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A simulation of business-to-business decision making in a relationship marketing context☆

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ABSTRACT

The dynamic and interactive SUGARSCAPE simulation is adapted to represent agent-based relationship marketing models in business-to-business exchanges. Computer-generated selling agents operate in complex environments using relationship marketing approaches that may or may not be uniformly distributed inside their organizations. The intricate nature of these models also allows for diverse combinations of buyer traits that impact their decisions as well as seller profitability. These features include individual and firm exchange experiences, the ability to identify and to become loyal to sellers, and the sharing of information within and among buyer firms. Relationship marketing is played out or operationalized based on pricing tactics that show differences between asking prices and post-exchange value.

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1. Introduction and purpose

Relationship marketing as a comprehensive business strategy has achieved prominence among academics and practitioners (Noble & Phillips, 2004). Approaches to RM focus on both tactical and strategic decisions to create, maintain, or enhance exchange activities among firms and their customers (Gronroos, 1995; Morgan & Hunt, 1994; Sheth & Shah, 2003; Zinkhan, 2002). The underlying premise is that RM leads to the establishment of successful and mutually-rewarding associations among parties that persist over the longer time horizon (Ravald & Gronroos, 1996). While some scholars disagree, the belief that loyalty garnered by relationship marketing results in a more profitable and stable customer base persists in the research literature (see Palmatier, Scheer, & Steenkamp, 2007).

Of course, not all buyer–seller relationships are transacted according to RM terms, revealing a dynamic tension between individual egoism that seeks to squeeze the most out of every exchange and cooperative altruism that tries to maximize benefits for the collective (see Ghosh & John, 1999). The former is more likely to slip into manipulative actions that treat people as a means to an end rather than as equal participants (Kavali, Tzokas, & Saren, 1999). Such misconduct may have a direct impact on relationship quality, reducing perceptions of trust and expectations of commitment (e.g., Jap & Anderson, 2003). Trust, which often leads to greater commitment in terms of interpersonal loyalty, is described as confidence in a partner's honesty, reliability, and integrity (Morgan & Hunt, 1994; Garbarino & Johnson, 1999).

One area that has received attention within relationship marketing is performance measurement (see Moorman, Zaltman, & Deshpande, 1992; Berger et al., 2006). While debate over valid indicators of RM outcomes continues (Sin, Tse, Yau, Lee, & Chow, 2002), a possibility expressed by scholars is customer value (Day, 2000; Veloutsou, Saren, & Tzokas, 2002). Implicit to their discussions is post-transaction perceived value may be judged as fair or unfair by some exchange partners. As such value represents the relative weighting of what is given up compared to what is received, resulting in greater loyalty and positive word-of-mouth when the equation tips in favor of buyers (Addis & Holbrook, 2001). These ends notwithstanding, marketing's ultimate goals are to increase sales and profits. Without such positive conclusions, even the best of intentions cannot lead to long-term survival.

The popularity of relationship marketing aside, Doherty and Alexander (2004) believe its use in B2B environments is somewhat lacking. In point-of-fact, even supply chain management investigations in these environments concentrated attention on issues such as power (Hingley, 2005), satisfaction (Ping, 2003), and culture (Chung, Sternquist, & Chen, 2006), with a lesser emphasis on RM topics such as trust, loyalty, and commitment. Additionally, studies involving pricing often use B2C paradigms to look at topics such as customer knowledge (Hardesty, Bearden, & Carlson, 2007), price-matching (Kukar-Kinney, Walters, & MacKenzie, 2007), and pricing optimization (Levy, Grewal, Kopalle, & Hess, 2004). The pricing literature that does exist in B2B settings concentrated attention on customers' perceived value (Kortge, Okonkwo, Burley, & Kortge, 1994) and the complexities of

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such strategies in global markets (Bolton & Myers, 2003). The next subsection extends our understanding of B2B pricing and provides a research rationale.

1.1. Orientation and objectives

Previous research has used Fiske (1991) as the basis for understanding and evaluating such buyer–seller relationships (Hill & Watkins, 2007). The models presented are *communal sharing*, *equality matching*, and *market pricing*. Communal sharing involves intimate linkages characterized by a common identity and purpose among partners. Interactions are embodied by trust based on consistent acts of generosity. Equality matching provides a middle ground whereby individuals are regarded as separate entities that seek to accomplish idiosyncratic goals and objectives. People are opportunistic in that they search for rewards or avoid punishments in order to maximize their particular situations (see Klein, 2003). Market pricing is the opposite end since persons on the other side of transactions are nothing more than commodities and means to economic ends. Individuals act in adversarial ways and seek to extract the maximum gain while minimizing what they must provide in an egoistic fashion (Kurland, 1995).

Hill and Watkins (2007) used this framework to study the impact of different moral philosophies of selling agents in a business-to-business setting on firm and industry sales. Once again, the extreme points are communal sharing and market pricing, captured for the purposes of their research as *true altruists* and *true egoists* respectively. The midpoint is equality matching with the opportunistic label *tit-for-tats*, along with hybrids that bisect the gap between prototypes and the middle ground of *realistic altruists* and *realistic egoists*. Employing the simulation Iterative Prisoner's Dilemma, situations were created with variations in morality, payoffs, and decision-making heuristics.

