	P= .020	P= .062	P= .000	P= .188	P= .000	P= .002
S6Q21	.4312	.5455	.6109	.4895	.5131	.5817	.5176	.6472	.0083	.6846	.3358
	(30)	(27)	(30)	(29)	(31)	(29)	(27)	(29)	(31)	(31)	(30)
	P= .009	P= .002	P= .000	P= .004	P= .002	P= .000	P= .003	P= .000	P= .482	P= .000	P= .035
S6Q22	.4097	.5409	.5147	.4252	.6648	.4979	.3714	.2882	.1897	.7490	.5362
	(32)	(29)	(31)	(31)	(33)	(30)	(29)	(31)	(33)	(32)	(32)
	P= .010	P= .001	P= .002	P= .009	P= .000	P= .003	P= .024	P= .058	P= .145	P= .000	P= .001

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	S6Q1	S6Q2	S6Q3	S6Q4	S6Q5	S6Q6	S6Q7	S6Q8	S6Q9	S6Q10	S6Q11
S6Q23	.5761	.5388	.8115	.7675	.3637	.4981	.5420	.7558	-.1142	.5559	.1436
	(29)	(27)	(28)	(28)	(30)	(27)	(27)	(28)	(30)	(29)	(29)
	P= .001	P= .002	P= .000	P= .000	P= .024	P= .004	P= .002	P= .000	P= .274	P= .001	P= .229
S6Q24	.3472	.3651	.4602	.4995	.5303	.3438	.4928	.5640	.1327	.5384	.2824
	(32)	(29)	(31)	(31)	(33)	(30)	(29)	(31)	(33)	(32)	(32)
	P= .026	P= .026	P= .005	P= .002	P= .00[illegible]	P= .031	P= .003	P= .000	P= .231	P= .001	P= .059
S6Q25	.3934	.6047	.5878	.4904	.4859	.4381	.4385	.6750	.2092	.4047	.5186
	(24)	(25)	(25)	(24)	(25)	(24)	(25)	(25)	(25)	(25)	(24)
	P= .029	P= .001	P= .001	P= .007	P= .007	P= .016	P= .014	P= .000	P= .158	P= .022	P= .005
S6Q26	.4529	.5485	.5282	.5030	.4913	.5302	.4971	.6009	.1551	.4454	.7285
	(25)	(26)	(25)	(25)	(26)	(24)	(26)	(26)	(26)	(25)	(25)
	P= .011	P= .002	P= .003	P= .005	P= .005	P= .004	P= .005	P= .001	P= .225	P= .013	P= .000
S6Q27	.5307	.5810	.5960	.5519	.5328	.5320	.4653	.6742	.0746	.5559	.6660
	(24)	(25)	(25)	(24)	(25)	(24)	(25)	(25)	(25)	(25)	(24)
	P= .004	P= .001	P= .001	P= .003	P= .003	P= .004	P= .010	P= .000	P= .362	P= .002	P= .000
S6Q28	.4856	.6900	.6318	.5455	.5746	.4504	.5325	.6695	.1391	.5529	.5969
	(22)	(23)	(23)	(22)	(23)	(22)	(23)	(23)	(23)	(23)	(22)
	P= .011	P= .000	P= .001	P= .004	P= .002	P= .018	P= .004	P= .000	P= .263	P= .003	P= .002
S6Q29	.5776	.7213	.5611	.5721	.8031	.5700	.4951	.3928	.1779	.7401	.6605
	(28)	(26)	(28)	(27)	(29)	(27)	(25)	(27)	(29)	(29)	(28)
	P= .001	P= .000	P= .001	P= .001	P= .000	P= .001	P= .006	P= .021	P= .178	P= .000	P= .000
S6Q30	.4395	.6891	.6776	.6528	.6687	.5250	.8240	.6427	.1695	.6538	.4821
	(24)	(25)	(25)	(24)	(25)	(24)	(25)	(25)	(25)	(25)	(24)
	P= .016	P= .000	P= .000	P= .000	P= .000	P= .004	P= .000	P= .000	P= .209	P= .000	P= .009
S6Q31	.4303	.4312	.3470	.2904	.6201	.2853	.3687	.1842	-.1409	.5312	.3223
	(30)	(28)	(31)	(30)	(31)	(30)	(28)	(30)	(31)	(31)	(30)
	P= .009	P= .011	P= .028	P= .060	P= .000	P= .063	P= .027	P= .165	P= .225	P= .001	P= .041

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	S6Q12	S6Q13	S6Q14	S6Q15	S6Q16	S6Q17	S6Q18	S6Q19	S6Q20	S6Q21	S6Q22
S6Q1	.5414	.5482	.4218	.3473	.4288	.3904	.5686	.6075	.6387	.4312	.4097
	(30)	(32)	(30)	(30)	(28)	(31)	(32)	(32)	(31)	(30)	(32)
	P= .001	P= .001	P= .010	P= .030	P= .011	P= .015	P= .000	P= .000	P= .000	P= .009	P= .010
S6Q2	.5095	.4106	.5336	.2344	.4551	.3143	.5882	.6096	.5316	.5455	.5409
	(26)	(28)	(27)	(27)	(27)	(27)	(29)	(29)	(28)	(27)	(29)
	P= .004	P= .015	P= .002	P= .120	P= .009	P= .055	P= .000	P= .000	P= .002	P= .002	P= .001
S6Q3	.4750	.6472	.5729	.3281	.4257	.4505	.6199	.6082	.7077	.6109	.5147
	(29)	(30)	(30)	(29)	(28)	(29)	(31)	(31)	(31)	(30)	(31)
	P= .005	P= .000	P= .000	P= .041	P= .012	P= .007	P= .000	P= .000	P= .000	P= .000	P= .002
S6Q4	.6252	.6384	.6023	.2479	.4647	.4688	.4181	.6096	.6073	.4895	.4252
	(29)	(31)	(29)	(29)	(28)	(30)	(31)	(31)	(30)	(29)	(31)
	P= .000	P= .000	P= .000	P= .097	P= .006	P= .004	P= .010	P= .000	P= .000	P= .004	P= .009
S6Q5	.4147	.3580	.4077	.4632	.5532	.2750	.6008	.6231	.5807	.5131	.6648
	(30)	(32)	(31)	(30)	(28)	(31)	(33)	(33)	(32)	(31)	(33)
	P= .011	P= .022	P= .011	P= .005	P= .001	P= .067	P= .000	P= .000	P= .000	P= .002	P= .000
S6Q6	.7216	.3739	.6079	.1865	.6397	.4673	.4682	.5007	.3771	.5817	.4979
	(29)	(30)	(29)	(29)	(28)	(29)	(30)	(30)	(30)	(29)	(30)
	P= .000	P= .021	P= .000	P= .166	P= .000	P= .005	P= .005	P= .002	P= .020	P= .000	P= .003
S6Q7	.4983	.3541	.5380	-.0168	.3670	.4298	.3502	.3731	.2977	.5176	.3714
	(26)	(28)	(27)	(27)	(26)	(27)	(29)	(29)	(28)	(27)	(29)
	P= .005	P= .032	P= .002	P= .467	P= .033	P= .013	P= .031	P= .023	P= .062	P= .003	P= .024
S6Q8	.5799	.6789	.7570	.4003	.7098	.8497	.4671	.3782	.6743	.6472	.2882
	(28)	(30)	(29)	(28)	(27)	(29)	(31)	([illegible])	(30)	(29)	(31)
	P= .001	P= .000	P= .000	P= .017	P= .000	P= .000	P= .004	P= .018	P= .000	P= .000	P= .058
S6Q9	-.0848	-.1489	-.3128	-.0234	.0782	-.2362	.2023	.0997	.1621	.0083	.1897
	(30)	(32)	(31)	(30)	(28)	(31)	(33)	(33)	(32)	(31)	(33)
	P= .328	P= .208	P= .043	P= .451	P= .346	P= .100	P= .130	P= .290	P= .198	P= .482	P= .145
S6Q10	.4824	.4280	.4883	.2150	.5023	.3645	.7380	.5974	.6599	.6846	.7490
	(30)	(31)	(31)	(30)	(28)	(30)	(32)	(32)	(32)	(31)	(32)
	P= .003	P= .008	P= .003	P= .127	P= .003	P= .024	P= .000	P= .000	P= .000	P= .000	P= .000
S6Q11	.6605	.0992	.0177	.1773	.3999	.1405	.5795	.5767	.5032	.3358	.5362
	(30)	(32)	(30)	(30)	(28)	(31)	(32)	(32)	(31)	(30)	(32)
	P= .000	P= .294	P= .463	P= .174	P= .018	P= .225	P= .000	P= .000	P= .002	P= .035	P= .001

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	S6Q12	S6Q13	S6Q14	S6Q15	S6Q16	S6Q17	S6Q18	S6Q19	S6Q20	S6Q21	S6Q22
S6Q12	1.0000	.2638	.4463	.0399	.7721	.4594	.5977	.4772	.5488	.4031	.3719
	(0)	(30)	(30)	(29)	(27)	(30)	(30)	(30)	(30)	(29)	(30)
	P= .	P= .079	P= .007	P= .419	P= .000	P= .005	P= .000	P= .004	P= .001	P= .015	P= .022
S6Q13	.2638	1.0000	.6510	.3693	.4047	.6213	.3269	.3698	.6066	.3118	.1855
	(30)	(0)	(30)	(30)	(28)	(31)	(32)	(32)	(31)	(30)	(32)
	P= .079	P= .	P= .000	P= .022	P= .016	P= .000	P= .034	P= .019	P= .000	P= .047	P= .155
S6Q14	.4463	.6510	1.0000	.0598	.5657	.7711	.3661	.3597	.3407	.4974	.2519
	(30)	(30)	(0)	(29)	(27)	(30)	(31)	(31)	(31)	(30)	(31)
	P= .007	P= .000	P= .	P= .379	P= .001	P= .000	P= .021	P= .023	P= .030	P= .003	P= .086
S6Q15	.0399	.3693	.0598	1.0000	.4224	.0748	.2225	.3155	.3933	.2471	.2241
	(29)	(30)	(29)	(0)	(28)	(29)	(30)	(30)	(30)	(29)	(30)
	P= .419	P= .022	P= .379	P= .	P= .013	P= .350	P= .119	P= .045	P= .016	P= .098	P= .117
S6Q16	.7721	.4047	.5657	.4224	1.0000	.6520	.6523	.3599	.6467	.5841	.3680
	(27)	(28)	(27)	(28)	(0)	(27)	(28)	(28)	(28)	(27)	(28)
	P= .000	P= .016	P= .001	P= .013	P= .	P= .000	P= .000	P= .030	P= .000	P= .001	P= .027
S6Q17	.4594	.6213	.7711	.0748	.6520	1.0000	.2897	.2275	.3575	.4625	.0786
	(30)	(31)	(30)	(29)	(27)	(0)	(31)	(31)	(30)	(29)	(31)
	P= .005	P= .000	P= .000	P= .350	P= .000	P= .	P= .057	P= .109	P= .026	P= .006	P= .337
S6Q18	.5977	.3269	.3661	.2225	.6523	.2897	1.0000	.7633	.8925	.5310	.6985
	(30)	(32)	(31)	(30)	(28)	(31)	(0)	(33)	(32)	(31)	(33)
	P= .000	P= .034	P= .021	P= .119	P= .000	P= .057	P= .	P= .000	P= .000	P= .001	P= .000
S6Q19	.4772	.3698	.3597	.3155	.3599	.2275	.7633	1.0000	.6887	.3795	.6197
	(30)	(32)	(31)	(30)	(28)	(31)	(33)	(0)	(32)	(31)	(33)
	P= .004	P= .019	P= .023	P= .045	P= .030	P= .109	P= .000	P= .	P= .000	P= .018	P= .000
S6Q20	.5488	.6066	.3407	.3933	.6467	.3575	.8925	.6887	1.0000	.4986	.5342
	(30)	(31)	(31)	(30)	(28)	(30)	(32)	(32)	(0)	(31)	(32)
	P= .001	P= .000	P= .030	P= .016	P= .000	P= .026	P= .000	P= .000	P= .	P= .002	P= .001
S6Q21	.4031	.3118	.4974	.2471	.5841	.4625	.5310	.3795	.4986	1.0000	.6862
	(29)	(30)	(30)	(29)	(27)	(29)	(31)	(31)	(31)	(0)	(31)
	P= .015	P= .047	P= .003	P= .098	P= .001	P= .006	P= .001	P= .018	P= .002	P= .	P= .000
S6Q22	.3719	.1855	.2519	.2241	.3680	.0786	.6985	.6197	.5342	.6862	1.0000
	(30)	(32)	(31)	(30)	(28)	(31)	(33)	(33)	(32)	(31)	(0)
	P= .022	P= .155	P= .086	P= .117	P= .027	P= .337	P= .000	P= .000	P= .001	P= .000	P= .

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	S6Q12	S6Q13	S6Q14	S6Q15	S6Q16	S6Q17	S6Q18	S6Q19	S6Q20	S6Q21	S6Q22
S6Q23	.3868	.8351	.7035	.0672	.3549	.4774	.4947	.4522	.7370	.5425	.3215
	(27)	(29)	(28)	(28)	(26)	(28)	(30)	(30)	(29)	(28)	(30)
	P= .023	P= .000	P= .000	P= .367	P= .038	P= .005	P= .003	P= .006	P= .000	P= .001	P= .042
S6Q24	.3961	.6177	.5437	.1160	.5250	.5219	.5766	.4493	.5981	.2602	.4178
	(30)	(32)	(31)	(30)	(28)	(31)	(33)	(33)	(32)	(31)	(33)
	P= .015	P= .000	P= .001	P= .271	P= .002	P= .001	P= .000	P= .004	P= .000	P= .079	P= .008
S6Q25	.5667	.3568	.3688	.4280	.7351	.3649	.7187	.6199	.6758	.4423	.4000
	(23)	(24)	(24)	(24)	(24)	(23)	(25)	(25)	(25)	(25)	(25)
	P= .002	P= .043	P= .038	P= .018	P= .000	P= .043	P= .000	P= .000	P= .000	P= .013	P= .024
S6Q26	.6110	.3797	.3720	.3556	.6284	.2817	.6230	.6334	.6608	.3779	.3981
	(23)	(25)	(24)	(24)	(24)	(24)	(26)	(26)	(25)	(25)	(26)
	P= .001	P= .031	P= .037	P= .044	P= .001	P= .091	P= .000	P= .000	P= .000	P= .031	P= .022
S6Q27	.5309	.4493	.4776	.2236	.5916	.4349	.7539	.7275	.7260	.4797	.4198
	(23)	(24)	(24)	(24)	(24)	(23)	(25)	(25)	(25)	(25)	(25)
	P= .005	P= .014	P= .009	P= .147	P= .001	P= .019	P= .000	P= .000	P= .000	P= .008	P= .018
S6Q28	.5031	.3641	.3999	.0210	.5621	.4066	.7513	.7771	.7121	.6078	.4991
	(22)	(22)	(23)	(22)	(22)	(22)	(23)	(23)	(23)	(23)	(23)
	P= .009	P= .048	P= .029	P= .463	P= .003	P= .030	P= .000	P= .000	P= .000	P= .001	P= .008
S6Q29	.4963	.3042	.3200	.3995	.4606	.1639	.7455	.7605	.6704	.4993	.7412
	(27)	(28)	(28)	(27)	(26)	(27)	(29)	(29)	(29)	(28)	(29)
	P= .004	P= .058	P= .048	P= .019	P= .009	P= .207	P= .000	P= .000	P= .000	P= .003	P= .000
S6Q30	.5326	.5294	.4161	.2402	.5187	.3381	.6864	.6106	.6923	.5215	.5643
	(23)	(24)	(24)	(24)	(24)	(23)	(25)	(25)	(25)	(24)	(25)
	P= .004	P= .004	P= .022	P= .129	P= .005	P= .057	P= .000	P= .001	P= .000	P= .004	P= .002
S6Q31	.1748	.1125	.0574	.4672	.2355	-.0290	.4530	.4616	.4265	.3876	.4665
	(29)	(30)	(30)	(29)	(28)	(29)	(31)	(31)	(31)	(30)	(31)
	P= .182	P= .277	P= .382	P= .005	P= .114	P= .441	P= .005	P= .004	P= .008	P= .017	P= .004

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:17:05 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S6Q23	S6Q24	S6Q25	S6Q26	S6Q27	S6Q28	S6Q29	S6Q30	S6Q31
S6Q1	.5761 (29) P= .001	.3472 (32) P= .026	.3934 (24) P= .029	.4529 (25) P= .011	.5307 (24) P= .004	.4856 (22) P= .011	.5776 (28) P= .001	.4395 (24) P= .016	.4304 (30) P= .009
S6Q2	.5388 (27) P= .002	.3651 (29) P= .026	.6047 (25) P= .001	.5485 (26) P= .002	.5810 (25) P= .001	.6900 (23) P= .000	.7213 (26) P= .000	.6891 (25) P= .000	.4312 (28) P= .011
S6Q3	.8115 (28) P= .000	.4602 (31) P= .005	.5878 (25) P= .001	.5282 (25) P= .003	.5960 (25) P= .001	.6318 (23) P= .001	.5611 (28) P= .001	.6776 (25) P= .000	.3470 (31) P= .028
S6Q4	.7675 (28) P= .000	.4995 (31) P= .002	.4904 (24) P= .007	.5030 (25) P= .005	.5519 (24) P= .003	.5455 (22) P= .004	.5721 (27) P= .001	.6578 (24) P= .000	.2904 (30) P= .060
S6Q5	.3637 (30) P= .024	.5303 (33) P= .001	.4859 (25) P= .007	.4913 (26) P= .005	.5328 (25) P= .003	.5746 (23) P= .002	.8031 (29) P= .000	.6687 (25) P= .000	.6201 (31) P= .000
S6Q6	.4981 (27) P= .004	.3438 (30) P= .031	.4381 (24) P= .016	.5302 (24) P= .004	.5320 (24) P= .004	.4504 (22) P= .018	.5700 (27) P= .001	.5250 (24) P= .004	.2853 (30) P= .063
S6Q7	.5420 (27) P= .002	.4928 (29) P= .003	.4385 (25) P= .014	.4971 (26) P= .005	.4653 (25) P= .010	.5325 (23) P= .004	.4951 (25) P= .006	.8240 (25) P= .000	.3687 (28) P= .027
S6Q8	.7558 (28) P= .000	.5640 (31) P= .000	.6750 (25) P= .000	.6009 (26) P= .001	.6242 (25) P= .000	.6695 (23) P= .000	.3928 (27) P= .021	.6427 (25) P= .000	.1842 (30) P= .165
S6Q9	-.1142 (30) P= .274	.1327 (33) P= .231	.2092 (25) P= .158	.1551 (26) P= .225	.0746 (25) P= .362	.1391 (23) P= .263	.1779 (29) P= .178	.1695 (25) P= .209	-.1409 (31) P= .225
S6Q10	.5559 (29) P= .001	.5384 (32) P= .001	.4047 (25) P= .022	.4454 (25) P= .013	.5559 (25) P= .002	.5529 (23) P= .003	.7401 (29) P= .000	.6538 (25) P= .000	.5312 (31) P= .001
S6Q11	.1436 (29) P= .229	.2824 (32) P= .059	.5186 (24) P= .005	.7285 (25) P= .000	.6660 (24) P= .000	.5969 (22) P= .002	.6605 (28) P= .000	.4821 (24) P= .009	.3223 (30) P= .041

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:17:05 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S6Q23	S6Q24	S6Q25	S6Q26	S6Q27	S6Q28	S6Q29	S6Q30	S6Q31
S6Q12	.3868	.3961	.5667	.6110	.5309	.5031	.4963	.5326	.1748
	(27)	(30)	(23)	(23)	(23)	(22)	(27)	(23)	(29)
	P= .023	P= .015	P= .002	P= .001	P= .005	P= .009	P= .004	P= .004	P= .182
S6Q13	.8351	.6177	.3568	.3797	.4493	.3641	.3042	.5294	.1125
	(29)	(32)	(24)	(25)	(24)	(22)	(28)	(24)	(30)
	P= .000	P= .000	P= .043	P= .031	P= .014	P= .048	P= .058	P= .004	P= .277
S6Q14	.7035	.5437	.3688	.3720	.4776	.3999	.3200	.4161	.0574
	(28)	(31)	(24)	(24)	(24)	(23)	(28)	(24)	(30)
	P= .000	P= .001	P= .038	P= .037	P= .009	P= .029	P= .048	P= .022	P= .382
S6Q15	.0672	.1160	.4280	.3556	.2236	.0210	.3995	.2402	.4672
	(28)	(30)	(24)	(24)	(24)	(22)	(27)	(24)	(29)
	P= .367	P= .271	P= .018	P= .044	P= .147	P= .463	P= .019	P= .129	P= .005
S6Q16	.3549	.5250	.7351	.6284	.5916	.5621	.4606	.5187	.2355
	(26)	(28)	(24)	(24)	(24)	(22)	(26)	(24)	(28)
	P= .038	P= .002	P= .000	P= .001	P= .001	P= .003	P= .009	P= .005	P= .114
S6Q17	.4774	.5219	.3649	.2817	.4349	.4066	.1639	.3381	-.0290
	(28)	(31)	(23)	(24)	(23)	(22)	(27)	(23)	(29)
	P= .005	P= .001	P= .043	P= .091	P= .019	P= .030	P= .207	P= .057	P= .441
S6Q18	.4947	.5766	.7107	.6230	.7539	.7510	.7455	.6864	.4530
	(30)	(33)	(25)	(26)	(25)	(23)	(29)	(25)	(31)
	P= .003	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .005
S6Q19	.4522	.4493	.6199	.6334	.7275	.7771	.7605	.6106	.4616
	(30)	(33)	(25)	(26)	(25)	(23)	(29)	(25)	(31)
	P= .006	P= .004	P= .000	P= .000	P= .000	P= .000	P= .000	P= .001	P= .004
S6Q20	.7370	.5981	.6758	.6608	.7260	.7121	.6704	.6923	.4265
	(29)	(32)	(25)	(25)	(25)	(23)	(29)	(25)	(31)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .008
S6Q21	.5425	.2602	.4423	.3779	.4797	.6078	.4993	.5215	.3876
	(28)	(31)	(25)	(25)	(25)	(23)	(28)	(24)	(30)
	P= .001	P= .079	P= .013	P= .031	P= .008	P= .001	P= .003	P= .004	P= .017
S6Q22	.3215	.4178	.4000	.3981	.4198	.4991	.7412	.5643	.4665
	(30)	(33)	(25)	(26)	(25)	(23)	(29)	(25)	(31)
	P= .042	P= .008	P= .024	P= .022	P= .018	P= .008	P= .000	P= .002	P= .004

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:17:05 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - -

	S6Q23	S6Q24	S6Q25	S6Q26	S6Q27	S6Q28	S6Q29	S6Q30	S6Q31
S6Q23	1.0000	.6226	.4878	.5540	.6669	.6067	.4265	.6763	.2429
	(0)	(30)	(24)	(25)	(24)	(22)	(28)	(25)	(28)
	P= .	P= .000	P= .008	P= .002	P= .000	P= .001	P= .012	P= .000	P= .106
S6Q24	.6226	1.0000	.6193	.6487	.5680	.5101	.5232	.6834	.2377
	(30)	(0)	(25)	(26)	(25)	(23)	(29)	(25)	(31)
	P= .000	P= .	P= .000	P= .000	P= .002	P= .006	P= .002	P= .000	P= .099
S6Q25	.4878	.6193	1.0000	.8812	.7854	.8666	.7216	.6667	.3616
	(24)	(25)	(0)	(25)	(25)	(23)	(24)	(24)	(25)
	P= .008	P= .000	P= .	P= .000	P= .000	P= .000	P= .000	P= .000	P= .038
S6Q26	.5540	.6487	.8812	1.0000	.9156	.8532	.7412	.6475	.3937
	(25)	(26)	(25)	(0)	(25)	(23)	(24)	(24)	(25)
	P= .002	P= .000	P= .000	P= .	P= .000	P= .000	P= .000	P= .000	P= .026
S6Q27	.6669	.5680	.7854	.9156	1.0000	.9225	.7785	.5723	.3777
	(24)	(25)	(25)	(25)	(0)	(23)	(24)	(24)	(25)
	P= .000	P= .002	P= .000	P= .000	P= .	P= .000	P= .000	P= .002	P= .031
S6Q28	.6067	.5101	.8666	.8532	.9225	1.0000	.8001	.6531	.4198
	(22)	(23)	(23)	(23)	(23)	(0)	(22)	(22)	(23)
	P= .001	P= .006	P= .000	P= .000	P= .000	P= .	P= .000	P= .000	P= .023
S6Q29	.4265	.5232	.7216	.7412	.7785	.8001	1.0000	.6565	.6660
	(28)	(29)	(24)	(24)	(24)	(22)	(0)	(25)	(28)
	P= .012	P= .002	P= .000	P= .000	P= .000	P= .000	P= .	P= .000	P= .000
S6Q30	.6763	.6834	.6667	.6475	.5723	.6531	.6565	1.0000	.4344
	(25)	(25)	(24)	(24)	(24)	(22)	(25)	(0)	(25)
	P= .000	P= .000	P= .000	P= .000	P= .002	P= .000	P= .000	P= .	P= .015
S6Q31	.2429	.2377	.3616	.3937	.3777	.4198	.6660	.4344	1.0000
	(28)	(31)	(25)	(25)	(25)	(23)	(28)	(25)	(0)
	P= .106	P= .099	P= .038	P= .026	P= .031	P= .023	P= .000	P= .015	P= .

