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EDITORIAL REVIEW

Evaluating the performance of supply chains through a pluralistic methodology

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Introduction

In the agriculture sector, if farmers are to be more competitive in both domestic and international markets their supply chains need to be more efficient and more effective [1]. To improve the competitiveness of supply chains, a holistic approach is required to address all aspects of the chain including input suppliers, production, processing, handling, distribution and marketing.

In the transitional economies, postharvest losses of perishable commodities often range between 40–60% of harvest [2]. The primary factors responsible for these losses are poor preharvest measures, the adoption of poor production techniques, inappropriate harvesting procedures, non-application of recommended preharvest practices, improper post-harvest care, packing in bulk without grading and sorting, improper transportation and storage, inaccessible markets and limited access to market information.

There is also a belief in many transitional economies that small farmers are exploited by market intermediaries. In most transitional economies, the agricultural marketing system is characterised by a highly atomistic production side where there are many small, widely-dispersed farmers grow-

ing highly perishable crops and an oligopolistic marketing system where there are only a few traders [3]. Marketing costs are often high because of an inefficient transport system, inadequate cool storage capacity and significant variations in product form, variety and quality [4]. The supply chain itself is often long and protracted and involves a large number of market intermediaries [5]. Furthermore, locational factors may limit the number of market intermediaries available to transact with primary producers [6]. In other instances, the need for working capital may lock farmers into long-term relationships where the farmer is, to varying degrees, more or less dependent on a market intermediary [3].

These problems are also common among vegetable farmers in the Southern Philippines. In the absence of sufficient working capital, most vegetable farmers must borrow from market intermediaries at rates of interest ranging from 30–53% [7]. High postharvest losses are compounded by inefficiencies that appear to start at the farm level due to poor infrastructure and poor production techniques.

The adoption of a supply chain framework theoretically enables farmers to better meet the needs of their down-

stream customers. However, just as important is the need for downstream customers to satisfy the farmer's needs. Failure by either party in the transaction to satisfy the needs of their preferred trading partner will potentially introduce conflict into the exchange, thereby increasing transaction costs and reducing the efficiency of the market.

Transaction costs

Developed primarily by Williamson [8, 9], transaction cost theory assumes that various costs are associated with an exchange. These costs are comprised of the costs of obtaining and processing information, negotiating contracts, monitoring agents and enforcing contracts. These costs may become significant in the presence of information asymmetry, uncertainty and transaction specific investments.

Although there are several different approaches towards measuring the level and effects of transaction costs, Frank and Henderson [10] employ various measures to evaluate the costs of uncertainty, transaction specific investments and the costs of co-ordination and concentration. Market concentration is a strong indicator of non-competitive pricing behaviour and of inefficient market performance [3]. Ordinarily, the presence of a few large market agents within a market is sufficient evidence of market power and price collusion. However, in order to verify the extent to which various actors have been exploited by unfair trading practices, the net returns and marketing margins at each step in the supply chain need to be estimated [6].

Markets are said to be efficient if the price consumers ultimately pay adequately reflects storage costs, transportation costs and differences in price due to product form [4]. Since price data is usually the most readily available and most reliable source of market information in developing countries [11], the performance of the supply chain is most often evaluated using price margins. However, a large marketing margin may result in little or no profit for an actor and may even result in a trading loss, depending on the buying and selling prices and the costs of marketing [12]. Marketing margins may also fluctuate due to the perishability of the product, the number of actors involved in the exchange, the marketing services provided, and the risk and uncertainty borne by each actor [6].

Purchasing behaviour

As market intermediaries strive to improve customer value while simultaneously reducing costs, many firms derive their competitive advantage from more aggressive purchasing management [13]. A firm achieves two major benefits from focusing on the purchasing function; a reduction in costs and improved product quality.

