



# Managing the distribution channels for high-technology products

## A behavioural approach

Sunil Sahadev

*Indian Institute of Management, Calicut, Kerala, India, and*

S. Jayachandran

*Department of Humanities and Social Sciences,  
Indian Institute of Technology Madras, Chennai, India*

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**Abstract** *The effects of variations in the external environment on channel member behaviour have been widely acknowledged in marketing channel literature. This paper focuses on the behavioural issues associated with the management of distribution channels dealing in high-technology products in India. The marketing task environment associated with high-technology products being highly dynamic and unpredictable, the attendant channel management functions become extremely challenging. The paper presents a conceptual model for managing the distribution channels operating in highly dynamic and unpredictable environments. The conceptual model is validated through a sample survey conducted among computer hardware dealers.*

### Introduction

Marketing channels essentially consist of interacting groups of interdependent organisational entities enjoying varying degrees of autonomy from each other. The exchange relationships in a channel system are an outcome of two types of interactions: interactions among the constituent entities in a channel set-up, as well as between the channel set-up and the external environment. To achieve greater clarity in understanding the impact of external environmental variables on exchange relationships, Arndt (1983) introduced the "relations to the environment" concept. Based on the political-economy framework, this concept postulates the relationships between external environmental variables and the internal polity of a channel system. The view that the context or situation has an important effect on the nature and functioning of exchange relationships has of course been supported by a variety of research in sociology, organisational behaviour and marketing (Filly *et al.*, 1976, Stern and Brown, 1969; Weitz, 1981).

Uncertainty in the task environment of a channel system could be caused due to several factors. Here we consider the environmental uncertainty associated with the marketing of high-technology products. Since high-technology products are identified with high levels of technological



change and unpredictability, marketing channels that deal in such product categories are confronted with an external political economy characterised by highly uncertain decision environments. Based on Wholey and Brittain's (1989) classification scheme, such task environments can be considered as displaying high variations in terms of the frequency, amplitude and the predictability dimensions. Dynamic and uncertain task environments pose tremendous challenges to the decision makers in a channel set-up.

Such circumstances make it absolutely necessary for the decision maker to both assimilate and anticipate environmental conditions so as to undertake strategic actions. These processes entail an assessment of the complexity of environmental elements and their rate of change. Since the complexity and dynamics of the environment are difficult to assess under conditions of extreme uncertainty, decision making becomes a difficult task. Moreover, effective implementation of the decisions becomes even more difficult until all the channel members are convinced about the rationale of the decision and agree to abide by it. Therefore, to operate in environments characterised by extraordinarily high levels of uncertainty, it becomes imperative for marketing channels to follow approaches and practices that are quite unique to these environments and are dissimilar from the approaches followed by channels operating in relatively placid environments. These approaches basically orient channel systems to operate like a single unit so as to enhance their capabilities to adjust to the ever-changing environment by facilitating fast decision making and efficient implementation.

The study puts forth a conceptual model that suggests specific behavioural approaches which will enable channel systems to adapt to the uncertainties associated with the marketing of high-tech products. The rationale for a distinct approach for marketing high-technology products is sufficiently supported in theory (Lynn *et al.*, 1999; Weiss and Heide, 1993; Smith *et al.*, 1999). The model is validated using the data collected from a sample of computer hardware dealers in India. The model cannot thus claim universal validity, however, since the study focuses primarily on conceptualising the distribution channel management task in a high-technology environment, further studies in this area could explore the validity of the model in other channel settings and incorporate modifications if required.

To better appreciate the need for a distinct model to manage the marketing channels dealing in high-tech products, we first look at the impact of the high-tech attributes on the task environment of a channel. Subsequent sections explain the model development and validation process.

### **Effects of high-technology attributes**

For the purpose of the study high-tech products are defined as product categories which are characterised by certain attributes. These high-tech attributes are instrumental in transforming the external political economy of

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the channel systems dealing in these product categories. The five high-tech attributes considered here were derived from the extant literature in high-technology marketing. A survey of the extant high-tech products marketing literature provided a long list of such attributes. However, several attributes that appeared in this list were interrelated and hence effectively represent the same dimensions. Since the objective was to generate a list of attributes as parsimonious and as exhaustive as possible, an extensive content analysis was carried out on the initial list. This threw up five high-tech attributes that more or less captured the various dimensions appearing in the literature. Each of these attributes in fact subsumes several sub-attributes that are interrelated. The five high-tech attributes and their impact on channel management issues are discussed in the following sections.

#### *Shorter product life cycle*

High-tech products are characterised by a short product life cycle curve (Ryans and Shanklin, 1984; Rosenau, 1988). Such products typically go through the life-cycle stages in shorter periods of time compared to an ordinary product. Thus the sales volume of a particular product category will peak within a short interval of time before descending in an equally short period of time. This is in fact a reflection of the constant technological changes that characterise high-tech products. Though incremental in nature, such continuous technological changes “shrink” the product life cycles considerably for specific models.

#### *Greater risk of discontinuous change in product technology*

While incremental changes occur almost regularly among high-technology products, they are also more prone to radical and discontinuous technological changes than ordinary products. A discontinuous change is explained as one that will create a total change in the consumption patterns, customer profile etc. Such changes are considered as competence destroying, as the existing knowledge becomes inadequate to develop and market the new product categories. High-tech products may become technologically obsolete within short periods of time due to a greater possibility of discontinuous change occurring in the product technology domain. Several authors (e.g. Weiss and Heide, 1993) have associated the attribute “unpredictability” with high-tech contexts. This can also be considered as a direct consequence of the high occurrence of discontinuous innovation to happen in high-technology contexts.

#### *Indispensability of associated infrastructure*

High-technology products are incapable of existing in isolation. It is widely acknowledged that the ability to develop supporting infrastructure that could keep pace with the rapid and dynamic changes happening in high-tech product categories is a key factor determining the success of a high-tech product launch. For example, MacInnis and Heslop (1990) and Moriarty and Kosnik

(1989) consider the existence of a well-established service network to be a vital component in the marketing mix of high-tech products. The supporting infrastructure will typically include complementary products vitally needed for the functioning of the product, essential supplies and spares, well trained service executives who can install and repair the products etc. Being technologically advanced, high-tech products will require complementary products that are compatible with the technology employed. Unless such technologically compatible products are widely available, users will find it difficult to adopt high-tech products.

*Lack of well established industry standards*

A basic characteristic of high technologies is their evolutionary nature. As a result of their constant state of evolution, products that are meant to satisfy the same needs operate with different standards. The emergence of a universally accepted standard that can benchmark the other offers takes a lot of time. This idea is represented by the “dominant design” concept in technology management literature. According to Utterback (1994):

... a dominant design is the one that wins the allegiance of the market place, the one that competitors and innovators should adhere to if they hope to command significant market share.

In high-tech markets, the establishment of a dominant design is generally an arduous and highly unpredictable process. In a particular product category, when it will appear as if a dominant design is emerging, a new design is introduced which could confound the entire market.

*Uncertainty about product functionality*

From the consumers’ point of view, high levels of uncertainty are associated with the functional variables attached to high-technology products. Moriarty and Kosnik (1989), for instance, consider all such functionality-related uncertainties under the heading “market related uncertainty”. To start with, consumers tend to face difficulty in matching their needs to the benefits the high-tech products might offer. Added to this is the high amount of risk associated with high-tech products. The risk is more since high-tech products generally have high switching costs associated with. Difficulty in anticipating the changes that could take place in the market place adds another dimension to this uncertainty

The five major attributes that characterise high-technology products impact on the marketing task in a significant manner. The extant technology management literature considers these issues rather comprehensively. Here, we analyse the different ways in which each of the five high-tech attributes affects the task environment of a channel set-up.