(COEFFICIENT / (CASES) / 1 TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS X RELEASE 2.2 FOR IBM VM/CMS
09:18:27 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - -

	S1Q1	S1Q2	S1Q3	S1Q4	S1Q5	S1Q6	S1Q7	S1Q8	S1Q9	S1Q10	S1Q11
S1Q1	1.0000 (0) P= .	.5303 (20) P= .008	.1378 (20) P= .281	.2954 (20) P= .103	.3089 (20) P= .093	.3439 (20) P= .069	.3132 (20) P= .089	.5154 (20) P= .010	.2563 (20) P= .138	.2692 (20) P= .126	.5484 (20) P= .006
S1Q2	.5303 (20) P= .008	1.0000 (0) P= .	.7241 (28) P= .000	.7146 (28) P= .000	.6687 (28) P= .000	.6181 (28) P= .000	.7735 (28) P= .000	.7295 (28) P= .000	.6438 (28) P= .000	.6011 (28) P= .000	.7941 (28) P= .0(
S1Q3	.1378 (20) P= .281	.7241 (28) P= .000	1.0000 (0) P= .	.7475 (28) P= .000	.6886 (28) P= .000	.5786 (28) P= .001	.7724 (28) P= .000	.6173 (28) P= .000	.8737 (28) P= .000	.8514 (28) P= .000	.6611 (28) P= .000
S1Q4	.2954 (20) P= .103	.7146 (28) P= .000	.7475 (28) P= .000	1.0000 (0) P= .	.7449 (28) P= .000	.6994 (28) P= .000	.6370 (28) P= .000	.6045 (28) P= .000	.7612 (28) P= .000	.7701 (28) P= .000	.6686 (28) P= .000
S1Q5	.3089 (20) P= .093	.6687 (28) P= .000	.6886 (28) P= .000	.7449 (28) P= .000	1.0000 (0) P= .	.5313 (28) P= .002	.7717 (28) P= .000	.5906 (28) P= .000	.7154 (28) P= .000	.6512 (28) P= .000	.6486 (28) P= .000
S1Q6	.3439 (20) P= .069	.6181 (28) P= .000	.5786 (28) P= .001	.6994 (28) P= .000	.5313 (28) P= .002	1.0000 (0) P= .	.5084 (28) P= .003	.7724 (28) P= .000	.6261 (28) P= .000	.5604 (28) P= .001	.6247 (28) P= .000
S1Q7	.3132 (20) P= .089	.7735 (28) P= .000	.7724 (28) P= .000	.6370 (28) P= .000	.7717 (28) P= .000	.5084 (28) P= .003	1.0000 (0) P= .	.7034 (28) P= .000	.7435 (28) P= .000	.6766 (28) P= .000	.7858 (28) P= .000
S1Q8	.5154 (20) P= .010	.7295 (28) P= .000	.6173 (28) P= .000	.6045 (28) P= .000	.5906 (28) P= .000	.7724 (28) P= .000	.7034 (28) P= .000	1.0000 (0) P= .	.7724 (28) P= .000	.5824 (28) P= .001	.7894 (28) P= .000
S1Q9	.2563 (20) P= .138	.6438 (28) P= .000	.8737 (28) P= .000	.7612 (28) P= .000	.7154 (28) P= .000	.6261 (28) P= .000	.7435 (28) P= .000	.7724 (28) P= .000	1.0000 (0) P= .	.8981 (28) P= .000	.7312 (28) P= .000
S1Q10	.2692 (20) P= .126	.6011 (28) P= .000	.8514 (28) P= .000	.7701 (28) P= .000	.6512 (28) P= .000	.5604 (28) P= .001	.6766 (28) P= .000	.5824 (28) P= .001	.8981 (28) P= .000	1.0000 (0) P= .	.6288 (28) P= .000
S1Q11	.5484 (20) P= .006	.7941 (28) P= .000	.6611 (28) P= .000	.6686 (28) P= .000	.6486 (28) P= .000	.6247 (28) P= .000	.7858 (28) P= .000	.7894 (28) P= .000	.7312 (28) P= .000	.6288 (28) P= .000	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - -

	S1Q1	S1Q2	S1Q3	S1Q4	S1Q5	S1Q6	S1Q7	S1Q8	S1Q9	S1Q10	S1Q11
S1Q12	.2276	.6813	.8797	.7636	.6659	.5194	.7575	.5741	.8600	.9047	.7478
	(20)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)
	P= .167	P= .000	P= .000	P= .000	P= .000	P= .002	P= .000	P= .001	P= .000	P= .000	P= .000
S1Q13	.3891	.6705	.7606	.6807	.7653	.5900	.8114	.7340	.7832	.7042	.7325
	(20)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)
	P= .045	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
S1Q14	.6711	.6845	.5270	.4604	.5959	.5468	.7581	.6846	.5740	.4511	.8561
	(20)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)
	P= .001	P= .000	P= .002	P= .007	P= .000	P= .001	P= .000	P= .000	P= .001	P= .008	P= .000
S1Q15	.3608	.6859	.6442	.6360	.8785	.6007	.7652	.5923	.6074	.5954	.6693
	(20)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)
	P= .059	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
S1Q16	.3796	.7180	.7446	.5613	.7391	.5187	.8256	.6389	.7053	.6559	.8224
	(20)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)
	P= .049	P= .000	P= .000	P= .001	P= .000	P= .002	P= .000	P= .000	P= .000	P= .000	P= .000
S1Q17	.4579	.6760	.5891	.7032	.5096	.6749	.5135	.7620	.7601	.6765	.7829
	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)
	P= .021	P= .001	P= .003	P= .000	P= .011	P= .001	P= .010	P= .000	P= .000	P= .001	P= .000
S1Q18	.4792	.3798	.6327	.4531	.6230	.5857	.6385	.8010	.7764	.6510	.6341
	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .019	P= .054	P= .002	P= .026	P= .002	P= .004	P= .002	P= .000	P= .000	P= .001	P= .002
S1Q19	.6918	.5238	.4174	.3528	.4605	.5409	.4920	.6715	.5353	.4736	.6989
	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .001	P= .011	P= .038	P= .069	P= .024	P= .008	P= .016	P= .001	P= .009	P= .020	P= .000
S1Q20	.4591	.5241	.3197	.6351	.3547	.6225	.2175	.4880	.4210	.4518	.3209
	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)
	P= .021	P= .009	P= .085	P= .001	P= .062	P= .002	P= .179	P= .015	P= .032	P= .023	P= .084
S1Q21	.6443	.5759	.6433	.6893	.6498	.5482	.6016	.7541	.7508	.7065	.6263
	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)
	P= .001	P= .004	P= .001	P= .000	P= .001	P= .006	P= .003	P= .000	P= .000	P= .000	P= .002
S1Q22	.6549	.4979	.2266	.3182	.4096	.3565	.3318	.3594	.2339	.2769	.3670
	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)
	P= .001	P= .013	P= .168	P= .086	P= .036	P= .061	P= .076	P= .060	P= .160	P= .119	P= .056

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
09:18:28 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S1Q12	S1Q13	S1Q14	S1Q15	S1Q16	S1Q17
S1Q1	.2276 (20) P= .167	.3891 (20) P= .045	.6711 (20) P= .001	.3608 (20) P= .059	.3796 (20) P= .049	.4579 (20) P= .021
S1Q2	.6813 (28) P= .000	.6705 (28) P= .000	.6845 (28) P= .000	.6859 (28) P= .000	.7180 (28) P= .000	.6760 (20) P= .001
S1Q3	.8797 (28) P= .000	.7606 (28) P= .000	.5270 (28) P= .002	.6442 (28) P= .000	.7446 (28) P= .000	.5891 (20) P= .003
S1Q4	.7636 (28) P= .000	.6807 (28) P= .000	.4604 (28) P= .007	.6360 (28) P= .000	.5613 (28) P= .001	.7032 (20) P= .000
S1Q5	.6659 (28) P= .000	.7653 (28) P= .000	.5959 (28) P= .000	.8785 (28) P= .000	.7391 (28) P= .000	.5096 (20) P= .011
S1Q6	.5194 (28) P= .002	.5930 (28) P= .000	.5468 (28) P= .001	.6007 (28) P= .000	.5187 (28) P= .002	.6749 (20) P= .001
S1Q7	.7575 (28) P= .000	.8114 (28) P= .000	.7581 (28) P= .000	.7652 (28) P= .000	.8256 (28) P= .000	.5135 (20) P= .010
S1Q8	.5741 (28) P= .001	.7340 (28) P= .000	.6846 (28) P= .000	.5923 (28) P= .000	.6389 (28) P= .000	.7620 (20) P= .000
S1Q9	.8600 (28) P= .000	.7832 (28) P= .000	.5740 (28) P= .001	.6074 (28) P= .000	.7063 (28) P= .000	.7601 (20) P= .000
S1Q10	.9047 (28) P= .000	.7042 (28) P= .000	.4511 (28) P= .008	.5954 (28) P= .000	.6559 (28) P= .000	.6765 (20) P= .001
S1Q11	.7478 (28) P= .000	.7325 (28) P= .000	.8561 (28) P= .000	.6693 (28) P= .000	.8224 (28) P= .000	.7829 (20) P= .000

	S1Q18	S1Q19	S1Q20	S1Q21	S1Q22
S1Q1	.4792 (19) P= .019	.6918 (19) P= .001	.4591 (20) P= .021	.6443 (20) P= .001	.6549 (20) P= .001
S1Q2	.3798 (19) P= .054	.5238 (19) P= .011	.5241 (20) P= .009	.5759 (20) P= .004	.4979 (20) P= .013
S1Q3	.6327 (19) P= .002	.4174 (19) P= .038	.3197 (20) P= .085	.6433 (20) P= .001	.2266 (20) P= .168
S1Q4	.4531 (19) P= .026	.3528 (19) P= .069	.6351 (20) P= .001	.6893 (20) P= .000	.3182 (20) P= .086
S1Q5	.6230 (19) P= .002	.4605 (19) P= .024	.3547 (20) P= .062	.6498 (20) P= .001	.4096 (20) P= .036
S1Q6	.5857 (19) P= .004	.5409 (19) P= .008	.6225 (20) P= .002	.5482 (20) P= .006	.3565 (20) P= .061
S1Q7	.6385 (19) P= .002	.4920 (19) P= .016	.2175 (20) P= .179	.6016 (20) P= .003	.3318 (20) P= .076
S1Q8	.8010 (19) P= .000	.6715 (19) P= .001	.4880 (20) P= .015	.7541 (20) P= .000	.3594 (20) P= .060
S1Q9	.7764 (19) P= .000	.5353 (19) P= .009	.4210 (20) P= .032	.7508 (20) P= .000	.2339 (20) P= .160
S1Q10	.6510 (19) P= .001	.4736 (19) P= .020	.4518 (20) P= .023	.7065 (20) P= .000	.2769 (20) P= .119
S1Q11	.6341 (19) P= .002	.6989 (19) P= .000	.3209 (20) P= .084	.6263 (20) P= .002	.3670 (20) P= .056

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
09:18:28 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - -

	S1Q12	S1Q13	S1Q14	S1Q15	S1Q16	S1Q17	S1Q18	S1Q19	S1Q20	S1Q21	S1Q22
S1Q12	1.0000	.7698	.5889	.6341	.7131	.7741	.6934	.5625	.4082	.6931	.2526
	(0)	(28)	(28)	(28)	(28)	(20)	(19)	(19)	(20)	(20)	(20)
	P= .	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000	P= .006	P= .037	P= .000	P= .141
S1Q13	.7698	1.0000	.7178	.7661	.7608	.6276	.8268	.6513	.4259	.7446	.4098
	(28)	(0)	(28)	(28)	(28)	(20)	(19)	(19)	(20)	(20)	(20)
	P= .000	P= .	P= .000	P= .000	P= .000	P= .002	P= .000	P= .001	P= .031	P= .000	P= .036
S1Q14	.5889	.7178	1.0000	.6780	.7663	.5805	.6971	.8078	.1618	.5617	.4609
	(28)	(28)	(0)	(28)	(28)	(20)	(19)	(19)	(20)	(20)	(20)
	P= .000	P= .000	P= .	P= .000	P= .000	P= .004	P= .001	P= .000	P= .248	P= .005	P= .020
S1Q15	.6341	.7661	.6780	1.0000	.7601	.3341	.6641	.6152	.3542	.5267	.6478
	(28)	(28)	(28)	(0)	(28)	(20)	(19)	(19)	(20)	(20)	(20)
	P= .000	P= .000	P= .000	P= .	P= .000	P= .075	P= .001	P= .003	P= .063	P= .009	P= .001
S1Q16	.7131	.7608	.7663	.7601	1.0000	.5487	.6279	.6936	.1538	.5776	.4638
	(28)	(28)	(28)	(28)	(0)	(20)	(19)	(19)	(20)	(20)	(20)
	P= .000	P= .000	P= .000	P= .000	P= .	P= .006	P= .002	P= .000	P= .259	P= .004	P= .020
S1Q17	.7741	.6276	.5805	.3341	.5487	1.0000	.6955	.6881	.6333	.6394	.2854
	(20)	(20)	(20)	(20)	(20)	(0)	(19)	(19)	(20)	(20)	(20)
	P= .000	P= .002	P= .004	P= .075	P= .006	P= .	P= .000	P= .001	P= .001	P= .001	P= .111
S1Q18	.6934	.8268	.6921	.6641	.6279	.6955	1.0000	.8309	.5107	.8188	.5129
	(19)	(19)	(19)	(19)	(19)	(19)	(0)	(19)	(19)	(19)	(19)
	P= .000	P= .000	P= .001	P= .001	P= .002	P= .000	P= .	P= .000	P= .013	P= .000	P= .012
S1Q19	.5625	.6513	.8078	.6152	.6936	.6881	.8309	1.0000	.5026	.7394	.7092
	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(0)	(19)	(19)	(19)
	P= .006	P= .001	P= .000	P= .003	P= .000	P= .001	P= .000	P= .	P= .014	P= .000	P= .000
S1Q20	.4082	.4259	.1618	.3542	.1538	.6333	.5107	.5026	1.0000	.6575	.6249
	(20)	(20)	(20)	(20)	(20)	(20)	(19)	(19)	(0)	(20)	(20)
	P= .037	P= .031	P= .248	P= .063	P= .259	P= .001	P= .013	P= .014	P= .	P= .001	P= .002
S1Q21	.6931	.7446	.5617	.5267	.5776	.6394	.8188	.7394	.6575	1.0000	.6484
	(20)	(20)	(20)	(20)	(20)	(20)	(19)	(19)	(20)	(0)	(20)
	P= .000	P= .000	P= .005	P= .009	P= .004	P= .001	P= .000	P= .000	P= .001	P= .	P= .001
S1Q22	.2526	.4098	.4609	.6478	.4638	.2854	.5129	.7092	.6249	.6484	1.0000
	(20)	(20)	(20)	(20)	(20)	(20)	(19)	(19)	(20)	(20)	(0)
	P= .141	P= .036	P= .020	P= .001	P= .020	P= .111	P= .012	P= .000	P= .002	P= .001	P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
09:18:28 U.W O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S2Q1	S2Q2	S2Q3	S2Q4	S2Q5	S2Q6	S2Q7	S2Q8	S2Q9	S2Q10
S2Q1	1.0000	.7423	.1263	.0659	.5668	.4193	.5175	.3198	.3659	.0587
	(0)	(26)	(26)	(26)	(18)	(17)	(18)	(18)	(18)	(18)
	P= .	P= .000	P= .269	P= .375	P= .007	P= .047	P= .014	P= .098	P= .068	P= .408
S2Q2	.7423	1.0000	.3266	.1938	.4624	.5459	.6687	.3441	.6612	.2181
	(26)	(0)	(27)	(27)	(19)	(18)	(19)	(19)	(19)	(19)
	P= .000	P= .	P= .048	P= .166	P= .023	P= .010	P= .001	P= .075	P= .001	P= .185
S2Q3	.1263	.3266	1.0000	.6727	.1969	.5291	.3818	.2003	.6083	.3614
	(26)	(27)	(0)	(27)	(19)	(18)	(19)	(19)	(19)	(19)
	P= .269	P= .048	P= .	P= .000	P= .210	P= .012	P= .053	P= .206	P= .003	P= .064
S2Q4	.0659	.1938	.6727	1.0000	.0639	.5826	.4047	.4466	.6218	.3037
	(26)	(27)	(27)	(0)	(19)	(18)	(19)	(19)	(19)	(19)
	P= .375	P= .166	P= .000	P= .	P= .397	P= .006	P= .043	P= .028	P= .002	P= .103
S2Q5	.5668	.4624	.1969	.0639	1.0000	.1413	.6135	.3616	.2094	-.0661
	(18)	(19)	(19)	(19)	(0)	(18)	(19)	(19)	(19)	(19)
	P= .007	P= .023	P= .210	P= .397	P= .	P= .288	P= .003	P= .064	P= .195	P= .394
S2Q6	.4193	.5459	.5291	.5826	.1413	1.0000	.6924	.3379	.5726	.2439
	(17)	(18)	(18)	(18)	(18)	(0)	(18)	(18)	(18)	(18)
	P= .047	P= .010	P= .012	P= .006	P= .288	P= .	P= .001	P= .085	P= .007	P= .165
S2Q7	.5175	.6687	.3818	.4047	.6135	.6924	1.0000	.4148	.5467	.0874
	(18)	(19)	(19)	(19)	(19)	(18)	(0)	(19)	(19)	(19)
	P= .014	P= .001	P= .053	P= .043	P= .003	P= .001	P= .	P= .039	P= .008	P= .361
S2Q8	.3198	.3441	.2003	.4466	.3616	.3379	.4148	1.0000	.5633	.3432
	(18)	(19)	(19)	(19)	(19)	(18)	(19)	(0)	(19)	(19)
	P= .098	P= .075	P= .206	P= .028	P= .064	P= .085	P= .039	P= .	P= .006	P= .075
S2Q9	.3659	.6612	.6083	.6218	.2094	.5726	.5467	.5633	1.0000	.4313
	(18)	(19)	(19)	(19)	(19)	(18)	(19)	(19)	(0)	(19)
	P= .068	P= .001	P= .003	P= .002	P= .195	P= .007	P= .008	P= .006	P= .	P= .033
S2Q10	.0587	.2181	.3614	.3037	.0661	.2439	.0874	.3432	.4313	1.0000
	(18)	(19)	(19)	(19)	(19)	(18)	(19)	(19)	(19)	(0)
	P= .408	P= .185	P= .064	P= .103	P= .394	P= .165	P= .361	P= .075	P= .033	P= .

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11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
09:18:29 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S3Q1	S3Q2	S3Q3	S3Q4	S3Q5	S3Q6	S3Q7	S3Q8	S3Q9	S3Q10	S3Q11
S3Q1	1.0000 (0) P= .	.0130 (19) P= .479	-.1694 (19) P= .244	-.1325 (19) P= .294	-.1520 (19) P= .267	.3124 (19) P= .096	.2422 (19) P= .159	.4338 (19) P= .032	-.0098 (19) P= .484	-.1558 (19) P= .262	.2765 (19) P= .126
S3Q2	.0130 (19) P= .479	1.0000 (0) P= .	.4450 (27) P= .010	.4811 (27) P= .006	.4783 (27) P= .006	.3437 (27) P= .040	.6390 (27) P= .000	.4624 (27) P= .008	.4620 (27) P= .008	.5059 (27) P= .004	.3384 (27) P= .042
S3Q3	-.1694 (19) P= .244	.4450 (27) P= .010	1.0000 (0) P= .	.6404 (27) P= .000	.4873 (27) P= .005	.3848 (27) P= .024	.3013 (27) P= .063	.4948 (27) P= .004	.6871 (27) P= .000	.5562 (27) P= .001	.4508 (27) P= .009
S3Q4	-.1325 (19) P= .294	.4811 (27) P= .006	.6404 (27) P= .000	1.0000 (0) P= .	.7617 (27) P= .000	.6547 (27) P= .000	.4546 (27) P= .009	.5629 (27) P= .001	.8308 (27) P= .000	.8426 (27) P= .000	.6549 (27) P= .000
S3Q5	-.1520 (19) P= .267	.4783 (27) P= .006	.4873 (27) P= .005	.7617 (27) P= .000	1.0000 (0) P= .	.4099 (27) P= .017	.4299 (27) P= .013	.3524 (27) P= .036	.6616 (27) P= .000	.7065 (27) P= .000	.3570 (27) P= .034
S3Q6	.3124 (19) P= .096	.3437 (27) P= .040	.3848 (27) P= .024	.6547 (27) P= .000	.4099 (27) P= .017	1.0000 (0) P= .	.4511 (27) P= .009	.7577 (27) P= .000	.7069 (27) P= .000	.6085 (27) P= .000	.4852 (27) P= .005
S3Q7	.2422 (19) P= .159	.6390 (27) P= .000	.3013 (27) P= .063	.4546 (27) P= .009	.4299 (27) P= .013	.4511 (27) P= .009	1.0000 (0) P= .	.6954 (27) P= .000	.4721 (27) P= .006	.6310 (27) P= .000	.3408 (27) P= .041
S3Q8	.4338 (19) P= .032	.4624 (27) P= .008	.4948 (27) P= .004	.5629 (27) P= .001	.3524 (27) P= .036	.7577 (27) P= .000	.6954 (27) P= .000	1.0000 (0) P= .	.6512 (27) P= .000	.4832 (27) P= .005	.5922 (27) P= .001
S3Q9	-.0098 (19) P= .484	.4620 (27) P= .008	.6871 (27) P= .000	.8308 (27) P= .000	.6616 (27) P= .000	.7069 (27) P= .000	.4721 (27) P= .006	.6512 (27) P= .000	1.0000 (0) P= .	.7962 (27) P= .000	.7255 (27) P= .000
S3Q10	-.1558 (19) P= .262	.5059 (27) P= .004	.5562 (27) P= .001	.8426 (27) P= .000	.7065 (27) P= .000	.6085 (27) P= .000	.6310 (27) P= .000	.4832 (27) P= .005	.7962 (27) P= .000	1.0000 (0) P= .	.5170 (27) P= .003
S3Q11	.2765 (19) P= .126	.3384 (27) P= .042	.4508 (27) P= .009	.6549 (27) P= .000	.3570 (27) P= .034	.4852 (27) P= .005	.3408 (27) P= .041	.5922 (27) P= .001	.7255 (27) P= .000	.5170 (27) P= .003	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89   SPSS-X RELEASE 2.2 FOR IBM VM/CMS
09:18:29   U.W.O. SCHOOL OF BUSINESS   IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S3Q1	S3Q2	S3Q3	S3Q4	S3Q5	S3Q6	S3Q7	S3Q8	S3Q9	S3Q10	S3Q11
S3Q12	.0260 (19) P= .458	.4993 (27) P= .004	.3840 (27) P= .024	.7561 (27) P= .000	.6877 (27) P= .000	.3687 (27) P= .029	.5159 (27) P= .003	.3460 (27) P= .039	.6834 (27) P= .000	.7925 (27) P= .000	.6278 (27) P= .000
S3Q13	.0612 (19) P= .402	.5762 (27) P= .001	.3740 (27) P= .050	.6708 (27) P= .000	.4272 (27) P= .013	.6861 (27) P= .000	.6109 (27) P= .000	.6524 (27) P= .000	.6516 (27) P= .000	.7124 (27) P= .000	.6596 (27) P= .000
S3Q14	.1488 (19) P= .272	.4136 (27) P= .016	.1919 (27) P= .169	.4086 (27) P= .017	-.0316 (27) P= .438	.5270 (27) P= .002	.2716 (27) P= .085	.4743 (27) P= .006	.2907 (27) P= .071	.2999 (27) P= .064	.4314 (27) P= .012
S3Q15	-.0554 (19) P= .411	.3373 (26) P= .046	.2252 (26) P= .134	.6186 (26) P= .000	.6571 (26) P= .000	.5058 (26) P= .004	.4381 (26) P= .013	.5057 (26) P= .004	.6272 (26) P= .000	.5699 (26) P= .001	.4234 (26) P= .016
S3Q16	-.1753 (19) P= .236	.5719 (27) P= .001	.6758 (27) P= .000	.7553 (27) P= .000	.7693 (27) P= .000	.6599 (27) P= .000	.4901 (27) P= .005	.5650 (27) P= .001	.7837 (27) P= .000	.7384 (27) P= .000	.4017 (27) P= .019
S3Q17	.0795 (19) P= .373	.3653 (19) P= .062	.6548 (19) P= .001	.4284 (19) P= .034	-.0300 (19) P= .451	.4052 (19) P= .043	.3820 (19) P= .053	.6088 (19) P= .003	.5980 (19) P= .003	.4978 (19) P= .015	.7082 (19) P= .000
S3Q18	.2266 (19) P= .175	.2313 (19) P= .170	.5236 (19) P= .011	.4522 (19) P= .024	-.0400 (19) P= .435	.5957 (19) P= .004	.5160 (19) P= .012	.8128 (19) P= .000	.5570 (19) P= .007	.4446 (19) P= .028	.7176 (19) P= .000
S3Q19	.2337 (19) P= .168	.3042 (19) P= .103	.6351 (19) P= .002	.4801 (19) P= .019	.1931 (19) P= .214	.5260 (19) P= .010	.5561 (19) P= .007	.6560 (19) P= .001	.5654 (19) P= .006	.5815 (19) P= .005	.5826 (19) P= .004
S3Q20	-.0761 (19) P= .378	.2499 (19) P= .151	.3908 (19) P= .049	.1771 (19) P= .234	.1305 (19) P= .297	.1451 (19) P= .277	.1101 (19) P= .327	.0837 (19) P= .367	.1851 (19) P= .224	.4388 (19) P= .030	.0461 (19) P= .426
S3Q21	.2465 (19) P= .154	.1753 (19) P= .236	.2914 (19) P= .113	.5846 (19) P= .004	.2855 (19) P= .118	.6197 (19) P= .002	.4750 (19) P= .020	.5353 (19) P= .009	.5473 (19) P= .008	.5591 (19) P= .006	.5233 (19) P= .011
S3Q22	.2794 (19) P= .123	.4387 (19) P= .030	.1327 (19) P= .294	.2727 (19) P= .129	.1712 (19) P= .242	.1741 (19) P= .238	.5009 (19) P= .014	.2480 (19) P= .153	.2718 (19) P= .130	.3923 (19) P= .048	.1666 (19) P= .248

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
09:18:29 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S3Q12	S3Q13	S3Q14	S3Q15	S3Q16	S3Q17	S3Q18	S3Q19	S3Q20	S3Q21	S3Q22
S3Q1	.0260	.0612	.1488	-.0554	-.1753	.0795	.2266	.2337	-.0761	.2465	.2794
	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .458	P= .402	P= .272	P= .411	P= .236	P= .373	P= .175	P= .168	P= .378	P= .154	P= .123
S3Q2	.4993	.5762	.4136	.3373	.5719	.3653	.2313	.3042	.2499	.1753	.4387
	(27)	(27)	(27)	(26)	(27)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .004	P= .001	P= .016	P= .046	P= .001	P= .062	P= .170	P= .103	P= .151	P= .236	P= .030
S3Q3	.3840	.3240	.1919	.2262	.6758	.6548	.5236	.6351	.3908	.2914	.1327
	(27)	(27)	(27)	(26)	(27)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .024	P= .050	P= .169	P= .134	P= .000	P= .001	P= .011	P= .002	P= .049	P= .113	P= .294
S3Q4	.7561	.6708	.4006	.6186	.7553	.4284	.4577	4801	.1771	.5846	.2727
	(27)	(27)	(27)	(26)	(27)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .000	P= .000	P= .017	P= .000	P= .000	P= .034	P= 024	P= .019	P= .234	P= .004	P= .129
S3Q5	.6877	.4272	-.0316	.6571	.7693	-.0300	-.0400	.1931	.1305	.2855	.1712
	(27)	(27)	(27)	(26)	(27)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .000	P= .013	P= .438	P= .000	P= .000	P= .451	P= 435	P= .214	P= .297	P= .118	P= .242
S3Q6	.3687	6861	5770	.5058	.6599	.4052	.5957	.5260	.1451	.6197	.1741
	(27)	(27)	(27)	(26)	(27)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .029	P= 000	P= 002	P= 004	P= .000	P= .043	P= .004	P= .010	P= .277	P= .002	P= .238
S3Q7	.5159	.6109	.2716	.4381	.4901	.3820	.5160	.5561	.1101	.4750	.5009
	(27)	(27)	(27)	(26)	(27)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .003	P= .000	P= 085	P= .013	P= 005	P= .053	P= .012	P= .007	P= .327	P= .020	P= .014
S3Q8	.3460	6524	.4743	.5057	.5650	6088	8128	.6560	.0837	.5353	.2480
	(27)	(27)	(27)	(26)	(27)	(19)	(19)	(19)	(19)	(19)	(19)
	P= 039	P= 000	P= .006	P= 004	P= .001	P= 003	P= .000	P= 001	P= .367	P= .009	P= .153
S3Q9	.6834	.6516	2907	.6272	.7837	.5980	.5570	.5654	1851	.5473	.2718
	(27)	(27)	(27)	(26)	(27)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .000	P= .000	P= 071	P= .000	P= .000	P= 003	P= 007	P= .006	P= .224	P= .008	P= .130
S3Q10	7925	.7124	.2999	.5699	.7304	4978	.4446	5815	.4188	.5591	.3923
	(27)	(27)	(27)	(26)	(27)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .000	P= .000	P= 064	P= 001	P= 000	P= .015	P= .028	P= .005	P= .030	P= .006	P= .048
S3Q11	.6278	.6596	.4514	.4234	.4017	.7082	7176	.5826	.0461	.52[illegible]	.1666
	(27)	(27)	(27)	(26)	(27)	(19)	(19)	(19)	(19)	(19)	(19)
	P= .000	P= .000	P= 012	P= 016	P= .019	P= 000	P= 000	P= 004	P= .426	P= .011	P= .248