In business-to-business markets, purchasing behaviour is purposively directed towards the achievement of rational economic goals where the major objective is to find least cost

solutions that best satisfy functional criteria. Quality, price and the ability to deliver are generally regarded as the most important criteria by which organisational buyers evaluate potential suppliers [14, 15, 16, 17]. Where there is no difficulty in accurately specifying the exact nature of the product and there are several reliable suppliers in the market, a buyer can simply choose that supplier who offers the lowest price from among all those who fulfil the functional requirements [18].

However, there is increasing evidence in business-to-business markets that the importance of price as a key variable in supplier selection is decreasing in importance [17, 19]. Even in the pursuit of lower costs, quality is emerging as the most important issue. Competing on price alone may lead to additional costs because of inferior quality, unreliable delivery, limited quantities and inadequate communication. As suppliers' account for 30% of quality problems and 80% of the problems associated with lead times [20], market intermediaries will understandably seek to reduce these costs and to achieve greater market coordination through developing more cooperative long-term buyer-seller relationships [17].

In describing a supplier's offer quality, Gronroos [21] finds it necessary to differentiate between technical quality and functional quality. Technical quality describes the customer's specifications. This is a physical description of the product in terms of its size, shape, colour, freedom from pests and diseases, purity (in terms of its freedom from chemical contaminants, pathogenic organisms and genetically modified plants), maturity or freshness, and the manner in which the product is packed [22].

Functional quality describes the way a supplier goes about delivering the product to the customer [21]. While this fundamentally means being able to deliver the product when the customer wants it, by implication, it involves many inter-related activities such as production scheduling, storage and warehousing, logistics, ordering and invoicing. Since most market intermediaries purchase products in the expectation that they will be able to resell them, the timely and efficient receipt of goods is critical to the success of most downstream manufacturing and retail operations.

Even so, Batt [22] finds it necessary to add an additional dimension: service quality. Service quality best describes the extra things a supplier is prepared to do to retain the customer's business. While the exact meaning of the term service varies with the nature of the product and the requirements of the buying organisation [23], service may include such variables as providing technical assistance, innovative suggestions to improve the profitability of a customer's operations, support for special needs, or advance notice of impending changes in price or shortages in supply.

In measuring the extent to which suppliers are able to meet the needs of their customers, Parasuraman *et al.* [24], pro-

posed the concept of a service gap, which is a measure of how well the service level delivered by a supplier matches customers' expectations. An integral part of this analysis is concerned with the identification of the various constraints that prevent the supplier from fulfilling the customer's needs. It is only after these constraints have been identified that the supplier can improve their performance.

However, this approach addresses only one side of the transaction. While a great deal has been written about the manner in which a customer selects a preferred supplier, significantly less information is available to describe how producers and market intermediaries select downstream trading partners.

Rational economic theory would suggest that farmers will seek to transact with those buyers who offer the highest price. However, unless the transaction concludes with the exchange of produce for cash, additional costs may be incurred and there is the potential risk of non-payment. Where it is necessary to offer credit, farmers will seek to transact with those exchange partners who have a good reputation and with whom they have dealt in the past. Cardozo and Cagley [25] and Puto *et al.* [26] demonstrate that buyers are strongly attracted to well known or existing suppliers, for current suppliers are perceived as being less risky. Lyon [27] suggests that where it is necessary to offer credit, farmers prefer to transact with local buyers because they know where to find them in the event of non-payment.

While buyers generally seek to purchase the best quality produce available for the least cost, farmers are expected to identify those buyers who offer the highest price for good average quality. Assuming that farmers take the time to grade the produce prior to sale, most farmers will have no difficulty in selling better quality produce. As significant premiums are often paid for quality, the problem that then arises is how to dispose of the inferior quality produce, especially when the market is saturated. To overcome this problem, Batt and Parining [28] find that most farmers prefer to sell produce to distributors and collector agents without grading.

Relationship marketing

Marketing theory has been traditionally built on the marketing mix model where the key problem facing the marketing manager is to most effectively allocate the organisation's limited resources to the different elements of the marketing mix so as to maximise customer response [29]. Implicit in the Four P's approach is the concept that the customer is passive and only reacts to the supplier's offer by deciding to purchase or not to purchase.