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*Effects due to the shorter product life-cycles*

A shorter product life cycle significantly affects the various factors associated with the channel management task. Related to the product life-cycle concept is the diffusion of innovation curve. As the product passes through each stage in the life cycle, it is being adopted by different consumer segments. Each segment in the curve consists of groups of customers whose responses to marketing stimuli are different. When the product passes through each of the stages in the life cycle very rapidly, there is an accompanying change in the profile of the customers (Butaney and Wortzel, 1988). To target each customer segment in the diffusion of innovation curve, a different marketing approach becomes necessary (Etgar, 1977; Moore, 1991). This is a result of the different consumer characteristics like expectancies and risk acceptabilities of each consumer segment. Further, as Christensen (1997) establishes using data from the desktop PC industry, as the technology matures in the course of a life cycle, customers tend to look at newer criteria for evaluating a product. Thus, the distributors who maintain contact with the consumer segments on behalf of the supplier will have to continuously change their orientations. At the introductory stage when the early adopters constitute the prime customer base, the sales pitch should address their concerns with greater emphasis on the innovative technical features. When the product moves to the growth phase, the early majority needs to be influenced by a different approach with far lesser emphasis on the innovative features. Such constant and continuous change in the marketing approaches requires the entire channel set-up to adjust to the shorter product cycle time by grasping the technological and market related characteristics of the product continuously. Shorter product life cycles also have serious implications for the channel system from the pricing point of view. Since the performance to price ratio will show a declining trend (Smith *et al.*, 1999), the issues related to sharing of marketing costs, margins etc. will have to be sorted out on a regular basis. This is possible only with greater levels of cooperation and trust between the supplier and the distributor. Normal levels of trust and cooperation are inadequate to achieve the required amount of agility and synchronisation in the behaviour of the distributor because the entire channel system, comprising several independent organisational entities, would have to act in perfect unison like a single organisation.

*Effects due to the greater risk of discontinuous change in product technology*

High-tech product categories not only witness dynamic change in their product technologies, the changes are often totally unpredictable and sudden. The effects of such changes are not just limited to the products. Most often, there is an accompanying shift in the consumption patterns, user profile, complementary products, demand curve etc. (Robertson, 1971). Such abrupt and drastic shifts in the decision variables can have a debilitating impact on the channel constituents. Operating with a particular set of market variables that

either remain constant or are predictable in their pattern of change over a considerably long period of time, channel members tend to develop some amount of expertise in the markets they serve. This expertise may be in the form of possessing grass-roots level knowledge about the purchase decision-making process, consumption pattern, personal contacts or specialised selling skills. Such expertise gathered over a period of time is a vital asset for distributors in their dealings with the supplier. Occurrence of discontinuous changes can render such expertise virtually obsolete (Tushman and Anderson, 1986; Eisenhardt, 1989; Von Hippel, 1986). On the other hand, the supplier runs the risk of losing the confidence of the market. Such extreme situations demand rapid adoption of survival tactics like phasing out of product lines or aggressive pricing. As Achrol *et al.* (1983) say:

... changes in the macro environment cannot usually be acted upon proactively with much success and adaptive strategies like withdrawal provide the only effective response.

Further, as Glazer and Weiss (1993) argue, in highly turbulent markets, formal planning is sub-optimal since it slows down the process and interferes with the environmental requirement of faster, “real-time” decision making. The adoption of such drastic measures becomes impossible unless cooperation and trust characterise the interrelationships among the channel constituents.

#### *Effects due to the non-existence of industry standards*

Existence of well accepted industrial standards makes it easy for both the supplier and the distributor to convince the customer since it could reduce buyer uncertainty (Moriarty and Kosnik, 1989). In the absence of such well-established standards, customers tend to spend more time and effort in the search process (Cyert and March, 1963). The marketing task will consequently involve greater customer education (Ryans and Shanklin, 1984) which in turn requires greater willingness to acquire information about the product technology in the associated fields. As Moriarty and Kosnik (1989) say, “the minimum acceptable breadth and depth of knowledge is greater in high-tech settings than in low-tech settings”. Besides, the process of purchasing high-tech products has been found to be a complex process which involves seeking and analysing information at every stage (Patterson and Dawes, 1999). The distributors’ willingness to learn and gather knowledge is thus a crucial factor in the successful marketing of high-tech products. Only a climate of cooperation and trust can foster this.

#### *Effects due to the indispensability of supporting infrastructure*

Successful customer adoption of high-technology products is significantly affected by the development of associated infrastructure (McIntyre, 1988). High-tech products often get rejected by the markets when they are launched prematurely. Described as the “market adoption process” (Olleros, 1986; Venkatesh and Vitalari, 1986) in high-tech strategy literature, the rate of

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development of the supporting infrastructure is considered to be a crucial factor in the rate of adoption of high-tech products. The rate of development of the supporting infrastructure may be uneven across market segments. Distributors, being in close contact with the customers, will be in a better position to gauge the availability and accessibility of such supporting infrastructure in the market. Further, installation and servicing assume special significance in the case of high-tech products (Moriarty and Kosnik, 1989; MacInnis and Heslop, 1990). If the supplier depends on the distributor for these functions, the distributor's willingness and cooperation in employing a network of highly trained servicemen becomes crucial in the successful marketing of high-tech products. Moreover, since the product technology is constantly changing, the service force should be trained regularly (Abratt, 1986). The distributors should recruit skilled servicemen, motivate them to enhance their skill set, assess the training needs from time to time and cooperate with the supplier in training programs. Thus, unless the dyadic relationship is characterised by high-levels of cooperation, the ability of the channel set-up to market high-technology products will be affected.

#### *Effects due to the uncertainty in product functionality*

Uncertainty related to product functionality has been highlighted very prominently in high-tech literature (Weiss and Heide, 1993; Moriarty and Kosnik, 1989; MacInnis and Heslop, 1990; Moore, 1991; Ryans and Shanklin, 1984; Dunn *et al.*, 1991). Since the products are technologically very advanced, customers are dependent on highly trained technicians for installation and maintenance. Further, several issues like the threat of technology becoming obsolete, switching costs associated with the replacement of products, the ability of the technology to perform to the promised levels etc. are matters of concern for the customer. To command the confidence of the customer in the face of such uncertainty, marketing must refocus away from selling products towards creating relationships (McKenna, 1991). This is possible only if the supplier and the distributor work like a single organisation, sacrificing short-term losses for long term gains. Mutual trust is a vital factor in achieving this level of integration. Table I summarises the implications of high-technology attributes and the suggested channel member behaviour.

#### **Conceptual model**

The model has as its focus supplier-distributor dyads dealing in high-technology products. Because of their peculiar characteristics, high-tech products are associated with a highly uncertain environment. Under such extreme uncertainties, the effectiveness of a channel dyad depends on the degree of success it achieves in adapting to the environment. The adaptation process in the context of channel dyads has two basic characteristics, the adaptation process is "symbiotic", which implies that the adaptation takes

High-technology attributes	Major effect	Behavioural response sought
Shorter product life cycle	Reduced cycle time leading to constant and rapid changes in the customer/market profile	Timely absorption and adjustment to the technological/market trends by providing continuity in change
Greater probability of discontinuous change in product technology	Greater risk of obsolescence of the technological and marketing skills acquired by the distributor	Quick adoption of drastic measures like reduction in prices or phasing out of product whenever required
Non-existence of industry standards	Comparison of alternatives based on well-defined criteria becomes impossible for the consumer and information asymmetry becomes a crucial factor in the consumers' decision making process	Greater thrust on educating the customer after acquiring knowledge about a wider breadth of topics
Indispensability of supporting infrastructure	Greater importance for a well-established service network. Greater need for closely observing the market adoption process	Providing regular training to the service force and encouraging them to improve their skill set
Uncertainty about product functionality	Difficulty in gaining the confidence of the customer	Focus to shift from selling the product to creating relationships

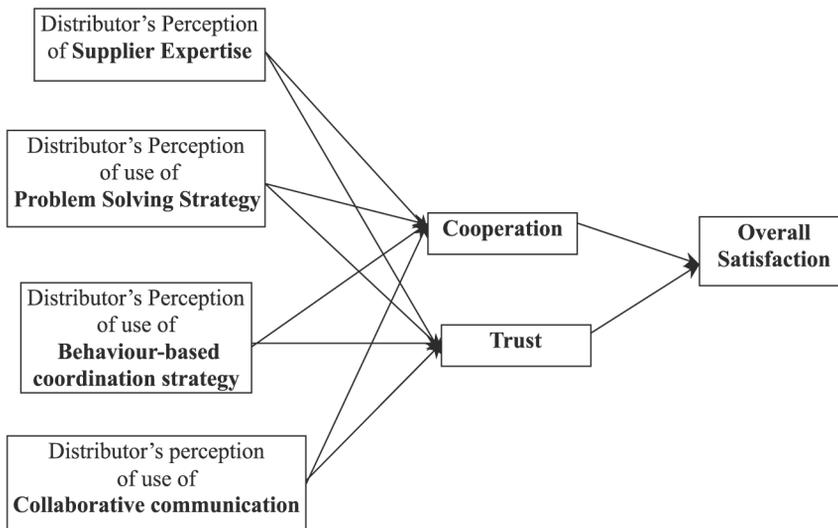
**Table I.**  
High technology attributes, their effects on channels and the responses sought

place between two units that are dependent on each other, the adaptation process is “ongoing” in the sense that it takes place under changing business conditions. To facilitate this adaptation process it is necessary that both the parties should indulge in similar or complementarily coordinated actions to achieve mutual outcomes or similar outcomes with expected reciprocation, i.e. they should cooperate, and both the parties should believe that the actions performed by the other party will result in positive outcomes and that the unexpected decisions taken by the other party will not harm the relationship, i.e. mutual trust should be maximum. The model is hence based on the premise that, to achieve efficiency and effectiveness in operation, channel dyads dealing in high-technology products must adopt explicit behavioural patterns that will manifest in greater trust and cooperation between the channel members. This is because, to successfully adapt to an extremely dynamic and uncertain environment, the channel system must function like a single unit. This view is consistent with the one put forward by Morgan and Hunt (1994) that considers close inter-firm relationships as an uncertainty absorption mechanism. Further, according to Alderson (1965), only those channel dyads that possess greater

degrees of mutual cooperation and trust can function as a single unit. This assumption is also broadly supported by Chipello (1989) and Zachary (1990).