(COEFFICIENT / (CASES) / 1 TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89   SPSS X REL . . 2.2 FOR IBM VM/CMS
09:18:29   U.W.O. SCHOOL OF BUSINESS   IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S3Q12	S3Q13	S3Q14	S3Q15	S3Q16	S3Q17	S3Q18	S3Q19	S3Q20	S3Q21	S3Q22
S3Q12	1.0000 (0) P= .	.6960 (27) P= .000	.2098 (27) P= .147	.5820 (26) P= .001	.5753 (27) P= .001	.3853 (19) P= .052	.2784 (19) P= .124	.3497 (19) P= .071	.3113 (19) P= .097	.6931 (19) P= .001	.5230 (19) P= .011
S3Q13	.6960 (27) P= .000	1.0000 (0) P= .	.5469 (27) P= .002	.4613 (26) P= .009	.5559 (27) P= .001	.5322 (19) P= .009	.7116 (19) P= .000	.5962 (19) P= .004	.3219 (19) P= .090	.6286 (19) P= .002	.4194 (19) P= .037
S3Q14	.2098 (27) P= .147	.5469 (27) P= .002	1.0000 (0) P= .	.2200 (26) P= .140	.2581 (27) P= .097	.3947 (19) P= .047	.4664 (19) P= .022	.1972 (19) P= .209	.1954 (19) P= .211	.3676 (19) P= .061	.2103 (19) P= .194
S3Q15	.5820 (26) P= .001	.4613 (26) P= .009	.2200 (26) P= .140	1.0000 (0) P= .	.6963 (26) P= .000	.0889 (19) P= .359	.1883 (19) P= .220	.0152 (19) P= .475	.0092 (19) P= .485	.4206 (19) P= .036	.2383 (19) P= .163
S3Q16	.5753 (27) P= .001	.5559 (27) P= .001	.2581 (27) P= .097	.6963 (26) P= .000	1.0000 (0) P=	.2974 (19) P= .108	.2099 (19) P= .194	.2788 (19) P= .124	.3980 (19) P= .046	.3586 (19) P= .066	.2661 (19) P= .135
S3Q17	.3853 (19) P= .052	.5322 (19) P= .009	.3947 (19) P= .047	.0889 (19) P= .359	.2974 (19) P= .108	1.0000 (0) P= .	.7225 (19) P= .000	.6716 (19) P= .001	.3187 (19) P= .092	.3320 (19) P= .082	.2013 (19) P= .204
S3Q18	.2784 (19) P= .124	.7116 (19) P= .000	.4664 (19) P= .022	.1883 (19) P= .220	.2099 (19) P= .194	.7225 (19) P= .000	1.0000 (0) P= .	.8865 (19) P= .000	.1169 (19) P= .317	.4113 (19) P= .040	.3259 (19) P= .087
S3Q19	.3497 (19) P= .071	.5962 (19) P= .004	.1972 (19) P= .209	.0152 (19) P= .475	.2788 (19) P= .124	.6716 (19) P= .001	.8865 (19) P= .000	1.0000 (0) P= .	.2360 (19) P= .165	.4254 (19) P= .035	.4094 (19) P= .041
S3Q20	.3113 (19) P= .097	.3219 (19) P= .090	.1954 (19) P= .211	.0092 (19) P= .485	.3980 (19) P= .046	.3187 (19) P= .092	.1169 (19) P= .317	.2360 (19) P= .165	1.0000 (0) P= .	.4561 (19) P= .025	.2920 (19) P= .113
S3Q21	.6931 (19) P= .001	.6286 (19) P= .002	.3676 (19) P= .061	.4206 (19) P= .036	.3586 (19) P= .066	.3320 (19) P= .082	.4113 (19) P= .040	.4254 (19) P= .035	.4561 (19) P= .025	1.0000 (0) P= .	.4690 (19) P= .021
S3Q22	.5230 (19) P= .011	.4194 (19) P= .037	.2103 (19) P= .194	.2383 (19) P= .163	.2661 (19) P= .135	.2013 (19) P= .204	.3259 (19) P= .087	.4094 (19) P= .041	.2920 (19) P= .113	.4690 (19) P= .021	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:15:46 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S4Q1	S4Q2	S4Q3	S4Q4	S4Q5	S4Q6	S4Q7	S4Q8	S4Q9	S4Q10	S4Q11
S4Q1	1.0000 (0) P= .	.8559 (26) P= .000	.7186 (26) P= .000	.6801 (26) P= .000	.6645 (26) P= .000	.6783 (26) P= .000	-.0043 (23) P= .492	.6340 (24) P= .000	.0000 (18) P= .500	.7295 (18) P= .000	.4414 (18) P= .033
S4Q2	.8559 (26) P= .000	1.0000 (0) P= .	.6499 (27) P= .000	.6501 (26) P= .000	.5106 (26) P= .004	.5275 (27) P= .002	-.2716 (23) P= .105	.5544 (25) P= .002	-.0458 (19) P= .426	.6432 (19) P= .001	.4881 (19) P= .017
S4Q3	.7186 (26) P= .000	.6499 (27) P= .000	1.0000 (0) P= .	.7155 (26) P= .000	.7815 (26) P= .000	.6317 (27) P= .000	-.0894 (23) P= .343	.5808 (25) P= .001	-.3170 (19) P= .093	.6733 (19) P= .001	.6895 (19) P= .001
S4Q4	.6801 (26) P= .000	.6501 (26) P= .000	.7155 (26) P= .000	1.0000 (0) P= .	.5830 (26) P= .001	.7766 (26) P= .000	.0617 (23) P= .390	.3953 (24) P= .028	-.2197 (18) P= .191	.7227 (18) P= .000	.6415 (18) P= .002
S4Q5	.6645 (26) P= .000	.5106 (26) P= .004	.7815 (26) P= .000	.5830 (26) P= .001	1.0000 (0) P= .	.7571 (26) P= .000	.2107 (23) P= .167	.4833 (24) P= .008	-.1062 (18) P= .338	.7882 (18) P= .000	.6627 (18) P= .001
S4Q6	.6783 (26) P= .000	.5275 (27) P= .002	.6317 (27) P= .000	.7766 (26) P= .000	.7571 (26) P= .000	1.0000 (0) P= .	.2893 (23) P= .090	.5044 (25) P= .005	.2618 (19) P= .139	.7204 (19) P= .000	.4975 (19) P= .015
S4Q7	-.0043 (23) P= .492	-.2716 (23) P= .105	-.0894 (23) P= .343	.0617 (23) P= .390	.2107 (23) P= .167	.2893 (23) P= .090	1.0000 (0) P= .	.1317 (23) P= .275	.2814 (15) P= .155	.0384 (15) P= .446	-.0805 (15) P= .388
S4Q8	.6340 (24) P= .000	.5544 (25) P= .002	.5808 (25) P= .001	.3953 (24) P= .028	.4833 (24) P= .008	.5044 (25) P= .005	.1317 (23) P= .275	1.0000 (0) P= .	-.1720 (17) P= .255	.5337 (17) P= .014	.5076 (17) P= .019
S4Q9	.0000 (18) P= .500	-.0458 (19) P= .426	-.3170 (19) P= .093	-.2197 (18) P= .191	-.1062 (18) P= .338	.2618 (19) P= .139	.2814 (15) P= .155	-.1720 (17) P= .255	1.0000 (0) P= .	.1655 (19) P= .249	-.2927 (19) P= .112
S4Q10	.7295 (18) P= .000	.6432 (19) P= .001	.6733 (19) P= .001	.7227 (18) P= .000	.7882 (18) P= .000	.7204 (19) P= .000	.0384 (15) P= .446	.5337 (17) P= .014	.1655 (19) P= .249	1.0000 (0) P= .	.5199 (19) P= .011
S4Q11	.4414 (18) P= .033	.4881 (19) P= .017	.6895 (19) P= .001	.6415 (18) P= .002	.6627 (18) P= .001	.4975 (19) P= .015	-.0805 (15) P= .388	.5076 (17) P= .019	-.2927 (19) P= .112	.5199 (19) P= .011	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1 TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

- - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - -

	S4Q1	S4Q2	S4Q3	S4Q4	S4Q5	S4Q6	S4Q7	S4Q8	S4Q9	S4Q10	S4Q11
S4Q12	.5452	.5410	.6530	.5967	.7471	.6559	.2370	.8057	.2070	.5413	.7531
	(18)	(19)	(19)	(18)	(18)	(19)	(15)	(17)	(19)	(19)	(19)
	P= .010	P= .008	P= .001	P= .004	P= .000	P= .001	P= .198	P= .000	P= .198	P= .008	P= .000
S4Q13	.4901	.7191	.5441	.7493	.6034	.6573	-.2438	.2800	-.0305	.6212	.6726
	(18)	(19)	(19)	(18)	(18)	(19)	(15)	(17)	(19)	(19)	(19)
	P= .019	P= .000	P= .008	P= .000	P= .004	P= .001	P= .191	P= .138	P= .451	P= .002	P= .001
S4Q14	.5425	.5155	.4947	.3971	.6870	.5894	.2094	.5046	.0459	.3575	.6223
	(18)	(19)	(19)	(18)	(18)	(19)	(15)	(17)	(19)	(19)	(19)
	P= .010	P= .012	P= .016	P= .051	P= .001	P= .004	P= .227	P= .019	P= .426	P= .066	P= .002
S4Q15	.2292	.4163	.3256	.2001	.4958	.3320	.0000	.3377	.2676	.5737	.5231
	(18)	(19)	(19)	(18)	(18)	(19)	(15)	(17)	(19)	(19)	(19)
	P= .180	P= .038	P= .087	P= .213	P= .018	P= .082	P= .500	P= .092	P= .134	P= .005	P= .011
S4Q16	.0339	.0848	.0210	-.2370	.1310	.0222	.1901	.2028	.2068	-.0368	.2540
	(17)	(18)	(18)	(17)	(17)	(18)	(15)	(17)	(18)	(18)	(18)
	P= .449	P= .369	P= .467	P= .180	P= .308	P= .465	P= .249	P= .217	P= .205	P= .442	P= .155
S4Q17	.5022	.5422	.6223	.5061	.6713	.4137	-.0255	.5146	-.1817	.4058	.6688
	(17)	(18)	(18)	(17)	(17)	(18)	(15)	(17)	(18)	(18)	(18)
	P= .020	P= .010	P= .003	P= .019	P= .002	P= .044	P= .464	P= .017	P= .235	P= .047	P= .001
S4Q18	.5707	.5656	.5379	.4114	.6930	.4162	.0311	.3123	.0791	.4532	.6985
	(17)	(18)	(18)	(17)	(17)	(18)	(14)	(16)	(18)	(18)	(18)
	P= .008	P= .007	P= .011	P= .050	P= .001	P= .043	P= .458	P= .119	P= .378	P= .029	P= .001
S4Q19	.5447	.3679	.5718	.4371	.6569	.6606	.1588	.6814	-.1701	.4762	.6560
	(18)	(19)	(19)	(18)	(18)	(19)	(15)	(17)	(19)	(19)	(19)
	P= .010	P= .061	P= .005	P= .035	P= .002	P= .001	P= .286	P= .001	P= .243	P= .020	P= .001
S4Q20	.4523	.5354	.6078	.4700	.7598	.4582	-.0108	.3328	-.1934	.4748	.7966
	(18)	(19)	(19)	(18)	(18)	(19)	(15)	(17)	(19)	(19)	(19)
	P= .030	P= .009	P= .003	P= .025	P= .000	P= .024	P= .485	P= .096	P= .214	P= .020	P= .000
S4Q21	.3516	.1748	.3045	.1930	.6399	.3878	.5011	.5250	-.0192	.3657	.6225
	(18)	(19)	(19)	(18)	(18)	(19)	(15)	(17)	(19)	(19)	(19)
	P= .076	P= .237	P= .102	P= .221	P= .002	P= .050	P= .029	P= .015	P= .469	P= .062	P= .002
S4Q22	.5712	.2483	.5849	.4899	.4033	.4617	-.1048	.5206	-.0121	.5522	.3215
	(18)	(19)	(19)	(18)	(18)	(19)	(15)	(17)	(19)	(19)	(19)
	P= .007	P= .153	P= .004	P= .020	P= .048	P= .023	P= .355	P= .016	P= .480	P= .007	P= .090

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

- - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - -

	S4Q1	S4Q2	S4Q3	S4Q4	S4Q5	S4Q6	S4Q7	S4Q8	S4Q9	S4Q10	S4Q11
S4Q23	.6609	.8175	.6745	.6292	.7515	.6052	.4150	.4120	-.0523	.7878	.6327
	(17)	(18)	(18)	(17)	(17)	(18)	(14)	(16)	(18)	(18)	(18)
	P= .002	P= .000	P= .001	P= .003	P= .000	P= .004	P= .070	P= .056	P= .418	P= .000	P= .002
S4Q24	.6535	.3477	.6782	.6878	.6935	.6951	.2787	.5991	-.2704	.5117	.6607
	(18)	(19)	(19)	(18)	(18)	(19)	(15)	(17)	(19)	(19)	(19)
	P= .002	P= .072	P= .001	P= .001	P= .001	P= .000	P= .206	P= .006	P= .131	P= .013	P= .001
S4Q25	.3711	.3956	.4639	.4354	.6783	.2915	.0354	.4304	-.1190	.4712	.6120
	(17)	(18)	(18)	(17)	(17)	(18)	(14)	(16)	(18)	(18)	(18)
	P= .071	P= .052	P= .026	P= .040	P= .003	P= .120	P= .452	P= .048	P= .319	P= .024	P= .003
S4Q26	.1952	.0585	.1080	.1539	.3863	.2790	.2368	.1798	.1186	.1604	.4258
	(16)	(16)	(16)	(16)	(16)	(16)	(13)	(14)	(16)	(16)	(16)
	P= .234	P= .415	P= .345	P= .285	P= .070	P= .148	P= .218	P= .269	P= .331	P= .276	P= .050
S4Q27	.2585	.0916	.1284	.2131	.3305	.2818	.3300	.2377	.2439	.2097	.4255
	(16)	(16)	(16)	(16)	(16)	(16)	(13)	(14)	(16)	(16)	(16)
	P= .167	P= .368	P= .318	P= .214	P= .106	P= .145	P= .135	P= .207	P= .181	P= .218	P= .050
S4Q28	.3640	.1214	.3022	.3570	.5696	.4211	.0913	.3062	-.1709	.3851	.3412
	(14)	(14)	(14)	(14)	(14)	(14)	(11)	(12)	(14)	(14)	(14)
	P= .100	P= .340	P= .147	P= .105	P= .017	P= .067	P= .395	P= .167	P= .280	P= .087	P= .116
S4Q29	.6635	.4567	.4700	.3928	.6457	.6547	.1353	.3488	.3509	.7224	.2987
	(18)	(19)	(19)	(18)	(18)	(19)	(15)	(17)	(19)	(19)	(19)
	P= .001	P= .025	P= .021	P= .053	P= .002	P= .001	P= .315	P= .085	P= .070	P= .000	P= .107
S4Q30	.4490	-.0208	.2757	.1810	.3943	.3928	.7291	.4297	.2906	.3224	.2190
	(17)	(18)	(18)	(17)	(17)	(18)	(14)	(16)	(18)	(18)	(18)
	P= .035	P= .467	P= .134	P= .243	P= .059	P= .053	P= .002	P= .048	P= .121	P= .096	P= .191
S4Q31	.7128	.6907	.4515	.7922	.5569	.6899	.0980	.2696	.1744	.7342	.3219
	(17)	(18)	(18)	(17)	(17)	(18)	(14)	(16)	(18)	(18)	(18)
	P= .001	P= .001	P= .030	P= .000	P= .010	P= .001	P= .369	P= .156	P= .244	P= .000	P= .096

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89   SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:15:46   U.W.O. SCHOOL OF BUSINESS   IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S4Q12	S4Q13	S4Q14	S4Q15	S4Q16	S4Q17	S4Q18	S4Q19	S4Q20	S4Q21	S4Q22
S4Q1	.5452 (18) P= .010	.4901 (18) P= .019	.5425 (18) P= .010	.2292 (18) P= .180	.0339 (17) P= .449	.5022 (17) P= .020	.5707 (17) P= .008	.5447 (18) P= .010	.4523 (18) P= .030	.3516 (18) P= .076	.5712 (18) P= .007
S4Q2	.5410 (19) P= .008	.7191 (19) P= .000	.5155 (19) P= .012	.4163 (19) P= .038	.0848 (18) P= .369	.5422 (18) P= .010	.5656 (18) P= .007	.3679 (19) P= .061	.5354 (19) P= .009	.1748 (19) P= .237	.2483 (19) P= .153
S4Q3	.6530 (19) P= .001	.5441 (19) P= .008	.4947 (19) P= .016	.3256 (19) P= .087	.0210 (18) P= .467	.6223 (18) P= .003	.5379 (18) P= .011	.5718 (19) P= .005	.6078 (19) P= .003	.3045 (19) P= .102	.5849 (19) P= .004
S4Q4	.5967 (18) P= .004	.7493 (18) P= .000	.3971 (18) P= .051	.2001 (18) P= .213	.2370 (17) P= .180	.5061 (17) P= .019	.4114 (17) P= .050	.4371 (18) P= .035	.4700 (18) P= .025	.1930 (18) P= .221	.4899 (18) P= .020
S4Q5	.7471 (18) P= .000	.6034 (18) P= .004	.6870 (18) P= .001	.4958 (18) P= .018	.1310 (17) P= .308	.6713 (17) P= .002	.6940 (17) P= .001	.6569 (18) P= .002	.7598 (18) P= .000	.6399 (18) P= .002	.4033 (18) P= .048
S4Q6	.6559 (19) P= .001	.6573 (19) P= .001	.5894 (19) P= .004	.3320 (19) P= .082	.0222 (18) P= .465	.4137 (18) P= .044	.4162 (18) P= .043	.6606 (19) P= .001	.4582 (19) P= .024	.3878 (19) P= .050	.4617 (19) P= .023
S4Q7	.2370 (15) P= .198	.2438 (15) P= .191	.2094 (15) P= .227	.0000 (15) P= .500	.1901 (15) P= .249	.0255 (15) P= .464	.0311 (14) P= .458	.1588 (15) P= .286	.0108 (15) P= .485	.5011 (15) P= .029	-.1048 (15) P= .355
S4Q8	.8057 (17) P= .000	.2800 (17) P= .138	.5046 (17) P= .019	.3377 (17) P= .092	.2028 (17) P= .217	.5146 (17) P= .017	.3123 (16) P= .119	.6814 (17) P= .001	.3328 (17) P= .096	.5250 (17) P= .015	.5206 (17) P= .016
S4Q9	-.2070 (19) P= .198	-.0305 (19) P= .451	.0459 (19) P= .426	.2676 (19) P= .134	.2068 (18) P= .205	-.1817 (18) P= .235	.0791 (18) P= .378	-.1701 (19) P= .243	-.1934 (19) P= .214	-.0192 (19) P= .469	-.0121 (19) P= .480
S4Q10	.5413 (19) P= .008	.6212 (19) P= .002	.3575 (19) P= .066	.5737 (19) P= .005	.0368 (18) P= .442	.4058 (18) P= .047	.4532 (18) P= .029	.4762 (19) P= .020	.4748 (19) P= .020	.3657 (19) P= .062	.5522 (19) P= .007
S4Q11	.7531 (19) P= .000	.6726 (19) P= .001	.6223 (19) P= .002	.5231 (19) P= .011	.2540 (18) P= .155	.6688 (18) P= .001	.6985 (18) P= .001	.6560 (19) P= .001	.7966 (19) P= .000	.6225 (19) P= .002	.3215 (19) P= .090

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:15:47 U.B.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - -

	S4Q12	S4Q13	S4Q14	S4Q15	S4Q16	S4Q17	S4Q18	S4Q19	S4Q20	S4Q21	S4Q22
S4Q12	1.0000 (0) P= .	.5870 (19) P= .004	.7537 (19) P= .000	.4160 (19) P= .038	.2897 (18) P= .122	.7639 (18) P= .000	.5959 (18) P= .005	.7139 (19) P= .000	.6616 (19) P= .001	.6776 (19) P= .001	.3844 (19) P= .052
S4Q13	.5870 (19) P= .004	1.0000 (0) P= .	.5686 (19) P= .006	.5865 (19) P= .004	.0018 (18) P= .497	.4907 (18) P= .019	.4446 (18) P= .032	.4099 (19) P= .041	.6212 (19) P= .002	.1816 (19) P= .228	.2289 (19) P= .173
S4Q14	.7537 (19) P= .000	.5686 (19) P= .006	1.0000 (0) P= .	.4542 (19) P= .025	.5921 (18) P= .005	.6922 (18) P= .001	.6316 (18) P= .002	.7158 (19) P= .000	.6451 (19) P= .001	.6382 (19) P= .002	.3188 (19) P= .092
S4Q15	.4160 (19) P= .038	.5865 (19) P= .004	.4542 (19) P= .025	1.0000 (0) P= .	.4222 (18) P= .040	.3209 (18) P= .097	.5030 (18) P= .017	.2697 (19) P= .132	.5689 (19) P= .006	.4369 (19) P= .031	.0678 (19) P= .391
S4Q16	.2897 (18) P= .122	-.0018 (18) P= .497	.5921 (18) P= .005	.4222 (18) P= .040	1.0000 (0) P= .	.3580 (18) P= .072	.3995 (17) P= .056	.2430 (18) P= .166	.1331 (18) P= .299	.5719 (18) P= .007	.0044 (18) P= .493
S4Q17	.7639 (18) P= .000	.4907 (18) P= .019	.6922 (18) P= .001	.3209 (18) P= .097	.3580 (18) P= .072	1.0000 (0) P= .	.8121 (17) P= .000	.3857 (18) P= .057	.6848 (18) P= .001	.5121 (18) P= .015	.3378 (18) P= .085
S4Q18	.5959 (18) P= .005	.4446 (18) P= .032	.6316 (18) P= .002	.5030 (18) P= .017	.3995 (17) P= .056	.8121 (17) P= .000	1.0000 (0) P= .	.4229 (18) P= .040	.8211 (18) P= .000	.6629 (18) P= .001	.1903 (18) P= .225
S4Q19	.7139 (19) P= .000	.4099 (19) P= .041	.7158 (19) P= .000	.2697 (19) P= .132	.2430 (18) P= .166	.3857 (18) P= .057	.4229 (18) P= .040	1.0000 (0) P= .	.5164 (19) P= .012	.6677 (19) P= .001	.5838 (19) P= .004
S4Q20	.6616 (19) P= .001	.6212 (19) P= .002	.6451 (19) P= .001	.5689 (19) P= .006	.1331 (18) P= .299	.6848 (18) P= .001	.8211 (18) P= .000	.5164 (19) P= .012	1.0000 (0) P= .	.6158 (19) P= .002	.0514 (19) P= .417
S4Q21	.6776 (19) P= .001	.1816 (19) P= .228	.6382 (19) P= .002	.4369 (19) P= .031	.5719 (18) P= .007	.5121 (18) P= .015	.6629 (18) P= .001	.6677 (19) P= .001	.6158 (19) P= .002	1.0000 (0) P= .	.2166 (19) P= .187
S4Q22	.3844 (19) P= .052	.2289 (19) P= .173	.3188 (19) P= .092	.0678 (19) P= .391	.0044 (18) P= .493	.3378 (18) P= .085	.1903 (18) P= .225	.5838 (19) P= .004	.0514 (19) P= .417	.2166 (19) P= .187	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS X RELEASE 2.2 FOR IBM VM/CMS
14:15:47 U.W.O SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S4Q12	S4Q13	S4Q14	S4Q15	S4Q16	S4Q17	S4Q18	S4Q19	S4Q20	S4Q21	S4Q22
S4Q23	.6120	.7886	.4963	.5416	.0441	.5399	.6356	.5487	.6822	.3387	.4385
	(18)	(18)	(18)	(18)	(17)	(17)	(17)	(18)	(18)	(18)	(18)
	P= .003	P= .000	P= .018	P= .012	P= .433	P= .013	P= .003	P= .009	P= .001	P= .085	P= .034
S4Q24	.7521	.4372	.6229	.0525	.0153	.6130	.4491	.7439	.4784	.4344	.6362
	(19)	(19)	(19)	(19)	(18)	(18)	(18)	(19)	(19)	(19)	(19)
	P= .000	P= .031	P= .002	P= .416	P= .476	P= .003	P= .031	P= .000	P= .019	P= .032	P= .002
S4Q25	.6906	.3453	.4894	.3638	.2255	.8776	.8102	.2932	.6919	.6492	.2598
	(18)	(18)	(18)	(18)	(17)	(17)	(17)	(18)	(18)	(18)	(18)
	P= .001	P= .080	P= .020	P= .069	P= .192	P= .000	P= .000	P= .119	P= .001	P= .002	P= .149
S4Q26	.4645	.0795	.6177	.1745	.7142	.5960	.5845	.4895	.3300	.7555	.3660
	(16)	(16)	(16)	(16)	(15)	(15)	(15)	(16)	(16)	(16)	(16)
	P= .035	P= .385	P= .005	P= .259	P= .001	P= .010	P= .011	P= .027	P= .106	P= .000	P= .082
S4Q27	.4209	.1129	.5426	.2758	.7432	.5825	.6012	.329[illegible]	.2083	.6455	.4072
	(16)	(16)	(16)	(16)	(15)	(15)	(15)	(16)	(16)	(16)	(16)
	P= .052	P= .339	P= .015	P= .151	P= .001	P= .011	P= .009	P= .106	P= .219	P= .003	P= .061
S4Q28	.5009	.1654	.4551	.0154	.1891	.5960	.3234	.5649	.2704	.5487	.6098
	(14)	(14)	(14)	(14)	(13)	(13)	(14)	(14)	(14)	(14)	(14)
	P= .034	P= .286	P= .051	P= .479	P= .268	P= .016	P= .130	P= .018	P= .175	P= .021	P= .010
S4Q29	.4690	.2985	.4694	.2854	.3050	.4363	.4619	.4667	.2494	.3539	.5170
	(19)	(19)	(19)	(19)	(18)	(18)	(18)	(19)	(19)	(19)	(19)
	P= .021	P= .107	P= .021	P= .118	P= .109	P= .035	P= .027	P= .022	P= .152	P= .069	P= .012
S4Q30	.2551	.1164	.3213	.2218	.4183	.2637	.3563	.3173	.1166	.5194	.4458
	(18)	(18)	(18)	(18)	(17)	(17)	(17)	(18)	(18)	(18)	(18)
	P= .154	P= .323	P= .097	P= .188	P= .047	P= .153	P= .080	P= .100	P= .322	P= .014	P= .032
S4Q31	.3592	.6148	.2177	.2222	.1575	.3602	.4223	.2906	.2487	.1553	.4959
	(18)	(18)	(18)	(18)	(17)	(17)	(17)	(18)	(18)	(18)	(18)
	P= .072	P= .003	P= .193	P= .187	P= .273	P= .078	P= .046	P= .121	P= .160	P= .269	P= .018

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:15:47 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S4Q23	S4Q24	S4Q25	S4Q26	S4Q27	S4Q28	S4Q29	S4Q30	S4Q31
S4Q1	.6609 (17) P= .002	.6535 (18) P= .002	.3711 (17) P= .071	.1952 (16) P= .234	.2505 (16) P= .167	.3640 (14) P= .100	.6635 (18) P= .001	.4490 (17) P= .035	.7128 (17) P= .001
S4Q2	.8175 (18) P= .000	.3427 (19) P= .072	.3956 (18) P= .052	.0585 (16) P= .415	.0916 (16) P= .368	.1214 (14) P= .340	.4567 (19) P= .025	.0208 (18) P= .467	.6907 (18) P= .001
S4Q3	.6745 (18) P= .001	.6782 (19) P= .001	.4639 (18) P= .026	.1080 (16) P= .345	.1284 (16) P= .318	.3022 (14) P= .147	.4700 (19) P= .021	.2757 (18) P= .134	.4515 (18) P= .030
S4Q4	.6292 (17) P= .003	.6878 (18) P= .001	.4354 (17) P= .040	.1539 (16) P= .285	.2131 (16) P= .214	.3570 (14) P= .105	.3928 (18) P= .053	.1810 (17) P= .243	.7927 (17) P= .000
S4Q5	.7515 (17) P= .000	.6935 (18) P= .001	.6283 (17) P= .003	.3863 (16) P= .070	.3305 (16) P= .106	.5696 (14) P= .017	.6457 (18) P= .002	.3943 (17) P= .059	.5569 (17) P= .010
S4Q6	.6052 (18) P= .004	.6951 (19) P= .000	.2915 (18) P= .120	.2790 (16) P= .148	.2818 (16) P= .145	.4211 (14) P= .067	.6547 (19) P= .001	.3928 (18) P= .053	.6899 (18) P= .001
S4Q7	-.4150 (14) P= .070	.2282 (15) P= .206	.0354 (14) P= .452	.2368 (13) P= .218	.3300 (13) P= .135	.0913 (11) P= .395	.3353 (15) P= .115	.7291 (14) P= .002	.0980 (14) P= .369
S4Q8	.4120 (16) P= .056	.5991 (17) P= .006	.4304 (16) P= .048	.1798 (14) P= .269	.2322 (14) P= .207	.3062 (12) P= .167	.3488 (17) P= .085	.4297 (16) P= .048	.2696 (16) P= .156
S4Q9	-.0523 (18) P= .418	.2704 (19) P= .131	.1190 (18) P= .319	.1186 (16) P= .331	.2439 (16) P= .181	.1709 (14) P= .280	.3509 (19) P= .070	.2906 (18) P= .121	.1744 (18) P= .244
S4Q10	.7878 (18) P= .000	.5112 (19) P= .013	.4712 (18) P= .024	.1604 (16) P= .276	.2097 (16) P= .218	.3851 (14) P= .087	.7224 (19) P= .000	.3224 (18) P= .096	.7342 (18) P= .000
S4Q11	.6327 (18) P= .002	.6607 (19) P= .001	.6170 (18) P= .003	.4258 (16) P= .050	.4255 (16) P= .050	.3412 (14) P= .116	.2987 (19) P= .107	.2190 (18) P= .191	.3219 (18) P= .096