While it is generally accepted that the concept of the Four P's was developed during the 1950s in the North American mass market for consumer packaged goods [30], in the industrial market, both the buyer and supplier are active participants in the market. Each may engage in the search for suitable exchange partners, the preparation of specifications and ma-

nipulate or attempt to control the transaction process [29]. Purchasing is therefore an interactive process where relationship building and relationship management are fundamental.

Gronroos [30] defines relationship marketing as the means of establishing, maintaining and enhancing relationships with customers and other partners, at a profit, so that the objectives of the parties involved in the relationship are met. This is achieved by mutual exchange and the fulfilment of promises. A firm must not only attract customers, but it must also build relationships with the customer if the goals of the relationship are to be achieved. A firm that is pre-occupied with giving promises may attract new customers and initially build relationships, but if promises are not kept, the relationship cannot be maintained and enhanced. By its very nature, relationship marketing seeks to enhance profitability in the long-term through building enduring relationships with customers.

A firm pursuing a relationship marketing strategy will attempt to create more value for its customers than that which is provided by the core product itself [29]. Through installing capital goods, providing technical advice, developing just-in-time logistics, adapting invoicing and a host of other elements, the relationship becomes both more attractive and more profitable for the customer, thus enhancing the attractiveness of an on-going relationship. As such elements are different types of services, the more the firm adopts a relationship marketing strategy, the more it has to understand how to manage the service elements of its market offer.

However, not all market relationships are identical. Webster [31] describes relationship marketing as a continuum, anchored at one end by pure transactions and at the other by strategic alliances. A pure transaction is a one-time exchange of value between two parties with no prior or subsequent interaction. There is virtually no risk for the buyer in terms of either product performance or quality. All the information necessary for both parties to consummate the exchange is contained in the price. Furthermore, no investments or other costs are associated with switching from one vendor to another. The supplier and the buyer incur no obligation towards one another beyond the delivery and payment for a product that meets specifications. At the other extreme, a strategic alliance constitutes a complex and enduring form of buyer-seller relationship that involves total interdependence between the buyer and supplier. In this situation, buyers purchase their total requirements from a single supplier. Due to many strategic linkages and interactions between the two parties, switching costs are high.

Where there is some uncertainty surrounding an exchange, buyers attempt to reduce the perceived risk by either splitting orders between several alternative suppliers or to purchase from well known suppliers with whom they have dealt in the past [14]. Dempsey [16] and Anderson, Chu and Weitz [32] suggest that buyers prefer to purchase from those firms who are reputable market leaders, for they are perceived as being

more trustworthy. Lehmann and O'Shaughnessy [15] indicate that when the decision to purchase involves a significant amount of capital, reputation becomes a very important decision variable. Reputation may be used to distinguish between those traders with whom a farmer will interact and those who will no longer be considered.

Herbig and Milewicz [33] view reputation as a customer's estimation of the consistency over time of an attribute, based on an evaluation of the supplier's willingness and ability to perform an activity repeatedly in a similar fashion. Similarly, Moorman *et al.* [34] regard reputation as an indicator of reliability. Derived primarily from personal experience, perceptions of a supplier's past performance may also be drawn from the various signalling behaviours the supplier undertakes to both develop and maintain its reputation [35]. Reputation therefore creates expectations, not only about the key attributes of the supplier, but about how that supplier will behave in the future. Reputation may not only signal a supplier's ability to deliver valued outcomes to its customers in situations of information overload or information inadequacy, but may also provide an important cue about how its products compare with those from competing firms.