The importance of trust and cooperation in facilitating channel member adaptation finds moderate support in the extant literature. Kumar (1996) points to the role of trust in ensuring greater adaptability among channel members. According to Kumar (1996), “When both sides trust each other, they are able to share confidential information, to invest in understanding in each other’s business and to customise their information systems or dedicate people and resources to serve each other better”. Moreover, trust is believed to “create a reservoir of goodwill that helps preserve the relationship when, as will inevitably happen, one party engages in an act that its partner considers destructive”. Morgan and Hunt (1994) link greater amounts of trust among channel members to a reduction in decision-making uncertainty. Narus and Anderson (1996) highlight the importance of cooperative arrangements in developing adaptive channels. Cooperation places emphasis on the sharing of capabilities and joint efforts (Cannon and Perreault, 1997). As early as in 1963, Mallen (1963) had concluded that “the channel must cooperate and act as a unit for the maximisation of channel profits”. Gultinan *et al.* (1980) had found a positive association between cooperation and uncertainty reduction. Anderson *et al.* (1987) have found empirical support linking a “transaction climate” characterised by mutual trust and goal compatibility to enhanced dealer involvement in the relationship. The model is depicted in Figure 1.

The exogenous constructs in the model are all defined in terms of the distributors’ perception, this is so because attitudinal change is considered to



**Figure 1.**  
The conceptual model

occur mainly in the perceptual domain. Further, there is empirical support in channels theory for the contention that behaviour is based on perceptions rather than any objective measures of interaction (Anderson *et al.*, 1987).

### Hypotheses

**130** The following hypotheses can be stated from the pattern of relationships between the constructs presented in the conceptual model.

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#### *Distributors' perception of supplier expertise*

Sources of channel power and their application have been considered to be immensely important in channel management theory. A body of research has been based on Stern's (1969) pioneering notion that appropriate role behaviour can be specified and maintained in inter-firm relationships by the exercise of power and influence (Lusch, 1976; Lusch and Brown, 1982; Stern and El-Ansary, 1982). The exercise of different types of social power has been hypothesised to have different effects on the target party's beliefs, attitudes and behaviour (Raven and Kruglanski, 1970). The appropriateness of the different power sources under different situations has also received significant attention (Johnson *et al.*, 1993; Kale, 1986). Expertise as a source of power has been considered as a non-coercive approach for influencing channel members which could build up trust and solidarity in the relationship (Keith *et al.*, 1990; Busch and Wilson, 1976).

The uncertainty associated with marketing high-tech products impels distributors to look forward to their suppliers as leaders who could provide them the required information and advice to reduce uncertainty. The amount of expertise possessed by the supplier, both technical as well as market related, will be of immense value to the distributor. Referent power and legitimate power cannot elicit the same level of trust or cooperation under such circumstances, as they are incapable of contributing positively towards reducing decision-making uncertainty. Coercive sources of power, on the other hand, have always been found to be associated with such negative attitudes like dissatisfaction (Wilkinson, 1979), opportunism (John, 1984), negative relationships (Frazier and Summers, 1984) etc. Skinner *et al.* (1992) have found empirical evidence to prove the negative impact of coercive sources of power on channel cooperation. In a highly uncertain environment it becomes absolutely necessary for a channel system to work in perfect harmony and a negative attitude will have the effect of destabilising the process. Hence coercive sources of power are unsuitable in a high-technology context. The following interlinkages can therefore be hypothesised in the context of high-technology products:

- H1. Distributors' perception of supplier expertise leads to the attainment of higher levels of cooperation in the dyad.

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H2. Distributors' perception of supplier expertise leads to the attainment of higher levels of trust in the dyad.

*Distributors' perception about the use of problem-solving strategy for conflict resolution*

Problem-solving strategy is defined as an approach for resolving conflicts by developing solutions that integrate the requirements of both the parties (Walton and Mckersie, 1965). This strategy involves searching for alternative solutions and assessing the outcomes to both the parties from all such alternative actions. Information exchange is central to this approach. Other types of non-institutionalised conflict-resolution approaches like avoidance, persuasion, competing, etc. rely less on sharing information. Achrol *et al.* (1983) predict greater use of problem-solving approaches when environmental uncertainty is high. Clopton (1984) associates use of problem-solving strategy with higher levels of trust and cooperation in buyer-seller relationships. Mohr and Spekman (1994) find empirical support to consider the use of problem-solving strategy as a primary characteristic of successful partnerships between firms. In channel dyads, to cultivate cooperation and trust it is imperative that both the parties should not get the impression that they are getting a "raw deal". Thus, when conflicts arise, the resolution process must address the concerns and desires of both the parties. When problem-solving strategy is employed, the parties to the conflict could obtain a better insight about the goals, constraints, beliefs and attitudes of each other. The antecedents to each decision can be easily traced and motives appreciated. Such a state of affairs can be expected to foster cooperation and trust that will enable dyads to face the challenges of marketing high technology products. Hence:

H3. Increasing use of the problem-solving approach to resolve conflicts can lead to greater cooperation in a channel dyad.

H4. Increasing use of the problem-solving approach to resolve conflicts can lead to greater trust between the members of the dyad.

*Distributor's perception about the use of behaviour-based coordination efforts*

Over the years there has been a discernible shift in emphasis from control to coordination in channels literature. Coordination implies the alignment of activities of the channel members to achieve the desired outcomes. Coordination is defined as the degree to which the manufacturer and dealer activities are well organised and synchronised (Gultinan *et al.*, 1980). From a microeconomic perspective, a channel-dyad is said to be coordinated when all managerial control variables are set at the values that maximise the sum of manufacturer plus retailer profits (Igene and Parry, 1995). To achieve the desired levels of coordination, considerable effort is required on the part of the supplier. Celly and Frazier (1996) suggest two distinct types of coordination

efforts which could be used by the supplier to coordinate the activities of the channel, namely, outcome-based coordination efforts and behaviour-based coordination efforts.

Outcome-based coordination efforts imply placing greater emphasis on “bottom-line” results like sales growth, market share, target achievement etc. in the personal communication with the distributor personnel. Behaviour-based coordination efforts, on the other hand, place emphasis on tasks and activities like customer education, sales person training, selling techniques etc. Celly and Frazier (1996) found strong empirical association between environmental uncertainty and the use of behaviour-based coordination efforts. Outcome-based coordination efforts are characterised by high levels of “cause-effect” ambiguity from the distributor’s point of view as the relationship between the efforts and performance cannot be easily determined, especially when the environmental uncertainty is very high (Merchant, 1985). Under conditions of environmental uncertainty, an emphasis on outcomes is equivalent to holding the distributor responsible for uncontrollable factors (Jaworski and MacInnis, 1989). Moreover, since a focus on outcomes under high uncertainty might transfer excessive risk to the distributor (Eisenhardt, 1989; March and Shapira, 1987; Oliver and Weitz, 1991), their level of cooperation will be inadequate.

On the other hand, since, behaviour-based efforts involve a greater deal of information exchange (Frazier and Summers, 1984) and a general emphasis on sharing expertise, the distributor’s inclination to cooperate with the supplier will be high. Further, behaviour-based coordination efforts imply greater accountability for the actions that in turn can lead to greater levels of trust in the ongoing relationship. Thus:

- H5.* Use of behaviour-based coordination efforts can lead to higher levels of cooperation between the members in the dyad.
- H6.* Use of behaviour-based coordination efforts can lead to higher levels of trust between the members in the dyad.