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

- - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - -

	S4Q23	S4Q24	S4Q25	S4Q26	S4Q27	S4Q28	S4Q29	S4Q30	S4Q31
S4Q12	.6120	.7521	.6906	.4645	.4209	.5009	.4690	.2551	.3592
	(18)	(19)	(18)	(16)	(16)	(14)	(19)	(18)	(18)
	P= .003	P= .000	P= .001	P= .035	P= .052	P= .034	P= .021	P= .154	P= .072
S4Q13	.7886	.4372	.3453	.0795	.1129	.1654	.2985	-.1164	.6148
	(18)	(19)	(18)	(16)	(16)	(14)	(19)	(18)	(18)
	P= .000	P= .031	P= .080	P= .385	P= .339	P= .286	P= .107	P= .323	P= .003
S4Q14	.4963	.6229	.4894	.6177	.5426	.4551	.4694	.3213	.2177
	(18)	(19)	(18)	(16)	(16)	(14)	(19)	(18)	(18)
	P= .018	P= .002	P= .020	P= .005	P= .015	P= .051	P= .021	P= .097	P= .193
S4Q15	.5316	.0525	.3638	.1745	.2758	-.0154	.2854	.2218	.2227
	(18)	(19)	(18)	(16)	(16)	(14)	(19)	(18)	(18)
	P= .012	P= .416	P= .069	P= .259	P= .151	P= .479	P= .118	P= .188	P= .187
S4Q16	-.0441	-.0153	.2255	.7142	.7432	.1891	.3050	.4183	.1575
	(17)	(18)	(17)	(15)	(15)	(13)	(18)	(17)	(17)
	P= .433	P= .476	P= .192	P= .001	P= .001	P= .268	P= .109	P= .047	P= .273
S4Q17	.5399	.6130	.8776	.5960	.5825	.5960	.4363	.2637	.3602
	(17)	(18)	(17)	(15)	(15)	(13)	(18)	(17)	(17)
	P= .013	P= .003	P= .000	P= .010	P= .011	P= .016	P= .035	P= .153	P= .078
S4Q18	.6356	.4491	.8102	.5845	.6012	.3234	.4619	.3563	.4223
	(17)	(18)	(17)	(15)	(15)	(14)	(18)	(17)	(17)
	P= .003	P= .031	P= .000	P= .011	P= .009	P= .130	P= .027	P= .080	P= .046
S4Q19	.5487	.7439	.2932	.4895	.3295	.5649	.4667	.3173	.2906
	(18)	(19)	(18)	(16)	(16)	(14)	(19)	(18)	(18)
	P= .009	P= .000	P= .119	P= .027	P= .106	P= .018	P= .022	P= .100	P= .121
S4Q20	.6822	.4784	.6919	.3300	.2083	.2704	.2493	.1166	.2487
	(18)	(19)	(18)	(16)	(16)	(14)	(19)	(18)	(18)
	P= .001	P= .019	P= .001	P= .106	P= .219	P= .175	P= .152	P= .322	P= .160
S4Q21	.3387	.4344	.6492	.7555	.6455	.5487	.3539	.5194	.1553
	(18)	(19)	(18)	(16)	(16)	(14)	(19)	(18)	(18)
	P= .085	P= .032	P= .002	P= .000	P= .003	P= .021	P= .069	P= .014	P= .269
S4Q22	.4385	.6362	.2598	.3660	.4022	.6098	.5170	.4458	.4959
	(18)	(19)	(18)	(16)	(16)	(14)	(19)	(18)	(18)
	P= .034	P= .002	P= .149	P= .082	P= .061	P= .010	P= .012	P= .032	P= .018

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:15:47 U W.O SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S4Q23	S4Q24	S4Q25	S4Q26	S4Q27	S4Q28	S4Q29	S4Q30	S4Q31
S4Q23	1.0000	.4887	.5321	.0942	.0638	.2915	.5361	.1168	.6985
	(0)	(18)	(17)	(16)	(16)	(14)	(18)	(17)	(17)
	P= .	P= .020	P= .014	P= .364	P= .407	P= .156	P= .011	P= .328	P= .001
S4Q24	.4887	1.0000	.4673	.4190	.3935	.6313	.5626	.4109	.3920
	(18)	(0)	(18)	(16)	(16)	(14)	(19)	(18)	(18)
	P= .020	P= .	P= .025	P= .053	P= .066	P= .008	P= .006	P= .045	P= .054
S4Q25	.5321	.4673	1.0000	.6146	.5691	.5816	.3630	.2726	.4024
	(17)	(18)	(0)	(16)	(16)	(14)	(18)	(18)	(17)
	P= .014	P= .025	P= .	P= .006	P= .011	P= .015	P= .069	P= .137	P= .055
S4Q26	.0942	.4190	.6146	1.0000	.9077	.7547	.4628	.5548	.1880
	(16)	(16)	(16)	(0)	(16)	(14)	(16)	(16)	(15)
	P= .364	P= .053	P= .006	P=	P= .000	P= .001	P= .036	P= .013	P= .251
S4Q27	.0638	.3935	.5691	.9077	1.0000	.5705	.4666	.7105	.2891
	(16)	(16)	(16)	(16)	(0)	(14)	(16)	(16)	(15)
	P= .407	P= .066	P= .011	P= .000	P= .	P= .017	P= .034	P= .001	P= .148
S4Q28	.2915	.6313	.5816	.7547	.5705	1.0000	.5809	.3574	.2652
	(14)	(14)	(14)	(14)	(14)	(0)	(14)	(14)	(13)
	P= .156	P= .008	P= .015	P= .001	P= .017	P=	P= .015	P= .105	P= .191
S4Q29	.5361	.5626	.3630	.4628	.4666	.5809	1.0000	.4300	.4684
	(18)	(19)	(18)	(16)	(16)	(14)	(0)	(18)	(18)
	P= .011	P= .006	P= .069	P= .036	P= .034	P= .015	P= .	P= .037	P= .025
S4Q30	.1168	.4109	.2726	.5548	.7105	.3574	.4300	1.0000	.1779
	(17)	(18)	(18)	(16)	(16)	(14)	(18)	(0)	(17)
	P= .328	P= .045	P= .137	P= .013	P= .001	P= .105	P= .037	P= .	P= .247
S4Q31	.6985	.3920	.4024	.1880	.2891	.2652	.4684	.1779	1.0000
	(17)	(18)	(17)	(15)	(15)	(13)	(18)	(17)	(0)
	P= .001	P= .054	P= .055	P= .251	P= .148	P= .191	P= .025	P= .247	P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:51:43 U W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S1Q1	S1Q2	S1Q3	S1Q4	S1Q5	S1Q6	S1Q7	S1Q8
S1Q1	1.0000 (0) P= .	.7090 (10) P= .011	.2538 (10) P= .240	-.1024 (10) P= .389	.8977 (9) P= .001	.7096 (10) P= .011	.1831 (10) P= .306	.4445 (10) P= .099
S1Q2	.7090 (10) P= .011	1.0000 (0) P= .	.0000 (10) P= .500	-.5436 (10) P= .052	.7528 (9) P= .010	.5600 (10) P= .046	.1364 (10) P= .354	.2418 (10) P= .250
S1Q3	.2538 (10) P= .240	.0000 (10) P= .500	1.0000 (0) P= .	.4711 (10) P= .085	.0472 (9) P= .452	-.1336 (10) P= .356	.2651 (10) P= .230	.0577 (10) P= .437
S1Q4	-.1024 (10) P= .389	-.5436 (10) P= .052	.4711 (10) P= .085	1.0000 (0) P= .	-.5399 (9) P= .067	-.2408 (10) P= .251	.3978 (10) P= .127	-.1954 (10) P= .294
S1Q5	.8977 (9) P= .001	.7528 (9) P= .010	.0472 (9) P= .452	-.5399 (9) P= .067	1.0000 (0) P= .	.8315 (9) P= .003	-.2182 (9) P= .286	.5459 (9) P= .064
S1Q6	.7096 (10) P= .011	.5600 (10) P= .046	-.1336 (10) P= .356	-.2408 (10) P= .251	.8315 (9) P= .003	1.0000 (0) P= .	.0557 (11) P= .435	.0753 (11) P= .413
S1Q7	.1831 (10) P= .306	.1364 (10) P= .354	.2651 (10) P= .230	.3978 (10) P= .127	-.2182 (9) P= .286	.0557 (11) P= .435	1.0000 (0) P= .	-.0229 (11) P= .473
S1Q8	.4445 (10) P= .099	.2418 (10) P= .250	.0577 (10) P= .437	-.1954 (10) P= .294	.5459 (9) P= .064	.0753 (11) P= .413	-.0229 (11) P= .473	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1 TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:51:43 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S2Q1	S2Q2	S2Q3	S2Q4	S2Q5	S2Q6	S2Q7	S2Q8	S2Q9	S2Q10	S2Q11
S2Q1	1.0000 (0) P= .	.3549 (13) P= .117	.7036 (13) P= .004	.2203 (13) P= .235	.7568 (13) P= .001	.5810 (13) P= .019	.5609 (13) P= .023	.4449 (13) P= .064	.4829 (12) P= .056	.4773 (13) P= .050	.4692 (13) P= .053
S2Q2	.3549 (13) P= .117	1.0000 (0) P= .	.5477 (13) P= .026	.6100 (13) P= .013	.4023 (13) P= .086	.3899 (13) P= .094	.5136 (13) P= .036	.3192 (13) P= .144	.8557 (12) P= .000	.3432 (13) P= .125	.0940 (13) P= .380
S2Q3	.7036 (13) P= .004	.5477 (13) P= .026	1.0000 (0) P= .	.5409 (13) P= .028	.6715 (13) P= .006	.4983 (13) P= .042	.4501 (13) P= .061	.5180 (13) P= .035	.7286 (12) P= .004	.6803 (13) P= .005	.2745 (13) P= .182
S2Q4	.2203 (13) P= .235	.6100 (13) P= .013	.5409 (13) P= .028	1.0000 (0) P= .	.2373 (13) P= .218	.6378 (13) P= .010	.5316 (13) P= .031	.2434 (13) P= .211	.7613 (12) P= .002	.6494 (13) P= .008	.2696 (13) P= .187
S2Q5	.7568 (13) P= .001	.4023 (13) P= .086	.6715 (13) P= .006	.2373 (13) P= .218	1.0000 (0) P= .	.3930 (13) P= .092	.5595 (13) P= .023	.2885 (13) P= .170	.4475 (12) P= .072	.4058 (13) P= .084	.2692 (13) P= .187
S2Q6	.5810 (13) P= .019	.3899 (13) P= .094	.4983 (13) P= .042	.6378 (13) P= .010	.3930 (13) P= .092	1.0000 (0) P= .	.7826 (13) P= .001	.7340 (13) P= .002	.6094 (12) P= .018	.5353 (13) P= .030	.7216 (13) P= .003
S2Q7	.5609 (13) P= .023	.5136 (13) P= .036	.4501 (13) P= .061	.5316 (13) P= .031	.5595 (13) P= .023	.7826 (13) P= .001	1.0000 (0) P= .	.6031 (13) P= .015	.4907 (12) P= .053	.3626 (13) P= .112	.6743 (13) P= .006
S2Q8	.4449 (13) P= .064	.3192 (13) P= .144	.5180 (13) P= .035	.2434 (13) P= .211	.2885 (13) P= .170	.7340 (13) P= .002	.6031 (13) P= .015	1.0000 (0) P= .	.4117 (12) P= .092	.3895 (13) P= .094	.5722 (13) P= .020
S2Q9	.4829 (12) P= .056	.8557 (12) P= .000	.7286 (12) P= .004	.7613 (12) P= .002	.4475 (12) P= .072	.6094 (12) P= .018	.4907 (12) P= .053	.4117 (12) P= .092	1.0000 (0) P= .	.5378 (12) P= .036	.3031 (12) P= .169
S2Q10	.4773 (13) P= .050	.3432 (13) P= .125	.6803 (13) P= .005	.6494 (13) P= .008	.4058 (13) P= .084	.5353 (13) P= .030	.3626 (13) P= .112	.3895 (13) P= .094	.5378 (12) P= .036	1.0000 (0) P= .	.1106 (13) P= .360
S2Q11	.4692 (13) P= .053	.0940 (13) P= .380	.2745 (13) P= .182	.2696 (13) P= .187	.2692 (13) P= .187	.7216 (13) P= .003	.6743 (13) P= .006	.5722 (13) P= .020	.3031 (12) P= .169	.1106 (13) P= .360	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S2Q1	S2Q2	S2Q3	S2Q4	S2Q5	S2Q6	S2Q7	S2Q8	S2Q9	S2Q10	S2Q11
S2Q12	.4080 (13) P= .093	.5944 (13) P= .016	.6945 (13) P= .004	.7394 (13) P= .002	.6474 (13) P= .008	.4421 (13) P= .065	.5711 (13) P= .021	.2257 (13) P= .229	.6201 (12) P= .016	.7460 (13) P= .002	.0206 (13) P= .473
S2Q13	.7501 (12) P= .002	.4588 (12) P= .067	.5320 (12) P= .038	.1254 (12) P= .349	.7716 (12) P= .002	.4529 (12) P= .070	.7727 (12) P= .002	.4836 (12) P= .056	.3674 (11) P= .133	.3541 (12) P= .129	.5222 (12) P= .041
S2Q14	.4107 (13) P= .082	.2009 (13) P= .255	.2201 (13) P= .235	.3610 (13) P= .113	.1990 (13) P= .257	.6630 (13) P= .007	.7684 (13) P= .001	.4166 (13) P= .078	.2568 (12) P= .210	.0000 (13) P= .500	.8715 (13) P= .000
S2Q15	.9428 (13) P= .000	.3991 (13) P= .088	.7494 (13) P= .002	.3393 (13) P= .128	.8145 (13) P= .000	.5609 (13) P= .023	.5189 (13) P= .035	.3583 (13) P= .115	.5081 (12) P= .046	.4919 (13) P= .044	.3594 (13) P= .114
S2Q16	.5421 (13) P= .028	.6013 (13) P= .015	.5855 (13) P= .018	.7453 (13) P= .002	.5529 (13) P= .025	.8337 (13) P= .000	.6040 (13) P= .014	.4550 (13) P= .059	.8590 (12) P= .000	.6290 (13) P= .011	.4521 (13) P= .060
S2Q17	.4195 (13) P= .077	.1391 (13) P= .325	.2709 (13) P= .185	.1094 (13) P= .361	.1968 (13) P= .260	.5368 (13) P= .029	.4660 (13) P= .054	.8216 (13) P= .000	.2804 (12) P= .189	-.0364 (13) P= .453	.6676 (13) P= .006
S2Q18	.5191 (13) P= .035	.2458 (13) P= .209	.5386 (13) P= .029	.3274 (13) P= .137	.3565 (13) P= .116	.8111 (13) P= .000	.6371 (13) P= .010	.9049 (13) P= .000	.4560 (12) P= .068	.3214 (13) P= .142	.7582 (13) P= .001
S2Q19	.4570 (13) P= .058	.1674 (13) P= .292	.3362 (13) P= .131	.0539 (13) P= .431	.1865 (13) P= .271	.6050 (13) P= .014	.5396 (13) P= .028	.6575 (13) P= .007	.3515 (12) P= .131	.0000 (13) P= .500	.8010 (13) P= .000
S2Q20	.2725 (13) P= .184	.1696 (13) P= .290	.3406 (13) P= .127	.0500 (13) P= .436	.1050 (13) P= .366	.4654 (13) P= .054	.1179 (13) P= .351	.7791 (13) P= .001	.3626 (12) P= .123	.3991 (13) P= .088	.3163 (13) P= .146
S2Q21	.7884 (13) P= .001	.5445 (13) P= .027	.6363 (13) P= .010	.1285 (13) P= .338	.6201 (13) P= .012	.6011 (13) P= .015	.6162 (13) P= .012	.7345 (13) P= .002	.5656 (12) P= .028	.2563 (13) P= .199	.5259 (13) P= .032
S2Q22	.7836 (13) P= .001	.1513 (13) P= .311	.4972 (13) P= .042	.0568 (13) P= .427	.6314 (13) P= .010	.6035 (13) P= .014	.6933 (13) P= .004	.5217 (13) P= .034	.2547 (12) P= .212	.1187 (13) P= .350	.6693 (13) P= .006

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89   SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:51:43   U.W.O. SCHOOL OF BUSINESS   IBM 4381 MOD 13   VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S2Q12	S2Q13	S2Q14	S2Q15	S2Q16	S2Q17	S2Q18	S2Q19	S2Q20	S2Q21	S2Q22
S2Q1	.4080	.7501	.4107	.9428	.5421	.4195	.5191	.4570	.2725	.7884	.7836
	(13)	(12)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .083	P= .002	P= .082	P= .000	P= .028	P= .077	P= .035	P= .058	P= .184	P= .001	P= .001
S2Q2	.5944	.4588	.2009	.3991	.6013	.1391	.2458	.1674	.1696	.5445	.1513
	(13)	(12)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .016	P= .067	P= .255	P= .088	P= .015	P= .325	P= .209	P= .292	P= .290	P= .027	P= .311
S2Q3	.6945	.5320	.2201	.7494	.5855	.2709	.5386	.3362	.3406	.6363	.4972
	(13)	(12)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .004	P= .038	P= .235	P= .002	P= .018	P= .185	P= .029	P= .131	P= .127	P= .010	P= .042
S2Q4	.7394	.1254	.3610	.3393	.7453	-.1094	.3274	.0559	.0500	.1285	.0568
	(13)	(12)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .002	P= .349	P= .113	P= .128	P= .002	P= .361	P= .137	P= .431	P= .436	P= .338	P= .427
S2Q5	.6474	.7716	.1990	.8145	.5529	.1968	.3565	.1865	.1050	.6201	.6314
	(13)	(12)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .008	P= .002	P= .257	P= .000	P= .025	P= .260	P= .116	P= .271	P= .366	P= .012	P= .010
S2Q6	.4421	.4529	.6610	.5609	.8337	.5368	.8111	.6050	.4654	.6011	.6035
	(13)	(12)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .065	P= .070	P= .007	P= .023	P= .000	P= .029	P= .000	P= .014	P= .054	P= .015	P= .014
S2Q7	.5711	.7727	.7684	.5189	.6040	.4660	.6371	.5396	.1179	.6162	.6933
	(13)	(12)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .021	P= .002	P= .001	P= .035	P= .014	P= .054	P= .010	P= .028	P= .351	P= .012	P= .004
S2Q8	.2257	.4836	.4166	.3583	.4550	.8216	.9049	.6575	.7791	.7345	.5217
	(13)	(12)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .229	P= .056	P= .078	P= .115	P= .059	P= .000	P= .000	P= .007	P= .001	P= .002	P= .034
S2Q9	.6201	.3674	.2568	.5081	.8590	.2804	.4560	.3515	.3626	.5656	.2547
	(12)	(11)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
	P= .016	P= .133	P= .210	P= .046	P= .000	P= .189	P= .068	P= .131	P= .123	P= .028	P= .212
S2Q10	.7460	.3541	.0000	.4919	.6290	.0364	.3214	.0000	.3991	.2563	.1187
	(13)	(12)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .002	P= .129	P= .500	P= .044	P= .011	P= .453	P= .142	P= .500	P= .088	P= .199	P= .350
S2Q11	.0206	.5222	.8715	.3594	.4571	.6676	.7582	.8010	.3163	.5259	.6693
	(13)	(12)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .473	P= .041	P= .000	P= .114	P= .060	P= .006	P= .001	P= .000	P= .146	P= .032	P= .006

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S2Q12	S2Q13	S2Q14	S2Q15	S2Q16	S2Q17	S2Q18	S2Q19	S2Q20	S2Q21	S2Q22
S2Q12	1.0000 (0) P= .	.4595 (12) P= .066	.1249 (13) P= .342	.5463 (13) P= .027	.6354 (13) P= .010	-.1662 (13) P= .294	.2308 (13) P= .224	-.0520 (13) P= .433	.0155 (13) P= .480	.2470 (13) P= .208	.2269 (13) P= .228
S2Q13	.4595 (12) P= .066	1.0000 (0) P= .	.5215 (12) P= .041	.6326 (12) P= .014	.3701 (12) P= .118	.4161 (12) P= .089	.4286 (12) P= .082	.5025 (12) P= .048	.1489 (12) P= .322	.7775 (12) P= .001	.7335 (12) P= .003
S2Q14	.1249 (13) P= .342	.5215 (12) P= .041	1.0000 (0) P= .	.3595 (13) P= .114	.3759 (13) P= .103	.4672 (13) P= .054	.5978 (13) P= .015	.7606 (13) P= .001	-.0262 (13) P= .466	.4579 (13) P= .058	.7108 (13) P= .003
S2Q15	.5463 (13) P= .027	.6326 (12) P= .014	.3595 (13) P= .114	1.0000 (0) P= .	.6094 (13) P= .014	.2407 (13) P= .214	.4772 (13) P= .050	.3465 (13) P= .123	.1993 (13) P= .257	.7107 (13) P= .003	.7218 (13) P= .003
S2Q16	.6354 (13) P= .010	.3701 (12) P= .118	.3759 (13) P= .103	.6094 (13) P= .014	1.0000 (0) P= .	.1983 (13) P= .258	.5256 (13) P= .033	.3579 (13) P= .115	.3626 (13) P= .112	.5239 (13) P= .033	.4043 (13) P= .085
S2Q17	-.1662 (13) P= .294	.4161 (12) P= .089	.4672 (13) P= .054	.2407 (13) P= .214	.1983 (13) P= .258	1.0000 (0) P= .	.8300 (13) P= .000	.7522 (13) P= .002	.6435 (13) P= .009	.6836 (13) P= .005	.5827 (13) P= .018
S2Q18	.2308 (13) P= .224	.4286 (12) P= .082	.5978 (13) P= .015	.4772 (13) P= .050	.5256 (13) P= .033	.8300 (13) P= .000	1.0000 (0) P= .	.7386 (13) P= .002	.6906 (13) P= .004	.6673 (13) P= .006	.6218 (13) P= .012
S2Q19	-.0520 (13) P= .433	.5025 (12) P= .048	.7606 (13) P= .001	.3465 (13) P= .123	.3579 (13) P= .115	.7522 (13) P= .002	.7386 (13) P= .002	1.0000 (0) P= .	.4083 (13) P= .083	.6843 (13) P= .005	.7675 (13) P= .001
S2Q20	.0155 (13) P= .480	.1489 (12) P= .322	-.0262 (13) P= .466	.1993 (13) P= .257	.3626 (13) P= .112	.6435 (13) P= .009	.6906 (13) P= .004	.4083 (13) P= .083	1.0000 (0) P= .	.5001 (13) P= .041	.1184 (13) P= .350
S2Q21	.2470 (13) P= .208	.7775 (12) P= .001	.4579 (13) P= .058	.7107 (13) P= .003	.5239 (13) P= .033	.6836 (13) P= .005	.6673 (13) P= .006	.6843 (13) P= .005	.5001 (13) P= .041	1.0000 (0) P= .	.7655 (13) P= .001
S2Q22	.2269 (13) P= .228	.7335 (12) P= .003	.7108 (13) P= .003	.7218 (13) P= .003	.4043 (13) P= .085	.5827 (13) P= .018	.6218 (13) P= .012	.7675 (13) P= .001	.1184 (13) P= .350	.7655 (13) P= .001	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:51:44 U W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S3Q1	S3Q2	S3Q3	S3Q4	S3Q5	S3Q6	S3Q7	S3Q8	S3Q9	S3Q10
S3Q1	1.0000 (0) P= .	.6641 (13) P= .007	.1424 (13) P= .321	.1491 (13) P= .313	.3243 (13) P= .140	.1411 (13) P= .323	.1658 (13) P= .294	.6022 (13) P= .015	.3380 (13) P= .129	.5757 (13) P= .020
S3Q2	.6641 (13) P= .007	1.0000 (0) P= .	.0352 (13) P= .455	-.0707 (13) P= .409	.0228 (13) P= .471	.1095 (13) P= .361	.2069 (13) P= .249	.2903 (13) P= .168	.1120 (13) P= .358	.3190 (13) P= .144
S3Q3	.1424 (13) P= .321	-.0352 (13) P= .455	1.0000 (0) P= .	.7889 (13) P= .001	.4986 (13) P= .041	.3752 (13) P= .103	.1507 (13) P= .312	.2200 (13) P= .235	.6815 (13) P= .005	.3429 (13) P= .126
S3Q4	.1491 (13) P= .313	-.0707 (13) P= .409	.7889 (13) P= .001	1.0000 (0) P= .	.3626 (13) P= .112	.3012 (13) P= .159	.0000 (13) P= .500	.4967 (13) P= .042	.5039 (13) P= .040	.5735 (13) P= .020
S3Q5	.3243 (13) P= .140	.0228 (13) P= .471	.4986 (13) P= .041	.3626 (13) P= .112	1.0000 (0) P= .	.1526 (13) P= .309	.0660 (13) P= .415	.2161 (13) P= .239	.4640 (13) P= .055	.1787 (13) P= .280
S3Q6	.1411 (13) P= .323	.1095 (13) P= .361	.3752 (13) P= .103	.3012 (13) P= .159	.1526 (13) P= .309	1.0000 (0) P= .	.5792 (13) P= .019	.3904 (13) P= .094	.6598 (13) P= .007	.3028 (13) P= .157
S3Q7	.1658 (13) P= .294	.2069 (13) P= .249	.1507 (13) P= .312	.0000 (13) P= .500	.0660 (13) P= .415	.5792 (13) P= .019	1.0000 (0) P= .	.1356 (13) P= .329	.3791 (13) P= .101	-.1522 (13) P= .310
S3Q8	.6022 (13) P= .015	.2903 (13) P= .168	.2200 (13) P= .235	.4967 (13) P= .042	.2161 (13) P= .239	.3904 (13) P= .094	.1356 (13) P= .329	1.0000 (0) P= .	.3957 (13) P= .090	.5318 (13) P= .031
S3Q9	.3380 (13) P= .129	.1120 (13) P= .358	.6815 (13) P= .005	.5039 (13) P= .040	.4640 (13) P= .055	.6598 (13) P= .007	.3791 (13) P= .101	.3957 (13) P= .090	1.0000 (0) P= .	.4844 (13) P= .047
S3Q10	.5757 (13) P= .020	.3190 (13) P= .144	.3429 (13) P= .126	.5735 (13) P= .020	.1787 (13) P= .280	.3028 (13) P= .157	.1522 (13) P= .310	.5318 (13) P= .031	.4844 (13) P= .047	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:51:44 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S4Q1	S4Q2	S4Q3	S4Q4	S4Q5	S4Q6	S4Q7	S4Q8	S4Q9	S4Q10	S4Q11
S4Q1	1.0000 (0) P= .	-.0092 (13) P= .488	.5076 (13) P= .038	.2096 (13) P= .246	.1678 (13) P= .292	.0259 (13) P= .467	.1301 (13) P= .336	-.0237 (12) P= .471	-.2169 (13) P= .238	-.3568 (13) P= .116	-.2655 (13) P= .190
S4Q2	-.0092 (13) P= .488	1.0000 (0) P= .	.0491 (13) P= .437	.3811 (13) P= .099	.2137 (13) P= .242	.2567 (13) P= .199	-.0186 (13) P= .476	.2581 (12) P= .209	.1590 (13) P= .302	.1314 (13) P= .334	.5355 (13) P= .030
S4Q3	-.5076 (13) P= .038	.0491 (13) P= .437	1.0000 (0) P= .	.2342 (13) P= .221	.1438 (13) P= .320	.3103 (13) P= .151	-.1633 (13) P= .297	.2931 (12) P= .178	.2169 (13) P= .238	.5536 (13) P= .025	.3993 (13) P= .088
S4Q4	2096 (13) P= .246	.3811 (13) P= .099	.2342 (13) P= .221	1.0000 (0) P= .	.4621 (13) P= .056	.6478 (13) P= .008	.0725 (13) P= .407	.3372 (12) P= .142	.6412 (13) P= .009	.6372 (13) P= .010	.1416 (13) P= .322
S4Q5	.1678 (13) P= .292	.2137 (13) P= .242	.1438 (13) P= .320	.4621 (13) P= .056	1.0000 (0) P= .	.5226 (13) P= .033	.2691 (13) P= .187	.5106 (12) P= .045	.1707 (13) P= .289	.4516 (13) P= .061	.2909 (13) P= .167
S4Q6	.0259 (13) P= .467	.2567 (13) P= .199	.3103 (13) P= .151	.6478 (13) P= .008	.5226 (13) P= .033	1.0000 (0) P= .	.2786 (13) P= .178	.7217 (12) P= .004	.6228 (13) P= .011	.3506 (13) P= .120	.5971 (13) P= .016
S4Q7	.1301 (13) P= .336	-.0186 (13) P= .476	-.1633 (13) P= .297	.0725 (13) P= .407	.2691 (13) P= .187	.2786 (13) P= .178	1.0000 (0) P= .	.6576 (12) P= .010	.0591 (13) P= .424	-.1529 (13) P= .309	.0582 (13) P= .425
S4Q8	-.0237 (12) P= .471	.2581 (12) P= .209	.2931 (12) P= .178	.3372 (12) P= .142	.5106 (12) P= 045	.7217 (12) P= .004	.6576 (12) P= .010	1.0000 (0) P= .	.3247 (12) P= .152	.1618 (12) P= .308	.5259 (12) P= .040
S4Q9	-.2169 (13) P= .238	.1590 (13) P= .302	.2169 (13) P= .238	.6412 (13) P= .009	.1707 (13) P= .289	.6228 (13) P= .011	.0591 (13) P= .424	.3247 (12) P= .152	1.0000 (0) P= .	.6045 (13) P= .014	.2807 (13) P= .176
S4Q10	-.3568 (13) P= .116	.1314 (13) P= .334	.5536 (13) P= .025	.6372 (13) P= .010	.4516 (13) P= .061	.3506 (13) P= .120	-.1529 (13) P= .309	.1618 (12) P= .308	.6045 (13) P= .014	1.0000 (0) P= .	.1692 (13) P= .290
S4Q11	-.2655 (13) P= .190	.5355 (13) P= .030	.3993 (13) P= .088	.1416 (13) P= .322	.2909 (13) P= .167	.5971 (13) P= .016	.0582 (13) P= .425	.5259 (12) P= .040	.2807 (13) P= .176	.1692 (13) P= .290	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1 TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPU

- - - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - -

	S4Q1	S4Q2	S4Q3	S4Q4	S4Q5	S4Q6	S4Q7	S4Q8	S4Q9	S4Q10	S4Q11
S4Q12	-.5406 (13) P= .028	-.0926 (13) P= .382	.5736 (13) P= .020	.2126 (13) P= .243	.0535 (13) P= .431	-.0780 (13) P= .400	-.3590 (13) P= .114	-.0396 (12) P= .451	.2492 (13) P= .206	.7651 (13) P= .001	.0745 (13) P= .404
S4Q13	.1122 (13) P= .358	.1340 (13) P= .331	.1181 (13) P= .350	.2561 (13) P= .199	.7970 (13) P= .001	.6200 (13) P= .011	.4851 (13) P= .046	.7910 (12) P= .001	.3649 (13) P= .110	.3269 (13) P= .138	.5679 (13) P= .021
S4Q14	-.1050 (13) P= .366	.6095 (13) P= .015	.3458 (13) P= .124	.2217 (13) P= .233	.2909 (13) P= .167	.6884 (13) P= .005	.1664 (13) P= .293	.6048 (12) P= .019	.3172 (13) P= .146	.0776 (13) P= .401	.9504 (13) P= .000
S4Q15	-.0341 (13) P= .456	.2302 (13) P= .225	.3788 (13) P= .101	.4533 (13) P= .060	.6871 (13) P= .005	.5300 (13) P= .031	.1301 (13) P= .336	.4002 (12) P= .099	.4545 (13) P= .059	.5709 (13) P= .021	.2964 (13) P= .163
S4Q16	-.3476 (13) P= .122	.1062 (13) P= .365	.6686 (13) P= .006	.2756 (13) P= .181	.4087 (13) P= .083	.3760 (13) P= .103	.1535 (13) P= .308	.1982 (12) P= .269	.4817 (13) P= .048	.8165 (13) P= .000	.5264 (13) P= .032
S4Q17	.2969 (13) P= .162	.1323 (13) P= .333	.4322 (13) P= .070	.4787 (13) P= .049	.6194 (13) P= .012	.8360 (13) P= .000	.2533 (13) P= .202	.7490 (12) P= .003	.4274 (13) P= .073	.4266 (13) P= .073	.4249 (13) P= .074
S4Q18	-.1262 (13) P= .341	.1432 (13) P= .320	.6293 (13) P= .011	.5763 (13) P= .020	.3904 (13) P= .094	.6431 (13) P= .009	.1870 (13) P= .270	.7281 (12) P= .004	.3602 (13) P= .113	.4899 (13) P= .045	.3127 (13) P= .149
S4Q19	-.2740 (13) P= .183	.2829 (13) P= .175	.3506 (13) P= .120	.5970 (13) P= .016	.6214 (13) P= .012	.5454 (13) P= .027	.3750 (13) P= .103	.7585 (12) P= .002	.3454 (13) P= .124	.5323 (13) P= .031	.3530 (13) P= .118
S4Q20	-.0859 (13) P= .390	.5572 (13) P= .024	.5157 (13) P= .036	.4714 (13) P= .052	.3626 (13) P= .112	.4400 (13) P= .066	.1158 (13) P= .353	.6569 (12) P= .010	.1953 (13) P= .261	.3925 (13) P= .092	.3736 (13) P= .104
S4Q21	.2472 (13) P= .208	.0273 (13) P= .465	.0524 (13) P= .432	.0392 (13) P= .449	.7348 (13) P= .002	.3387 (13) P= .129	.3027 (13) P= .157	.4113 (12) P= .092	-.2196 (13) P= .235	.1411 (13) P= .323	.3114 (13) P= .150
S4Q22	.1968 (13) P= .260	.0725 (13) P= .407	.4294 (13) P= .072	.2052 (13) P= .251	.3397 (13) P= .128	.4020 (13) P= .087	.5543 (13) P= .025	.5511 (12) P= .032	.3009 (13) P= .159	-.1532 (13) P= .309	.1215 (13) P= .346

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89   SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:51:44   U.W.O SCHOOL OF BUSINESS   IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S4Q12	S4Q13	S4Q14	S4Q15	S4Q16	S4Q17	S4Q18	S4Q19	S4Q20	S4Q21	S4Q22
S4Q1	-.5406 (13) P= .028	.1122 (13) P= .358	.1050 (13) P= .366	-.0341 (13) P= .456	-.3476 (13) P= .122	.2969 (13) P= .162	-.1262 (13) P= .341	.2740 (13) P= .183	-.0859 (13) P= .390	.2472 (13) P= .208	.1968 (13) P= .260
S4Q2	-.0926 (13) P= .382	.1340 (13) P= .331	.6005 (13) P= .015	.2302 (13) P= .225	.1062 (13) P= .365	.1323 (13) P= .333	.1432 (13) P= .320	.2829 (13) P= .175	.5572 (13) P= .024	.0273 (13) P= .465	-.0725 (13) P= .407
S4Q3	.5736 (13) P= .020	.1181 (13) P= .350	.3458 (13) P= .124	.3789 (13) P= .101	.6686 (13) P= .006	.4322 (13) P= .070	.6293 (13) P= .011	.3506 (13) P= .120	.5157 (13) P= .036	-.0524 (13) P= .432	-.4294 (13) P= .072
S4Q4	.2126 (13) P= .243	.2561 (13) P= .199	.2217 (13) P= .233	.4533 (13) P= .060	.2756 (13) P= .181	.4787 (13) P= .049	.5763 (13) P= .020	.5970 (13) P= .016	.4714 (13) P= .052	.0392 (13) P= .449	.2052 (13) P= .251
S4Q5	-.0535 (13) P= .431	.7970 (13) P= .001	.2909 (13) P= .167	.6871 (13) P= .005	.4087 (13) P= .083	.6194 (13) P= .012	.3904 (13) P= .094	.6214 (13) P= .012	.3626 (13) P= .112	.7348 (13) P= .002	.3397 (13) P= .128
S4Q6	-.0780 (13) P= .400	.6280 (13) P= .011	.6884 (13) P= .005	.5300 (13) P= .031	.3760 (13) P= .103	.8360 (13) P= .000	.6431 (13) P= .009	.5454 (13) P= .027	.4400 (13) P= .066	.3387 (13) P= .129	.4020 (13) P= .087
S4Q7	-.3590 (13) P= .114	.4851 (13) P= .046	.1664 (13) P= .293	.1301 (13) P= .336	-.1535 (13) P= .308	.2533 (13) P= .202	.1870 (13) P= .270	.3750 (13) P= .103	.1158 (13) P= .353	.3027 (13) P= .157	.5543 (13) P= .025
S4Q8	-.0396 (12) P= .451	.7910 (12) P= .001	.6048 (12) P= .019	.4002 (12) P= .099	.1982 (12) P= .269	.7490 (12) P= .003	.7281 (12) P= .004	.7585 (12) P= .002	.6569 (12) P= .010	.4113 (12) P= .092	.5511 (12) P= .032
S4Q9	.2492 (13) P= .206	.3649 (13) P= .110	.3172 (13) P= .146	.4545 (13) P= .059	.4817 (13) P= .048	.4274 (13) P= .073	.3602 (13) P= .113	.3454 (13) P= .124	.1953 (13) P= .261	-.2196 (13) P= .235	.3009 (13) P= .159
S4Q10	.7651 (13) P= .001	.3269 (13) P= .138	.0776 (13) P= .401	.5709 (13) P= .021	.8165 (13) P= .000	.4266 (13) P= .073	.4899 (13) P= .045	.5323 (13) P= .031	.3925 (13) P= .092	.1411 (13) P= .323	-.1532 (13) P= .309
S4Q11	.0745 (13) P= .404	.5679 (13) P= .021	.9564 (13) P= .000	.2964 (13) P= .163	.5264 (13) P= .032	.4249 (13) P= .074	.3127 (13) P= .149	.3530 (13) P= .118	.3736 (13) P= .104	.3114 (13) P= .150	.1215 (13) P= .346

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:51:44 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S4Q12	S4Q13	S4Q14	S4Q15	S4Q16	S4Q17	S4Q18	S4Q19	S4Q20	S4Q21	S4Q22
S4Q12	1.0000 (0) P= .	-.0554 (13) P= .429	-.0869 (13) P= .389	.1523 (13) P= .310	.7254 (13) P= .003	.0531 (13) P= .432	.3145 (13) P= .148	.2102 (13) P= .245	.1728 (13) P= .286	-.0602 (13) P= .423	-.4376 (13) P= .067
S4Q13	-.0554 (13) P= .429	1.0000 (0) P= .	.5679 (13) P= .021	.5727 (13) P= .020	.5151 (13) P= .036	.6608 (13) P= .007	.3698 (13) P= .107	.5533 (13) P= .025	.2233 (13) P= .232	.6539 (13) P= .008	.5810 (13) P= .019
S4Q14	-.0869 (13) P= .389	.5679 (13) P= .021	1.0000 (0) P= .	.2964 (13) P= .163	.4056 (13) P= .085	.5298 (13) P= .031	.3840 (13) P= .098	.3218 (13) P= .142	.4203 (13) P= .076	.2320 (13) P= .223	.1847 (13) P= .273
S4Q15	.1523 (13) P= .310	.5727 (13) P= .020	.2964 (13) P= .163	1.0000 (0) P= .	.5413 (13) P= .028	.6186 (13) P= .012	.5956 (13) P= .016	.6451 (13) P= .009	.6016 (13) P= .015	.3933 (13) P= .092	.0805 (13) P= .397
S4Q16	.7254 (13) P= .003	.5151 (13) P= .036	.4056 (13) P= .085	.5413 (13) P= .028	1.0000 (0) P= .	.4789 (13) P= .049	.4024 (13) P= .086	.3368 (13) P= .130	.2586 (13) P= .197	.2254 (13) P= .230	-.2288 (13) P= .226
S4Q17	.0531 (13) P= .432	.6608 (13) P= .007	.5298 (13) P= .031	.6186 (13) P= .012	.4789 (13) P= .049	1.0000 (0) P= .	.7848 (13) P= .001	.5350 (13) P= .030	.5614 (13) P= .023	.4551 (13) P= .059	.2610 (13) P= .195
S4Q18	.3145 (13) P= .148	.3698 (13) P= .107	.3840 (13) P= .098	.5956 (13) P= .016	.4024 (13) P= .086	.7848 (13) P= .001	1.0000 (0) P= .	.7380 (13) P= .002	.8017 (13) P= .000	.2446 (13) P= .210	.1431 (13) P= .321
S4Q19	.2102 (13) P= .245	.5533 (13) P= .025	.3218 (13) P= .142	.6451 (13) P= .009	.3368 (13) P= .130	.5350 (13) P= .030	.7380 (13) P= .002	1.0000 (0) P= .	.7686 (13) P= .001	.5287 (13) P= .032	.4209 (13) P= .076
S4Q20	.1728 (13) P= .286	.2233 (13) P= .232	.4203 (13) P= .076	.6016 (13) P= .015	.2586 (13) P= .197	.5614 (13) P= .023	.8017 (13) P= .000	.7686 (13) P= .001	1.0000 (0) P= .	.2550 (13) P= .200	.0000 (13) P= .500
S4Q21	.0602 (13) P= .423	.6539 (13) P= .008	.2320 (13) P= .223	.3933 (13) P= .092	.2254 (13) P= .230	.4551 (13) P= .059	.2446 (13) P= .210	.5287 (13) P= .032	.2550 (13) P= .200	1.0000 (0) P= .	.3361 (13) P= .131
S4Q22	-.4376 (13) P= .067	.5810 (13) P= .019	.1847 (13) P= .273	.0805 (13) P= .397	.2288 (13) P= .226	.2610 (13) P= .195	.1431 (13) P= .321	.4209 (13) P= .076	.0000 (13) P= .500	.3361 (13) P= .131	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:13:40 U W O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S2Q1	S2Q2	S2Q3	S2Q4	S2Q5	S2Q6	S2Q7	S2Q8	S2Q9	S2Q10	S2Q11
S2Q1	1.0000 (0) P= .	.1038 (21) P= .327	.2810 (21) P= .109	-.1621 (21) P= .241	-.2559 (21) P= .131	.2346 (21) P= .153	-.5621 (20) P= .005	-.3115 (21) P= .085	-.2755 (21) P= .113	-.1524 (21) P= .255	-.3361 (21) P= .068
S2Q2	.1038 (21) P= .327	1.0000 (0) P= .	-.1097 (21) P= .318	.2807 (21) P= .109	.2030 (21) P= .189	.1784 (21) P= .220	.3769 (20) P= .051	.2867 (21) P= .104	.3206 (21) P= .078	.4100 (21) P= .032	.2086 (21) P= .182
S2Q3	.2810 (21) P= .109	-.1097 (21) P= .318	1.0000 (0) P= .	-.1680 (21) P= .233	.2393 (21) P= .148	.8471 (21) P= .000	-.1612 (20) P= .249	.1753 (21) P= .224	-.0023 (21) P= .496	.4081 (21) P= .033	.0499 (21) P= .415
S2Q4	-.1621 (21) P= .241	.2807 (21) P= .109	-.1680 (21) P= .233	1.0000 (0) P= .	.1268 (21) P= .292	-.1376 (21) P= .276	.0000 (20) P= .500	.2022 (21) P= .189	.5200 (21) P= .008	.4499 (21) P= .020	.5862 (21) P= .003
S2Q5	-.2559 (21) P= .131	.2030 (21) P= .189	.2393 (21) P= .148	.1268 (21) P= .292	1.0000 (0) P= .	-.0621 (21) P= .395	.3656 (20) P= .056	.0434 (21) P= .426	.3449 (21) P= .063	.0801 (21) P= .365	-.1842 (21) P= .212
S2Q6	.2346 (21) P= .153	.1784 (21) P= .220	.8471 (21) P= .000	-.1376 (21) P= .276	-.0621 (21) P= .395	1.0000 (0) P= .	-.0431 (20) P= .428	.3063 (21) P= .088	.0452 (21) P= .423	.4918 (21) P= .012	.1037 (21) P= .327
S2Q7	-.5621 (20) P= .005	.3769 (20) P= .051	-.1612 (20) P= .249	.0000 (20) P= .500	.3656 (20) P= .056	-.0431 (20) P= .428	1.0000 (0) P= .	.2924 (20) P= .106	.3440 (20) P= .069	.1506 (20) P= .263	.0275 (20) P= .454
S2Q8	-.3115 (21) P= .085	.2867 (21) P= .104	.1753 (21) P= .224	.2022 (21) P= .189	.0434 (21) P= .426	.3063 (21) P= .088	.2924 (20) P= .106	1.0000 (0) P= .	.0479 (21) P= .418	.4267 (21) P= .027	.1975 (21) P= .195
S2Q9	-.2755 (21) P= .113	.3206 (21) P= .078	-.0023 (21) P= .496	.5200 (21) P= .008	.3449 (21) P= .063	.0452 (21) P= .423	.3440 (20) P= .069	.0479 (21) P= .418	1.0000 (0) P= .	.4960 (21) P= .011	.5834 (21) P= .003
S2Q10	-.1524 (21) P= .255	.4100 (21) P= .032	.4081 (21) P= .033	.4499 (21) P= .020	.0801 (21) P= .365	.4918 (21) P= .012	.1506 (20) P= .263	.4267 (21) P= .027	.4960 (21) P= .011	1.0000 (0) P= .	.5142 (21) P= .009
S2Q11	-.3361 (21) P= .068	.2086 (21) P= .182	.0499 (21) P= .415	.5862 (21) P= .003	-.1842 (21) P= .212	.1037 (21) P= .327	.0275 (20) P= .454	.1975 (21) P= .195	.5834 (21) P= .003	.5142 (21) P= .009	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
15:21:37 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - -

	S1Q1	S1Q2	S1Q3	S1Q4	S1Q5	S1Q6	S1Q7	S1Q8
S1Q1	1.0000 (0) P= .	.3944 (21) P= .038	.0496 (21) P= .415	.1423 (21) P= .269	.0602 (21) P= .398	-.1547 (21) P= .252	-.0785 (21) P= .368	.0892 (21) P= .350
S1Q2	.3944 (21) P= .038	1.0000 (0) P= .	-.1147 (21) P= .310	.1902 (21) P= .205	.2275 (21) P= .161	-.0071 (21) P= .488	-.1039 (21) P= .327	.2219 (21) P= .167
S1Q3	.0496 (21) P= .415	-.1147 (21) P= .310	1.0000 (0) P= .	.5369 (21) P= .006	.0000 (21) P= .500	.0925 (21) P= .345	.1506 (21) P= .257	.2703 (21) P= .118
S1Q4	-.1423 (21) P= .269	-.1902 (21) P= .205	.5369 (21) P= .006	1.0000 (0) P= .	-.3491 (21) P= .060	-.1574 (21) P= .248	-.0202 (21) P= .465	.1573 (21) P= .248
S1Q5	.0602 (21) P= .398	.2275 (21) P= .161	.0000 (21) P= .500	.3491 (21) P= .060	1.0000 (0) P= .	.0000 (21) P= .500	.1565 (21) P= .249	.0819 (21) P= .362
S1Q6	.1547 (21) P= .252	-.0071 (21) P= .488	.0925 (21) P= .345	-.1574 (21) P= .248	.0000 (21) P= .500	1.0000 (0) P= .	.5261 (21) P= .007	.1345 (21) P= .281
S1Q7	.0785 (21) P= .368	-.1039 (21) P= .327	.1506 (21) P= .257	.0202 (21) P= .465	.1565 (21) P= .249	.5261 (21) P= .007	1.0000 (0) P= .	.1068 (21) P= .327
S1Q8	.0892 (21) P= .350	.2219 (21) P= .167	.2703 (21) P= .118	.1573 (21) P= .248	-.0819 (21) P= .362	.1345 (21) P= .281	.1068 (21) P= .322	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:13:41 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - -

	S2Q1	S2Q2	S2Q3	S2Q4	S2Q5	S2Q6	S2Q7	S2Q8	S2Q9	S2Q10	S2Q11
S2Q12	- 3278 (21) P= 073	.2619 (21) P= .126	1258 (21) P= .293	4623 (21) P= 017	0777 (21) P= 369	1699 (21) P= .231	0150 (20) P= .475	.2083 (21) P= 182	.5803 (21) P= .003	4806 (21) P= .014	.9229 (21) P= .000
S2Q13	- 3710 (21) P= 049	.3263 (21) P= .074	1978 (21) P= .195	1489 (21) P= 260	1330 (21) P= .283	.4110 (21) P= 032	2379 (20) P= .156	.5993 (21) P= .002	.3726 (21) P= .048	6138 (21) P= .002	.5916 (21) P= .002
S2Q14	- 2569 (21) P= .130	.1971 (21) P= .196	- 1524 (21) P= .255	.1690 (21) P= 232	1674 (21) P= .234	-.0309 (21) P= 447	- 1156 (20) P= .314	0933 (21) P= .344	2864 (21) P= 104	.1670 (21) P= .235	.2069 (21) P= .184
S2Q15	-.1630 (21) P= .240	2231 (21) P= .165	0822 (21) P= .362	.1742 (21) P= .225	.0538 (21) P= .408	2476 (21) P= .140	- 0695 (20) P= 385	.0430 (21) P= .427	.3832 (21) P= .043	.3344 (21) P= .069	.4141 (21) P= .031
S2Q16	- 2120 (21) P= .178	3224 (21) P= 077	1605 (21) P= .243	0872 (21) P= .354	-.0043 (21) P= .493	2756 (21) P= 113	0071 (20) P= .488	1145 (21) P= .311	2115 (21) P= .179	.2714 (21) P= .117	.1905 (21) P= .204

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:13:41 U.W.D. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S2Q12	S2Q13	S2Q14	S2Q15	S2Q16
S2Q1	-.3278 (21) P= .073	.3710 (21) P= .049	-.2569 (21) P= .130	1630 (21) P= .240	-.2120 (21) P= 178
S2Q2	.2619 (21) P= .126	.3263 (21) P= .074	1971 (21) P= 196	.2231 (21) P= .165	3224 (21) P= 077
S2Q3	.1258 (21) P= .293	.1978 (21) P= .195	.1524 (21) P= .255	.0822 (21) P= .362	.1605 (21) P= .243
S2Q4	4623 (21) P= .017	1489 (21) P= .260	1690 (21) P= 232	.1742 (21) P= .225	0872 (21) P= .354
S2Q5	-.0777 (21) P= .369	- 1330 (21) P= .283	1674 (21) P= 234	.0538 (21) P= 408	.0043 (21) P= 493
S2Q6	.1699 (21) P= .231	.4110 (21) P= 032	-.0309 (21) P= 447	.2476 (21) P= 140	2756 (21) P= 113
S2Q7	0150 (20) P= .475	.2379 (20) P= .156	.1156 (20) P= 314	- 0695 (20) P= 385	.0071 (20) P .488
S2Q8	.2083 (21) P= 182	5993 (21) P= 002	0933 (21) P= 344	0430 (21) P= 427	.1145 (21) P= 311
S2Q9	.5803 (21) P= .003	.3726 (21) P= .048	.2864 (21) P= 104	3832 (21) P= .043	2115 (21) P= .179
S2Q10	.4806 (21) P= 014	6138 (21) P= .002	1670 (21) P= 235	3344 (21) P= 069	2714 (21) P 117
S2Q11	9229 (21) P= 000	.5916 (21) P 002	.2069 (21) P= 184	4141 (21) P= 031	1905 (21) P= 204

(COEFFICIENT / (CASES) / 1 TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89   SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:13:41   U.W.O SCHOOL OF BUSINESS   IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S2Q12	S2Q13	S2Q14	S2Q15	S2Q16
S2Q12	1.0000	.5595	.4192	.5426	.3504
	(0)	(21)	(21)	(21)	(21)
	P=	P= .004	P= .029	P= .006	P= .060
S2Q13	.5595	1.0000	.2959	.4884	.3685
	(21)	(0)	(21)	(21)	(21)
	P= .004	P=	P= .096	P= .012	P= .050
S2Q14	.4192	.2959	1.0000	.7828	.7852
	(21)	(21)	(0)	(21)	(21)
	P= .029	P= .096	P=	P= .000	P= .000
S2Q15	.5426	.4884	.7828	1.0000	.7868
	(21)	(21)	(21)	(0)	(21)
	P= .006	P= .012	P= .000	P=	P= .000
S2Q16	.3504	.3685	.7852	.7868	1.0000
	(21)	(21)	(21)	(21)	(0)
	P= .060	P= .050	P= .000	P= .000	P=

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:13:41 U.N.D. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S3Q1	S3Q2	S3Q3	S3Q4	S3Q5	S3Q6	S3Q7	S3Q8	S3Q9
S3Q1	1.0000 (0) P= .	.4761 (21) P= .015	-.3191 (21) P= .079	.4692 (21) P= .016	-.0669 (21) P= .387	.5299 (21) P= .007	-.0429 (21) P= .427	.2289 (21) P= .159	.0043 (21) P= .493
S3Q2	.4761 (21) P= .015	1.0000 (0) P= .	-.1261 (21) P= .293	.3296 (21) P= .072	.1295 (21) P= .288	.3145 (21) P= .083	.0987 (21) P= .335	.0341 (21) P= .442	.0469 (21) P= .420
S3Q3	-.3191 (21) P= .079	-.1261 (21) P= .293	1.0000 (0) P= .	.2869 (21) P= .104	.2217 (21) P= .167	.0071 (21) P= .488	.1312 (21) P= .285	.2043 (21) P= .187	.0770 (21) P= .370
S3Q4	.4692 (21) P= .016	.3296 (21) P= .072	.2869 (21) P= .104	1.0000 (0) P=	.1070 (21) P= .322	.3301 (21) P= .072	.0686 (21) P= .384	-.0494 (21) P= .416	-.2012 (21) P= .191
S3Q5	-.0669 (21) P= .387	.1295 (21) P= .288	.2217 (21) P= .167	.1070 (21) P= .322	1.0000 (0) P=	.1840 (21) P= .212	.0734 (21) P= .376	.2095 (21) P= .181	.3370 (21) P= .068
S3Q6	.5299 (21) P= .007	.3145 (21) P= .083	.0071 (21) P= .488	.3301 (21) P= .072	-.1840 (21) P= .212	1.0000 (0) P=	.4614 (21) P= .018	-.1996 (21) P= .193	-.0933 (21) P= .344
S3Q7	-.0429 (21) P= .427	-.0987 (21) P= .335	.1312 (21) P= .285	.0686 (21) P= .384	.0734 (21) P= .376	.4614 (21) P= .018	1.0000 (0) P=	.0000 (21) P= .500	-.2855 (21) P= .105
S3Q8	-.2289 (21) P= .159	-.0341 (21) P= .442	.2043 (21) P= .187	-.0494 (21) P= .416	.2095 (21) P= .181	-.1996 (21) P= .193	.0000 (21) P= .500	1.0000 (0) P= .	.2025 (21) P= .189
S3Q9	.0043 (21) P= .493	.0469 (21) P= .420	.0770 (21) P= .370	-.2012 (21) P= .191	.3370 (21) P= .068	-.0933 (21) P= .344	-.2855 (21) P= .105	.2025 (21) P= .189	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1 TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
15:21:37 U W O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - -

	S4Q1	S4Q2	S4Q3	S4Q4	S4Q5	S4Q6	S4Q7	S4Q8	S4Q9	S4Q10	S4Q11
S4Q1	1.0000 (0) P= .	.5581 (13) P= .024	.3998 (13) P= .088	.3444 (13) P= .125	.1968 (13) P= .260	.3459 (13) P= .123	.2193 (13) P= .236	.4046 (13) P= .085	.3106 (13) P= .151	.0093 (13) P= .488	.5424 (13) P= .028
S4Q2	.5581 (13) P= .024	1.0000 (0) P= .	.8069 (21) P= .000	.6755 (21) P= .000	.2961 (21) P= .096	.7881 (21) P= .000	.5918 (21) P= .002	.7383 (21) P= .000	.6758 (21) P= .000	.3495 (21) P= .060	.5992 (21) P= .002
S4Q3	.3998 (13) P= .088	.8069 (21) P= .000	1.0000 (0) P= .	.7683 (21) P= .000	.2688 (21) P= .119	.5954 (21) P= .002	.6246 (21) P= .001	.6557 (21) P= .001	.5935 (21) P= .002	.4195 (21) P= .029	.4463 (21) P= .021
S4Q4	.3444 (13) P= .125	.6755 (21) P= .000	.7683 (21) P= .000	1.0000 (0) P= .	.5172 (21) P= .008	.5207 (21) P= .008	.7334 (21) P= .000	.6178 (21) P= .001	.6575 (21) P= .001	.2707 (21) P= .118	.4688 (21) P= .016
S4Q5	.1968 (13) P= .260	.2961 (21) P= .096	.2688 (21) P= .119	.5172 (21) P= .008	1.0000 (0) P= .	.3966 (21) P= .038	.6812 (21) P= .000	.5521 (21) P= .005	.4255 (21) P= .027	.2116 (21) P= .179	.3988 (21) P= .037
S4Q6	.3459 (13) P= .123	.7881 (21) P= .000	.5954 (21) P= .002	.5207 (21) P= .008	.3966 (21) P= .038	1.0000 (0) P= .	.7623 (21) P= .000	.8258 (21) P= .000	.5674 (21) P= .004	.2996 (21) P= .094	.7605 (21) P= .000
S4Q7	.2193 (13) P= .236	.5918 (21) P= .002	.6246 (21) P= .001	.7334 (21) P= .000	.6812 (21) P= .000	.7623 (21) P= .000	1.0000 (0) P= .	.7623 (21) P= .000	.5217 (21) P= .008	.3625 (21) P= .053	.6791 (21) P= .000
S4Q8	.4046 (13) P= .085	.7383 (21) P= .000	.6557 (21) P= .001	.6178 (21) P= .001	.5521 (21) P= .005	.8258 (21) P= .000	.7623 (21) P= .000	1.0000 (0) P= .	.7114 (21) P= .000	.3695 (21) P= .050	.7453 (21) P= .000
S4Q9	.3106 (13) P= .151	.6758 (21) P= .000	.5935 (21) P= .002	.6575 (21) P= .001	.4255 (21) P= .027	.5674 (21) P= .004	.5217 (21) P= .008	.7114 (21) P= .000	1.0000 (0) P= .	.4531 (21) P= .020	.4141 (21) P= .031
S4Q10	.0093 (13) P= .488	.3495 (21) P= .060	.4195 (21) P= .029	.2707 (21) P= .118	.2116 (21) P= .179	.2996 (21) P= .094	.3625 (21) P= .053	.3695 (21) P= .050	.4531 (21) P= .020	1.0000 (0) P= .	.3121 (21) P= .084
S4Q11	.5424 (13) P= .028	.5992 (21) P= .002	.4463 (21) P= .021	.4688 (21) P= .016	.3988 (21) P= .037	.7605 (21) P= .000	.6791 (21) P= .000	.7453 (21) P= .000	.4141 (21) P= .031	.3121 (21) P= .084	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
15:21:37 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S4Q1	S4Q2	S4Q3	S4Q4	S4Q5	S4Q6	S4Q7	S4Q8	S4Q9	S4Q10	S4Q11
S4Q12	.0742 (13) P= .405	.6081 (21) P= .002	.6720 (21) P= .000	.5178 (21) P= .008	.4374 (21) P= .024	.5898 (21) P= .002	.6279 (21) P= .001	.7834 (21) P= .000	.5509 (21) P= .005	.5150 (21) P= .008	.6041 (21) P= .002
S4Q13	.3580 (13) P= .115	.3547 (21) P= .057	.0599 (21) P= .398	.1582 (21) P= .275	.3234 (21) P= .076	.2760 (21) P= .113	.2125 (21) P= .178	.3916 (21) P= .040	.4635 (21) P= .017	.0350 (21) P= .440	.2949 (21) P= .097
S4Q14	.6612 (13) P= .007	.5472 (21) P= .005	.4112 (21) P= .032	.3693 (21) P= .050	.2775 (21) P= .112	.5684 (21) P= .004	.4839 (21) P= .013	.3804 (21) P= .044	.3063 (21) P= .088	.4722 (21) P= .015	.6698 (21) P= .000
S4Q15	.0322 (13) P= .458	.4289 (21) P= .026	.5565 (21) P= .004	.4361 (21) P= .024	.5668 (21) P= .004	.4231 (21) P= .028	.6151 (21) P= .002	.4530 (21) P= .020	.3741 (21) P= .047	.4743 (21) P= .015	.3354 (21) P= .069
S4Q16	.2506 (13) P= .204	.6680 (21) P= .000	.7074 (21) P= .000	.5493 (21) P= .005	.3657 (21) P= .052	.5405 (21) P= .006	.6056 (21) P= .002	.5239 (21) P= .007	.6165 (21) P= .001	.5531 (21) P= .005	.4831 (21) P= .013
S4Q17	-.0470 (13) P= .439	.3055 (13) P= .155	.2116 (13) P= .244	.3067 (13) P= .154	.5971 (13) P= .016	.4819 (13) P= .048	.5949 (13) P= .016	.5868 (13) P= .018	.4806 (13) P= .048	.7420 (13) P= .002	.4285 (13) P= .072
S4Q18	.1377 (13) P= .327	.4605 (13) P= .057	.2054 (13) P= .250	.2553 (13) P= .200	.1550 (13) P= .307	.1459 (13) P= .317	.2034 (13) P= .253	.4668 (13) P= .054	.2386 (13) P= .216	.4771 (13) P= .050	.2932 (13) P= .165
S4Q19	.2426 (13) P= .212	.6384 (13) P= .009	.1539 (13) P= .308	.2915 (13) P= .167	.2880 (13) P= .170	.4129 (13) P= .078	.3408 (13) P= .127	.4020 (13) P= .087	.4249 (13) P= .074	.2089 (13) P= .247	.3002 (13) P= .159
S4Q20	.1155 (13) P= .354	.2406 (13) P= .214	.2755 (13) P= .181	.4910 (13) P= .044	.8736 (13) P= .000	.4374 (13) P= .067	.7628 (13) P= .001	.5445 (13) P= .027	.2188 (13) P= .236	.3906 (13) P= .094	.6621 (13) P= .007
S4Q21	.1099 (13) P= .360	.5490 (13) P= .026	.4244 (13) P= .074	.6524 (13) P= .008	.7748 (13) P= .001	.6078 (13) P= .014	.8359 (13) P= .000	.7188 (13) P= .003	.4868 (13) P= .046	.6230 (13) P= .011	.7576 (13) P= .001
S4Q22	.5437 (13) P= .027	.8015 (13) P= .000	.6886 (13) P= .005	.3792 (13) P= .101	.1913 (13) P= .266	.5731 (13) P= .020	.4506 (13) P= [illegible]	.5394 (13) P= .029	.4570 (13) P= .058	.4946 (13) P= .043	.4660 (13) P= .054