In the context of developing long-term buyer-seller relationships in the transitional economies, Fafchamps [36] describes reputation as a collective coordination and information sharing device which ensures contracts are complied with. In its simplest form, it suggests that individuals will choose not to interact with those firms who are known not to comply with their contractual obligations. Reputation is a form of social collateral that can guarantee contract performance without prior acquaintance. Concern for one's reputation may be sufficient to ensure compliance and to enable firms to offer credit or take large orders without knowing each other personally. Furthermore, within the transitional economies, there is a growing recognition that exchange is embedded in various overarching social institutions including locality, class, ethnicity, religion, gender and age [37, 38, 39]. The importance of trust and social capital as a means of reducing risk and facilitating exchange is becoming more evident [27, 36, 40].

For any particular potential exchange, trust will be critical if two situational factors are present: risk and incomplete buyer information. Since most potential sales transactions present some degree of risk and uncertainty to the potential buyer, without some degree of trust, the perceived risk may be too great for the transaction to occur. More specifically, trust becomes important in an exchange whenever there is a high level of performance ambiguity, and poor product performance will have a significant adverse impact on the value derived by the buyer [41]. In such circumstances, trust acts as an information resource that directly reduces the perceived threat of information asymmetry and performance ambiguity.

While a supplier's technical and functional quality impact on satisfaction, both will also impact customer trust [42]. In

those markets where relatively high levels of perceived risk are associated with the purchase of the product, customer trust can play a pivotal role in supplier selection and patronage. The development of trust depends on both the credibility of the product and the credibility of the service offered.

Background to the study area

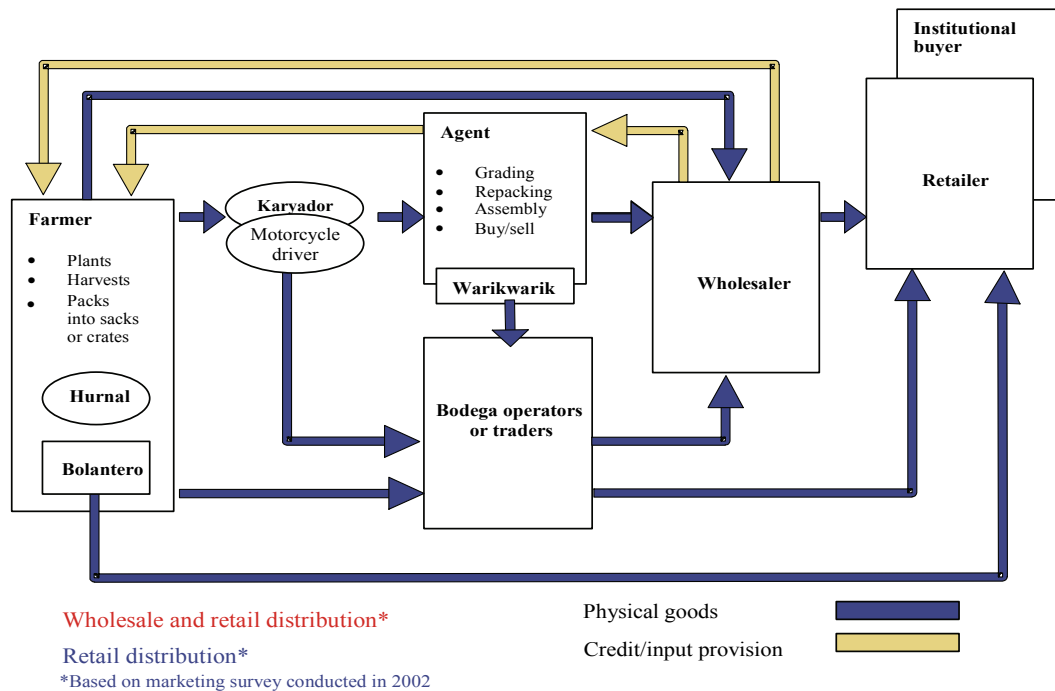
In the three papers that follow, Digal *et al.* [this issue] explore the use of price margin analysis and the margins available to farmers for producing better quality produce. Conception *et al.* [the issue] utilise Parasuraman *et al.* [24] concept of a service gap to investigate the extent to which suppliers are able to meet the needs of downstream market intermediaries and ultimately fulfil consumer demand. In the final paper, Batt [this issue] utilises relationship marketing theory to explore the social aspects of the exchange including satisfaction, trust, commitment, power-dependence and the willingness to make relationship specific investments. All three studies draw their respondents from Kapatagan, a small village on the slopes of Mt Apo and from the various market intermediaries involved in the distribution of the fresh vegetables cultivated to metropolitan markets in Mindanao.