#### *Use of collaborative communication strategy*

Mohr and Nevin (1990) proposed a classification of communication strategies to be applicable to channel management contexts based on the various combinations of communication facets. A collaborative communication strategy entails frequent, bi-directional, formal and non-coercive communication between channel members and as opposed to this, autonomous communication involves infrequent, uni-dimensional and coercive communication. Inter-channel communication in this sense has been visualised as a continuum anchored between collaborative communication and autonomous communication. According to Mohr *et al.* (1996), collaborative communication places emphasis on shared interests and common goals and

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thus leads to volitional compliance between partners. Empirical studies have associated the use of collaborative communication with greater levels of channel member satisfaction (Keith *et al.*, 1990, Mohr *et al.*, 1996) and coordination (Guiltinan *et al.*, 1980). Morgan and Hunt (1994) associate collaborative communication with cooperative attitudes, which creates an atmosphere of mutual support and respect. Kumar (1996) advocates the use of bilateral communication to create trust between channel members. Further, bi-directional flow of communication becomes absolutely necessary while dealing with high-technology products since information about the market adaptation process is very crucial in the decision-making process of the supplier. Greater frequency of communication between the members of the channel dyad will lead to a greater appreciation of the operational tactics and will thus result in better cooperation. Anderson *et al.* (1987) underline the importance of direct and frequent communication in enhancing mutual trust and goal compatibility. Hence, for marketing high-technology products:

- H7. Greater use of collaborative communication will lead to greater cooperation between the members of the dyad.
- H8. Greater use of collaborative communication will lead to greater trust between the members of the dyad.

#### *Cooperation, trust and satisfaction*

The primary objective of the model is to suggest behavioural approaches that will enable channel dyads to successfully adapt to the uncertain environments associated with marketing high-tech products. A successful adaptation process in turn is considered to be a function of the levels of trust and cooperation prevalent among the members of the channel dyad. Overall satisfaction with the relationship is portrayed as the indicator of the channel dyad's success in adapting to the uncertain environment. Performance is not considered as an end in itself, this is because in a highly evolving environment, conceptualisation of performance is a difficult task. Several studies (Anderson and Narus, 1990; Siguaw *et al.*, 1998; Mohr and Spekman, 1994; Skinner *et al.*, 1992) consider satisfaction rather than performance to be the focal consequence of channel relationships. Besides, there is theoretical evidence to show that satisfaction results from perceptions of past performance (Schul *et al.*, 1981).

The association between trust, cooperation and satisfaction has been considered extensively in channels literature (Andaleeb, 1995; Anderson and Narus, 1990; Childers *et al.*, 1984; Ganesan, 1993; John and Reve, 1982; Skinner *et al.*, 1992). Geyskens *et al.* (1998) conducted a meta-analysis of trust in the context of channels' research. After a comprehensive review of about 24 studies they concluded that trust is strongly related to satisfaction. Based on a laboratory study, Dwyer (1980) found satisfaction to be positively correlated to

the perceived cooperativeness of firms. In the model, achievement of greater levels of trust and cooperation are hypothesised to facilitate greater channel member adaptation, resulting in greater satisfaction. Thus: In the context of marketing channels dealing with high-technology products:

*H9.* High levels of trust will lead to greater satisfaction in the relationship.

*H10.* High levels of cooperation will lead to greater satisfaction in the relationship.

### **Model validation**

The conceptual model basically hypothesises the interlinkages between specific behavioural constructs in the channel management domain and certain relational norms like cooperation and trust. The validation procedure closely follows the methodology adopted by researchers in the past (e.g. Ganesan, 1993; Kumar *et al.*, 1995; Celly and Frazier, 1996; Mohr and Sohi, 1995; Li and Dant, 1999) who studied channel management variables in the context of dyadic relationships. Since the interlinkages are hypothesised in the context of marketing high-technology products, selection of an appropriate high-tech product was necessary for the model validation process. This approach has been followed in several studies (e.g. Abratt, 1986; Norton and Bass, 1987; Weiss and Heide, 1993) where hypotheses related to the marketing of high-technology products were tested by collecting data from entities associated with a particular high-tech marketing context. Weiss and Heide (1993) justified the focus on a specific product/buying situation on the basis of need to develop context-sensitive measures; greater minimisation achieved in the variation on non-focal variables; and greater simplification achieved in the survey form. Here the marketing channels dealing in computer hardware products were chosen for model validation. The computer hardware markets have witnessed extremely high levels of technological upgrading over the years. Consequently, it has led to greater dynamism and unpredictability in the marketing task environments for these products. Several studies indicate that the model life cycles in the computer hardware product category have shrunk to as short as three months. Curry and Kenney (1999) in their study bring out the high-tech nature of the computer hardware products by highlighting the rapid growth of innovation and technological absorption in the industry. For example, they found that due to high rate of product innovation, especially in the semi-conductors and magnetic storage technology, PC assemblers are forced to upgrade their products as quickly as possible or risk losses if the components in their PCs turn out to be obsolete or old.

### **Sample survey**

To test the validity of the conceptual model, data were collected from the 217 distributors of branded computer hardware products located in the two

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southern states (namely, Kerala and Tamil Nadu) of India. Distributors belonging to six different suppliers participated in the survey. The distributors and their suppliers were involved in the marketing of products like personal computers, peripherals, secondary storage devices, and high-end servers. The distributors were also involved in the installation and maintenance of these products.

The unit of analysis was defined as the distributor firm as represented by the distributor principal who interacts with the supplier firm. Since all the distributor firms were either owner-managed or managed by professional managers representing a group of partners, the views expressed by the distributor principal more or less represented that of the distributor organisation. To check for differences in perception among owners and managers, the responses were analysed using a MANOVA with respondent status as the grouping variable. The results did not indicate any significant influence for respondent status (i.e. owner or professional manager) on the seven relationship perception variables. ( $F = 1.237, p = 0.2833$ )

#### *Pre-study interviews*

A total of 20 distributors who represented several suppliers were contacted prior to the sample survey with the main intention of: developing context specific measurement scales for certain constructs; assessing the face validity of the items used for measuring the constructs; and investigating the channel structure for the various suppliers in the markets. From the pre-study interviews, items for measuring two constructs, namely, supplier expertise and overall satisfaction, were developed. Preliminary studies revealed that in the case of six suppliers, the extant modes of inter-firm contract, governance and structure were reasonably similar across their channel dyads.

#### *Sampling procedure*

Channel managers representing the six suppliers were requested to furnish a list of their distributors in the two states. The list supplied included the names of the distributor principals with whom the supplier personnel interacted and who were the decision makers in the distributor firm. The list consisted of more than 600 names. Owing to time and resource constraints it was not possible to contact all the distributors whose names appeared in the list. Further, during the course of the preliminary survey it was noticed that the respondents were reluctant to respond to mail or telephone interviews. Hence it was necessary to meet all the respondents in person. A total of 217 distributors mostly located in the main cities of the two states were contacted over a period of seven months.

Data were collected from the distributor principal by means of a structured questionnaire. A letter of introduction from the research supervisor accompanied the questionnaire. The introductory letter explained the purpose of the study and assured total confidentiality for the responses provided. In most cases an appointment was fixed over the phone with the

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respondent before the personal interview. On an average each respondent took about 20 to 30 minutes to fill in the questionnaire. Several respondents retained the questionnaire with them for a few days since they were too busy to fill up the questionnaire during office hours.

### **Development of measurement scales**

All the constructs were measured using multi-item scales. Conceptual definitions as well as research studies in which the same or similar constructs were measured guided measure development. With the exception of supplier's expertise and overall satisfaction with the relationship, all the constructs used in the study had received psychometric attention in the domain of marketing channels research.

Distributors' perception of supplier expertise indicates the extent to which the distributor is confident of the supplier's ability to impart expertise related to the marketing of high-technology products. This is a measure of the supplier's base of expert power. The construct was operationalised using seven statements that mirror certain context-specific issues related to supplier expertise. The respondents were requested to express their degree of agreement with these statements on a five-point scale anchored between strongly agree and strongly disagree. The items used in the scale were developed from the insights gained through pre-study interviews conducted among distributors as well as channel managers. The arithmetic mean of the responses obtained against the seven items was used for further analysis. The statements used for measuring this concept are given in the Appendix.

Use of a problem-solving approach to resolve conflicts was measured by using the items developed by Ganesan (1993). The scale consisted of six items and the respondents were requested to express their extent of agreement on a five-point Likert scale anchored between strongly agree and strongly disagree. The arithmetic mean of the responses obtained against the six items was used for further analysis as the indicator of the construct.