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89   SPSS-X RELEASE 2.2 FOR IBM VM/CMS
15:21:38   U W O. SCHOOL OF BUSINESS   IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S4Q12	S4Q13	S4Q14	S4Q15	S4Q16	S4Q17	S4Q18	S4Q19	S4Q20	S4Q21	S4Q22
S4Q1	.0742 (13) P= .405	.3580 (13) P= .115	.6612 (13) P= .007	-.0322 (13) P= .458	.2506 (13) P= .204	-.0470 (13) P= .439	.1377 (13) P= .327	.2426 (13) P= .212	.1155 (13) P= .354	.1099 (13) P= .360	.5437 (13) P= .027
S4Q2	.6081 (21) P= .002	.3547 (21) P= .057	.5472 (21) P= .005	.4289 (21) P= .026	.6680 (21) P= .000	.3055 (13) P= .155	.4605 (13) P= .057	.6384 (13) P= .009	.2406 (13) P= .214	.5490 (13) P= .026	.8615 (13) P= .000
S4Q3	.6720 (21) P= .000	.0599 (21) P= .398	.4112 (21) P= .032	.5565 (21) P= .004	.7074 (21) P= .000	.2116 (13) P= .244	.2054 (13) P= .250	.1539 (13) P= .308	.2755 (13) P= .181	.4244 (13) P= .074	.6886 (13) P= .005
S4Q4	.5178 (21) P= .008	.1382 (21) P= .275	.3693 (21) P= .050	.4361 (21) P= .024	.5494 (21) P= .005	.3067 (13) P= .154	.2553 (13) P= .200	.2915 (13) P= .167	.4910 (13) P= .044	.6524 (13) P= .006	.3792 (13) P= .101
S4Q5	.4374 (21) P= .024	.3234 (21) P= .076	.2775 (21) P= .112	.5668 (21) P= .004	.3657 (21) P= .052	.5971 (13) P= .016	.1550 (13) P= .307	.2880 (13) P= .170	.8736 (13) P= .000	.7748 (13) P= .001	.1913 (13) P= .266
S4Q6	.5898 (21) P= .002	.2760 (21) P= .113	.5684 (21) P= .004	.4231 (21) P= .028	.5405 (21) P= .006	.4819 (13) P= .048	.1459 (13) P= .317	.4179 (13) P= .078	.4374 (13) P= .067	.6078 (13) P= .014	.5731 (13) P= .020
S4Q7	.6279 (21) P= .001	.2125 (21) P= .178	.4839 (21) P= .013	.6151 (21) P= .002	.6056 (21) P= .002	.5949 (13) P= .016	.2034 (13) P= .253	.3408 (13) P= .127	.7628 (13) P= .001	.8359 (13) P= .000	.4606 (13) P= .057
S4Q8	.7834 (21) P= .000	.3916 (21) P= .040	.3804 (21) P= .044	.4530 (21) P= .020	.5239 (21) P= .007	.5868 (13) P= .018	.4668 (13) P= .054	.4020 (13) P= .087	.5445 (13) P= .027	.7188 (13) P= .003	.5394 (13) P= .029
S4Q9	.5509 (21) P= .005	.4635 (21) P= .017	.3063 (21) P= .088	.3741 (21) P= .047	.6165 (21) P= .001	.4806 (13) P= .048	.2186 (13) P= .216	.4249 (13) P= .074	.2188 (13) P= .236	.4868 (13) P= .046	.4570 (13) P= .058
S4Q10	.5158 (21) P= .008	.0350 (21) P= .440	.4722 (21) P= .015	.4743 (21) P= .015	.5531 (21) P= .005	.7420 (13) P= .002	.4771 (13) P= .050	.2089 (13) P= .247	.3906 (13) P= .094	.6230 (13) P= .011	.4946 (13) P= .043
S4Q11	.6041 (21) P= .002	.2949 (21) P= .097	.6698 (21) P= .000	.3354 (21) P= .069	.4831 (21) P= .013	.4285 (13) P= .072	.2932 (13) P= .165	.3002 (13) P= .159	.6621 (13) P= .007	.7576 (13) P= .001	.4660 (13) P= .054

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89   SPSS-X RELEASE 2.2 FOR IBM VM/CMS
15:21:38   U.W.O SCHOOL OF BUSINESS   IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S4Q12	S4Q13	S4Q14	S4Q15	S4Q16	S4Q17	S4Q18	S4Q19	S4Q20	S4Q21	S4Q22
S4Q12	1.0000 (0) P= .	.1563 (21) P= .249	.2422 (21) P= .145	.4628 (21) P= .017	.5419 (21) P= .006	.4626 (13) P= .056	.4912 (13) P= .044	.2786 (13) P= .178	.5058 (13) P= .039	.6532 (13) P= .008	.4947 (13) P= .043
S4Q13	.1563 (21) P= .249	1.0000 (0) P= .	.2666 (21) P= .121	.3671 (21) P= .051	.3912 (21) P= .040	.1346 (13) P= .331	.4954 (13) P= .043	.4199 (13) P= .077	.2838 (13) P= .174	.2085 (13) P= .247	.2003 (13) P= .256
S4Q14	.2422 (21) P= .145	.2666 (21) P= .121	1.0000 (0) P= .	.4435 (21) P= .022	.6446 (21) P= .001	.3428 (13) P= .126	.1051 (13) P= .366	.2049 (13) P= .251	.6701 (13) P= .006	.6877 (13) P= .005	.5752 (13) P= .020
S4Q15	.4628 (21) P= .017	.3671 (21) P= .051	.4435 (21) P= .022	1.0000 (0) P= .	.7734 (21) P= .000	.4686 (13) P= .053	.2326 (13) P= .222	.0885 (13) P= .387	.7842 (13) P= .001	.7185 (13) P= .003	.3758 (13) P= .103
S4Q16	.5419 (21) P= .006	.3912 (21) P= .040	.6446 (21) P= .001	.7734 (21) P= .000	1.0000 (0) P= .	.1957 (13) P= .261	.2342 (13) P= .221	.3103 (13) P= .151	.5477 (13) P= .026	.7139 (13) P= .003	.5420 (13) P= .028
S4Q17	.4626 (13) P= .056	.1346 (13) P= .331	.3428 (13) P= .126	.4686 (13) P= .053	.1957 (13) P= .261	1.0000 (0) P= .	.2931 (13) P= .166	.1597 (13) P= .301	.5486 (13) P= .026	.5927 (13) P= .016	.2298 (13) P= .225
S4Q18	.4912 (13) P= .044	.4954 (13) P= .043	.1051 (13) P= .366	.2326 (13) P= .222	.2342 (13) P= .221	.2931 (13) P= .166	1.0000 (0) P= .	.5502 (13) P= .026	.1018 (13) P= .370	.3731 (13) P= .105	.3271 (13) P= .138
S4Q19	.2786 (13) P= .178	.4199 (13) P= .077	.2049 (13) P= .251	.0885 (13) P= .387	.3103 (13) P= .151	.1597 (13) P= .301	.5502 (13) P= .026	1.0000 (0) P= .	.0348 (13) P= .455	.4162 (13) P= .079	.4439 (13) P= .064
S4Q20	.5058 (13) P= .039	.2838 (13) P= .174	.6701 (13) P= .006	.7842 (13) P= .001	.5477 (13) P= .026	.5486 (13) P= .026	.1018 (13) P= .370	.0348 (13) P= .455	1.0000 (0) P= .	.8274 (13) P= .000	.1718 (13) P= .287
S4Q21	.6532 (13) P= .008	.2085 (13) P= .247	.6877 (13) P= .005	.7185 (13) P= .003	.7139 (13) P= .003	.5927 (13) P= .016	.3731 (13) P= .105	.4162 (13) P= .079	.8274 (13) P= .000	1.0000 (0) P= .	.2911 (13) P= .167
S4Q22	.4947 (13) P= .043	.2003 (13) P= .256	.5752 (13) P= .020	.3758 (13) P= .103	.5420 (13) P= .028	.2298 (13) P= .225	.3271 (13) P= .138	.4439 (13) P= .064	.1718 (13) P= .287	.2911 (13) P= .167	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

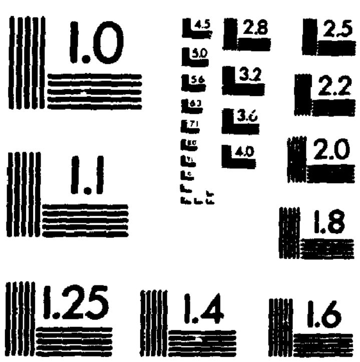
11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
15:21:38 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - -

	S5Q1	S5Q2	S5Q3	S5Q4	S5Q5	S5Q6	S5Q7	S5Q8	S5Q9	S5Q10
S5Q1	1.0000	.3802	.1658	.4002	.2448	.3642	.2803	.3430	.3259	-.6134
	(0)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .	P= .100	P= .294	P= .088	P= .210	P= .111	P= .177	P= .126	P= .139	P= .013
S5Q2	.3802	1.0000	.1924	.5229	.6109	.6236	.7171	.5246	.5995	-.1433
	(13)	(0)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .100	P= .	P= .264	P= .033	P= .013	P= .011	P= .003	P= .033	P= .015	P= .320
S5Q3	.1658	.1924	1.0000	.2941	.1924	.4444	.2827	.0756	.3291	-.0205
	(13)	(13)	(0)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .294	P= .264	P= .	P= .165	P= .264	P= .064	P= .175	P= .403	P= .136	P= .474
S5Q4	.4002	.5229	.2941	1.0000	.2079	.0964	.3762	.3816	.5413	-.3323
	(13)	(13)	(13)	(0)	(13)	(13)	(13)	(13)	(13)	(13)
	P= .088	P= .033	P= .165	P= .	P= .248	P= .377	P= .103	P= .099	P= .028	P= .134
S5Q5	.2448	.6109	.1924	.2079	1.0000	.5374	.4940	.4268	.4768	.0586
	(13)	(13)	(13)	(13)	(0)	(13)	(13)	(13)	(13)	(13)
	P= .210	P= .013	P= .264	P= .248	P= .	P= .029	P= .043	P= .073	P= .050	P= .425
S5Q6	.3642	.6236	.4444	.0964	.5374	1.0000	.7451	.5648	.1749	.0859
	(13)	(13)	(13)	(13)	(13)	(0)	(13)	(13)	(13)	(13)
	P= .111	P= .011	P= .064	P= .377	P= .029	P= .	P= .002	P= .022	P= .284	P= .390
S5Q7	.2803	.7171	-.2827	.3762	.4940	.7451	1.0000	.3076	.2122	-.0847
	(13)	(13)	(13)	(13)	(13)	(13)	(0)	(13)	(13)	(13)
	P= .177	P= .003	P= .175	P= .103	P= .043	P= .002	P= .	P= .153	P= .243	P= .392
S5Q8	.3430	.5246	.0756	.3816	.4268	.5668	.3076	1.0000	.6126	.2295
	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(0)	(13)	(13)
	P= .126	P= .033	P= .403	P= .099	P= .073	P= .022	P= .153	P= .	P= .013	P= .225
S5Q9	.3259	.5995	.3291	.5413	.4768	.1749	.2122	.6126	1.0000	-.2882
	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(0)	(13)
	P= .139	P= .015	P= .136	P= .028	P= .050	P= .284	P= .243	P= .013	P= .	P= .170
S5Q10	-.6134	-.1433	-.0205	.3323	.0586	.0859	.0847	.2295	-.2882	1.0000
	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(0)
	P= .013	P= .320	P= .474	P= .134	P= .425	P= .390	P= .392	P= .225	P= .170	P= .

(COEFFICIENT / (CASES) / 1 TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

5 OF/DE 5



- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S6Q1	S6Q2	S6Q3	S6Q4	S6Q5	S6Q6	S6Q7	S6Q8	S6Q9	S6Q10	S6Q11
S6Q1	1.0000 (0) P= .	.6467 (13) P= .008	.5815 (13) P= .019	.4312 (13) P= .071	.4769 (13) P= .050	.6059 (13) P= .014	.6334 (13) P= .010	.6032 (13) P= .015	.2584 (13) P= .197	.3508 (13) P= .120	.3585 (13) P= .114
S6Q2	.6467 (13) P= .008	1.0000 (0) P= .	.6496 (21) P= .001	.3940 (21) P= .039	.5690 (21) P= .004	.5010 (21) P= .010	.5907 (21) P= .002	.4922 (21) P= .012	.4740 (21) P= .015	.5156 (21) P= .008	.3676 (21) P= .051
S6Q3	.5815 (13) P= .019	.6496 (21) P= .001	1.0000 (0) P= .	.5129 (21) P= .009	.3103 (21) P= .086	.4785 (21) P= .014	.4056 (21) P= .034	.6004 (21) P= .002	.5723 (21) P= .003	.5608 (21) P= .004	.3885 (21) P= .041
S6Q4	.4312 (13) P= .071	.3940 (21) P= .039	.5129 (21) P= .009	1.0000 (0) P= .	.0122 (21) P= .479	.4399 (21) P= .023	.6243 (21) P= .001	.5763 (21) P= .003	.7287 (21) P= .000	.4788 (21) P= .014	.7044 (21) P= .000
S6Q5	.4769 (13) P= .050	.5690 (21) P= .004	.3103 (21) P= .086	-.0122 (21) P= .479	1.0000 (0) P= .	.6561 (21) P= .001	.5024 (21) P= .010	.4189 (21) P= .029	.0797 (21) P= .366	.3815 (21) P= .044	-.1221 (21) P= .299
S6Q6	.6059 (13) P= .014	.5010 (21) P= .010	.4785 (21) P= .014	.4399 (21) P= .023	.6561 (21) P= .001	1.0000 (0) P= .	.7135 (21) P= .000	.6643 (21) P= .001	.3364 (21) P= .068	.4012 (21) P= .036	.3764 (21) P= .046
S6Q7	.6334 (13) P= .010	.5907 (21) P= .002	.4056 (21) P= .034	.6243 (21) P= .001	.5024 (21) P= .010	.7135 (21) P= .000	1.0000 (0) P= .	.7808 (21) P= .000	.5709 (21) P= .003	.6976 (21) P= .000	.4566 (21) P= .019
S6Q8	.6032 (13) P= .015	.4922 (21) P= .012	.6004 (21) P= .002	.5763 (21) P= .003	.4189 (21) P= .029	.6643 (21) P= .001	.7808 (21) P= .000	1.0000 (0) P= .	.6231 (21) P= .001	.4765 (21) P= .014	.5575 (21) P= .004
S6Q9	.2584 (13) P= .197	.4740 (21) P= .015	.5723 (21) P= .003	.7287 (21) P= .000	.0797 (21) P= .366	.3364 (21) P= .068	.5709 (21) P= .003	.6231 (21) P= .001	1.0000 (0) P= .	.6346 (21) P= .001	.3963 (21) P= .038
S6Q10	.3508 (13) P= .120	.5156 (21) P= .008	.5608 (21) P= .004	.4788 (21) P= .014	.3815 (21) P= .044	.4012 (21) P= .036	.6976 (21) P= .000	.4765 (21) P= .014	.6346 (21) P= .001	1.0000 (0) P= .	.2075 (21) P= .183
S6Q11	.3585 (13) P= .114	.3676 (21) P= .051	.3885 (21) P= .041	.7044 (21) P= .000	-.1221 (21) P= .299	.3764 (21) P= .046	.4566 (21) P= .019	.5575 (21) P= .004	.3963 (21) P= .038	.2075 (21) P= .183	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
15:21:39 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S6Q1	S6Q2	S6Q3	S6Q4	S6Q5	S6Q6	S6Q7	S6Q8	S6Q9	S6Q10	S6Q11
S6Q12	.3335 (13) P= .133	.6111 (21) P= .002	.7456 (21) P= .000	.5860 (21) P= .003	.4610 (21) P= .018	.6667 (21) P= .000	.7262 (21) P= .000	.6881 (21) P= .000	.7389 (21) P= .000	.7964 (21) P= .000	.3477 (21) P= .061
S6Q13	.0609 (13) P= .422	.1792 (21) P= .219	.5698 (21) P= .004	.3528 (21) P= .058	.2388 (21) P= .149	.4760 (21) P= .015	.5018 (21) P= .010	.6313 (21) P= .001	.5294 (21) P= .007	.6462 (21) P= .001	.2342 (21) P= .153
S6Q14	.4780 (13) P= .049	.4833 (21) P= .013	.6142 (21) P= .002	.3465 (21) P= .062	.2524 (21) P= .135	.3571 (21) P= .056	.4483 (21) P= .021	.4502 (21) P= .020	.3389 (21) P= .066	.6782 (21) P= .000	.4751 (21) P= .015
S6Q15	.5407 (13) P= .028	.5144 (21) P= .009	.4867 (21) P= .013	.4771 (21) P= .014	.5515 (21) P= .005	.6064 (21) P= .002	.6749 (21) P= .000	.4678 (21) P= .016	.4704 (21) P= .016	.6354 (21) P= .001	.2030 (21) P= .189
S6Q16	.0843 (13) P= .392	.0905 (21) P= .348	.0954 (21) P= .340	.3652 (21) P= .052	-.0807 (21) P= .364	.1338 (21) P= .282	.2920 (21) P= .099	.0490 (21) P= .416	.3340 (21) P= .069	.4779 (21) P= .014	.2370 (21) P= .150
S6Q17	.0126 (13) P= .484	.2882 (13) P= .170	.1241 (13) P= .343	.3744 (13) P= .104	.5922 (13) P= .016	.5797 (13) P= .019	.5524 (13) P= .025	.4328 (13) P= .070	.7403 (13) P= .002	.5211 (13) P= .034	.0119 (13) P= .485
S6Q18	.1534 (13) P= .308	.2513 (13) P= .204	.0101 (13) P= .487	.1722 (13) P= .287	.6961 (13) P= .004	.4180 (13) P= .078	.5253 (13) P= .033	.3445 (13) P= .125	.3705 (13) P= .106	.3061 (13) P= .155	-.3946 (13) P= .091
S6Q19	-.2278 (13) P= .227	.0730 (13) P= .406	.1993 (13) P= .257	.1327 (13) P= .333	.1981 (13) P= .258	.2731 (13) P= .183	-.0966 (13) P= .377	-.4694 (13) P= .053	.1331 (13) P= .332	.0128 (13) P= .483	-.3836 (13) P= .098
S6Q20	.3704 (13) P= .106	.3987 (13) P= .089	.3039 (13) P= .156	.2787 (13) P= .178	.4469 (13) P= .063	.4549 (13) P= .059	.3926 (13) P= .092	.2930 (13) P= .166	.3948 (13) P= .091	.1761 (13) P= .282	.0116 (13) P= .485
S6Q21	.7738 (13) P= .001	.6736 (13) P= .006	.3486 (13) P= .122	.2426 (13) P= .212	.5279 (13) P= .032	.5741 (13) P= .020	.7182 (13) P= .003	.5718 (13) P= .021	.2968 (13) P= .162	.3985 (13) P= .089	.2972 (13) P= .162
S6Q22	.6562 (13) P= .007	.7359 (13) P= .002	.4617 (13) P= .056	.4950 (13) P= .043	.6851 (13) P= .005	.6556 (13) P= .007	.8182 (13) P= .000	.5444 (13) P= .027	.6716 (13) P= .006	.7214 (13) P= .003	.1218 (13) P= .346

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S6Q12	S6Q13	S6Q14	S6Q15	S6Q16	S6Q17
S6Q1	.3335 (13) P= .133	.0609 (13) P= .422	4780 (13) P= .049	.5407 (13) P= .028	.0843 (13) P= .392	.0126 (13) P= .484
S6Q2	6111 (21) P= .002	.1792 (21) P= .219	4833 (21) P= .013	.5144 (21) P= .009	.0905 (21) P= .348	2802 (13) P= .170
S6Q3	.7456 (21) P= .000	.5698 (21) P= .004	.6142 (21) P= .002	.4867 (21) P= .013	.0954 (21) P= .340	.1241 (13) P= .343
S6Q4	.5860 (21) P= .003	.3528 (21) P= .058	.3465 (21) P= .062	.4771 (21) P= .014	.3652 (21) P= .052	.3744 (13) P= .104
S6Q5	.4610 (21) P= .018	.2388 (21) P= .149	.2524 (21) P= 135	.5515 (21) P= .005	.0807 (21) P= .364	.5922 (13) P= .016
S6Q6	.6667 (21) P= .000	4760 (21) P= .015	.3571 (21) P= 056	.6064 (21) P= .002	.1338 (21) P= .282	.5797 (13) P= 019
S6Q7	.7262 (21) P= .000	.5018 (21) P= .010	.4483 (21) P= .021	.6749 (21) P= .000	.2920 (21) P= .099	.5524 (13) P= .025
S6Q8	.6881 (21) P= 000	.6313 (21) P= .001	4502 (21) P= 020	.4678 (21) P= .016	.0490 (21) P= 416	.4328 (13) P= .070
S6Q9	7389 (21) P= .000	.5294 (21) P= .007	3389 (21) P= .066	4704 (21) P= .016	.3340 (21) P= .069	.7403 (13) P= .002
S6Q10	.7964 (21) P= .000	.6462 (21) P= 001	.6782 (21) P= 000	.6354 (21) P= 001	.4779 (21) P= 014	.5211 (13) P= .034
S6Q11	.3477 (21) P= .061	.2342 (21) P= .153	4751 (21) P= .015	2030 (21) P= .189	.2370 (21) P= 150	.0119 (13) P= 485

	S6Q18	S6Q19	S6Q20	S6Q21	S6Q22
S6Q1	.1534 (13) P= 308	-.2278 (13) P= .227	.3704 (13) P= .106	.7738 (13) P= .001	.6562 (13) P= .007
S6Q2	2513 (13) P= 204	.0730 (13) P= .406	.3987 (13) P= .089	.6736 (13) P= .006	.7359 (13) P= .002
S6Q3	.0101 (13) P= .487	-.1993 (13) P= .257	.3039 (13) P= .156	.3486 (13) P= .122	.4617 (13) P= .056
S6Q4	.1722 (13) P= 287	.1327 (13) P= 333	.2787 (13) P= .178	.2426 (13) P= .212	.4950 (13) P= .043
S6Q5	.6961 (13) P= 004	-.1981 (13) P= .258	.4469 (13) P= .063	.5279 (13) P= .032	.6831 (13) P= .005
S6Q6	.4180 (13) P= .078	-.2731 (13) P= .183	.4549 (13) P= .059	.5741 (13) P= .020	.6556 (13) P= .007
S6Q7	.5253 (13) P= 033	-.0966 (13) P= .377	.3926 (13) P= .092	.7182 (13) P= .003	.8182 (13) P= .000
S6Q8	.3445 (13) P= .125	-.4694 (13) P= .053	.2930 (13) P= .166	.5718 (13) P= .021	.5444 (13) P= .027
S6Q9	.3705 (13) P= .106	.1331 (13) P= .332	.3948 (13) P= .091	.2968 (13) P= .162	.6716 (13) P= .006
S6Q10	3061 (13) P= .155	.0128 (13) P= .483	.1761 (13) P= .282	.3985 (13) P= .089	.7214 (13) P= .003
S6Q11	-.3946 (13) P= .091	-.3836 (13) P= .098	.0116 (13) P= .485	.2972 (13) P= .162	.1218 (13) P= .346