Findings demonstrate the long-term benefits of altruism over egoism as a moral imperative on simulated financial performance. For example, companies made up of altruists earned significantly more income than companies containing egoists. This conclusion is corroborated by results using multiple moral philosophies where individual approaches were allowed to change over time. These findings show that economic success declined in perfect order from the most altruistic marketers (i.e., true altruists) to the least altruistic marketers (i.e., true egoists). Finally, sensitivity analyses involving payoffs and decision-making heuristics reveal that these outcomes are robust except under extraordinary circumstances that over-reward egoistic behavior relative to altruism or hide selfishness from marketing partners for an extended and unacceptable length of time.

With this background in mind, the current study expands application of this developing paradigm to the impact of relationship marketing orientation on individual as well as company sales success in business-to-business contexts. Using the close connection between relationship marketing and ethical behavior proposed by Murphy, Laczniak, and Wood (2007), selling agents are described according to their RM approaches as *altruistic*, *opportunistic*, or *egoistic*. From an operational point-of-view, altruistic agents seek to establish associations that involve transactions of consistent value. In contrast, egoistic agents look to gain as much as possible from exchanges without regard for the long-term interests of buyers. Opportunistic agents are in between these extremes, and they sometimes present buyers with valuable offerings yet at other times act in self-serving ways without notice or provocation.

There are a number of potential contexts in which relationship marketing may play an important role within business-to-business exchanges, but the oft neglected area of pricing is well suited to the task necessary for the conduct of this research (Xia, Monroe, & Cox, 2004). Seller's pricing strategies present conditions under which buyers are able to evaluate transaction quality, leading to subjective determinations of preference, trust, and (eventually) commitment. Such evaluations are the result of comparisons to external standards or internal norms as a basis for judgments (Rallapalli, Vitell, & Szeinbech, 2000). Given the literature review provided, our research purpose is to examine a variety of the most important relationship marketing variables in a business-to-business context and on both sides of the exchange equation to determine their impact upon individual and company financial performance.

One method for the study of relationship marketing and its associated variables includes various forms of simulation. Typical uses include modeling existing situations that represent important constructs such as satisfaction and perceptions of quality (see Bolton, Lemon, & Verhoef, 2008). For instance, Ouwersloot, Lemmink, and de Ruyter (2004) utilized a standard simulation routine to assess customer relationships during managerial decision making under uncertainty. While such approaches to knowledge creation are important and valid, they rarely allow for the *manipulation* of key variables to determine their relative impact on sales and other measures of success. Thus, our approach is similar to Hill and Watkins (2007) in that RM dimensions are determined according to relevant contexts from the marketing literature but evolve and change in ways that are of significance to this project.

The next section describes the research method, which involves a considerably more robust simulation of business-to-business exchanges than earlier investigations. In this new environment, buying agents look for selling agents to interact with based on their previous experiences and/or word-of-mouth. This knowledge is accumulated over time and reflects tolerance for variation in price offerings relative to actual delivered value. Analysis and results follow this discussion, comprised of simulation runs of the SUGARSCAPE model of artificial societies that show the comparative success of sellers and their firms under distinct RM conditions. The close examines the importance of results to the understanding of buyer–seller interactions, with an emphasis on RM theory, practice, and research.

2. Modeling RM behavior in B2B exchange relationships

This work employs an agent-based model of relationship marketing (ABRM) rooted in the existing body of research on social simulation (see van der Zee & van der Vorst, 2005 for an excellent review of B2B simulation models). One of the best known is SUGARSCAPE (Epstein & Axtell, 1996), which is designed to examine agent behavior in artificial societies. The key to this model is its use of a unique bottom-up approach to create dynamic and interactive environments that operate according to simple yet instrumental rules. Such models are explicitly intended to test hypothetical situations rather than represent or mimic real-world systems, but with advantages of quantitative models and their subsequent analysis potential. In this situation, the most important ingredient is the ability to simulate exchange behavior using RM constructs described earlier.

Epstein and Axtell (1996) used SUGARSCAPE technology to build historical models of civilization in order to understand their effects on the evolution of various social phenomena. Their original and seminal research has been revised and extended in a variety ways. For example, this framework has been employed to model communication and cooperation within animal societies (Buzing, Eiber, & Schut, 2003), to estimate the effects of taxation on evolution (Bäck, Vermeulen, & Eiben, 2002), and to study an assortment of cooperative behaviors among agents (see Nishizaki, Sakawa, & Katagiri, 2004). In each case, agents associate and/or cooperate under conditions reflective of complex topics like resource availability, migration, and trade, emphasizing their impact on individuals and their collectives much like the intent and purpose of RM transactions.

Thus, our ABRM model employs basic guidelines established by previous users of SUGARSCAPE in that agents operate within an

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