Use of behaviour-based coordination strategy was measured using the items developed by Celly and Frazier (1996) in their study. The respondents were asked to recollect all their interactions with the supplier personnel and to indicate on a five-point scale the emphasis placed by the supplier personnel on five specific issues. The scale was anchored between very high emphasis and very little emphasis. The arithmetic mean of the responses obtained against the five items from each respondent firm was used as an indicator for the construct.

Use of collaborative communication was measured using scales adapted from Mohr *et al.* (1996). The construct was operationalised using 12 items which measured the extent of collaborative communication in the channel relationship in terms of the frequency of communication, extent to which the communication is bi-directional, extent to which the communication is formal and the extent to which the communication is non-coercive. The arithmetic

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mean calculated from the responses obtained for the 12 items for each respondent firm was used as an index of collaborative communication for further analysis

Cooperation was measured using a scale developed by Cannon (1992). The scale, composed of six items, requires respondents to indicate the extent to which the items accurately describe their experience with the supplier. Arithmetic mean of the responses obtained for the six items was used for further analysis as an index of cooperation

Trust was measured using the items developed by Kumar *et al.* (1995). The construct was operationalised using ten statements. The respondents were requested to indicate their extent of agreement to the statements on a five-point Likert scale anchored between strongly agree and strongly disagree. The arithmetic mean calculated from the responses obtained against each item was used for further analysis as an index of trust.

Overall satisfaction was operationalised using five items. Overall satisfaction in the context of the study is an outcome of the successful adaptation process. The construct was operationalised using five statements developed on the basis of the insights derived from the pre-study interviews. The arithmetic mean of the responses obtained against the five items from each respondent firm was used as the index of satisfaction for further analysis. The statements used for measuring the concept are given in the Appendix.

### **Validation of measures**

In empirical research a thorough measurement analysis of the instruments is essential to establish that the empirical findings accurately reflect the proposed constructs. Following Bagozzi (1980), Bagozzi and Philips (1982) and Venkatraman and Grant (1986), the following measurement properties were considered for validating the measurement scales used in the study:

- internal consistency of operationalisation (reliability and unidimensionality);
- convergent validity; and
- discriminant validity.

#### *Unidimensionality, convergent validity and reliability of the measures*

Unidimensionality of the measures were assessed using the confirmatory factor analysis method. In this method, a measurement model is specified for each construct. In this model, individual items constituting the construct are examined to see how closely they represent the same construct. Confirmatory factor analysis implemented in LISREL 8.3 was used to assess the unidimensionality of the constructs. A goodness of fit index (GFI) of 0.90 or higher for the model suggests that there is no evidence of a lack of unidimensionality (Joreskog and Sorbom, 1993). Table II presents the GFI indices of all the seven constructs. All the seven constructs have their values above 0.90, which indicates that evidence for lack of unidimensionality is not

found in any of the constructs. Reliability of the measurement scales was assessed by Cronbach's coefficient alpha. Values of 0.7 and above for coefficient alpha is considered to indicate strong reliability for the scale (Nunnally, 1978). Table III presents the reliability coefficients for all the seven constructs. Since all the seven constructs have coefficient alpha values above 0.7, reliability of the scale is established. Convergent validity of the model was assessed using the Bentler and Bonett's (1980) incremental fit index. A Bentler Bonett fit index value of more than 0.90 is considered by researchers to be a satisfactory fit index (Bentler and Bonett, 1980). Table II lists the Bentler Bonett fit index value for all the seven constructs. Since all the constructs have a Bentler Bonett index value of more than 0.90, convergent validity of the measures are established.

*Discriminant validity*

To assess discriminant validity of the measures the nested model confirmatory factor analysis was used. In this method confirmatory factor analysis was run on pairs of measures initially with unconstrained inter-construct correlations and then with the inter-construct correlations fixed at unity. The difference between the chi-square goodness of fit values of the constrained and unconstrained models is used as an indicator of discriminant validity of the constructs. If the chi-square values are significant, the discriminant validity of the measures is considered to be established (Anderson and Gerbing, 1988). Table III lists the chi-square goodness of fit values of the 21 pairs of tests and the difference between the chi-square values of the constrained and unconstrained models. The respective degrees of freedom are shown in brackets. The chi-square differences between the constrained and unconstrained models were all associated with a probability value less than 0.05 thus providing evidence of discriminant validity between the constructs in the model.

**Analytical procedure**

Path analysis as implemented in LISREL 8.3 was used to test the hypotheses represented by Figure 1. The correlation matrices of the constructs are shown in Table IV. The chief advantage of the LISREL methodology over ordinary least

**Table II.**  
Unidimensionality,  
convergent validity and  
reliability of the  
measures

Construct	Number of indicators	GFI	Cronbach's alpha	Bentler Bonett's index
Supplier expertise	7	0.995	0.8157	0.984
Use of problem-solving strategy	6	0.970	0.9403	0.962
Use of behaviour-based coordination	5	0.994	0.9607	0.990
Use of collaborative communication	12	0.900	0.8891	0.910
Cooperation	6	0.946	0.9639	0.935
Trust	10	0.901	0.8964	0.911
Satisfaction	5	0.976	0.9695	0.971

Test no.	Description of the test	Chi-square constrained model (df)	Chi-square unconstrained model (df)	Difference
1	Supplier expertise and use of problem solving strategy	357.652 (65)	153.711 (64)	203.941
2	Supplier expertise and use of behaviour based coordination	552.952 (77)	513.407 (76)	39.513
3	Supplier expertise and use of collaborative communication	498.358 (104)	331.171 (103)	167.187
4	Supplier expertise and cooperation	544.293 (102)	255.811 (101)	288.482
5	Supplier expertise and trust	685.344 (119)	420.398 (118)	264.946
6	Supplier expertise and satisfaction	571.162 (63)	147.057 (62)	424.105
7	Use of problem solving strategy and use of behaviour based coordination	502.609 (63)	425.233 (62)	77.376
8	Use of problem solving strategy and use of collaborative communication	454.764 (90)	321.43 (89)	133.334
9	Use of problem solving strategy and cooperation	491.977 (90)	330.291 (89)	161.686
10	Use of problem solving strategy and trust	596.704 (104)	461.513 (103)	135.191
11	Use of problem solving strategy and satisfaction	368.536 (54)	178.893 (53)	189.643
12	Use of behaviour based coordination strategy and use of collaborative communication	667.793 (120)	583.268 (119)	84.525
13	Use of behaviour based coordination strategy and cooperation	723.181 (104)	666.594 (103)	56.587
14	Use of behaviour based coordination strategy and trust	740.759 (104)	725.579 (103)	15.180
15	Use of behaviour based coordination strategy and satisfaction	528.893 (54)	453.543 (53)	75.350
16	Use of collaborative communication and cooperation	639.952 (135)	602.612 (134)	37.340
17	Use of collaborative communication and trust	775.620 (150)	559.597 (149)	216.023
18	Use of collaborative communication and satisfaction	521.492 (90)	414.384 (89)	107.108
19	Cooperation and trust	835.212 (150)	603.350 (149)	231.862
20	Cooperation and satisfaction	587.918 (90)	313.858 (89)	274.060
21	Trust and satisfaction	723.606 (104)	445.870 (103)	277.736

**Table III.**  
Discriminant validity  
of the constructs

squares for estimating path models is that the former allows for errors in measurement to be explicitly considered. Since the constructs in this study were not measured without error (i.e. their reliability coefficients were less than one) LISREL methodology was particularly suitable for the research objective in hand.

## Results

The analysis of the model showed a significant chi-square value for the overall model fit (chi-square = 52.29 for 5 degrees of freedom with  $p < 0.001$ ).

	Sati	Coop	Trust	Exp	Confli	Bcor	Cocom
Sati	1.00						
Coop	0.87	1.00					
Trust	0.86	0.80	1.00				
Exp	0.86	0.82	0.80	1.00			
Confli	0.82	0.82	0.78	0.76	1.00		
Bcor	0.70	0.65	0.70	0.62	0.57	1.00	
Cocom	0.82	0.81	0.80	0.79	0.77	0.59	1.00

**Table IV.**  
Inter-construct  
correlation

**Notes:** Sati = satisfaction, Exp = Supplier expertise, Confli = Use of problem-solving approach, Bcor = Use of behaviour-based coordination, Cocom = Use of collaborative communication, Coop = Cooperation

However, two other indices of model fit, namely, goodness of fit index (GFI) = 0.94 and comparative fit index (CFI) = 0.97 indicate a good fit for the model although the root mean square error of approximation, (RMSEA) = 0.21, also showed a poor fit. Thus overall, the model can be considered to enjoy a moderate fit. Table V presents the standardised path coefficients and the *t*-values associated with the estimates.