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
15:21:39 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S6Q12	S6Q13	S6Q14	S6Q15	S6Q16	S6Q17	S6Q18	S6Q19	S6Q20	S6Q21	S6Q22
S6Q12	1.0000 (0) P= .	.8173 (21) P= .000	.4895 (21) P= .012	.6314 (21) P= .001	.1940 (21) P= .200	.5466 (13) P= .027	.3809 (13) P= .100	-.0481 (13) P= .438	.2739 (13) P= .183	.3573 (13) P= .115	.6714 (13) P= .006
S6Q13	.8173 (21) P= .000	1.0000 (0) P= .	.3752 (21) P= .047	.3591 (21) P= .055	.1107 (21) P= .316	.3849 (13) P= .097	.2110 (1[illegible]) P= [illegible]4	.2858 (13) P= .172	-.0080 (13) P= .490	.0531 (13) P= .432	.3199 (13) P= .143
S6Q14	.4895 (21) P= .012	.3752 (21) P= .047	1.0000 (0) P= .	.4155 (21) P= .031	.4724 (21) P= .015	.0537 (13) P= .431	-.2141 (13) P= .241	-.3396 (13) P= .128	.2103 (13) P= .245	.3568 (13) P= .116	.2138 (13) P= .241
S6Q15	.6314 (21) P= .001	.3591 (21) P= .055	.4155 (21) P= .031	1.0000 (0) P= .	.3853 (21) P= .042	.6414 (13) P= .009	.5954 (13) P= .016	-.0232 (13) P= .470	.5849 (13) P= .018	.4717 (13) P= .052	.7720 (13) P= .001
S6Q16	.1940 (21) P= .200	.1107 (21) P= .316	.4724 (21) P= .015	.3853 (21) P= .042	1.0000 (0) P= .	.4290 (13) P= .072	.0236 (13) P= .470	.2982 (13) P= .161	.4549 (13) P= .059	.2100 (13) P= .245	.1280 (13) P= .338
S6Q17	.5466 (13) P= .027	.3849 (13) P= .097	.0537 (13) P= .431	.6414 (13) P= .009	.4290 (13) P= .072	1.0000 (0) P= .	.6436 (13) P= .009	.1113 (13) P= .359	.4894 (13) P= .045	.1851 (13) P= .272	.5212 (13) P= .034
S6Q18	.3809 (13) P= .100	.2110 (13) P= .244	-.2141 (13) P= .241	.5954 (13) P= .016	.0236 (13) P= .470	.6436 (13) P= .009	1.0000 (0) P= .	.1714 (13) P= .288	.6274 (13) P= .011	.2719 (13) P= .184	.4177 (13) P= .078
S6Q19	-.0481 (13) P= .438	-.2858 (13) P= .172	-.3396 (13) P= .128	-.0232 (13) P= .470	.2982 (13) P= .161	.1113 (13) P= .359	.1714 (13) P= .288	1.0000 (0) P= .	.0359 (13) P= .454	-.1345 (13) P= .331	.1190 (13) P= .349
S6Q20	.2739 (13) P= .183	-.0080 (13) P= .490	.2103 (13) P= .245	.5849 (13) P= .018	.4549 (13) P= .059	.4894 (13) P= .045	.6274 (13) P= .011	.0359 (13) P= .454	1.0000 (0) P= .	.4736 (13) P= .051	.3429 (13) P= .126
S6Q21	.3573 (13) P= .115	.0531 (13) P= .432	.3568 (13) P= .116	.4717 (13) P= .052	.2100 (13) P= .245	.1851 (13) P= .272	.2719 (13) P= .184	-.1345 (13) P= .331	.4736 (13) P= .051	1.0000 (0) P= .	.7003 (13) P= .004
S6Q22	.6714 (13) P= .006	.3199 (13) P= .143	.2138 (13) P= .241	.7720 (13) P= .001	.1280 (13) P= .338	.5212 (13) P= .034	.4177 (13) P= .078	.1190 (13) P= .349	.3429 (13) P= .126	.7003 (13) P= .004	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:44:42 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S1Q1	S1Q2	S1Q3	S1Q4	S1Q5	S1Q6	S1Q7	S1Q8	S1Q9	S1Q10	S1Q11
S1Q1	1.0000 (0) P= .	.1285 (20) P= .295	.2071 (21) P= .184	.5242 (21) P= .007	.0295 (21) P= .449	.1384 (21) P= .275	.5576 (20) P= .005	.2989 (21) P= .094	.3358 (21) P= .068	.3203 (20) P= .084	.0141 (21) P= .476
S1Q2	.1285 (20) P= .295	1.0000 (0) P= .	.1629 (20) P= .246	-.0574 (20) P= .405	-.1689 (20) P= .238	-.2063 (20) P= .191	.1111 (19) P= .325	-.0324 (20) P= .446	.1313 (20) P= .291	.4805 (19) P= .019	-.2997 (20) P= .100
S1Q3	.2071 (21) P= .184	.1629 (20) P= .246	1.0000 (0) P= .	.4315 (21) P= .025	.3392 (21) P= .066	.6677 (21) P= .000	.1119 (20) P= .319	.4189 (21) P= .029	.2011 (21) P= .191	-.0184 (20) P= .469	.0922 (21) P= .346
S1Q4	.5242 (21) P= .007	-.0574 (20) P= .405	.4315 (21) P= .025	1.0000 (0) P= .	.6121 (21) P= .002	.3675 (21) P= .051	.1958 (20) P= .204	.5478 (21) P= .005	.7349 (21) P= .000	.2249 (20) P= .170	.0600 (21) P= .398
S1Q5	.0295 (21) P= .449	-.1689 (20) P= .238	.3392 (21) P= .066	.6121 (21) P= .002	1.0000 (0) P= .	.6471 (21) P= .001	.3327 (20) P= .076	.7563 (21) P= .000	.4021 (21) P= .035	-.2208 (20) P= .175	.2615 (21) P= .126
S1Q6	.1384 (21) P= .275	.2063 (20) P= .191	.6677 (21) P= .000	.3675 (21) P= .051	.6471 (21) P= .001	1.0000 (0) P= .	.4549 (20) P= .022	.6777 (21) P= .000	.0439 (21) P= .425	-.3570 (20) P= .061	.2468 (21) P= .140
S1Q7	.5576 (20) P= .005	.1111 (19) P= .325	.1119 (20) P= .319	.1958 (20) P= .204	.3327 (20) P= .076	.4549 (20) P= .022	1.0000 (0) P= .	.6639 (20) P= .001	-.2395 (20) P= .155	.1113 (20) P= .320	.1295 (20) P= .293
S1Q8	.2989 (21) P= .094	-.0324 (20) P= .446	.4189 (21) P= .029	.5478 (21) P= .005	.7563 (21) P= .000	.6777 (21) P= .000	.6639 (20) P= .001	1.0000 (0) P= .	.3697 (21) P= .050	-.1672 (20) P= .240	.3271 (21) P= .074
S1Q9	.3358 (21) P= .068	.1313 (20) P= .291	.2011 (21) P= .191	.7349 (21) P= .000	.4021 (21) P= .035	.0439 (21) P= .425	-.2395 (20) P= .155	.3697 (21) P= .050	1.0000 (0) P= .	.4584 (20) P= .021	.1052 (21) P= .325
S1Q10	.3203 (20) P= .084	.4805 (19) P= .019	-.0184 (20) P= .469	.2249 (20) P= .170	-.2208 (20) P= .175	-.3570 (20) P= .061	.1113 (20) P= .320	-.1672 (20) P= .240	.4584 (20) P= .021	1.0000 (0) P= .	-.0261 (20) P= .457
S1Q11	.0141 (21) P= .476	-.2997 (20) P= .100	.0922 (21) P= .346	.0600 (21) P= .398	.2615 (21) P= .126	.2468 (21) P= .140	.1295 (20) P= .293	.3271 (21) P= .074	.1052 (21) P= .325	-.0261 (20) P= .457	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:44:42 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S1Q1	S1Q2	S1Q3	S1Q4	S1Q5	S1Q6	S1Q7	S1Q8	S1Q9	S1Q10	S1Q11
S1Q12	-.1433 (21) P= .268	-.0788 (20) P= .371	-.1425 (21) P= .269	-.2661 (21) P= .122	.3636 (21) P= .053	.3552 (21) P= .057	.5912 (20) P= .003	.4837 (21) P= .013	-.3158 (21) P= .082	-.2891 (20) P= .108	.3129 (21) P= .084
S1Q13	-.2332 (21) P= .154	-.2261 (20) P= .169	-.0357 (21) P= .439	.1879 (21) P= .207	.2534 (21) P= 134	.2020 (21) P= .190	.1028 (20) P= .333	.2132 (21) P= .177	-.1523 (21) P= .255	.0113 (20) P= .481	.7335 (21) P= .000
S1Q14	.1499 (21) P= .258	.2623 (20) P= .132	-.1748 (21) P= .224	-.0630 (21) P= .393	-.1291 (21) P= .288	-.2861 (21) P= .104	.3603 (20) P= .059	-.0879 (21) P= .352	-.2186 (21) P= .171	.5324 (20) P= .008	.1029 (21) P= .329
S1Q15	-.0616 (20) P= .398	.2522 (19) P= .149	-.5368 (20) P= .007	-.2601 (20) P= .134	-.0446 (20) P= .426	-.4552 (20) P= .022	.1392 (19) P= .285	-.1825 (20) P= .221	-.1154 (20) P= .314	.3571 (19) P= .067	.0048 (20) P= .492
S1Q16	.0791 (20) P= .370	.3669 (19) P= .061	.0507 (20) P= .416	.0984 (20) P= .340	.4741 (20) P= .017	.2012 (20) P= .197	.4422 (19) P= .029	.3856 (20) P= .047	-.0479 (20) P= .421	-.0600 (19) P= .404	-.3155 (20) P= .088

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:44:42 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - -

	S1Q12	S1Q13	S1Q14	S1Q15	S1Q16
S1Q1	-.1433	-.2337	.1499	-.0616	.0791
	(21)	(21)	(21)	(20)	(20)
	P= .268	P= .154	P= .258	P= .398	P= .370
S1Q2	-.0788	-.2261	.2623	.2522	.3669
	(20)	(20)	(20)	(19)	(19)
	P= .371	P= .169	P= .132	P= .149	P= .061
S1Q3	-.1425	-.0357	-.1748	-.5368	.0507
	(21)	(21)	(21)	(20)	(20)
	P= .269	P= .439	P= .224	P= .007	P= .416
S1Q4	-.2661	-.1879	-.0630	.2601	.0984
	(21)	(21)	(21)	(20)	(20)
	P= .122	P= .207	P= .393	P= .134	P= .340
S1Q5	.3636	.2534	.1291	-.0446	.4741
	(21)	(21)	(21)	(20)	(20)
	P= .053	P= .134	P= .288	P= .426	P= .017
S1Q6	.3552	.2020	-.2861	-.4552	.2012
	(21)	(21)	(21)	(20)	(20)
	P= .057	P= .190	P= .104	P= .022	P= .197
S1Q7	.5912	.1028	.3603	.1392	.4422
	(20)	(20)	(20)	(19)	(19)
	P= .003	P= .333	P= .059	P= .285	P= .029
S1Q8	.4837	.2132	.0879	-.1825	.3856
	(21)	(21)	(21)	(20)	(20)
	P= .013	P= .177	P= .352	P= .221	P= .047
S1Q9	-.3150	.1523	-.2186	-.1154	-.0479
	(21)	(21)	(21)	(20)	(20)
	P= .082	P= .255	P= .171	P= .314	P= .421
S1Q10	-.2891	.0113	.5324	.3571	-.0600
	(20)	(20)	(20)	(19)	(19)
	P= .108	P= .481	P= .008	P= .067	P= .404
S1Q11	.3129	.7335	.1029	.0048	.3155
	(21)	(21)	(21)	(20)	(20)
	P= .084	P= .000	P= .329	P= .492	P= .088

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

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11 APR 89   SPSS-X RELEASE 2.2  FOR IBM VM/CMS
11:44:42    U.W.O. SCHOOL OF BUSINESS      IBM 4381 MOD 13  VM/SP CMS

- - - - - - - - - - - - - -  P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S  - - - - - - - - - - - - - -
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	S1Q12	S1Q13	S1Q14	S1Q15	S1Q16
S1Q12	1.0000	.5391	-.0069	.0781	.4757
	(0)	(21)	(21)	(20)	(20)
	P= .	P= .006	P= .488	P= .372	P= .017
S1Q13	.5391	1.0000	.1462	.1225	.1634
	(21)	(0)	(21)	(20)	(20)
	P= .006	P= .	P= .264	P= .303	P= .246
S1Q14	-.0069	.1462	1.0000	.6907	.3109
	(21)	(21)	(0)	(20)	(20)
	P= .488	P= .264	P= .	P= .000	P= .091
S1Q15	.0781	.1225	.6907	1.0000	.4350
	(20)	(20)	(20)	(0)	(20)
	P= .372	P= .303	P= .000	P= .	P= .028
S1Q16	.4757	-.1634	.3109	.4350	1.0000
	(20)	(20)	(20)	(20)	(0)
	P= .017	P= .246	P= .091	P= .028	P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
11:44:43 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S201	S202	S203	S204	S205	S206	S207	S208	S209
S201	1.0000 (0) P= .	.3857 (21) P= .042	-.1205 (21) P= .301	.1160 (21) P= .308	-.1835 (21) P= .213	.6820 (21) P= .000	.3261 (20) P= .080	.2691 (21) P= .119	.2842 (21) P= .106
S202	.3857 (21) P= .042	1.0000 (0) P= .	.2253 (21) P= .163	.4080 (21) P= .033	.0907 (21) P= .348	.3348 (21) P= .069	-.0779 (20) P= .372	.4201 (21) P= .029	.2521 (21) P= .135
S203	-.1205 (21) P= .301	.2253 (21) P= .163	1.0000 (0) P= .	.6046 (21) P= .002	.5219 (21) P= .008	.0109 (21) P= .481	.3098 (20) P= .092	.2437 (21) P= .144	.3071 (21) P= .088
S204	.1160 (21) P= .308	.4080 (21) P= .033	.6046 (21) P= .002	1.0000 (0) P= .	.3712 (21) P= .049	.4605 (21) P= .018	.3203 (20) P= .084	.3241 (21) P= .076	.2853 (21) P= .105
S205	-.1835 (21) P= .213	.0907 (21) P= .348	.5219 (21) P= .008	.3712 (21) P= .049	1.0000 (0) P= .	-.0051 (21) P= .491	-.1209 (20) P= .306	.2123 (21) P= .178	.6075 (21) P= .002
S206	.6820 (21) P= .000	.3348 (21) P= .069	.0109 (21) P= .481	.4605 (21) P= .018	-.0051 (21) P= .491	1.0000 (0) P= .	.4618 (20) P= .020	.1460 (21) P= .264	.2898 (21) P= .101
S207	.3261 (20) P= .080	-.0779 (20) P= .372	.3098 (20) P= .092	.3203 (20) P= .084	.1209 (20) P= .306	.4618 (20) P= .020	1.0000 (0) P= .	-.0774 (20) P= .373	.0722 (20) P= .381
S208	.2691 (21) P= .119	.4201 (21) P= .029	.2437 (21) P= .144	.3241 (21) P= .076	.2123 (21) P= .178	.1460 (21) P= .264	-.0774 (20) P= .373	1.0000 (0) P= .	.3886 (21) P= .041
S209	.2842 (21) P= .106	.2521 (21) P= .135	.3071 (21) P= .088	.2853 (21) P= .105	.6075 (21) P= .002	.2898 (21) P= .101	.0722 (20) P= .381	.3886 (21) P= .041	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:09:25 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - -

	S3Q1	S3Q2	S3Q3	S3Q4	S3Q5	S3Q6	S3Q7	S3Q8	S3Q9	S3Q10	S3Q11
S3Q1	1.0000 (0) P= .	.3064 (11) P= .180	.1286 (11) P= .353	.4370 (11) P= .089	.5537 (11) P= .039	.1550 (11) P= .325	.4145 (11) P= .102	.0000 (11) P= .500	.2797 (11) P= .202	-.0512 (11) P= .441	.2951 (11) P= .189
S3Q2	.3064 (11) P= .180	1.0000 (0) P= .	.3033 (21) P= .091	.3387 (21) P= .067	.2050 (21) P= .186	.4298 (21) P= .026	.0555 (20) P= .408	.1892 (21) P= .206	.4623 (20) P= .020	.5930 (20) P= .003	.1479 (20) P= .267
S3Q3	.1286 (11) P= .353	.3033 (21) P= .091	1.0000 (0) P= .	.5067 (21) P= .010	.3484 (21) P= .061	.1190 (21) P= .304	.6595 (20) P= .001	.3989 (21) P= .037	.7458 (20) P= .000	.6822 (20) P= .000	.5326 (20) P= .008
S3Q4	.4370 (11) P= .089	.3387 (21) P= .067	.5067 (21) P= .010	1.0000 (0) P= .	.2981 (21) P= .095	.3437 (21) P= .064	.4238 (20) P= .031	.2608 (21) P= .127	.4743 (20) P= .017	.5730 (20) P= .004	.4509 (20) P= .023
S3Q5	.5537 (11) P= .039	.2050 (21) P= .186	.3484 (21) P= .061	.2981 (21) P= .095	1.0000 (0) P= .	.6000 (21) P= .002	.5280 (20) P= .008	.4190 (21) P= .029	.2566 (20) P= .137	.2873 (20) P= .110	.3134 (20) P= .089
S3Q6	.1550 (11) P= .325	.4298 (21) P= .026	.1190 (21) P= .304	.3437 (21) P= .064	.6000 (21) P= .002	1.0000 (0) P= .	.0783 (20) P= .371	.5367 (21) P= .006	.3083 (20) P= .093	.4707 (20) P= .018	.1775 (20) P= .227
S3Q7	.4145 (11) P= .102	.0555 (20) P= .408	.6595 (20) P= .001	.4238 (20) P= .031	.5280 (20) P= .008	.0783 (20) P= .371	1.0000 (0) P= .	.3222 (20) P= .083	.4725 (20) P= .018	.3683 (20) P= .055	.6153 (20) P= .002
S3Q8	.0000 (11) P= .500	.1892 (21) P= .206	.3989 (21) P= .037	.2608 (21) P= .127	.4190 (21) P= .029	.5367 (21) P= .006	.3222 (20) P= .083	1.0000 (0) P= .	.4380 (20) P= .027	.5453 (20) P= .006	.4567 (20) P= .021
S3Q9	.2797 (11) P= .202	.4623 (20) P= .020	.7458 (20) P= .000	.4743 (20) P= .017	.2566 (20) P= .137	.3083 (20) P= .093	.4725 (20) P= .018	.4380 (20) P= .027	1.0000 (0) P= .	.7271 (20) P= .000	.5116 (20) P= .011
S3Q10	-.0512 (11) P= .441	.5930 (20) P= .003	.6822 (20) P= .000	.5730 (20) P= .004	.2873 (20) P= .110	.4707 (20) P= .018	.3683 (20) P= .055	.5453 (20) P= .006	.7271 (20) P= .000	1.0000 (0) P= .	.5764 (20) P= .004
S3Q11	.2951 (11) P= .189	.1479 (20) P= .267	.5326 (20) P= .008	.4509 (20) P= .023	.3134 (20) P= .089	.1775 (20) P= .227	.6153 (20) P= .002	.4567 (20) P= .021	.5116 (20) P= .011	.5764 (20) P= .004	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

- - - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S3Q1	S3Q2	S3Q3	S3Q4	S3Q5	S3Q6	S3Q7	S3Q8	S3Q9	S3Q10	S3Q11
S3Q12	-.1697 (11) P= .309	.4952 (20) P= .013	.4035 (20) P= .039	.6392 (20) P= .001	.0472 (20) P= .422	.4188 (20) P= .033	.2781 (20) P= .118	.3505 (20) P= .065	.6861 (20) P= .000	.7580 (20) P= .000	.5086 (20) P= .011
S3Q13	.0840 (11) P= .403	.1887 (20) P= .213	.6431 (20) P= .001	.5353 (20) P= .007	.4335 (20) P= .028	.1728 (20) P= .233	.7205 (20) P= .000	.3325 (20) P= .076	.5513 (20) P= .006	.4878 (20) P= .015	.6369 (20) P= .001
S3Q14	-.2828 (10) P= .214	-.0369 (19) P= .440	.4739 (19) P= .020	.5452 (19) P= .008	.4991 (19) P= .015	.4992 (19) P= .015	.4472 (19) P= .027	.2917 (19) P= .112	.4299 (19) P= .033	.3621 (19) P= .064	.5180 (19) P= .012
S3Q15	.3173 (11) P= .171	.3843 (20) P= .047	.5152 (20) P= .010	.4304 (20) P= .029	.2471 (20) P= .147	.4062 (20) P= .038	.5772 (20) P= .004	.3824 (20) P= .048	.8070 (20) P= .000	.6138 (20) P= .002	.5420 (20) P= .007
S3Q16	-.0618 (11) P= .428	.3605 (20) P= .059	.6791 (20) P= .000	.6106 (20) P= .002	.1374 (20) P= .282	.3384 (20) P= .072	.4447 (20) P= .025	.4537 (20) P= .022	.9031 (20) P= .000	.7168 (20) P= .000	.6008 (20) P= .003
S3Q17	-.4605 (11) P= .077	.4522 (11) P= .081	.0687 (11) P= .420	.6324 (11) P= .018	-.3782 (11) P= .126	.3932 (11) P= .116	-.0346 (11) P= .460	.3688 (11) P= .132	.1981 (11) P= .280	.4310 (11) P= .093	.4480 (11) P= .083
S3Q18	-.2797 (11) P= .202	-.4170 (11) P= .101	.2646 (11) P= .216	.0000 (11) P= .500	-.3918 (11) P= .117	.1715 (11) P= .307	.3052 (11) P= .181	.3619 (11) P= .137	.3750 (11) P= .128	-.0099 (11) P= .488	.0879 (11) P= .399
S3Q19	-.1641 (11) P= .315	-.5008 (11) P= .058	.3561 (11) P= .141	-.0615 (11) P= .429	-.2583 (11) P= .222	.0259 (11) P= .470	-.1930 (11) P= .285	.3285 (11) P= .162	.3480 (11) P= .147	.1800 (11) P= .298	.1597 (11) P= .320
S3Q20	-.1933 (11) P= .284	-.0149 (11) P= .483	-.5883 (11) P= .028	.0524 (11) P= .439	.4249 (11) P= .096	.2347 (11) P= .244	-.5429 (11) P= .042	-.1121 (11) P= .371	-.2324 (11) P= .246	-.0614 (11) P= .429	-.3542 (11) P= .143
S3Q21	.2880 (11) P= .195	-.0228 (11) P= .473	-.4299 (11) P= .093	.1928 (11) P= .285	.0059 (11) P= .493	.5982 (11) P= .026	.2414 (11) P= .237	.3091 (11) P= .177	.2966 (11) P= .188	-.0734 (11) P= .415	-.4507 (11) P= .082
S3Q22	.1003 (11) P= .385	.1794 (11) P= .299	.0718 (11) P= .475	.0000 (11) P= .500	.3580 (11) P= .140	.1865 (11) P= .291	.0422 (11) P= .451	.5481 (11) P= .040	.3010 (11) P= .184	-.1802 (11) P= .298	-.0922 (11) P= .394

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89   SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:09:26   U.N.D. SCHOOL OF BUSINESS   IBM 4381 MOD 13 VM/SP CMS

- - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - -

	S3Q12	S3Q13	S3Q14	S3Q15	S3Q16	S3Q17	S3Q18	S3Q19	S3Q20	S3Q21	S3Q22
S3Q1	-.1697 (11) P= .309	.0840 (11) P= .403	-.2828 (10) P= .214	.3173 (11) P= .171	.0618 (11) P= .428	.4605 (11) P= .077	.2797 (11) P= .202	-.1641 (11) P= .315	-.1935 (11) P= .284	.2880 (11) P= .195	.1003 (11) P= .385
S3Q2	.4952 (20) P= .013	.1887 (20) P= .213	-.0369 (19) P= .440	.3843 (20) P= .047	.3605 (20) P= .059	.4522 (11) P= .081	.4170 (11) P= .101	-.5008 (11) P= .058	-.0149 (11) P= .483	-.0228 (11) P= .473	-.1794 (11) P= .299
S3Q3	.4035 (20) P= .039	.6431 (20) P= .001	.4739 (19) P= .020	.5152 (20) P= .010	.6791 (20) P= .000	.0687 (11) P= .420	.2646 (11) P= .216	.3561 (11) P= .141	-.5884 (11) P= .028	-.4299 (11) P= .093	.0218 (11) P= .475
S3Q4	.6392 (20) P= .001	.5353 (20) P= .007	.5452 (19) P= .008	.4304 (20) P= .029	.6106 (20) P= .002	.6374 (11) P= .018	.0000 (11) P= .500	.0615 (11) P= .429	-.0524 (11) P= .439	-.1928 (11) P= .285	.0000 (11) P= .500
S3Q5	.0472 (20) P= .422	.4335 (20) P= .028	.4991 (19) P= .015	.2471 (20) P= .147	.1374 (20) P= .282	.3782 (11) P= .126	.3918 (11) P= .117	.2583 (11) P= .222	.4249 (11) P= .096	.0059 (11) P= .493	.3580 (11) P= .140
S3Q6	.4188 (20) P= .033	.1728 (20) P= .233	.4992 (19) P= .015	.4062 (20) P= .038	.3384 (20) P= .072	.3932 (11) P= .116	.1715 (11) P= .307	.0259 (11) P= .470	.2347 (11) P= .244	.5982 (11) P= .026	.1865 (11) P= .291
S3Q7	.2781 (20) P= .118	.7205 (20) P= .000	.4472 (19) P= .027	.5772 (20) P= .004	.4447 (20) P= .025	.0346 (11) P= .460	.3052 (11) P= .181	-.1930 (11) P= .285	-.5429 (11) P= .042	-.2414 (11) P= .237	-.0422 (11) P= .451
S3Q8	.3505 (20) P= .065	.3325 (20) P= .076	.2932 (19) P= .112	.3824 (20) P= .048	.4537 (20) P= .022	.3688 (11) P= .132	.3619 (11) P= .137	.3285 (11) P= .162	-.1121 (11) P= .371	.3091 (11) P= .177	-.5481 (11) P= .040
S3Q9	.6861 (20) P= .000	.5513 (20) P= .006	.4299 (19) P= .033	.8070 (20) P= .000	.9031 (20) P= .000	.1981 (11) P= .280	.3750 (11) P= .128	.3480 (11) P= .147	-.2324 (11) P= .246	.2966 (11) P= .188	.3010 (11) P= .184
S3Q10	.7580 (20) P= .000	.4878 (20) P= .015	.3621 (19) P= .064	.6138 (20) P= .002	.7168 (20) P= .000	.4310 (11) P= .093	.0099 (11) P= .488	.1800 (11) P= .298	-.0614 (11) P= .429	-.0734 (11) P= .415	-.1802 (11) P= .298
S3Q11	.5086 (20) P= .011	.6369 (20) P= .001	.5180 (19) P= .012	.5420 (20) P= .007	.6008 (20) P= .003	.4480 (11) P= .083	.0879 (11) P= .399	.1597 (11) P= .320	-.3542 (11) P= .143	-.4507 (11) P= .082	-.0922 (11) P= .394

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:09:26 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S3Q12	S3Q13	S3Q14	S3Q15	S3Q16	S3Q17	S3Q18	S3Q19	S3Q20	S3Q21	S3Q22
S3Q12	1.0000 (0) P= .	.4491 (20) P= .023	.2841 (19) P= .119	.8036 (20) P= .000	.6844 (20) P= .000	.5000 (11) P= .059	.0143 (11) P= .483	.0830 (11) P= .404	.1373 (11) P= .344	.2849 (11) P= .198	-.0333 (11) P= .461
S3Q13	.4491 (20) P= .023	1.0000 (0) P= .	.3112 (19) P= .097	.5582 (20) P= .005	.4725 (20) P= .018	.0128 (11) P= .485	-.0939 (11) P= .392	.0045 (11) P= .495	-.7523 (11) P= .004	-.4989 (11) P= .059	.0262 (11) P= .469
S3Q14	.2841 (19) P= .119	.3112 (19) P= .097	1.0000 (0) P= .	.3853 (19) P= .052	.6229 (19) P= .002	.4594 (10) P= .091	.5252 (10) P= .059	.3261 (10) P= .179	.0435 (10) P= .453	-.0524 (10) P= .443	.3894 (10) P= .133
S3Q15	.8036 (20) P= .000	.5582 (20) P= .005	.3853 (19) P= .052	1.0000 (0) P= .	.7593 (20) P= .000	.1615 (11) P= .318	.0232 (11) P= .473	-.0042 (11) P= .495	-.0144 (11) P= .483	.4985 (11) P= .059	.3026 (11) P= .183
S3Q16	.6844 (20) P= .000	.4725 (20) P= .018	.6229 (19) P= .002	.7593 (20) P= .000	1.0000 (0) P= .	.6101 (11) P= .023	.5313 (11) P= .046	.3370 (11) P= .155	.0278 (11) P= .468	.1833 (11) P= .295	.1814 (11) P= .297
S3Q17	.5000 (11) P= .059	.0128 (11) P= .485	.4594 (10) P= .091	.1615 (11) P= .318	.6101 (11) P= .023	1.0000 (0) P= .	.2689 (11) P= .212	-.0771 (11) P= .411	.2675 (11) P= .213	-.1370 (11) P= .344	-.4090 (11) P= .106
S3Q18	.0143 (11) P= .483	-.0939 (11) P= .392	.5252 (10) P= .059	.0232 (11) P= .473	.5313 (11) P= .046	.2689 (11) P= .212	1.0000 (0) P= .	.8171 (11) P= .001	.0194 (11) P= .477	.0949 (11) P= .391	.1796 (11) P= .299
S3Q19	.0830 (11) P= .404	.0045 (11) P= .495	.3261 (10) P= .179	-.0042 (11) P= .495	.3370 (11) P= .155	-.0771 (11) P= .411	.8171 (11) P= .001	1.0000 (0) P= .	-.0938 (11) P= .392	.0776 (11) P= .410	.1904 (11) P= .287
S3Q20	.1373 (11) P= .344	-.7523 (11) P= .004	.0435 (10) P= .453	-.0144 (11) P= .483	.0278 (11) P= .468	.2675 (11) P= .213	.0194 (11) P= .477	-.0938 (11) P= .392	1.0000 (0) P= .	.4264 (11) P= .095	.1865 (11) P= .291
S3Q21	.2849 (11) P= .198	-.4989 (11) P= .059	-.0524 (10) P= .443	.4985 (11) P= .059	.1833 (11) P= .295	.1370 (11) P= .344	.0949 (11) P= .391	.0776 (11) P= .410	.4264 (11) P= .095	1.0000 (0) P= .	.2654 (11) P= .215
S3Q22	-.0333 (11) P= .461	.0262 (11) P= .469	.3894 (10) P= .133	.3026 (11) P= .183	.1814 (11) P= .297	-.4090 (11) P= .106	.1796 (11) P= .299	.1904 (11) P= .287	.1865 (11) P= .291	.2654 (11) P= .215	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:09:26 U W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - - -

	S4Q1	S4Q2	S4Q3	S4Q4	S4Q5	S4Q6	S4Q7	S4Q8	S4Q9	S4Q10
S4Q1	1.0000 (0) P= .	.6072 (13) P= .014	-.3115 (14) P= .139	-.1026 (14) P= .364	-.5113 (11) P= .054	.4010 (11) P= .111	-.4824 (11) P= .066	-.2163 (11) P= .261	.1666 (11) P= .312	-.1089 (11) P= .375
S4Q2	.6072 (13) P= .014	1.0000 (0) P= .	-.0222 (13) P= .471	-.1156 (13) P= .353	-.8368 (10) P= .001	.6215 (10) P= .028	-.1440 (10) P= .346	-.1297 (10) P= .361	-.1148 (10) P= .376	-.2221 (10) P= .269
S4Q3	-.3115 (14) P= .139	-.0222 (13) P= .471	1.0000 (0) P= .	.6493 (14) P= .006	.0294 (11) P= .466	.0735 (11) P= .415	-.3387 (11) P= .154	.6228 (11) P= .020	.7699 (11) P= .003	.3272 (11) P= .163
S4Q4	-.1026 (14) P= .364	-.1156 (13) P= .353	.6493 (14) P= .006	1.0000 (0) P= .	-.0617 (11) P= .428	.0478 (11) P= .445	-.0784 (11) P= .409	.8195 (11) P= .001	.8906 (11) P= .000	-.0965 (11) P= .389
S4Q5	-.5113 (11) P= .054	-.8368 (10) P= .001	.0294 (11) P= .466	-.0617 (11) P= .428	1.0000 (0) P= .	-.4286 (11) P= .094	.2309 (11) P= .247	-.2883 (11) P= .195	-.1843 (11) P= .294	.3899 (11) P= .118
S4Q6	.4010 (11) P= .111	.6215 (10) P= .028	.0735 (11) P= .415	.0478 (11) P= .445	-.4286 (11) P= .094	1.0000 (0) P= .	.2491 (11) P= .230	.1669 (11) P= .312	.1934 (11) P= .284	-.0248 (11) P= .471
S4Q7	-.4824 (11) P= .066	-.1440 (10) P= .346	-.3387 (11) P= .154	-.0784 (11) P= .409	.2309 (11) P= .247	.2491 (11) P= .230	1.0000 (0) P= .	-.0074 (11) P= .491	-.3451 (11) P= .149	-.3922 (11) P= .116
S4Q8	-.2163 (11) P= .261	-.1297 (10) P= .361	.6228 (11) P= .020	.8195 (11) P= .001	-.2883 (11) P= .195	.1669 (11) P= .312	-.0074 (11) P= .491	1.0000 (0) P= .	.7018 (11) P= .008	-.1966 (11) P= .281
S4Q9	.1666 (11) P= .312	-.1148 (10) P= .376	.7699 (11) P= .003	.8906 (11) P= .000	-.1843 (11) P= .294	.1934 (11) P= .284	-.3451 (11) P= .149	.7018 (11) P= .008	1.0000 (0) P= .	.0764 (11) P= .412
S4Q10	-.1089 (11) P= .375	-.2221 (10) P= .269	.3272 (11) P= .163	-.0965 (11) P= .389	.3899 (11) P= .118	-.0248 (11) P= .471	-.3922 (11) P= .116	-.1966 (11) P= .281	.0764 (11) P= .412	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1 TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:09:26 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - -

	S5Q1	S5Q2	S5Q3	S5Q4	S5Q5	S5Q6	S5Q7	S5Q8	S5Q9	S5Q10	S5Q11
S5Q1	1.0000 (0) P= .	.5255 (11) P= .048	-.5514 (11) P= .039	-.3118 (11) P= .175	-.1842 (11) P= .294	-.3428 (11) P= .151	-.2227 (11) P= .255	-.2785 (11) P= .203	-.3651 (11) P= .135	.0983 (11) P= .387	-.1760 (11) P= .302
S5Q2	.5255 (11) P= .048	1.0000 (0) P= .	.3140 (20) P= .089	-.1073 (20) P= .326	.1514 (20) P= .262	.0055 (20) P= .491	.0451 (20) P= .425	.0450 (20) P= .425	.0052 (20) P= .491	.2288 (20) P= .166	-.0097 (20) P= .484
S5Q3	-.5514 (11) P= .039	.3140 (20) P= .089	1.0000 (0) P= .	.5401 (20) P= .007	.3178 (20) P= .086	.4113 (20) P= .036	.5179 (20) P= .010	.5536 (20) P= .006	.6158 (20) P= .002	.4500 (20) P= .023	.4622 (20) P= .020
S5Q4	-.3118 (11) P= .175	-.1073 (20) P= .326	.5401 (20) P= .007	1.0000 (0) P= .	.2158 (20) P= .180	.6199 (20) P= .002	.3304 (20) P= .077	.6891 (20) P= .000	.7850 (20) P= .000	.4221 (20) P= .032	.4581 (20) P= .021
S5Q5	-.1842 (11) P= .294	.1514 (20) P= .262	.3178 (20) P= .086	.2158 (20) P= .180	1.0000 (0) P= .	.1968 (20) P= .203	.2872 (20) P= .110	.2864 (20) P= .110	.3932 (20) P= .043	.4673 (20) P= .019	-.0130 (20) P= .478
S5Q6	-.3428 (11) P= .151	.0055 (20) P= .491	.4113 (20) P= .036	.6199 (20) P= .002	.1968 (20) P= .203	1.0000 (0) P= .	.5151 (20) P= .010	.5986 (20) P= .003	.5923 (20) P= .003	.4360 (20) P= .027	.3859 (20) P= .046
S5Q7	-.2227 (11) P= .255	.0451 (20) P= .425	.5179 (20) P= .010	.3304 (20) P= .077	.2872 (20) P= .110	.5151 (20) P= .010	1.0000 (0) P= .	.4349 (20) P= .028	.3368 (20) P= .073	.2393 (20) P= .155	.4057 (20) P= .038
S5Q8	-.2785 (11) P= .203	.0450 (20) P= .425	.5536 (20) P= .006	.6891 (20) P= .000	.2864 (20) P= .110	.5986 (20) P= .003	.4349 (20) P= .028	1.0000 (0) P= .	.7156 (20) P= .000	.5527 (20) P= .006	.5763 (20) P= .004
S5Q9	-.3651 (11) P= .135	.0052 (20) P= .491	.6158 (20) P= .002	.7850 (20) P= .000	.3932 (20) P= .043	.5923 (20) P= .003	.3368 (20) P= .073	.7156 (20) P= .000	1.0000 (0) P= .	.6463 (20) P= .001	.7169 (20) P= .000
S5Q10	.0983 (11) P= .387	.2288 (20) P= .166	.4500 (20) P= .023	.4221 (20) P= .032	.4673 (20) P= .019	.4360 (20) P= .027	.2393 (20) P= .155	.5527 (20) P= .006	.6463 (20) P= .001	1.0000 (0) P= .	.4284 (20) P= .030
S5Q11	-.1760 (11) P= .302	-.0097 (20) P= .484	.4622 (20) P= .020	.4581 (20) P= .021	-.0130 (20) P= .478	.3859 (20) P= .046	.4057 (20) P= .038	.5763 (20) P= .004	.7169 (20) P= .000	.4284 (20) P= .030	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:09:26 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - - -

	S5Q1	S5Q2	S5Q3	S5Q4	S5Q5	S5Q6	S5Q7	S5Q8	S5Q9	S5Q10	S5Q11
S5Q12	-.2575	.2146	.5530	.3707	.3858	.3243	.4478	.3604	.4783	.7419	.4059
	(11)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)
	P= .222	P= .182	P= .006	P= .054	P= .046	P= .082	P= .024	P= .059	P= .016	P= .000	P= .038
S5Q13	-.1149	.0634	.4279	.2614	.0116	1891	.4016	.6067	.4904	.3775	.6969
	(11)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)
	P= .368	P= .395	P= .030	P= .133	P= .481	P= .212	P= .040	P= .002	P= .014	P= .050	P= .000
S5Q14	-.0741	-.1501	.2101	.2317	.2832	.1547	.1528	.6277	.4224	.5814	.3888
	(11)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)
	P= .414	P= .264	P= .187	P= .163	P= .113	P= .258	P= .260	P= .002	P= .032	P= .004	P= .045
S5Q15	-.3165	.0493	.2445	.3394	.4698	.4382	.4006	.5420	.3236	.6341	.2575
	(11)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)
	P= .171	P= .418	P= .149	P= 072	P= .018	P= .027	P= .040	P= .007	P= .082	P= .001	P= .136
S5Q16	.0465	.2467	.4031	.4014	.0686	.4640	.5902	.6249	.4846	.4000	.6513
	(11)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)
	P= .446	P= .147	P= 039	P= .040	P= .387	P= .020	P= .003	P= .002	P= .015	P= .040	P= .001
S5Q17	-.2340	-.5636	.3095	.3568	-.2798	.2648	.0897	.5668	.5778	.3529	.9457
	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
	P= .244	P= .036	P= 177	P= .141	P= .202	P= .216	P= .397	P= 035	P= .033	P= .144	P= .000
S5Q18	-.4455	-.7265	.3132	2229	-.5419	.2593	.3904	.2788	.1179	-.0336	.5312
	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
	P= .085	P= .006	P= .174	P= .255	P= .043	P= .221	P= .118	P= .203	P= .365	P= .461	P= .046
S5Q19	-.3334	-.7330	.2158	-.0250	-.5750	.0283	.2430	.0044	-.0735	-.1650	.2861
	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
	P= .158	P= .005	P= .262	P= .471	P= .032	P= .467	P= .236	P= .495	P= .415	P= .314	P= .197
S5Q20	.0294	-.3377	.1550	.4636	-.3246	.3662	-.0396	.6364	.4208	.0723	.6827
	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
	P= .466	P= .155	P= .325	P= .075	P= .165	P= .134	P= 454	P= .018	P= .099	P= .416	P= .010
S5Q21	-.2108	-.3438	.3046	.6246	.0314	.8493	.6185	8575	.4600	.4813	.6464
	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
	P= .267	P= .150	P= .181	P= 020	P= .463	P= .000	P= .021	P= .000	P= .077	P= .067	P= .016
S5Q22	.3842	.5601	.2197	.2146	.3371	-.0351	.2816	.0084	.4255	.3776	-.0285
	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
	P= .122	P= .037	P= 258	P= .263	P= 155	P= .459	P= .201	P= .490	P= .096	P= .126	P= .467

(COEFFICIENT / (CASES) / 1 TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:09:27 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - - - -

	S5Q12	S5Q13	S5Q14	S5Q15	S5Q16	S5Q17	S5Q18	S5Q19	S5Q20	S5Q21	S5Q22
S5Q12	1.0000 (0) P= .	.4061 (20) P= .038	.4471 (20) P= .024	.6755 (20) P= .001	.4494 (20) P= .023	.4280 (11) P= .095	.3138 (11) P= .174	.1383 (11) P= .343	.2028 (11) P= .275	.5991 (11) P= .026	.2880 (11) P= .195
S5Q13	.4061 (20) P= .038	1.0000 (0) P= .	.5383 (20) P= .007	.2602 (20) P= .134	.4182 (20) P= .033	.7238 (11) P= .006	.6862 (11) P= .010	.6760 (11) P= .011	.4827 (11) P= .066	.5222 (11) P= .050	-.1289 (11) P= .353
S5Q14	.4471 (20) P= .024	.5383 (20) P= .007	1.0000 (0) P= .	.6152 (20) P= .002	.4541 (20) P= .022	.7729 (11) P= .003	.2423 (11) P= .236	.0672 (11) P= .422	.5087 (11) P= .055	.6160 (11) P= .022	-.0285 (11) P= .467
S5Q15	.6755 (20) P= .001	.2602 (20) P= .134	.6152 (20) P= .002	1.0000 (0) P= .	.4432 (20) P= .025	.3818 (11) P= .123	.1967 (11) P= .281	-.0638 (11) P= .426	.1777 (11) P= .301	.8287 (11) P= .001	-.1959 (11) P= .282
S5Q16	.4494 (20) P= .023	.4182 (20) P= .033	.4541 (20) P= .022	.4432 (20) P= .025	1.0000 (0) P= .	.5652 (11) P= .035	.2552 (11) P= .224	-.0525 (11) P= .439	.5219 (11) P= .050	.7468 (11) P= .004	.1097 (11) P= .374
S5Q17	.4280 (11) P= .095	.7238 (11) P= .006	.7729 (11) P= .003	.3818 (11) P= .123	.5652 (11) P= .035	1.0000 (0) P= .	.6230 (11) P= .020	.4367 (11) P= .090	.6725 (11) P= .012	.5826 (11) P= .030	-.1228 (11) P= .359
S5Q18	.3138 (11) P= .174	.6862 (11) P= .010	.2423 (11) P= .236	.1967 (11) P= .281	.2552 (11) P= .224	.6230 (11) P= .020	1.0000 (0) P= .	.9136 (11) P= .000	.3248 (11) P= .165	.5089 (11) P= .055	-.5233 (11) P= .049
S5Q19	.1383 (11) P= .343	.6760 (11) P= .011	.0672 (11) P= .422	-.0638 (11) P= .426	-.0525 (11) P= .439	.4367 (11) P= .090	.9136 (11) P= .000	1.0000 (0) P= .	.1292 (11) P= .353	.2044 (11) P= .273	-.4413 (11) P= .087
S5Q20	.2028 (11) P= .275	.4827 (11) P= .066	.5087 (11) P= .055	.1777 (11) P= .301	.5219 (11) P= .050	.6725 (11) P= .012	.3248 (11) P= .165	.1292 (11) P= .353	1.0000 (0) P= .	.5562 (11) P= .038	.0528 (11) P= .439
S5Q21	.5991 (11) P= .026	.5222 (11) P= .050	.6160 (11) P= .022	.8287 (11) P= .001	.7468 (11) P= .004	.5826 (11) P= .030	.5089 (11) P= .055	.2044 (11) P= .273	.5562 (11) P= .038	1.0000 (0) P= .	-.2766 (11) P= .205
S5Q22	.2880 (11) P= .195	-.1289 (11) P= .353	-.0285 (11) P= .467	-.1959 (11) P= .282	.1097 (11) P= .374	.1228 (11) P= .359	-.5233 (11) P= .049	-.4413 (11) P= .087	.0528 (11) P= .439	-.2766 (11) P= .205	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG)   " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

11 APR 89 SPSS-X RELEASE 2.2 FOR IBM VM/CMS
14:09:26 U.W.O. SCHOOL OF BUSINESS IBM 4381 MOD 13 VM/SP CMS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - - -

	S5Q12	S5Q13	S5Q14	S5Q15	S5Q16	S5Q17	S5Q18	S5Q19	S5Q20	S5Q21	S5Q22
S5Q1	-.2575 (11) P= .222	-.1149 (11) P= .368	-.0741 (11) P= .414	-.3165 (11) P= .171	.0465 (11) P= .446	.2340 (11) P= .244	-.4455 (11) P= .085	-.3354 (11) P= .158	.0294 (11) P= .466	-.2108 (11) P= .267	.3842 (11) P= .122
S5Q2	.2146 (20) P= .182	-.0634 (20) P= .395	-.1501 (20) P= .264	.0493 (20) P= .418	.2467 (20) P= .147	-.5636 (11) P= .036	-.7265 (11) P= .006	-.7330 (11) P= .005	-.3377 (11) P= .155	-.3438 (11) P= .150	.5601 (11) P= .037
S5Q3	.5530 (20) P= .006	.4279 (20) P= .030	.2101 (20) P= .187	.2445 (20) P= .149	.4031 (20) P= .039	.3095 (11) P= .177	.3132 (11) P= .174	.2158 (11) P= .262	.1550 (11) P= .325	.3046 (11) P= .181	.2197 (11) P= .258
S5Q4	.3707 (20) P= .054	.2614 (20) P= .133	.2317 (20) P= .163	.3394 (20) P= .072	.4014 (20) P= .040	.3568 (11) P= .141	.2229 (11) P= .256	-.0250 (11) P= .471	.4636 (11) P= .075	.6246 (11) P= .020	.2146 (11) P= .263
S5Q5	.3858 (20) P= .046	.0116 (20) P= .481	.2832 (20) P= .113	.4698 (20) P= .018	.0686 (20) P= .387	-.2798 (11) P= .202	.5419 (11) P= .043	-.5750 (11) P= .032	-.3246 (11) P= .165	.0314 (11) P= .463	.3371 (11) P= .155
S5Q6	.3233 (20) P= .082	.1891 (20) P= .212	.1547 (20) P= .258	.4382 (20) P= .027	.4640 (20) P= .020	.2648 (11) P= .216	.2593 (11) P= .221	.0283 (11) P= .467	.3662 (11) P= .134	.8493 (11) P= .000	-.0351 (11) P= .459
S5Q7	.4478 (20) P= .024	.4016 (20) P= .040	.1528 (20) P= .260	.4006 (20) P= .040	.5902 (20) P= .003	.0897 (11) P= .397	.3904 (11) P= .118	.2430 (11) P= .236	-.0396 (11) P= .454	.6185 (11) P= .021	-.2816 (11) P= .201
S5Q8	.3604 (20) P= .059	.6067 (20) P= .002	.6277 (20) P= .002	.5420 (20) P= .007	.6249 (20) P= .002	.5668 (11) P= .035	.2788 (11) P= .203	.0044 (11) P= .495	.6364 (11) P= .018	.8575 (11) P= .000	.0084 (11) P= .490
S5Q9	.4783 (20) P= .016	.4904 (20) P= .014	.4224 (20) P= .032	.3236 (20) P= .082	.4846 (20) P= .015	.5728 (11) P= .033	.1179 (11) P= .365	-.0735 (11) P= .415	.4208 (11) P= .099	.4600 (11) P= .077	.4255 (11) P= .096
S5Q10	.7419 (20) P= .000	.3775 (20) P= .050	.5814 (20) P= .004	.6341 (20) P= .001	.4000 (20) P= .040	.3529 (11) P= .144	-.0336 (11) P= .461	-.1650 (11) P= .314	.0723 (11) P= .416	.4813 (11) P= .067	.3776 (11) P= .126
S5Q11	.4059 (20) P= .038	.6969 (20) P= .000	.3888 (20) P= .045	.2575 (20) P= .136	.6513 (20) P= .001	.9457 (11) P= .000	.5312 (11) P= .046	.2861 (11) P= .197	.6827 (11) P= .010	.6464 (11) P= .016	-.0285 (11) P= .467

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

Appendix B
Protocol For Interviews

Company: Number:

Equipment: Number:

The purpose of this interview is to solicit your input regarding the performance of purchasing achieved while being involved in the acquisition of .... During the acquisition process, a purchasing agent became involved in assisting with the completion of the purchase. Please respond to the following questions regarding that purchase experience.

First, could you please describe the nature of the equipment acquired including its functional aspects?

Would you classify this piece of equipment as very complex and technically difficult to comprehend?

At what point in time did you realize that equipment would have to be purchased?

What constraints were you under with regard to this acquisition? (e.g. budget limit, time, supplier)

For you, was this the first time you had to purchase something with the purchasing function help?

For you, was this the first time ever purchasing such equipment?
For the research centre?

Do you recall your expectations of what purchasing would be able to do for you with respect to this purchase? (e.g. help with technical specifications, identify "musts" and "wants", seek other supply sources)

At what point in time did you seek or be asked to have purchasing personnel involved? Why were they involved?

Was it your impression that purchasing understood what the equipment had to do and your requirements for this acquisition?

Did you have any information from the supplier previous to this involvement regarding technical characteristics, price, etc.?
Please describe? When did these contacts occur?

Had you essentially decided on a supplier prior to involving purchasing?

Was the invovlement of purchasing voluntary or mandated?

What was the nature of purchasing invovlement?

.............Functional Specification
.............Functional Needs Identification
.............Technical Specification
.............Multiple Project Use
.............Alternate Suppliers
.............Paper Shuffling
.............Expediting
.............After Sales Service
.............Price Negotiation
.............Bid Evaluation

Other?

Please describe this involvement during the course of the acquisition process and if possible, identify reference points of time for this involvement

Could you please estimate the time spent on the purchasing process by yourself? By purchasing?

Reflecting on this acquisition experience, did purchasing really help in getting you the best equipment possible?

If you had a choice, what would have been done differently if you had to purchase the equipment again?

What conditions do you believe are necessary in order that purchasing can make a greater contribution to the purchasing of such equipment? (e.g. technical skill, earlier involvement, supplier network)

Do you feel that such an expanded role for purchasing would be a worthwhile endeavour? Why?

What educational degree(s) do you posess?

In evaluating the work that you do, do you consider it to be basic research, applied research or development work?

Appendix C
High Involvement Protocol

Protocol Procedure for Companies displaying high meaningful involvement levels

Company Name:

Size:

Technical Proficiency of Purchasers:

Describe the observed involvement process as shown in equipment acquisitions

This company is demonstrating a behaviour pattern that is not found often in my studies. I call this practice "Meaningful involement" of purchasing in the acquisition process. I'd like to ask you and several of your colleagues some questions of how this practice works, why it works and how it came to pass.

First, in your opinion, what makes this process stay alive (e.g. reward system for purchasers, some policy framework, personality, technical backgrounds)?

Secondly, do you know how long this purchasing involvement has been going on?

Can you identify a potential start date? Could you name possible predecessors or origins of the practice?

Why did it happen? (a revolution, a screw up, personal interest)

Has there been any problems with scientists who rebel against such an idea?

Would you consider this lab to be a creative one with continued successful research programs?

Appendix D
Statistical Appendices

Exhibit S1
Scientist Time On The Acquisition Process
Plot Of Canadian Data Points
(Low Involvement Cases)

```
            Plot Of Equipment Cost Versus TIme Spent Buying
         ++----+----+----+----+----+----+----+----+----+---+
       40+                               2   1             +
         I                                                 I
         I                                                 I
         I                                                 I
T        I                                          1      I
i      30+                        1                        +
m        I                                                 I
e        I                                                 I
         I                                                 I
(        I                                                 I
D      20+                         1                       +
a        I                                                 I
y        I                                                 I
s        I                                                 I
)        I                1 1                              I
       10+                1 1                              +
         I             1  1                                I
         I             11  1   1                           I
         I           1   1                                 I
         I          161                                    I
        0+          21                                     +
         ++----+----+----+----+----+----+----+----+----+---+
       -200         0       200       400       600

                  Cost of Equipment ($000)

             29 cases plotted.
```

Exhibit S2
Scientist Time On The Acquisition Process
Plot Of U.S. Data Points
(Low Involvement Cases)

```
            Plot Of Equipment Cost Versus TIme Spent Buying
         ++----+----+----+----+----+----+----+----+----+---+
       60+                                                 +
         I                                                 I
         I                                                 I
         I                                         1       I
T        I                                                 I
i      40+                                                 +
m        I                                  1              I
e        I                                                 I
         I                                                 I
(        I                                                 I
D      20+                1      1                         +
a        I                       1                         I
y        I               1                                 I
s        I                                                 I
)        I             1                                   I
        0+          121                                    +
         I                                                 I
         I                                                 I
         I                                                 I
         I                                                 I
      -20+                                                 +
         ++----+----+----+----+----+----+----+----+----+---+
       -200         0       200       400       600
```

Cost of Equipment ($000)

11 cases plotted.

Exhibit S3
Scientist Responses to Constructs of Meaningful Involvement
High vs. Low Involvement
(Based on Observational Score)

	High Involvement	Low Involvement	Significance*
Needs	3.94	2.19	p=.003
Supply	3.07	1.98	p=.08
Timeliness	3.67	2.07	p=.004
Buying	4.70	3.50	p=.009
Long Term	3.80	1.73	p=.001
Service	2.97	1.65	p=.014
Technical	3.00	1.68	p=.02

* Tests of significance were performed using the Mann-Whitney U test

Exhibit S4
Purchasers versus Scientists Ratings For Purchasing Tasks Mean Values (Adjusted)

	Confidence in Ability		Importance	
Construct	Scientists	Purchaser	Scientists	Purchaser
Needs	2.84 (4.30)	4.30	3.34 (4.59)	4.54
Supply	2.96 (4.42)	4.51	3.54 (4.79)	4.82
Timeliness	3.09 (4.55)	4.55	3.50 (4.75)	5.21*
Buying	4.65 (6.11)	5.75*	5.00 (6.25)	5.74**
Long Term	3.13 (4.59)	4.66	4.06 (5.31)	4.96
Service	2.78 (4.24)	4.80*	3.20 (4.45)	4.71
Technical	2.64 (4.10)	4.14	2.95 (4.20)	4.37

* Statistically insignificant difference after adjustment but with p values less than 0.2
** Statistically significant difference after adjustment at the .05 level

Exhibit S5
Scientist vs. Purchasing
Ratings Of Importance Of Tasks
High vs. Low Involvement Companies

	Scientists			Purchaser		
Construct	Low Inv.	High Inv.	Delta	Low Inv.	High Inv.	Delta
Needs	3.19	4.15	.96*	4.26	6.13	1.87*
Supply	3.33	4.89	1.56*	4.58	6.17	1.59*
Timeliness	3.39	4.14	.75	5.06	6.08	1.02*
Buying	4.93	5.52	.59	5.58	6.33	.75*
Long Term	3.92	4.86	.94	4.79	5.92	1.13
Service	3.06	3.75	.69	4.57	5.25	.68
Technical	2.74	4.10	1.34*	4.13	5.75	1.62*

* Statistically significant at the .05 level (2 tailed)

Exhibit S6
Scientists vs. Purchasers
A Comparison of Confidence in Purchasing Ability
High vs. Low Involvement Cases

	Scientists			Purchaser		
Construct	Low Inv.	High Inv.	Delta	Low Inv.	High Inv.	Delta
Needs	2.56	4.40	1.84*	3.88	6.20	2.32*
Supply	2.74	4.39	1.65*	4.16	6.13	1.97*
Timeliness	2.85	4.48	1.63*	4.32	5.60	1.28*
Buying	4.48	5.33	.85	5.58	6.27	.69
Long Term	2.85	4.71	1.86*	4.38	5.93	1.55*
Service	2.42	4.21	1.79*	4.33	6.20	1.87*
Technical	2.35	4.24	1.89*	3.65	6.40	2.75*

*Statistically significant difference at the .05 level (2 tailed)

Exhibit S7
Research Administrators vs. Scientists
Autonomy Elements

Construct	Scientists	Administrators	Significant?
Supervision/ Freedom	5.73	5.43	No
Work	4.85	4.84	No
Judgement	5.81	5.33	No
Method	5.90	5.70	No
Publication	3.84	4.79	Yes

Exhibit S8

Scientists versus Research Administrators
Importance of Various Purchasing Tasks

Construct	Scientists		Research Admin.		Sign.?
	Value	Rank	Value	Rank	
Needs	3.34	3	3.84	3	No*
Supply	3.54	3	4.16	3	Yes
Timeliness	3.50	3	4.11	3	Yes
Buying	5.00	1	5.36	1	No
Long Term	4.06	2	4.67	2	No*
Service	3.20	3	3.54	3	No*
Technical	2.95	7	3.45	3	No*

* p values less than .2

Exhibit S9
Scientists vs. Research Administrators
Confidence in Purchasings' Abilities

Construct	Scientists Value	Scientists Rank	Research Admin. Value	Research Admin. Rank	Sign.?
Needs	2.84	5	3.19	5	Yes
Supply	2.96	2	3.35	2	No*
Timeliness	3.09	2	3.52	2	No
Buying	4.65	1	4.97	1	No
Long Term	3.13	2	3.48	2	No
Service	2.78	7	2.89	7	No
Technical	2.64	7	3.10	5	Yes

* p values less than .2

Exhibit S10
Purchasing Managers vs. Purchasers Ratings On Purchasing Tasks Mean Values and (Rank)

	Confidence in Ability		Importance	
Construct	Mgmt.	Purchaser	Mgmt.	Purchaser
Needs	4.15 (6)	4.39 (6)	4.75 (4)	4.58 (4)
Supply	4.58 (2)	4.63 (2)	5.36 (3)	4.87 (4)
Timeliness	4.49 (2)	4.60 (2)	5.69 (1)	5.22 (2)
Buying	5.63 (1)	5.70 (1)	5.92 (1)	5.67 (1)
Long Term	4.62 (2)	4.77 (2)	5.33 (3)	5.03 (2)
Service	4.35 (2)	4.81 (2)	4.94 (4)	4.65 (4)
Technical	4.08 (6)	4.25 (6)	4.54 (7)	4.39 (7)

Exhibit S11
Research Administrators vs. Purchasing Managers Ratings For Purchasing Tasks Mean Values (Adjusted Mean Values)

	Confidence in Ability		Importance	
	R.Mgrs.	P.Mgrs.	R.Mgrs.	P.Mgrs.
Needs	3.26	4.15 (3.15)	3.84	4.75 (3.70)
Supply	3.43	4.58 (3.58)	4.22	5.36 (4.31)
Timeliness	3.62	4.49 (3.49)	4.12	5.69 (4.64)
Buying	5.11	5.63 (4.63)	5.36	5.92 (4.87)
Long Term	3.55	4.62 (3.62)	4.70	5.33 (4.28)
Service	3.02	4.35 (3.35)	3.75	4.94 (3.89)
Technical	3.20	4.08 (3.08)	3.55	4.54 (3.49)