Kapatagan, a name which means "plains", is an area of about 6,675 hectares, located in part of an area proclaimed by the Philippine Government as a National Park in 1932. When logging operations ceased, many of the workers and their families remained. Initially the land was used for cultivating coffee, but when residents from nearby towns learned of the fertile, productive and vast lands in Kapatagan, others started to occupy the area. Today, some 1,700 households depend on the cultivation of temperate vegetable crops for their main source of income. Most farms are very small, ranging in size from 0.6–1.0 hectares, with most being comprised of 1–5 small parcels of land, often at different altitudes. While most farmers consider themselves to be the owners of the land they cultivate, landowners in Kapatagan have no formal title to the land, although a stewardship agreement was granted by the Digos City government.

Lying at the foot of Mt. Apo, the highest peak in the Philippines, Kapatagan is at an elevation of between 1,100–1,600 meters above sea level. The climate is cool with an average temperature of 22–25°C, with no pronounced rainy period or long dry season. The prevalent wind direction is Northeast to Southwest throughout the year. The growing area is safe from typhoons because it lies outside the typhoon belt and is further protected by its mountainous borders. The topography ranges from level to gently sloping terrain (8%), strongly sloping (18–20%) and hilly (30–50%). According to official records, in 2001, approximately 2,500 hectares or 37% of the area available was cultivated.

Kapatagan is an ideal place for planting temperate vegetables (cabbage, tomatoes, bell pepper, Chinese cabbage, Baguio beans, carrots), root crops (potatoes and sweet potato) and other agricultural products. Vegetables are produced and

Figure 1. The Kapatagan supply chain.



marketed mainly in the surrounding towns, including Digos, Kidapawan, Cotabato and Davao. Other buyers come from Cagayan de Oro, Surigao and Agusan and there are some buyers from the Visayas, including Tacloban, Iloilo and Cebu.

The farmer, or as they are locally known “planters”, cultivate, harvest and pack the produce in sacks or crates. Some of these farmers (*hurnal*) also provide farm labour (individual, group or family) to other farms. The *hurnal* are paid either daily or on a per job basis (*pakyaw*). The *hurnal* activity provides additional income for the farmers who are waiting to harvest their own produce.

After harvest, most farmers transport their products from the farm to the trading area through the *karyador* (Figure 1). The *karyador* brings the produce to the Trading Post, directly to the truck (traders) or to the warehouse operators (*bodega*). There are also instances where farmers employ the services of motorcycle drivers instead of the *karyador*. On the other hand, some of the farmers bring their products straight to the traders and *bodega* operators, while some products are collected from the farm by traders. The *bodega* operators perform the role of storing the vegetables. By storing, they are able to choose their buyers and allocate vegetables to those buyers who offer the highest returns making their part of the chain more efficient.

In the trading area, agents (*ahente*) move around to look for products to purchase. However, there are also agents who have pre-ordered some products from the farmers and will pick it up in the Trading Post. The agents sell the farmers’ produce to the buyers. They generally receive Ps 1–2 for every kg of vegetables they sell. It does not matter whether the price of the vegetable is high or low, the agents still get their margin.

Another variation of the agents is the *warikwarik*. The term *warikwarik* originally referred to jeepney drivers who did not wait for their turn in the terminal. They left the terminal and simply picked up passengers along the way. They were defined locally as “strikers” or “strike anywhere”. In the case of vegetable selling, the *warikwarik* is an individual who buys and sells vegetables in smaller quantities and deals less frequently than the regular buyers.