### *Analysis of results*

Since the conceptual model enjoys only a moderate fit it is imperative to be guarded in interpreting the results. The sign of the standardised coefficients between two constructs indicates the direction of the relationship between the two constructs and the magnitude indicates the strength of the relationships. The *t*-values indicate the significance of the standardised coefficients.

*H1* and *H2* which propose a direct interlinkage between perception of supplier's expertise, trust and cooperation are supported since the standardised coefficients for the path from perception of supplier's expertise to trust (0.25,

Structural path	Standardised coefficient	<i>t</i> -value	Hypothesis
Supplier expertise to cooperation	0.29	10.32**	H1
Use of problem-solving approach to cooperation	0.34	5.10*	H3
Use of behaviour-based coordination to cooperation	0.14	3.37**	H5
Use of collaborative communication to cooperation	0.24	4.33*	H7
Supplier expertise to trust	0.25	10.32**	H2
Use of problem solving approach to trust	0.24	4.21*	H4
Use of behaviour-based communication to trust	0.25	5.86**	H6
Use of collaborative communication to trust	0.27	4.63*	H8
Cooperation to satisfaction	0.51	11.19**	H10
Trust to satisfaction	0.46	10.09**	H9

**Table V.**  
Path coefficients

**Notes:** \*  $p < 0.1$ ; \*\*  $p < 0.05$

$t$ -value = 10.32) and to cooperation (0.29,  $t$ -value = 10.32) are both positive and significant. *H3* and *H4* finds support as the standardised coefficients for the path from the use of problem solving strategy to trust (0.24,  $t$ -value = 4.21) and to cooperation (0.34,  $t$ -value = 5.10) are both positive and significant. *H5* and *H6* are supported as the standardised coefficients for the path from use of behaviour based coordination effort to trust (0.25,  $t$ -value = 5.86) and to cooperation (0.14,  $t$ -value = 3.37) are both positive and significant. The magnitude of the standardised coefficients from behaviour based coordination effort to cooperation is however, relatively low. *H7* and *H8* which propose a direct relationship between the use of collaborative communication strategy, trust and cooperation are both supported as the standardised coefficient for the path from use of collaborative communication to trust (0.27,  $t$ -value = 4.63) and to cooperation (0.24,  $t$ -value = 4.33) are both positive and significant. *H9* and *H10* which link cooperation, trust and overall satisfaction with the relationship are supported as the standardised coefficient for the path from trust to satisfaction (0.46,  $t$ -value = 10.09) and for the path from cooperation to satisfaction (0.51,  $t$ -value = 11.19) are positive and significant.

#### *Theoretical implications*

The empirical results indicate that greater supplier expertise will result in greater distributor trust and cooperation in the context of marketing high-technology products. This result supports studies that had associated expert power with trust (Keith *et al.*, 1990; Busch and Wilson, 1976) and cooperation (Kasulis and Spekman, 1980). More significantly, the results indicate the importance of expert power to influence channel members when the external environment is highly turbulent. While the problem-solving strategy has been found to be associated with trust, cooperation (Clopton, 1984) and satisfaction (Ganesan, 1993; Mohr and Spekman, 1994), in the past, the present study explores its importance under conditions of environmental uncertainty. In the realm of channel coordination, the present study extends Celly and Frazier's (1996) contentions by demonstrating that behaviour-based coordination effort result in greater inter-channel trust and cooperation under conditions of environmental uncertainty and dynamism.

The present study also implements Mohr *et al.*'s (1996) suggestion about investigating the impact of collaborative communication outcomes under less favourable external environments. The empirical results that indicate a positive impact of collaborative communication on cooperation and trust under conditions of extreme environmental uncertainty should thus provide greater depth to the understanding of channel communication strategies.

The results related to trust, cooperation and satisfaction are already quite well established in channel management theory (Anderson and Narus, 1990; Siguaw *et al.*, 1998). The empirical results from the study thus confirm these findings under uncertain environmental conditions. The interrelationship

between cooperation and trust has been considered by several studies in the past. Here, the two constructs are portrayed as jointly leading to the achievement of relationship satisfaction. While the interrelationships are entirely plausible, the values generated through the LISREL program for an interrelated model do not show a proper fit. This indicates the need for further refinement of the model.

Extant high-tech marketing literature demonstrates that firms follow a different pricing strategy (Smith *et al.*, 1999), product development strategy (Roberts and Meyer, 1991), promotion strategy (Ryans and Shanklin, 1984), etc. in the context of marketing high-technology products. The present study basically advocates a different approach for the management of marketing channels in the context of high-tech products. While the need for new channel structures has been admitted (Moore, 1991), the need for a distinct approach to manage channel member behaviour has rarely been discussed. The present study focuses on the behavioural issues in managing the marketing channels for high-tech products.

#### *Practical implications*

The study presents a comprehensive strategy for managing the marketing channels dealing in high-technology products. The design of different types of distribution networks for marketing high-technology products (e.g. direct marketing, value-added resellers, company owned distribution channels) is only the first step in the channel management task. Managing the behaviour of entities performing the distribution function is a daunting task, especially when the external environment is characterised by high levels of uncertainty, technological complexity and dynamism. To successfully adapt to such environments an entirely different approach is required. This is because the channel system has to function like a single unit so as to be flexible while meeting sudden environmental changes and thus offset the effects of an uncertain and dynamic environment. To achieve this level of unity, the study basically recommends the supplier to place greater reliance on expertise for influencing the dealers, joint problem solving, greater emphasis on performing tasks than outcomes and frequent, bi-directional communication.

The importance of expertise for marketing high-tech products, as suggested by the study, has immense practical significance. It implies that, to command trust and to build up an attitude of cooperation among distributors, the supplier should be perceived as possessing high levels of expertise in marketing the product category. This requires the supplier to help distributor personnel in learning more about the product technology, gathering and disseminating information about the emerging technological trends, aiding the distributor to handle customer queries etc.

The study recommends use of problem-solving approach to resolve conflicts. The problem-solving approach requires greater sharing of information and

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understanding the needs of the other party. Thus, mechanisms that will enable the distributors and the supplier to share their viewpoints so as to jointly work out their problems have to be created. As far as coordination efforts are concerned, the study advocates an approach which places more emphasis on the tasks to be performed rather than on outcomes like sales targets, market share, etc.. The supplier is thus advised to focus more on issues like selling techniques, sales promotion etc. in their coordination efforts. Further, frequent, bi-directional intrachannel communication is recommended in order to achieve greater satisfaction in the relationship.

In summary, it is argued that a relational exchange mechanism equips distribution channel members to adapt to the dynamism and uncertainty associated with the marketing of high-technology products. Relational exchange implies joint planning between parties and better solidarity while discrete exchanges occur on an ad hoc basis where the relationship is entirely limited to the economics of transactions. However, it is not possible to conceive a truly discrete exchange mechanism and hence, the distribution between relational and discrete exchange mechanisms is viewed as a continuum (Mohr and Nevin, 1990). The exchange mechanism between suppliers and distributors should therefore be oriented towards achieving more relationalism while dealing in high-technology products.

#### *Limitations and directions for future research*

Even though the channel management variables considered in the study have been extensively analysed in the past, their interrelationships in the context of a highly dynamic and uncertain environment have not received much attention. The present study, is an attempt in that direction. The validity of the model, however, remains limited to the context of marketing computer hardware in the two southern districts of India. Future studies can test the validity of the model for other high-tech product categories like computer software, consumer electronics, telecommunication equipment, etc. after modifying the measurement scales to suit these contexts. The validity of the causal effects is further affected by the cross-sectional nature of the design. The scope for longitudinal studies in high-tech product marketing is immense as it can capture the effects of the high-tech attributes more precisely.

The second limitation of the study concerns the source of responses. Data for the present study were collected only from the distributor firm. Several studies, which consider the dyadic relationships, collect data from both sides of the dyad (e.g. buyer and the seller, franchisor and franchisee). Such a design is highly infeasible in the Indian business environment where there is a general reluctance to share information. However, in future, if it is possible to ensure cooperation from the suppliers, development and validation of a model which also incorporates the supplier's perspective will definitely prove to be a seminal contribution.