There are also instances when the farmers sell their produce direct to retail. Carrying only a few sacks of produce, they hitch a ride with the trucks that have purchased vegetables from the Trading Post. They then sell their produce in the public markets and are locally known as *bolanteros*.

References

1 Murray-Prior RB, Concepcion SB, Batt PJ, Rola-Rubzen MF, McGregor M, Rasco ET, Digal L, Manalili N, Montiflor M, Hualda L and Migalbin L. Analysing supply chains with pluralistic and agribusin-

- ness systems frameworks. *Asian Journal of Agriculture and Development* 2005:1(2):46–56.
- 2 Lum K. Establishment of a Commonwealth Knowledge Network (CKN) on post harvest issues: matching problems with issues; 2000. http://www.commonwealthknowledge.net/Subnetw/Post_Harv.htm
 - 3 Mendoza MS and Rosegrant MW. Pricing conduct of spatially differentiated markets. In: *Prices, products and people. Analysing agricultural markets in developing countries*, Scott GJ (ed). Lynne Rienner: Boulder; 1995: pp 343–360.
 - 4 Harris-White B. Efficiency and complexity: distributive margins and the profits of market enterprise. In: *Prices, products and people. Analysing agricultural markets in developing countries*, Scott GJ (ed). Lynne Rienner: Boulder; 1995: pp 301–324.
 - 5 Lele U. Cooperatives and the poor: a comparative perspective. *World Development* 1981:9:55–72.
 - 6 Pomeroy RS and Trinidad AC. Industrial organisation and market analysis: fish marketing. In: *Prices, products and people. Analysing agricultural markets in developing countries*, Scott GJ (ed). Lynne Rienner: Boulder; 1995: pp 217–238.
 - 7 Rasco ET, Maguilan MD, Mendoza MA, Migalbin LR, Hualda LT, Concepcion SB, Digal LN, Moran AG, Murray-Prior R, Batt, PJ, McGregor M, Rola-Rubzen MF and Manalili N. Sustainability of vegetable farming in Southern Mindanao, Philippines II. Yield and profitability of growing six major crops. *The Philippine Agricultural Scientist* 2005:88(1):19–34.
 - 8 Williamson OE. Transaction cost economics: the governance of contractual relations. *Journal of Law and Economics* 1979:22:233–262.
 - 9 Williamson OE. *The Economic Institutions of Capitalism*. The Free Press. New York; 1985.
 - 10 Frank SD and Henderson DR. Transaction costs as determinants of vertical coordination in the US food industries. *American Journal of Agricultural Economics* 1992. 74 (4): 941–50.
 - 11 Goletti F and Christina-Tsigas E. Analysing market integration. In: *Prices, products and people. Analysing agricultural markets in developing countries*, Scott GJ (ed). Lynne Rienner: Boulder; 1995: pp 325–342.
 - 12 Mendoza G. A primer on marketing channels and margins. In: *Prices, products and people. Analysing agricultural markets in developing countries*, Scott GJ (ed). Lynne Rienner: Boulder; 1995: pp 257–276.
 - 13 Monczka R, Trent R and Handfield R. *Purchasing and supply chain Management*. Cincinnati, OH: ITP South Western College Publishing; 1998.
 - 14 Cunningham MT and White JG. The determinants of choice of supplier. *European Journal of Marketing* 1973:7:189–202.
 - 15 Lehmann DR and O’Shaughnessy J. Differences in attribute importance for different industrial products. *Journal of Marketing* 1974:38 36–42.
 - 16 Dempsey WA. Vendor selection and the buying process. *Industrial Marketing Management* 1978:7:257–267.
 - 17 Wilson EJ. The relative importance of supplier selection criteria: a review and update. *International Journal of Purchasing and Materials Management* 1994:Summer:35–41.
 - 18 Hakansson H, Johanson J and Wootz B. Influence tactics in buyer-seller processes. *Industrial Marketing Management* 1977:5:319–332.