Being one of the first studies to consider the behavioural aspect of channel management in the context of marketing high-technology products, there may be limitations in the identification, definitions and measurement of the different variables used in the study. Further, the relationships hypothesised between the variables could also be affected with conceptual limitations. Since the model fit is moderate, it is necessary to consider other variables and possibly other relationships in a refined model. Future studies can refine and modify the conceptual model presented in the study by looking more closely at the channel member adaptation process, and also by considering the impact of several other constructs like achievement of flexibility in operations, time required for responses, the role of commitment, etc.

The scope of the study is limited to behavioural issues in the context of managing the marketing channels of marketing high-technology products. While several studies have considered the issues related to the design of distribution channels for marketing high-technology products, there is immense scope in this area for future investigation.

### References

- Abratt, R. (1986), "Industrial buying in high-tech markets", *Industrial Marketing Management*, Vol. 5, pp. 293-8.
- Achrol, R.S., Reve, T. and Stern, L. (1983), "The environment of marketing channel dyads: a framework for comparative analysis", *Journal of Marketing*, Vol. 47, pp. 55-67.
- Alderson, W. (1965), *Dynamic Marketing Behaviour*, Richard D. Irwin, Homewood, IL.
- Andaleeb, S.S. (1995), "Dependence relations and the moderating role of trust: implications for behavioural intentions in marketing channels", *International Journal of Research in Marketing*, Vol. 12 No. 2, pp. 157-72.
- Anderson, E., Lodish, L.M. and Weitz, B. (1987), "Resource allocation behaviour in conventional channels", *Journal of Marketing Research*, Vol. 24, pp. 85-97.
- Anderson, J.C. and Gerbing, D.W. (1988), "Structural equations modeling in practice: a review and recommended two step approach", *Psychological Bulletin*, Vol. 103 No. 3, pp. 411-23.
- Anderson, J.C. and Narus, J.C. (1990), "A model of distributor firm and manufacturer firm working partnerships", *Journal of Marketing*, Vol. 54, pp. 1-15.
- Arndt, J. (1983), "The political economy paradigm: foundation for theory building in marketing", *Journal of Marketing*, Vol. 47, pp. 44-54.
- Bagozzi, R.P. (1980), *Causal Models in Marketing*, Wiley, New York, NY.
- Bagozzi, R.P. and Philips, L.W. (1982), "Representing and testing organisational theories: a holistic approach", *Administrative Science Quarterly*, Vol. 27, pp. 459-89.
- Bentler, P.M. and Bonett, D.G. (1980), "Significant tests and goodness of fit in the analysis of covariance structures", *Psychological Bulletin*, Vol. 88, pp. 588-606.
- Busch, P. and Wilson, D.T. (1976), "An empirical analysis of a salesman's expert and referent bases of social power in the buyer-seller dyad", *Journal of Marketing Research*, Vol. 13, pp. 3-11.
- Butaney, G. and Wortzel, L.H. (1988), "Distributor power versus manufacturer power: the customer role", *Journal of Marketing*, Vol. 52, pp. 52-63.

- Cannon, J.P. (1992), "A taxonomy of buyer-seller relationships in business markets", doctoral dissertation, Department of Marketing, University of North Carolina, Chapel Hill, NC.
- Cannon, J.P. and Perreault, W.D. Jr (1997), "The nature of business relationships", Working paper, Department of Marketing, Colorado State University, Fort Collins, CO.
- Celly, K.S. and Frazier, G.L. (1996), "Outcome-based and behaviour-based coordination efforts in channel relationships", *Journal of Marketing Research*, Vol. 33, pp. 200-10.
- Childers, T.L., Rukert, R.W. and Bosch, D.M. (1984), "Assessment of the psychometric properties of cooperation and its antecedents within marketing channels", in Belk, R.W. *et al.* (Eds), *American Marketing Association Educators' Conference Proceedings*, AMA, Chicago, IL, pp. 256-60.
- Chipello, C.J. (1989), "More competitors turn to cooperation", *The Wall Street Journal*, 23 June.
- Christensen, C.M. (1997), *The Innovator's Dilemma*, Harvard Business School Press, Boston, MA.
- Clopton, S.W. (1984), "Seller and buyer firm factors affecting industrial buyers' negotiation behaviour and outcomes", *Journal of Marketing Research*, Vol. 21, pp. 39-53.
- Curry, J. and Kenney, M. (1999), "Corporate responses to rapid changes in the PC industry", *California Management Review*, Vol. 42, pp. 8-36.
- Cyert, R.M. and March, J.G. (1963), *A Behavioural Theory of the Firm*, Prentice-Hall, Englewood Cliffs, NJ.
- Dunn, D.T. Jr, Friar, J.H. and Thomas, C.A. (1991), "An approach to selling high-tech solutions", *Industrial Marketing Management*, Vol. 20, pp. 149-59.
- Dwyer, R.F. (1980), "Channel member satisfaction: laboratory insights", *Journal of Retailing*, Vol. 56, pp. 59-74.
- Eisenhardt, K. (1989), "Making fast strategic decisions in high-velocity environments", *Academy of Management Journal*, Vol. 32, pp. 543-76.
- Etgar, M. (1977), "Channel management and channel leadership", *Journal of Marketing*, Vol. 14, pp. 69-76.
- Filly, J., House, R. and Kerr, S. (1976), *Managerial Process and Organisational Behaviour*, Scott, Foresman and Company, New York, NY.
- Frazier, G.L. and Summers, O.J. (1984), "Inter firm influence strategies and their application within distribution channels", *Journal of Marketing*, Vol. 48, pp. 43-55.
- Ganesan, S. (1993), "Negotiation strategies and the nature of channel relationships", *Journal of Marketing Research*, Vol. 30, pp. 183-203.
- Geyskens, I., Steenkamp, J.B.E.M. and Kumar, N. (1998), "Generalisations about trust in marketing channel relationships using meta-analysis", *International Journal of Research in Marketing*, Vol. 15, pp. 223-48.
- Glazer, R. and Weiss, A.M. (1993), "Marketing in turbulent environments: decision process and the time sensitivity of information", *Journal of Marketing Research*, Vol. 30, pp. 509-21.
- Guiltinan, J., Rejab, I. and Rodgers, W. (1980), "Factors influencing coordination in a franchise channel", *Journal of Retailing*, Vol. 56, pp. 41-8.
- Igene, C.A. and Parry, M.E. (1995), "Coordination and manufacturer profit maximisation: the multiple retailer channel", *Journal of Retailing*, Vol. 71, pp. 129-51.
- Jaworski, B.J. and MacInnis, D.J. (1989), "Marketing jobs and management controls: toward a framework", *Journal of Marketing Research*, Vol. 26, pp. 406-19.
- John, G. (1984), "An empirical investigation of some antecedents of opportunism in a marketing channel", *Journal of Marketing Research*, Vol. 21, pp. 278-89.

- John, G. and Reve, T. (1982), "The reliability and validity of key informant data from dyadic relationships in marketing channels", *Journal of Marketing Research*, Vol. 19, pp. 517-24.
- Johnson, J.L., Sakano, T., Cote, J. and Onzo, N. (1993), "The exercise of inter-firm power and its repercussions in US Japanese channel relationships", *Journal of Marketing*, Vol. 57, pp. 1-10.
- Joreskog, K.G. and Sorbom, D. (1993), *LISREL 8 User's Reference Guide*, Scientific Software International, Chicago, IL.
- Kale, S. (1986), "Dealer perceptions of manufacturer power and influence strategies in a developing country", *Journal of Marketing Research*, Vol. 23, pp. 387-93.
- Kasulis, J.J. and Spekman, R.E. (1980), "A framework for the use of power", *European Journal of Marketing*, Vol. 14 No. 4, pp. 180-92.
- Keith, J.E., Jackson, D.W. Jr and Crosby, L.A. (1990), "Effects of alternate types of influence strategies under different channel dependence structures", *Journal of Marketing*, Vol. 54, pp. 30-41.
- Kumar, N. (1996), "The power of trust in manufacturer retailer relationships", *Harvard Business Review*, Vol. 74, pp. 82-106.
- Kumar, N., Scheer, L.K. and Steenkamp, J.B.E.M. (1995), "The effects of perceived interdependence on dealer attitudes", *Journal of Marketing Research*, Vol. 32, pp. 348-55.
- Li, Z.G. and Dant, R.P. (1999), "Effects of manufacturers' strategies on channel relationships", *Industrial Marketing Management*, Vol. 28, pp. 131-43.
- Lusch, R.F. (1976), "Sources of power their impact on inter channel conflict", *Journal of Marketing Research*, Vol. 13, pp. 382-90.
- Lusch, R.F. and Brown, J.R. (1982), "A modified model of power in the marketing channel", *Journal of Marketing Research*, Vol. 19, pp. 312-23.
- Lynn, G.S., Schaars, S.P. and Skov, R.B. (1999), "Survey of new product forecasting practices in industrial high-tech and low-tech business", *Industrial Marketing Management*, Vol. 28, pp. 565-71.
- MacInnis, M. and Heslop, L.A. (1990), "Market planning in a high-tech environment", *Industrial Marketing Management*, Vol. 19, pp. 107-16.
- McIntyre, S.H. (1988), "Marketing adaptation as a process in the product life cycle of radical innovations and high-technology products", *Journal of Product Innovation Management*, Vol. 5, pp. 140-52.
- McKenna, R. (1991), in Moore, G.A. (Ed.), *Crossing the Chasm: Marketing and Selling Technology Products to Mainstream Customers*, Harper Collins, New York, NY.
- Mallen, B. (1963), "A theory of retailer supplier conflict, control; and cooperation", *Journal of Retailing*, Vol. 39, pp. 24-32.
- March, J.G. and Shapira, Z. (1987), "Managerial perspectives on risk and risk taking", *Management Science*, Vol. 33, pp. 1404-18.
- Merchant, K.A. (1985), *Control in Business Organisations*, Pitman Publishing, Boston, MA.
- Mohr, J. and Nevin, J.R. (1990), "Communication strategies in marketing channels: a theoretical perspective", *Journal of Marketing*, Vol. 54, pp. 36-51.
- Mohr, J. and Sohi, R.S. (1995), "Communication flows in distribution channels: impact on assessments of communication quality and satisfaction", *Journal of Retailing*, Vol. 71, pp. 393-416.

- Mohr, J. and Spekman, R. (1994), "Characteristics of partnership success: partnership attributes, communication behaviour, and conflict resolution techniques", *Strategic Management Journal*, Vol. 15, pp. 135-52.
- Mohr, J., Fischer, R.J. and Nevin, J.R. (1996), "Collaborative communication in interfirm relationship: moderating effects of integration and control", *Journal of Marketing*, Vol. 60, pp. 103-15.
- Moore, G.A. (1991), *Crossing the Chasm: Marketing and Selling Technology Products to Mainstream Customers*, Harper Collins, New York, NY.
- Morgan, R.M. and Hunt, S.D. (1994), "The commitment-trust theory of relationship marketing", *Journal of Marketing*, Vol. 58, pp. 20-38.
- Moriarty, R.T. and Kosnik, T.J. (1989), "High-tech marketing: concepts continuity and change", *Sloan Management Review*, Vol. 30, pp. 7-17.
- Narus, J.A. and Anderson, J.C. (1996), "Rethinking distribution: adaptive channels", *Harvard Business Review*, Vol. 74, pp. 112-19.
- Norton, J.A. and Bass, F.M. (1987), "A diffusion theory model of adoption and substitution for successive generation of high-technology products", *Management Science*, Vol. 33, pp. 1069-86.
- Nunnally, J.C. (1978), *Psychometric Theory*, 2nd ed., McGraw-Hill, New York, NY.
- Oliver, R.L. and Weitz, B.A. (1991), *The Effects of Risk Preference, Uncertainty and Incentive Compensation on Salesperson Motivation*, MSI Report, No. 91-104.
- Olleros, F.J. (1986), "Emerging industries and the burnout of pioneers", *Journal of Production Innovation Management*, Vol. 1, pp. 5-8.
- Patterson, P.G. and Dawes, P.L. (1999), "The determinants of choice set structure in high-technology business markets", *Industrial Marketing Management*, Vol. 28, pp. 395-441.
- Raven, B. and Kruglanski, A.W. (1970), "Conflict and power", in Swingle, P. (Ed.), *The Structure of Conflict*, Academic Press, New York, NY.
- Roberts, E.B. and Meyer, M.H. (1991), "Product strategy and corporate success", *IEEE Engineering Management Review*, Vol. 19, pp. 4-19.
- Robertson, T.S. (1971), *Innovative Behaviour and Communication*, Holt, New York, NY.
- Rosenau, M.D. Jr (1988), "Speeding your product to market", *Journal of Consumer Marketing*, Vol. 5, pp. 23-33.
- Ryans, J.K. Jr and Shanklin, W.L. (1984), "Principles of high-technology marketing", *Business Marketing*, September, pp. 100-6.
- Schul, P.L., Lamb, C.W. Jr and Little, T.E. Jr (1981), "A path analysis of the interchannel conflict process", in *AMA Summer Educators' Conference Proceedings*, American Marketing Association, Chicago, IL, pp. 39-42.
- Siguaw, J.A., Simpson, P.M. and Baker, T.L. (1998), "Effects of supplier market orientation on distributor market orientation and the channel relationship: the distributor perspective", *Journal of Marketing*, Vol. 62, pp. 99-111.
- Skinner, S.J., Gassenheimer, J.B. and Kelly, S.W. (1992), "Cooperation in supplier-dealer relations", *Journal of Retailing*, Vol. 68 No. 2, pp. 174-93.
- Smith, M., Sinha, I., Lancioni, R. and Forman, H. (1999), "Role of market turbulence in shaping pricing strategy", *Industrial Marketing Management*, Vol. 28, pp. 637-49.
- Stern, L.W. (1969), *Distribution Channels: Behavioural Dimensions*, Houghton Mifflin Company, Boston, MA.

- Stern, L.W. and Brown, J. (1969), "Distribution channels: a social systems approach", in Stern, L. (Ed.), *Distribution Channels: Behavioural Dimensions*, Houghton-Mifflin, New York, NY, pp. 6-20.
- Stern, L.W. and El-Ansary, A.I. (1982), *Marketing Channels*, 2nd ed., Prentice-Hall, Englewood Cliffs, NJ.
- Tushman, L.M. and Anderson, P. (1986), "Technological discontinuities and organisational environments", *Administrative Science Quarterly*, Vol. 31, pp. 439-65.
- Utterback, J.M. (1994), *Mastering the Dynamics of Innovation*, Harvard Business School Press, Boston, MA.
- Venkatesh, A. and Vitalari, N.P. (1986), "Computing technology for the home: product strategies for the next generation", *Journal of Product Innovation Management*, Vol. 3, pp. 171-86.
- Venkatraman, N. and Grant, J.H. (1986), "Construct measurement in strategy research: a critique and proposal", *Academy of Management Review*, Vol. 11, pp. 71-86.
- Von Hippel (1986), "Lead users: a source of novel product concepts", *Management Science*, Vol. 32, pp. 791-805.
- Walton, R.E. and Mckersie, R.B. (1965), *A Behavioral Theory of Labour Negotiations: An Analysis of a Social Interaction System*, McGraw-Hill Book Company, New York, NY.
- Weiss, A.M. and Heide, J.B. (1993), "The nature of organisational search in high-technology markets", *Journal of Marketing Research*, Vol. 30, pp. 220-33.
- Weitz, B. (1981), "Effectiveness in sales interactions: a contingency framework", *Journal of Marketing*, Vol. 45, pp. 85-103.
- Wholey, D.R. and Brittain, J. (1989), "Characterising environmental variation", *Academy of Management Journal*, Vol. 32, pp. 44-54.
- Wilkinson, I.F. (1979), "Power and satisfaction in channels of distribution", *Journal of Retailing*, Vol. 55, pp. 79-95.
- Zachary, P.G. (1990), "Microsoft, IBM differ yet again about software", *The Wall Street Journal*, 12 September.

## Appendix

### *Supplier expertise scale*

A five-point scale anchored between strongly agree and strongly disagree to express the degree of agreement to the following statements:

- The supplier possesses a lot of expertise in this field.
- We attach great value to the technical knowledge that the supplier provides to us.
- The training programs that the supplier organises for our personnel help us immensely.
- While negotiating with the customers the help rendered by the supplier is very crucial.
- We are very confident of the supplier's ability to give technical guidance.
- While marketing high-end products to customers, we can handle all the queries without the help of the supplier.
- When there is uncertainty about the performance and acceptance of the product in the market, the supplier's advice becomes very helpful.

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*Overall satisfaction scale*

A five-point scale anchored between strongly agree and strongly disagree to express the degree of agreement to the following set of statements:

- Overall we are very satisfied with the supplier.
- We are very pleased with what this supplier does for us.
- If we were to do it all over again, we would still choose this supplier.
- We are satisfied with the progress that we have made in this business in association with this supplier.
- No other supplier could have given us more benefits than this supplier could.