 - 19 Simpson PM, Siguaw JA and White SC. Measuring the performance of suppliers: an analysis of evaluation processes. *Journal of Supply Chain Management* 2002:Winter:29–41.
 - 20 Dowlatshahi S. Bargaining power in buyer-supplier relationships. *Production and Inventory Management Journal* 1999:First Quarter:27–35.
 - 21 Gronroos C. *Service management and marketing: managing moments of truth in service competition*. Lexington, MA: Lexington Books; 1990.
 - 22 Batt PJ. Responding to customer needs through expanding the quality concept. *Stewart Postharvest Review* 2005:1:5.
 - 23 Hutt MD and Speh TW. *Business marketing management. A strategic view of industrial and organisational markets*, 5th ed. Orlando, FL: Dryden Press; 1995.
 - 24 Parasuraman A, Zeithamal VA and Berry LL. A conceptual model of service quality and its implications for future research. *Journal of Marketing* 1985:49(Fall):41–50.
 - 25 Cardozo RN and Cagley JW. Experimental study of industrial buyer behaviour. *Journal of Marketing Research* 1971:8:329–334.
 - 26 Puto CP, Patton III WE and King RH. Risk handling strategies in industrial vendor selection decisions. *Journal of Marketing* 1985:49 (Winter):89–98.
 - 27 Lyon F. Trust, networks and norms: the creation of social capital in agricultural economies in Ghana. *World Development* 2000:28(4): 663–681.
 - 28 Batt PJ and Parining N. Price-quality relationships in the fresh produce industry in Bali. *International Food and Agribusiness Management Review* 2000:3(2):177–187.
 - 29 Hakansson H (ed). *International marketing and purchasing of industrial goods: an interaction approach*. IMP Project Group. Chichester, UK: John Wiley and Sons; 1982.
 - 30 Gronroos C. From marketing mix to relationship marketing: Towards a paradigm shift in marketing; 1995. <http://www.mcb.co.uk> [on-line].
 - 31 Webster FE. The changing role of marketing in the corporation. *Journal of Marketing* 1992:56:1–17.
 - 32 Anderson E, Chu W and Weitz BA. Industrial purchasing: an empirical exploration of the buy-class framework. *Journal of Marketing* 1987:51 71–86.
 - 33 Herbig P and Milewicz J. To be or not to be...credible that is: A model of reputation and credibility among competing firms. *Marketing Intelligence and Planning* 1995:13(6):24–33.
 - 34 Moorman C, Zaltman G and Deshpande R. Relationships between providers and users of market research: the dynamics of trust within and between organizations. *Journal of Marketing Research* 1992:29 (3):314–28.
 - 35 Fombrun C and Shanley M. What's in a name? Reputation building and corporate strategy. *Academy of Management Journal* 1990:33(2):233–258.
 - 36 Fafchamps M. The enforcement of commercial contracts in Ghana. *World Development* 1996:24(3):427–448.
 - 37 Zucker LG. Production of trust: institutional sources of economic structure, 1840–1920. *Research in Organisational Behaviour* 1986:8: 53–111.
 - 38 Fukuyama F. *Trust: The social virtues and the creation of prosperity*. Hamish Hamilton; London, UK; 1995.
 - 39 Harris-White B. Staple food market efficiency in developing countries: Introduction. *Journal of International Development* 1997:9(1): 97–100.
 - 40 Humphrey J and Schmitz H. Trust and interfirm relations in developing and transition economies. *Journal of Development Studies* 1998:34(4): 32–49.
 - 41 Singh J and Sirdeshmukh D. Agency and trust mechanisms in consumer satisfaction and loyalty judgements. *Journal of the Academy of Marketing Science* 2000:28(1):150–167.
 - 42 de Ruyter K, Moorman L and Lemmink J. Antecedents of commitment and trust in customer-supplier relationships in high technology markets. *Industrial Marketing Management* 2001:30:271–286.